

MUDDY WATERS

News from the Missouri Cooperative Fish and Wildlife Research Unit

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Missouri Cooperative Fish and Wildlife Research Unit

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COOPERATORS



75 YEARS AND BEYOND



The Missouri Cooperative Fish and Wildlife Research Unit presented the Missouri Department of Conservation, the University of Missouri, and the US Fish and Wildlife Service with prints to commemorate the 75th Anniversary of the Unit and collaboration with the cooperators. From left: Tracy Hill (USFWS), Craig Paukert (Leader, MO Unit), Amanda Rosenberger (Assistant Leader, MO Unit), Mike Kruse (MDC), Mark Ryan (MU), Dan Zekor (MDC), Lisa Webb (Assistant Leader, MO Unit), and Amy Salveter (USFWS). 27 September, 2012.

The year 2012 marked the 75th anniversary of the Missouri Cooperative Fish and Wildlife Research Unit. This was quite a milestone, and it is no coincidence that this anniversary is shared with the Missouri Department of Conservation and the Wildlife program at the University of Missouri. One of the first acts of the Missouri Conservation Commission was to establish a Research Unit at the University of Missouri, which was the start of the wildlife program. Much has changed since Paul Dalke was the first leader in 1937-1937, including the establishment of the Fisheries Unit in 1962 (Dave Foster as the first acting Unit Leader and then Dick Anderson as leader from 1963 to 1984). In 1985, the Wildlife and Fishery Units combined to the structure we have today. I am not a history buff, but am proud to be part of the legacy of the Missouri Unit that once housed Rudy Bennett, Tom Baskett, Reid Goforth, Dick Anderson, Charlie Rabeni, and David Galat. This year was the first year since 2003 that we were fully staffed and we wanted to show a small token of

our appreciation to our cooperators. At our Cooperators Meeting in September in front of over 48 people from 7 different agencies, we presented framed artwork with engraved nameplates signifying our appreciation to each cooperator present: the Fisheries and Wildlife Sciences Department at MU, the Missouri Department of Conservation, and the US Fish and Wildlife Service. We kept the presentation a surprise until the meeting and I believe all the cooperators did not see this coming!. The key to the success of the Coop Unit program is the cooperators and we are thankful for the last 75 years and look forward to the next.

Craig Paukert
Unit Leader

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STUDENTS AND STAFF WIN AWARDS

At the American Fisheries Society Annual Meeting in St. Paul, **Jon Spurgeon**, MS student with Craig Paukert, was a finalist for the best student presentation. **Jason Neuswanger**, PhD student with Amanda Rosenberger, was the winner of the best student presentation at the meeting. Therefore the Missouri Unit was well represented in the best student presentation awards. In addition, **Trevor Haynes**, MS student with Amanda Rosenberger won best student presentation at the Alaska AFS Annual Meeting, and **Tammy Hoem**, PhD student with Amanda Rosenberger was awarded the Most Engaging Student Poster and Presentation at the Katchmak Bay Science Conference.

Students were also recognized for the professional achievements. **Landon Pierce**, PhD student with Craig Paukert, was one of 10 students nationwide to receive the Skinner Memorial Award at the AFS meeting in St. Paul in August 2012. Landon also received the Joan Duffy Travel Award from the Missouri Chapter of the AFS at the Midwest Fish and Wildlife Conference in December. Finally, **Craig Paukert** received a USGS STAR Award for outstanding performance this past year.

AMANDA LISTED AS OUTSTANDING ALUMNI

Amanda Rosenberger recently received high accolades from her alma mater, Virginia Polytechnic Institute and State University. Amanda was awarded the Outstanding Recent Graduate Alumna from the Virginia Tech University College of Natural Resources and Environment for 2012-2013. Amanda graduated from VPI with her PhD in 2003.

STUDENTS AND STAFF



Missouri Unit students and staff. Bottom from left: Katy Klymus, Emily Pherigo, Jessi Tapp, Jake Faulkner, Andy Dinges. Top from left: Nick Sievert, Bill Beatty, Jacob Westhoff, Evan Hill, Jason Harris, Emily Tracy-Smith, Landon Pierce, Dan Whiting

The backbone of the Unit's research is the graduate student and research staff. We have a growing number of students and staff as Lisa and Amanda start establishing their research programs so we expect to get much bigger. Currently the Unit faculty has seven MS students, one PhD student, and seven post docs, research staff and faculty. All scientists have several projects in development so expect more students in 2013.

Our MS students are the core of our graduate program and come from varied regions and backgrounds. **Jake Faulkner** is from Jefferson City, Missouri and received his BS from MU and will be finishing his MS work in spring 2013 on resource selection of Niangua darters. Previously, Jake had worked with MDC on various stream issues, including Niangua darter monitoring. **Jason Harris**, a South Dakota native and South Dakota State University graduate, started his MS work at MU in January 2011 to determine movement and habitat selection of largemouth bass related to a large reservoir habitat improvement project in Table Rock Lake, MO. He is planning on graduating in the spring of 2013. **Andy Dinges** is a MS student studying the effects of hunting disturbance on waterfowl behavior and distribution during the Light Goose Conservation Order in the Rainwater Basin of Nebraska. A native of Nebraska, Andy received his BS from the University of Nebraska-Lincoln. **Nick Sievert**, a Sturgeon Bay, Wisconsin native, finished his BS from the University of Wisconsin-Madison before

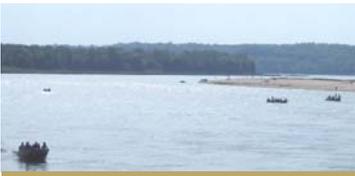
arriving at MU in fall 2011 to start his MS. Nick is evaluating how to calculate stream fish vulnerability and is using that information to identify strategies to best protect biodiversity in future scenarios of land use and climate change in Missouri. **Emily Pherigo** started at MU in summer 2011 and will be helping determine how river regulation in Missouri River tributaries effect big river fish populations. Emily is a native of St. Louis and, prior to grad school, worked for USGS and the USFWS in Columbia. **Jessi Tapp**, a western Kentucky native, began her MS research in January 2011 at Arkansas Tech University and followed her advisor Dr. Lisa Webb to MU in August 2011. Jessi has been conducting waterbird management related research on private lands in the Lower Mississippi Alluvial Valley and finished data collection in fall 2012. **Evan Hill** is a Twin Cities native and received his BS from Gustavus Adolphus College in Minnesota and started at MU in 2012 working on his MS with secretive marshbirds. **Landon Pierce** is a PhD student studying how landscape factors affect lotic fish assemblage structure in the Missouri and Colorado River basins. He is a native of Nebraska, and completed his BS at Nebraska before finishing his MS at South Dakota State University working on paddlefish population dynamics.

There are several research staff members or co-investigators affiliated with the Unit. **Dr. Jodi Whittier** is lead or co-principal investigator on several grants related to conservation planning for fishes,

(Continued on page 3)

UNIT EDUCATES KIDS WITH USFWS

On October 3rd **Amanda Rosenberger** and **Emily Pherigo** volunteered with the USFWS Columbia Fish and Wildlife Conservation Office in educating about 60 high school kids from Pettis County School. Students were educated on a Missouri River sandbar about the Big Muddy Fish and Wildlife Refuge, the Missouri River and the fish and wildlife that call it home.



Shuttling kids with USFWS

UNIT STUDENTS/STAFF OFFICERS IN PROFESSIONAL SOCIETIES

Professional society involvement is still strong at the Missouri Unit. **Landon Pierce** is the Student Subsection of the Education Section President Elect, and co-newsletter editor for the Education Section. **Nick Sievert** is the Fisheries Information and Technology newsletter editor. **Amanda Rosenberger** is the Secretary-Treasurer for the AFS Habitat Section, and also serves as the Time and Place Committee Chair for AFS, and on the committee to determine the Excellence in Fisheries Education Award. **Lisa Webb** is on the organizing committee of the International Duck Symposium that will be held in early 2013 in Memphis. **Jodi Whittier** is President of the Fisheries Information Technology Section of AFS, and was co-chair of a GIS Symposium held at the Midwest Fish and Wildlife Conference. **Craig Paukert** is President Elect of the Education Section of the AFS. Finally, **Nick Sievert** participated in a 3-day wetland delineation course in Wisconsin this past fall. Nick is now a certified wetland delineator for the state of Wisconsin!

STUDENTS AND STAFF (CONTINUED)

including how climate change will affect fish habitat, and modeling stream temperatures in Missouri and the northeast United States. She is a native of California and has a BS from Cal Poly-San Luis Obispo, and a MS and PhD from Oklahoma State University. She spends much of her time helping graduate and undergraduate students with their research, while conducting her own work, and teaching a GIS course at MU. **Dr. Jacob Westhoff** received his BS from MU, his MS at Tennessee Tech University, and his PhD from MU. Jacob is currently working on modeling stream temperature and habitat in the Current and Jacks Fork rivers and has been tracking smallmouth bass in the Jack's Fork River the last several months to determine if they select certain temperatures. **Dr. Michelle Staudinger** is stationed at the USGS National Climate Change and Wildlife Science Center in Reston, VA, but is a MU post doc that worked on the biodiversity component of the National Climate Assessment, which included membership on the steering committee for the entire technical input on biodiversity, ecosystems, and ecosystem services, and organizing a meeting of over 60 experts on climate change and biodiversity. Michelle received her PhD from University of Massachusetts, a MS from Stony Brook, and a BS from Boston University. **Dr. Katy Klymus** has just started with the group as a post-doctoral researcher working on how environmental DNA can be used as a detection tool for Asian carp invasion. Katy received her PhD from Missouri in 2011 working on genetic differentiation of canyon tree frogs, and also holds a BS from the University of Texas. **Dr. Bill Beatty** returned to MU (his undergraduate alma mater) as a post-doctoral researcher in August, after graduating with his doctorate from Purdue University in July 2012. Bill is working on analyzing mid-continent mallard movements, migration chronology and habitat selection during the non-breeding portion of the birds' annual life cycle.

Dan Whiting is a Senior Research Technician working in the Grand Canyon. He received his BS and MS from Southern Illinois University. Dan is finishing up work on evaluating the impacts of nonnative trout in Bright Angel Creek, a potential tributary for humpback chub translocations within Grand Canyon National Park. Finally, **Emily Tracy-Smith** is a research associate working on identifying the key biological metrics that are related to flows to help the Missouri Department of Conservation identify future research needs related to environmental flows. Emily received her BS from Florida, and her MS from MU, and worked for a couple years with the MO DNR before accepting her current position.



Jack's Fork at daybreak

Because all three Unit scientists recently moved from other universities, there are several students advised by Unit scientists housed at other universities. Amanda Rosenberger is continuing her work with six graduate students in Alaska. Two finished their degrees this fall, one PhD, **Tammy Hoem**, who is completing work on estuarine ecology of juvenile coho salmon in South-Central Alaska, the other, M.S. student **Michelle Gutsch**, completed her work on overwintering ecology of juvenile coho in the same region. **Kevin Foley**, M.S. student, is writing up his work examining the ecology of juvenile coho in headwater streams in the Little Susitna drainage. **Jason Neuswanger**, PhD student, is studying the ecology and behavior of Chinook salmon in the Chena River, using individual based ecology to inform population dynamics of a declining salmon run. Amanda has two other PhD students completing work on the North Slope of Alaska, one examining the role of fish distributions in nesting habitat selection of Yellow billed Loons, and the other examining the role of fish in altering food web dynamics of North Slope Lakes. Finally, **Craig Paukert** has one student at Kansas State University. **Joe Gerken** is a PhD student at K-State and is working on how floodplain connectivity and river flows affect river fishes. Joe is a native of Ohio and will be wrapping up at K-State in 2013.

RECENT GRADUATES

Jon Spurgeon finished his MS in May 2012 working on evaluating the success of translocating of humpback chub in Grand Canyon. He has started his PhD at the University of Nebraska. **Jeff Fore** finished his PhD working on how conservation practices in the Missouri River Basin affect fishes. He is currently working for The Nature Conservancy as the Western Tennessee Program Director. **Dr. Josh Lallaman** officially finished his PhD in December and is an Assistant Professor at St. Mary's University in Winona, Minnesota. **Dr. Allison Pease**, a former post-doctoral researcher in the Missouri Unit, is now an Assistant Professor in the Department of Natural Resources Management at Texas Tech University.

RESEARCH PROJECTS

Managing the nation's fish habitat at multiple spatial scales. MU Pls: C. Paukert and J. Whittier

This USGS-funded study addresses the objectives of the National Fish Habitat Action Plan to examine the impact of climate and land-use change on the Nation's aquatic systems. This a large effort with 17 principal investigators, and 13 students, post docs, and research staff throughout the country. At MU, **Jodi Whittier** is leading the effort to determine how climate and land use will affect fish habitat in the Lower Colorado River Basin, where **Allison Pease**, a former post-doctoral researcher, worked on how climate change will affect small-mouth bass populations in the Central US. This project is coming to a close and we are working with other investigators to disseminate the multiple products in peer reviewed journals.

Habitat selection of largemouth bass in Table Rock Lake. MU PI: C. Paukert

In Table Rock Lake, the Missouri Department of Conservation (MDC) and other partners are attempting to improve fish habitat for largemouth bass and other fishes. **Jason Harris**, an MS student, used radio telemetry to determine habitat selection of largemouth bass on a diel and seasonal basis and, in particular, use of constructed habitat. The project, funded by MDC, works closely with MDC fisheries biologists. Results suggest the highest areas of use are occurring in intermediate depths (3-5m) and areas near shore (<25m), with a high selection of boat docks. However, structures placed in the lake by cooperators are also being selected, and at a rate similar to naturally occurring woody structure, which they were meant to mimic. With this information, we will be able to prioritize placement of future habitat structures throughout Table Rock Lake.

Helping refine ecological flow research in Missouri. MU PI: C. Paukert

The MDC has researched ecological flow for several years and has developed a Missouri Hydrologic Assessment Tool (MOHAT) which can be used to establish a hydrologic baseline and aid in the development of ecological flow standards. However, substantial improvements are still needed for MOHAT. This study, funded by MDC and led by research associate **Emily Tracy Smith**, will help refine the list of flow metrics that can be used in refinement of MOHAT and further evaluate how these metrics are linked to biological metrics. In addition, Emily is conducting a thorough literature review to determine what flow metrics are associated which actual fish responses. Ultimately, this work could be used to determine the ecological response from altered hydrology to recommend suitable ecological flows for streams.

Climate change effects of biodiversity. MU PI: C. Paukert

The study, funded by the USGS National Climate Change and Wildlife Science Center, first helped prepare the "Technical Input on Biodiversity, Ecosystems, and Ecosystem Services" which was a contribution to the 2013 National Climate Assessment (NCA) under the leadership of **Michelle Staudinger**, a post-doctoral researcher. The NCA is released every four years to inform Congress and the President on recent advances in climate change impacts in the United States. As part of the steering committee, Michelle helped develop the outline and strategy of the report, organized a 60 person expert panel workshop, and was lead author on the final report. The report is available on the globalchange.gov website; a special issue in *Frontiers in Ecology and the Environment*, is also forthcoming in spring 2013. The second phase of the project is located in Missouri, where MS stu-



A diverse seine haul

dent **Nick Sievert** will develop and evaluate methods of calculating stream fish vulnerability to climate change. In addition, he will identify areas of greatest aquatic biodiversity in Missouri and determine how well existing public lands and other areas protect aquatic biodiversity in the state.

The role of tributaries on Missouri River recovery. MU PI: C. Paukert

This study, funded by USGS with support from the US Fish and Wildlife Service with **Emily Pherigo** as the MS student on the project, will determine seasonal use of the highly regulated Osage River and the unregulated Gasconade River by mainstem Missouri River fishes. Sampling in summer and fall 2012 documented 92 species in the tributaries, including the 26 Alabama shad (which migrate from the Gulf of Mexico to spawn in freshwater tributaries) in the Gasconade River. Missouri listed the species as "imperiled"; the most recent record of this species was 5 captured in 2005 on the Gasconade River. Three juvenile lake sturgeon were also captured in the Gasconade River. These fish were stocked nine miles upstream of the Missouri River confluence, and were caught six miles downstream and three miles upstream of the stocking location the month following stocking. The project began in fall 2011 and will continue for two years.

Smallmouth bass movement and habitat use related to thermal regimes. MU Pls: C. Paukert and J. Westhoff

Smallmouth bass are an important sport fish, but also a key indicator of stream health and thus are excellent study organisms to determine the effects of climate change. This study will classify habitats in the Current and Jack's Fork rivers in the Missouri Ozarks, and link these classifications to thermal habitats. In addition, smallmouth bass were implanted with radio transmitters and thermal loggers to determine the distribution and movement of these fish, particularly related to thermal habitat and springs. Tracking of the fish is ending this winter and the radio and thermal tags are being recovered. **Jacob Westhoff** is the post-doctoral researcher on the project, which will finish up in 2013.

Evaluations of translocation humpback chub in Grand Canyon. MU Pls: C. Paukert and J. Whittier

This project is evaluating the response of humpback chub translocated to Shinumo Creek, and potential interactions including predation and trophic suppression between native and non-native fishes in Bright Angel Creek, a potential site for HBC relocations. Initial analysis show that 42% introduced chub have left Shinumo Creek since beginning translocations in 2009, and that rainbow trout and humpback chub are consuming resources at the same trophic level. This work is part of a group effort between the National Park Service, US Bureau of Reclamation, the US Fish and Wildlife Service, MU, and others. **Jon Spurgeon** finished his MS in 2012 on this project, but **Dan Whiting**, Sr. research technician, will continued to work with the cooperators on these issues. The project is funded by USGS and the NPS and will be complete in 2013.

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RESEARCH PROJECTS CONTINUED

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Conservation planning for fishes in the Upper Colorado River Basin. MU PIs: J. Whittier and C. Paukert

This project builds on previous and on-going research on fish communities in the Lower Colorado River Basin. We have compiled a suite of environmental characteristics and threats frequently associated with presence or absence of freshwater fish species. Federal and state agencies from all the states encompassing the Basin have contributed nearly 2.6 million records of fish sampled from the late 1800's to 2010. The USGS-funded project is a group effort between **Jodi Whittier** and **Landon Pierce**.

Evaluation of environmental DNA as a tool for Asian Carp detection. MU PIs: C. Paukert

Environmental DNA (eDNA) is a method that detects DNA material from an organism that is released into the water through slime, skin cells, urine, or feces, in a species-specific manner; this tool has promise as a tool for detection of the invasive Asian carp. However, there are still questions on what a positive eDNA result means. For example, it is unclear if a positive eDNA detection means a live fish was actually in the vicinity, if the concentration of eDNA can be used to estimate relative abundance of Asian carp in the system, or how long the eDNA remains in the water before degradation. This study, which will be conducted by post-doctoral researcher **Katy Klymus**, is in collaboration with USGS Columbia Environmental Research Center and the Department of Biological Sciences at MU, and began in summer 2012.

Development of Stream Temperature Models for Selected Missouri Streams. MU PIs: J. Whittier and C. Paukert

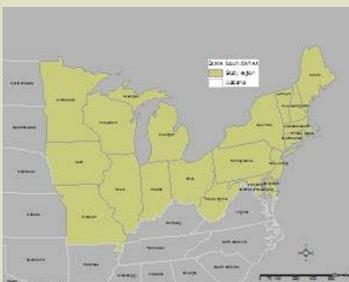
Water temperature is one of the most important drivers of ecosystem function in aquatic systems and an important indicator for impacts of natural and anthropogenic influences. The primary objectives of this MDC funded research are to 1) characterize stream temperature patterns for Missouri subregions and perennial streams, 2) develop stream temperature models to predict how stream temperature may change under predicted climate and land use changes, and 3) examine the relationship between stream temperature and flow rates across stream types and subregions. **Jodi Whittier** is working with MDC biologists to establish temperature loggers near over 70 USGS gage stations throughout the state. The project will continue another 2-3 years.



Stream temperature logger

Developing Stream Temperature and Flow Models: Identification of Gaps in the Distribution and Availability of Stream Temperature and Flow Data. MU PIs: J. Whittier and C. Paukert

The objectives of this project are to gather existing stream temperature datasets from Missouri and Iowa, identify data gaps, and contribute to a comparison of state-of-the-art stream tem-



Northeast region used for temperature modeling project

perature models across the Northeastern United States. Subsequent to funding by the USGS, Northeast Climate and Wildlife Science Center, additional collaborations were developed with similar efforts in the Upper Midwest and through the National Water-Quality Assessment Program such that datasets are now being compiled for much of NE United States.

Assessing minimum length requirements of crayfish tagged internally with PIT tags. MU PIs: J. Westhoff and N. Sievert



Seining in Alaska

Passive integrated transponder (PIT) tags have become commonplace in aquatics research. However, few studies have assessed what sizes of crayfish can be tagged internally with PIT tags. **Nick Sievert** and **Jacob Westhoff** completed data collection in the laboratory in the summer of 2012 to define the relation between crayfish carapace length and probability of tagging related crayfish mortality for two sizes of PIT tags.

Analysis and manuscript writing efforts are underway.

Investigating the potential for hybridization between native and invasive crayfishes. MU PI: J. Westhoff

Many potential mechanisms have been investigated to explain the displacement of two native Missouri crayfishes (*Orconectes peruncus* and *Orconectes quadricus*) by the invasive *Orconectes hylas*. Despite these efforts, no clear mechanism has been identified. **Jacob Westhoff** is working with Bob DiStefano of MDC and Jim Fetzner of the Carnegie Museum of Natural History to determine if hybridization has occurred between the invasive and either native. Genetic samples were taken in the summer of 2012, and analysis will begin in early 2013.

Effects of the light goose conservation order on behavior of waterfowl and hunting participants in the Rainwater Basin, Nebraska. MU PI: L. Webb

Spring is an energetically important time period for migratory waterfowl, and special regulations have been set in this region to protect non-target species during this hunting season. The goal of this project is to determine how waterfowl respond to hunting disturbance in relation to these special regulations. In 2011 Mallards and Pintails spent twice as much time foraging in wetlands closed to hunting during the first four weeks of migration when 83% of the hunting encounters were documented. Dabbling duck densities were at least three times greater on wetlands closed to hunting in every week of this time period. Information from this mail survey as well as field data collected will be evaluated to make decisions regarding spring hunting regulations. **Andy Dinges**, MS student, is heading up this project, which is funded by the Nebraska Game and Parks Commission and MU.

Waterbird use and food availability at migratory bird habitat initiative wetlands. MU PI: L. Webb

NRCS implemented the Migratory Bird Habitat Initiative (MBHI) in summer 2010 to mitigate potential impacts to coastal wetlands as a result of the Deepwater Horizon oil spill. The goal of the MBHI is to

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RESEARCH PROJECTS CONTINUED

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improve habitats on private farmlands, catfish ponds, and WRP easements in states near the Gulf of Mexico to provide additional habitats for wintering and migrating waterbirds that may be displaced from impacted coastal wetlands. To evaluate the effectiveness of the MBHI on WRP lands, **Jessi Tapp** is examining waterbird use and food availability on actively and passively managed wetlands enrolled in WRP, and on long-term actively managed public sites in the LMAV of Arkansas and Missouri.

Assessing validity and precision of moist-soil seed estimation techniques. MU PI: L. Webb

Lisa Webb and **Jessi Tapp** are assisting MDC in an evaluation of various techniques used to estimate moist-soil seed availability in wetlands. MDC biologists joined Jessi at her study sites in October to field-test an estimation technique involving plant measurements (e.g., plant height, seed-head diameter) and the lab component of this study is underway. This project started when it was determined that much of the data collected by Lisa and Jessi could also help MDC, and this is a collaborative effort between MDC and the Missouri Unit.

Effects of wetland management on secretive marshbirds. MU PI: L. Webb

This project focuses on a group of wetland dependent migratory birds known as secretive marsh birds (SMB) which encompass rails, bitterns and moorhens. Extensive wetland habitat loss throughout the United States is believed to have contributed to the subsequent decrease in geographic range of many SMB species. In addition, SMB are generally inconspicuous and tend to inhabit wetlands with robust, perennial vegetation making them difficult to detect. Overall,

limited distributions combined with low detection probability have resulted in SMBs being among the least studied avian groups and for most species there is limited information on population levels, breeding ecology, migration patterns, and overall habitat requirements. **Evan Hill** is a MS student on the project and will begin field work this spring to evaluate the effects of wetland management on SMB distribution and habitat selection of SMB on public wetlands in Missouri.



Evan Hill

Resource selection of mallards. MU PI: L. Webb and D. Kesler

Waterfowl movement and habitat use have been examined using a variety of methods, including counts, surveys, and radio-telemetry. However, habitat use studies in migratory species are often limited to local spatio-temporal scales. In this project, we are examining movement and resource selection patterns of mid-continent mallard ducks across broad spatio-temporal scales using GPS satellite transmitters. Preliminary results indicate that individual mallards exhibit substantial variability in the timing and duration of migratory events. Furthermore, resource selection analyses have illustrated differences in selection patterns between regional movements (<30 km) and long-distance migratory movements (>30 km). Specifically, resource selection at the migratory scale is likely dependent on the availability of general aquatic habitats. In contrast, selection at the regional scale is influenced by the availability of specific wetland types. **William Beatty**, a post-doctoral researcher, is leading the analysis on this project, which is a collaborative effort among the Missouri Department of Conservation, Arkansas Game and Fish Commission and Ducks Unlimited.

MISSOURI UNIT INVOLVED IN SOUTH FARM SHOWCASE

Eight Unit students and staff were active in the College of Agriculture, Food and Natural Resources South Farm Showcase. This event brings in over 8,000 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 cool things fish and wildlife people do, including electrofishing and radio telemetry. However, the real highlight was the students placing radio transmitters on duck decoys and having children track these ducks with the telemetry gear. This is a great opportunity to engage children and the general public on the importance of fish and wildlife conservation and management. This was a huge hit and we expect to participate again in the future.



Jodi Whittier (front) and Emily Pherigo (back right) explain the Coop Unit

Amanda Rosenberger explaining electrofishing

Jacob Westhoff (center) and Jason Harris (right) tracking duck decoys

UNIT PUBLICATIONS IN 2012

- Cooke, S., C. Paukert, and Z. Hogan. 2012. Endangered river fish: Factors hindering conservation and restoration. *Endangered Species Research* 17:179-191.
- Fischer, J., C. Paukert, and M. Daniels. 2012. Fish community response to habitat alteration: impacts of sand dredging in the Kansas River. *Transactions of the American Fisheries Society* 141:1532-1544.
- Hanlon, R., K. Buresch, H. Moustahfid, and M. Staudinger. In press. *Doryteuthis pealeii*, Longfin inshore squid. In: R. Rosa and G. Pierce, and R. O'Dor (eds) *Advances in Squid Biology, Ecology, and Fisheries*. Nova Science Publishers, Inc. Hauppauge, NY.
- Olmstead, V.G., E.B. Webb, and R. Johnson. In press. Moist-soil seed biomass and species richness on Wetland Reserve Program easements in the Mississippi Alluvial Valley. *Wetlands*
- Pease, A., A. Gonzáles Díaz, R. Rodiles Hernández, and K. Winemiller. 2012. Functional diversity and trait-environment relationships of stream fish assemblages in a large tropical catchment. *Freshwater Biology* 57:1060-1075.
- Schloesser, J. T., C. P. Paukert, W. J. Doyle, T. D. Hill, K. D. Steffensen, and V. H. Travnichek. 2012. Fish assemblages at engineered and natural channel structures in the Lower Missouri River: implications for modified dike structures. *River Research and Applications* 28:1695-1707.
- Schloesser, J. T., C. P. Paukert, W. J. Doyle, T. D. Hill, K. D. Steffensen, and V. H. Travnichek. 2012. Heterogeneous detection probabilities for imperiled Missouri River fishes: implications for large river monitoring programs. *Endangered Species Research* 16:211-224.
- Staudinger, M. Juanes, F., Salmon, B., and A. Koske. In press. The distribution, diversity, and importance of cephalopods in top predator diets from the Northwest Atlantic Ocean. *Deep Sea Research*.
- Staudinger, M.D., Grimm, N., Staudt, A., Carter, S., Chapin, F.S.III, Kareiva, P., Ruckelshaus, M., and B. Stein. 2012. Impacts of Climate Change on Biodiversity, Ecosystems, and Ecosystem Services: Technical Input to the 2013 National Climate Assessment. Cooperative Report to the 2013 National Climate Assessment. 296 p. Available at: <http://assessment.globalchange.gov>
- Staudt, A., A. Leidner, J. Howard, K. Brauman, J. Dukes, L. Hansen, C. Paukert, J. Sabo, and L. Solorzano. 2012. Climate change effects on already stressed biodiversity, ecosystems, and ecosystem services. Pages 5-1 to 5-32 in: M.D Staudinger, N. Grimm, A. Staudt, S. Carter, F. S. Chapin III, P. Kareiva, M. Ruckelshaus, and B. Stein, editors. *Impacts of Climate Change on Biodiversity, Ecosystems, and Ecosystem Services: Technical Input to the 2013 National Climate Assessment*. Cooperative Report to the 2013 National Climate Assessment. 296 p. Available at: <http://assessment.globalchange.gov>
- Westhoff, J., A. Watts, and H. Mattingly. In press. Efficacy of artificial refuge to enhance survival of young Barrens topminnows exposed to western mosquitofish. *Aquatic Conservation: Marine and Freshwater Ecosystems*.
- Westhoff, J., R. DiStefano, and D. Magoulick. 2012. Do environmental changes or juvenile competition act as mechanisms of species displacement in crayfishes? *Hydrobiologia* 683:43-51.
- Wirth, L., A. Rosenberger, A. Prakash, J. Margraf, and T. Hamazaki. 2012. A remote sensing/GIS-based approach to identify and model spawning habitat for fall chum salmon in a sub-arctic, glacially-fed river. *Transactions of the American Fisheries Society* 141:1349-1363.



IN THE NEWS

Michelle Staudinger was invited to participate in a research cruise off the Atlantic Coast in September. As part of that cruise she developed a post on a blog about the biodiversity of the deep sea:

<http://deepseanews.com/2012/09/guest-post-the-stunning-deep-water-biodiversity-of-the-bear-seamount/>

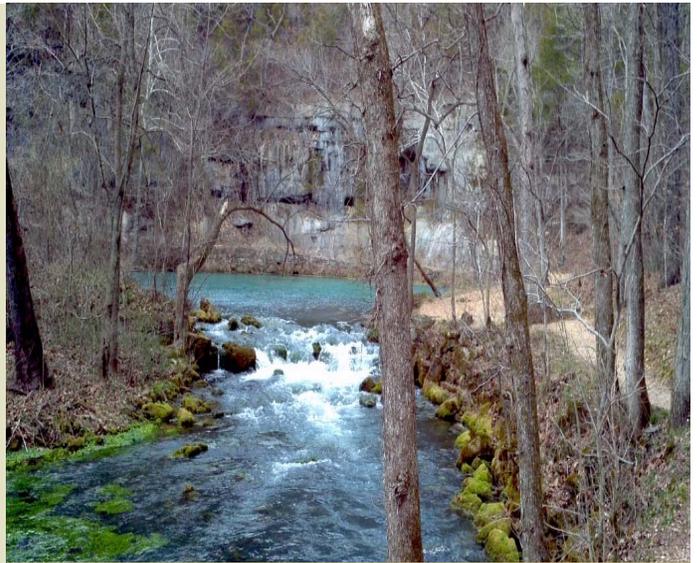
The work conducted by **Craig Paukert** and organized by **Michelle Staudinger** on how climate change affects biodiversity was recently highlighted by USGS and others.

<http://www.usgs.gov/newsroom/article.asp?ID=3483>

UNIT PRESENTATIONS SINCE JUNE 2012

American Fisheries Society Annual Meeting, St Paul, MN, August 2012

- Faulkner, J., C. Paukert. Seasonal changes in instream habitat selection of Niangua darters.
- Harris, J., C. Paukert, S. Bush, M. Allen, M. Siepkert. Movement and habitat selection of largemouth bass: implications for reservoir habitat improvements.
- Kaemingk, M., J. Jolley, C. Paukert, D. Willis, R. Holland, G. Wanner, M. Lindvall. The role of common carp in shallow lake ecosystems.
- Paukert, C., A. Pease. Potential effects of climate change on growth, prey consumption, and population dynamics of stream-dwelling smallmouth bass in the central U.S.
- Pierce, L., C. Paukert, J. Whittier. A taxonomic evaluation of the drivers of species invasions in the Upper Colorado River Basin.
- Rosenberger, A., J. Dunham, H. Neville, J. Neuswanger, B. Rieman. Resilience of rainbow trout in Idaho streams to wildfire-related disturbance.
- Rosenberger, A., K. Polivka. Multiple tools and conceptual approaches for evaluating fish habitat selection.
- Sievert, N., C. Paukert. Evaluation of conservation networks to protect aquatic biodiversity in Missouri.
- Spurgeon, J., C. Paukert, B. Healy, D. Whiting. Food webs and translocation: implications for native fish restoration.
- Staudinger, M. Impacts of Climate Change on Marine and Aquatic Biodiversity in the United States.
- Tracy-Smith, E., C. Paukert, D. Lobb, P. Blanchard. Ecological flow linkages: identifying relevant literature and recent advances.
- Whiting, D., C. Paukert, B. Healy, J. Spurgeon. Food web dynamics in Bright Angel Creek, Grand Canyon: Implications for fish conservation.
- Whittier, J., C. Paukert, J. Olden, A. Strecker, K. Pitts. Assessment of predicted changes in landuse and climate on fish habitat conditions in the arid southwest United States.
- Wirth, L. and A. Rosenberger, A. Prakash, J. Margraf, H. Hamazaki. A remote sensing, GIS-based approach to identify fall chum salmon spawning habitat in the mainstem Tanana River, Alaska.



Alley Spring in Missouri Ozarks

The Wildlife Society Annual Conference, Portland OR, October 2012

- Dinges, A., E. Webb, M. Vrtiska. Effects of the Light Goose Conservation Order on the behavior and distribution of dabbling ducks in the Rainwater Basin of Nebraska
- Kaminski, R, E. Webb, J. Tapp, 9 co-authors. Science and conservation combating the Gulf Oil Spill: The Migratory Bird Habitat Initiative.
- Tapp, J., E. Webb. Effects of management and disturbance on waterbird use at Wetland Reserve Program sites in Arkansas and Missouri.

Midwest Fish and Wildlife Conference, Wichita, KS, December 2012

- Beatty, W., E. Webb, D. Kesler. Mallard selection of private lands enrolled in the Conservation Easement Program
- Dinges, A., E. Webb, M. Vrtiska. Behavior and distribution of dabbling ducks during the Light Goose Conservation Order in the Rainwater Basin of Nebraska
- Harris, J., C. Paukert, S. Bush, M. Allen, M. Siepkert. Using largemouth bass to evaluate a large reservoir habitat project.
- Harris, J., C. Paukert. Aquatic applications of ArcGIS: tracking and analyzing telemetry data.
- Pherigo, E., and C. Paukert. Summer fish community in two Missouri River tributaries.
- Pierce, L., C. Paukert, J. Whittier. A family-level evaluation of drivers of fish invasions.
- Sievert, N., C. Paukert. Development and evaluation of vulnerability indices for Missouri's stream fishes.
- Tapp, J., E. Webb. Dynamics of waterbird use and food availability at Wetland Reserve Program Sites in ARK and MO.
- Tracy-Smith, E., C. Paukert, D. Lobb, P. Blanchard. A review of fish responses to stream flow metrics.

Other meetings

- Harris, J., C. Paukert, S. Bush, M. Allen, M. Siepkert. Movement and habitat selection of largemouth bass: implications for reservoir habitat improvements. MO/ARK White River Partnership, Branson, MO.
- Haynes, T., A. Rosenberger, M. Lindberg. Occupancy modeling of fish in the North Slope of Alaska. Annual Meeting of the Alaska Chapter of the AFS.
- Neuswanger, J., N. Hughes, A. Rosenberger, M. Wipfli. Three-dimensional feeding territories and territorial 'shadows' revealed in juvenile Chinook salmon using novel 3-dimensional video methods. Annual Meeting of the Alaska Chapter of the AFS.
- Staudinger, M. Size-based predation on shortfin squid in the Northwest Atlantic Ocean. American Malacological Society, Philadelphia, PA.
- Staudinger, M., Juanes, F., Salmon, B., A. Koske. The distribution, diversity, and importance of cephalopods in top predator diets from off-shore habitats of the Northwest Atlantic Ocean. Cephalopod International Advisory Council Symposium, Brazil.
- Westhoff, J., C. Paukert. Habitat and temperature selection of smallmouth bass in the Jacks Fork River. MO/ARK White River Partnership, Branson, MO.

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ACADEMIC SERVICE AT THE MISSOURI UNIT

Unit scientists and students also actively serve the University of Missouri and beyond. **Jason Harris**, MS student, gave a guest lecture on Fisheries Management, and **Landon Pierce**, PhD student was the teaching assistant for Fisheries Management. The students are also active in the Wildlife and Fisheries Sciences Graduate Student organization. **Emily Pherigo**, MS student, is the President, **Nick Sievert**, MS student, is the Vice President and Speaker Committee, and **Jessi Tapp**, MS student is the Secretary-Treasurer. **Craig Paukert**, **Amanda Rosenberger**, **Lisa Webb**, and **Jodi Whittier** provided lectures to the introductory undergraduate course called Colloquium, which is designed to expose students to the field of fisheries and wildlife Science. **Lisa Webb** taught Wetland Ecology and Management (FW 8460) as a graduate-level class and took students on a field trip to visit MDC and FWS wetlands in the Missouri bootheel. **Amanda** also serves on the Space Committee for the School of Natural Resources and **Craig** serves on the Graduate Affairs Committee for the Department. In the last year, **Jacob Westhoff**, a post-doctoral researcher, taught a mussel and crayfish conservation class at MU, and **Michelle Staudinger**, post-doctoral researcher, served on five graduate student committees at the University of Missouri, Michigan State University, University of North Carolina-Wilmington, and University of Massachusetts. In addition, Michelle was a climate expert for the US Fish and Wildlife Service, National Conservation Training Center course *Decision Analysis for Climate Change*. Finally, **Craig Paukert** gave a presentation to the University of Missouri Fisheries and Aquatic Sciences Society with tips to getting into graduate school.

Emily Pherigo with lake sturgeon

