

# **Bull Shoals Field Station Annual Report 2011**



**February 2012**

## **Bull Shoals Field Station Mission**

Our mission is to provide a location for faculty, students, and visiting scientists to conduct research and educational programs that increase public understanding of southwest Missouri ecosystems.

## **Overview of yearly activities**

Our major goal continues to be to increase the number of users. This year our total number of person days increased from 1109 in 2010 to 1370 in 2011. This is entirely due to the dramatic increase in the use of BSFS for research purposes by Missouri State faculty, staff, and students, as well as five outside universities and organizations. Three workshops, including a week-long leadership academy workshop for high school students, were held at the field station. Six Missouri State classes were held partially or completely on-site.

## **Expenditures**

The major expenses for 2011 include (1) maintenance of the facilities (utilities for the Mincy House, maintenance agreement for the solar power system, propane for the heat at the Drury House, boat maintenance and marina rental); (2) travel to conferences and Project WET workshops; and (3) partner of GLADE (see below). We have also purchased basic equipment for our new laboratory.

## **Partnerships**

BSFS staff continues to work with the U.S. Army Corps of Engineers and Missouri Department of Conservation staff. We correspond on research and monitoring questions. The Drury-Mincy site manager and the BSFS Staff also communicate about maintenance issues and the timing of group events.

J. Greene worked closely with the Greater Ozarks Audubon Society (GOAS) on the Christmas Bird Count for Taney County serving as the host site for the compilation event, as well as J. Greene counting on the Drury Conservation Area. GOAS, MDC, and staff (Greene and Prussia) work together to plan and conduct the Green Leadership Academy for Diverse Ecosystems (GLADE). Additional groups assisting with GLADE include the Springfield Plateau Chapter of the Master Naturalists, James River Basin Partnership, Watershed Committee of the Ozarks, and various university faculty/staff.

Beth Bowles completed the last year of the partnership with Upper White River Basin Foundation on the basin water quality monitoring project and provided the data and analysis for the Foundation's 2011 Status of the Watershed Report. J. Greene and B. Bowles served as President and Member of the James River Basin Partnership Board, respectively, which continues to address a variety of watershed issues.

Erica Cox works with Springfield and Greene County on a variety of stormwater education issues and with the James River Basin Partnership on their watershed festivals. She also works

with the public and private schools to improve water education throughout the state (for more information about her work with the City and County, please contact Erica).

### **Classes, Workshops, & Meetings held at BSFS**

- MSU
  - Identification of Woody Plants
  - Herpetology
  - Plant Ecology
  - Plant Taxonomy
  - Mammalogy
  - Ozarks Lichen Ecology
  - Limnology
  
- Workshops
  - Sustainability Minor Faculty Workshop
  - Wildlife Society Student Workshop
  - Green Leadership Academy for Diverse Ecosystems (GLADE)

### **BSFS Use Statistics for 2011 (person-days): Total = 1370**

- Classes and workshops (including students and faculty): 747
- Advisory board meeting: 6
- Research (Missouri State faculty and staff and non-MSU groups): **515** – a dramatic increase from 2010
- Maintenance, security, or staff work day: 85
- Tour: 17

### **Research**

#### *Faculty/Staff*

Bowles, B.D. and D. Bowles. Biodiversity of Ozark springs.

Bowles, D. Survey of insect diversity at Bull Shoals Field Station.

Greene, J.S. and Andrew Kinslow. Monitoring Avian Productivity and Survivorship: Bird banding at BSFS.

Claborn, D. Sand fly survey.

#### *Graduate and undergraduate students*

Patrick Goforth. Decomposition as a function of fire history (U)

Michelle Highfall. Productivity and precipitation (U)

MaryAnn Blinkhorn. Fire and plant diversity (G)

Benjamin Smith (U) and Tara Elmore (G). Bird banding at BSFS

Cottengim, S. In progress. Evaluation of year 2 of the Green Leadership Academy for Diverse Ecosystems (GLADE).

Dickson, D. In Progress. MNAS. A biological and geomorphological assessment of Bee Creek.

Beth Glidewell. Collection and isolation of *Daphnia lumholtzi* from Bull Shoals Lake (G)

Students in the Mathis lab have collected study organisms from BSFS in 2011 for the following projects:

- 1) Emilee Helton (graduate student) Embryonic learning by larval ringed salamanders.
- 2) Ben Dalton (graduate student) Indirect effects of contamination on reproductive pheromone discrimination by a terrestrial salamander.
- 3) Travis Reeder (graduate student) Manipulating behavioral syndromes in a terrestrial salamander.
- 4) Valerie Jones (graduate student) Gill blood flow: a bioassay for measuring predator recognition in a larval salamander.

#### *Research use outside of the university*

C. Wilton and M. Wilson. Mississippi State University. Black bear research.

J. Weng. Kansas State University. Sand fly research.

Audubon Society of Missouri. Bird surveys.

University of Missouri (2 researchers). Breeding bird/nesting research.

Jeremy Keene (Ballard lab), Ohio State University – Botanical Society of America contract on Violaceae

#### **Manuscripts and reports**

Bowles, B., and J. Greene. 2011. Upper White River Basin Monitoring Analysis: Triennial Report. Report submitted to Upper White River Basin Foundation, October 2011.

Bowles, B. and E. Theriot (*in prep*) Contrasting winter limnology of two subtropical reservoirs.

Crane AL, Mathis A (2011) Landmark learning by the Ozark zigzag salamander, *Plethodon angusticlavius* Current Zoology 57:485-490.

Crane AL, Mathis A (2011) Morphological and behavioral changes of salamanders infected with amphibian Chytrid fungus. IRCF Reptiles and Amphibians 18:138-143.

Crane AL, McGrane C, Mathis A (2012) Behavioral and physiological responses of Ozark zigzag salamanders to stimuli from an invasive predator: the armadillo. *International Journal of Ecology* 2012:1-7.

Crane AL, Mathis A, McGrane C (submitted) Socially facilitated antipredator behavior by larval ringed salamanders, *Ambystoma annulatum*.

Crane AL, Lampe M, Mathis A (in prep) Detecting danger from prey-guild members: behavioral and metabolic responses of Ozark zigzag salamanders to alarm secretions from earthworms.

Greene, J. In Prep. Developing Environmental Leaders: Green Leadership Academy for Diverse Ecosystems.

Prussia, C. Common Ozarks Lichens (informational pamphlet), in prep (in review by authorities on subject); Target printing: Spring 2012

### **Presentations**

Bowles, B.D. Building a community from scratch: Phytoplankton communities from reservoirs and natural lakes. Ecological Society of America Annual Meeting, August 2011. Poster presentation.

Crane AL, McGrane C, Mathis A. Predator recognition and social facilitation by ringed salamanders (*Ambystoma annulatum*). Reis Biological Station, MO, Missouri Herpetological Association (2011)

Crane AL. Ozark salamander behavior: predation risk and learning. Springfield, MO (invited), Springfield Herpetological Society (2011)

Crane AL, Mathis A. Socially facilitated antipredator behavior by ringed salamanders (*Ambystoma annulatum*). Minneapolis, MN, Joint Meeting of Ichthyologists and Herpetologists (2011)

Greene, J. November, 2011. Nature and the Human Condition. Public Lecture Series, College of Natural and Applied Sciences, Missouri State University.

Jones V, Mathis A, Crane AL. Predatory chemical cues affect gill blood flow in larval ringed salamanders. Reis Biological Station, MO, Missouri Herpetological Association (2011)

Lampe M, Mathis A, Crane AL. Detecting danger from prey-guild members: behavioral and metabolic responses of Ozark zigzag salamanders to stress secretions of earthworms. Reis Biological Station, MO, Missouri Herpetological Association (2011)

Mathis A, Lampe M, Crane AL. Behavioral and metabolic responses of Ozark zigzag salamanders (*Plethodon angusticlavius*) to alarm/stress secretions from heterospecific

members of the same prey-guild. Minneapolis, MN, Joint Meeting of Ichthyologists and Herpetologists (2011)

Prussia, C. “Partnering Youth Leadership and Community Resources” presentation of GLADE program results at Leopold Education Project National Conference, July 2011

Prussia, C. “An LEP Model to Train Homeschoolers” presentation of grant funded project (2010) at Leopold Education Project National Conference, July 2011

Wait, A. Fire in Eastern Oak Forests Conference, May 2011

## **Grants**

Bowles, B.D. Ozarks Springs Project. Missouri Department of Natural Resources. Funded for \$6,913.

Bowles, B.D. Oklahoma phytoplankton survey. Subcontract from Oklahoma State University. Funded for \$22,720.

Bowles, B.D. Ozarks Springs Project. Grant application to the L-A-D Foundation. Not funded.

Cox, E., and J. Greene. \$206,200. Interpretation and Communication of Ecological Monitoring in the NPS Heartland Network. National Park Service.

Cox, E. \$103,759. 319 Non-point Source Pollution grant from the Missouri Department of Natural Resources and Region 7 EPA, for WET workshops offered, state-wide, 2011-2014.

Cox, E. Conservation Federation of Missouri Grant for Project WET workshop and support for Lange Middle School teachers in Columbia school district as part of the MO Dept. of Natural Resources Environmental camps for middle school students.

- Project WET is also a partner for another 319 NPS grant with DNR and EPA—WET will provide education as part of a grant with the Watershed Committee of the Ozarks, City of Springfield, Greene County, and OEWRI

Greene, J. 2011. \$16,900. Green Leadership Academy for Diverse Ecosystems: Year 3. Greater Ozarks Audubon Society.

## **Activity Highlights**

### *Upper White River Basin water quality monitoring project*

The Bull Shoals Field Station completed the final year of a major water quality monitoring analysis project for the Upper White River Basin Foundation. The project provided funding for

an analysis of water quality and macroinvertebrate data from the Upper White River basin in Arkansas and Missouri. The report included the evaluation of the status of ten stream sites in the basin using the Water Quality Index (developed by BSFS staff in the first project year), trend analysis of long-term water quality data for eight sites in the basin, analysis of benthic macroinvertebrate data from ten sites in the basin, and writing the technical report to the Foundation of the water quality data analysis.

### *Project WET*

There were 22 WET workshops around the state in 2011, with 373 educators trained. Our largest number of workshop participants continues to be education majors at state universities, but classroom teachers and all other non-formal educators with state agencies and non-profits make up the remaining set of participants. These numbers have steadily increased each year that MSU has sponsored Project WET, so we look forward to 2012.

### *Green Leadership Academy for Diverse Ecosystems (GLADE)*

The 3rd year of the week-long GLADE brought 16 high school students from southwest Missouri to BSFS to learn about biodiversity and conservation, endangered species, water, and habitat restoration. They restored a section of glade/woodland. Students spent the morning cutting and removing cedar. This will open up the habitat and attract a greater variety of species. As part of the Academy, each could receive up to \$500 to go back into their community and conduct some type of environmental project. Projects from the 2011 group (so far) have included planting native wildflowers for the outdoor classrooms for Ozark Elementary schools, developing native plant gardens for schools and communities, and others. The GLADE website is: <http://www.greenleadershipacademy.org/index.htm>

### *Community-Based Social Marketing Lecture and Workshop*

Bull Shoals Field Station hosted a CBSM lecture and workshop that was presented by Dr. Rick Chenoweth, Emeritus Professor of Environmental Psychology at the University of Wisconsin-Madison. Attendees included the Cities of Springfield and Branson, James River Basin Partnership, Missouri Department of Natural Resources, and the Missouri Department of Conservation. Community-Based Social Marketing draws on knowledge of psychology and marketing strategy to design outreach programs that encourage the public to adopt sustainable behaviors at the community level.

### *Ozarks Springs Project*

Beth Bowles received a grant from the Missouri Department of Conservation to launch the Ozarks Springs Project. The objectives of the Ozarks Springs Project are to increase awareness of the effect of nonpoint source pollution on spring ecosystems and provide the public and community organizations with a resource for current information on springs important to their communities. Specifically, a Spring Scorecard will be developed for each of eight springs in Missouri to provide specific and readily understandable information about the ecological health of the springs. In addition, a website will be created to present the Scorecard, as well as educate

the public on spring hydrology and the impacts of non-point source pollution on spring ecosystems.

### *Oklahoma Phytoplankton Survey*

Beth Bowles received a subcontract from Oklahoma State University to process phytoplankton samples collected by the Oklahoma Water Resources Board. Processing includes counting and identifying the algal taxa, as well as measure cell biovolume.

### **Additional BSFS Activities by BSFS Faculty and Staff**

- J. Greene is President of the James River Basin Foundation Board
- B. Bowles served on the James River Basin Partnership Board
- Christmas Bird Count January 2011 and December 2011 (J. Greene)
- Guest lecturing for Limnology and Ecology classes (B. Bowles)
- Green Fire screening at Springfield Conservation Nature Center (SCNC) – co-sponsored by BSFS-MSU
- 2 Leopold Education Project workshops at SCNC in conjunction with Green Fire screening, Nov. 2011
- The Southwest chapter of the Missouri Native Plant Society helped with the Bio 334 field trip
- BSFS Advisory Board meetings were held in 2011
- Displayed at MSU Sustainability Fair, October 2011.
- Helped seek funding for and follow-up with GLADE students.
- Continue to work with Chase Studio on cooperative projects.
- Worked with Drury University architecture class to develop phased dormitory plans.
- Held a tour and short educational program for 8 elementary students (B. Bowles)
- Panel discussion – Making science relevant for parks and people. George Wright Society Conference, New Orleans, LA. March 14-18, 2011 (E. Cox).

### **Facilities**

We are in the process of getting a wireless internet connection for the Drury House. This has been a need since the beginning of BSFS. We have now found a cost-efficient method of using a phone that serves as a wireless hub for up to five computers. This will be a great advantage for researchers and classes!

### **Goals for 2012 and list of needs for the future**

Funding is being sought for additional specialty equipment that is needed for the new wet laboratory.

The continuation of the GLADE Academy continues to be a priority of BSFS. The 2012 Academy is funded but at a reduced level. We will continue to work with the Greater Ozarks Audubon Society for long-term funding sources.

We would like to recruit additional universities and conservation-related groups to use the field station to maintain the record levels we experienced in 2011. We plan to renovate the BSFS website to reach more potential users.