

# Missouri State<sup>™</sup>

U N I V E R S I T Y

## Bull Shoals Field Station Annual Report 2012



February 2013

## **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 was slightly less than 2011 because we did not have the resident researchers for 4.5 months. However it was still high at 1129 person days. The use by outside groups continues to increase in number and diversity with the Springfield-Greene County Parks, Master Naturalists, and the Ozarks Writing Project this year. We began a Friends of Bull Shoals Field Station group this year. We have a small number who have joined and plan to have a Friends event in Fall 2013.

## **Expenditures**

The major expenses for 2012 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 again this year 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 initiated talks with Tyson Research Center (Washington University) to begin a planning process to create a regional climate and ecosystem monitoring network. J. Greene and B. Bowles continued to serve on the James River Basin Partnership Board address a variety of watershed issues in the James River basin.

Erica Cox works with Springfield and Greene County on a variety of stormwater education issues, with the James River Basin Partnership on their watershed festivals, and 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
  - Plants for Ozarks Culture
  - Limnology
  - Ozarks Natural Communities
  - Making the Connections: Environmental Conservation in North and South America
  
- Workshops and meetings
  - Missouri Native Plant Society
  - Ozarks Writing Project
  - Green Leadership Academy for Diverse Ecosystems (GLADE)
  - Springfield Greene County Parks
  - Boy Scouts
  - Master Naturalists

### **BSFS Use Statistics for 2012 (person-days): Total = 1129**

- Classes (including students and faculty): 445
- Meetings and workshops: 426
- Research (Missouri State faculty and staff and non-MSU groups): 177
- Maintenance, security, or staff work day: 72
- Tour: 9

### **Research**

#### *Faculty/Staff*

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

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

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

*Graduate and undergraduate students*

Allen, C. Ryan and Nathan Light (Advisor: L. Robbins). Quantifying the Acoustic Call Signature of Silver-Haired Bats (*Lasionycteris noctivagans*). (G)

Armstrong, Kory (Advisor: L. Robbins). Use of an Artificial Roost (rocket box) by Missouri Bat Species at BSFS. (G)

John Ward (Advisor: J. Greene). Quail survey. (U)

Jordan Skaggs (Advisor: J. Greene). Saw whet owl survey (U)

David Dickson (Advisor: J. Greene). Land use effects on stream morphology and macroinvertebrate communities in the Ozarks region; Taney County, Missouri. (G) Thesis completed 12/2012

MaryAnn Blinkhorn (Advisor: A. Wait). Leaf litter research.

Emilee Helton (Advisor: A. Mathis). Embryonic learning by larval ringed salamanders (G)

Ben Dalton (Advisor: A. Mathis). Indirect effects of contamination on reproductive pheromone discrimination by a terrestrial salamander (G)

Kendell Lloyd (Advisor: A. Mathis). Classical conditioning in *Plethodon angusticlavius* (U)

*Research use outside of the university*

Logan-Rogersville School District

### **Manuscripts and educational materials**

Bowles, B.D. and D.E. Bowles. Evidence of overwintering in water hyacinth, *Eichhornia crassipes* (Pontederiaceae) in southwestern Missouri, U.S.A. Rhodora, in press.

Bowles, D. E., and R. W. Sites. *Merope tuber* (Mecoptera: Meropeidae) from the Interior Highlands of the United States. Submitted to Entomological News.

Bowles, D. E., and R. W. Sites. Megaloptera (Insecta) of the Interior Highlands, U.S.A. In prep.

C. Prussia. Common Ozark Lichens brochure. In press.

C. Prussia Leopold Education Project Explorer Cards (collaboration with Cliff Knapp and Jeannine Richards). In prep.

King, S.H., J. Moody, P.L. Redfearn, Jr., J.L. Keene and L. M. Bove. 2012. Plants of the Bull Shoals Field Station, Taney County, Missouri. *Missouriensis* 31: 19-43.

## **Presentations**

Bowles, B.D. and D. Bowles. Linking extant and historical aquatic vegetation communities in karst springs of the Ozark Highlands to assess status and threats to these highly groundwater-dependent ecosystems. Ecological Society of America Annual Meeting, August 2012. 20 min. oral presentation

Bowles, D.E. and D.Reynoso-Velasco. Mantispids (Neuroptera: Mantispidae) of the Interior Highlands of the United States. Annual Meeting of the Entomological Society of America, Knoxville, TN. 20-minute invited oral presentation.

Greene, J. Nature and the Human Condition. Science Café: Discovery Center. January 2012

Greene, J. Impacts of Human Interaction with Nature. Greene County Medical Society. April, 2012

Greene, J. Green Leadership Academy for Diverse Ecosystems. Greater Ozarks Audubon Society. November 2012

Greene, J. Leopold's Legacy Lessons. Ozarks Summit. June 2012

Greene, J., Bowles, B. and Prussia, C. Bull Shoals Field Station: Monitoring and Education. Biology Department Seminar. April 2012.

Greene, J. Green Leadership Academy for Diverse Ecosystems: Partnerships for Youth Development. Sustainable Campuses Conference. Baltimore, Maryland. April 2012. Poster presentation.

## **Grants**

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

Greene, J. Faculty Research Grant - \$3681. Bird Banding Study at the Bull Shoals Field Station and Comparison of Three Ozarks Banding Sites

Greene, J. Delta Foundation - \$8000. Ecological Education in the Ozarks: The Green Leadership Academy for Diverse Ecosystems.

Greene, J. Greater Ozarks Audubon Society - \$14,800. GLADE – Green Leadership Academy for Diverse Ecosystems, Summer 2012

## **Activity Highlights**

*Bat Workshops*

Bat Acoustic Identification Workshop held October 12<sup>th</sup>- 14<sup>th</sup>. Numerous bat experts gathered to discuss at length the implementation of the new USFWS Indiana bat survey protocol. An afternoon was spent conducting group qualitative call identification, and bat biologists and acoustic experts compared the efficiency and accuracy among three automated acoustic identification software packages: Kaleidoscope (Wildlife Acoustics Software), BCID and EchoClass.

Bat Identification Workshop. Run by Dr. Lynn Robbins, bat expert C. Ryan Allen, and Shannon Romeling (graduate student), assisted by Larisa Bishop-Boros and Nathan Light (graduate students). Participating entities: Ozark Plateau National Wildlife Refuge, Deputy Refuge Manager, Shea Hammond, Student Employee of USFWS Andrea Cormick and Student Conservation Association Intern Brian Fuller. Brian stated "I was so impressed with at the workshop that I decided to join MSU and become a graduate student"

### *Project WET*

This year was Year 2 of the 4-year grant 319 grant from Missouri DNR. WET workshops were conducted in the following locations: Camdenton, Cassville, Malden, Cape Girardeau, Kansas City, St. Louis. Each workshop also includes a speaker from the area, who presents about non-point source pollution, their involvement with 319 projects or other work around local water issues (the Cape Girardeau speaker talked about flooding along the Mississippi River, for example). Workshop participants include classroom teachers, Soil and Water Conservation District employees, MDC and DNR employees and other agency and non-profit groups.

We begin the second phase of the grant this month--the research piece. We are contacting all past workshop participants, beginning with the Dec. 2011 group (Trenton, Kirksville, Columbia) to see how many are using WET activities, which activities are they using, etc.

I'm also involved with the large local grant, which is another 319 funded project--it is for Storm Water improvements in the Springfield area and the Watershed Committee of the Ozarks, James River Basin Partnership, City of Springfield, Greene County and Project WET are all involved. My part ramps up this summer as I will be doing a 2-day teacher workshop in June, called Storm Water Management for Educators. We will be traveling around the city and county, looking at some of the 319 storm water projects, as well as prior projects and the impacts now. We will have a classroom component to this as well, focusing on engineering practices for K-12 as part of the new Next Generation Science Standards. I will also be planning 2 other one-night events for the public in which we will travel around the city/county and look at the 319 storm water projects (without the classroom piece). These will be in late summer/early fall 2013.

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

The 4th 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 transplanted giant river cane along Bee Creek. This will provide new habitat for the endangered Swainson's Warbler and other 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. The GLADE website is: <http://www.greenleadershipacademy.org/index.htm>

### *Insect diversity at BSFS*

David Bowles conducted approximately weekly insect diversity assessment using Malaise Traps during the summer at two BSFS locations. Mecoptera, Trichoptera, Neuroptera, Megaloptera, and Tabanidae (Diptera) were removed and are in process of being identified. The remaining samples were sent to the Smithsonian Institution where Hymenoptera currently are being sorted and identified.

### *Ozarks Springs Project*

Beth Bowles continued work on springs across the Ozark Plateau. Currently, the project includes two objectives in collaboration with David Bowles. The first goal is to conduct vegetation surveys on springs to determine changes in the vegetation community from surveys conducted in the 1930's by Julian Steyermark. Seventeen springs have been re-visited to date. The second goal is to conduct spring assessments on approximately third magnitude springs to determine the effect of urban and rural land uses on spring water quality and biodiversity.

### *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 and B. Bowles served on the James River Basin Partnership Board
- Christmas Bird Count December 2012 (J. Greene)
- Helped seek funding for and follow-up with GLADE students
- Continue to work with Chase Studio on cooperative projects
- Missouri Natural Resources Conference (E. Cox and J. Greene)
- Interface Conference (E. Cox)
- Established "Friends" group for Bull Shoals Field Station (J. Greene)
- GLADE Academy (J. Greene and C. Prussia)
- Bird banding research and saw whet owl survey (J. Greene)
- Environmental Education Blitz! (EE Blitz!) for Homeschoolers – Springfield Conservation Nature Center – The Digital Landscape presentation (C. Prussia)
- Pheasants Fest – Conservation Careers Youth Program presentation (C. Prussia)
- GLADE Mentor Development Project presentation (C. Prussia and J. Greene)
- Science Olympiad – February – Awesome Aquifers (C. Prussia)
- Papermaking with Springfield-Greene County Parks Outdoor Initiatives (C. Prussia)
- Public Lands Day – GLADE graduates & USDA-Forest Service at Dabbs Creek (glade restoration and habitat improvement project) (C. Prussia)

- Bull Shoals Lake sampling on two sites every three weeks for core water quality parameters, phytoplankton, and zooplankton (B. Bowles and C. Prussia)
- Taught Algal Ecology seminar class (B. Bowles)
- Assisted the James River Basin Partnership at a booth at the Lawn and Garden Show in Springfield, with the Watershed Festival, with the Earth on Your Plate fundraiser, and with Dam Jam Celebration (B. Bowles)
- Submitted the final report to the National Science Foundation for the wet lab grant (B. Bowles)
- Attended the Organization of Biological Field Stations annual meeting at Archbold Field Station, Lake Placid, Florida (B. Bowles)
- Guest lecturing for Biology classes (B. Bowles)
- Displayed the BSFS booth display at a career fair at Field Elementary (B. Bowles)

### **Facilities**

We are continuing to search for funding opportunities for a dormitory or, at a minimum, a facility with a common room, kitchen, and bath facilities. This would provide an excellent meeting space for groups. Cabins or another housing facility could be added at a later date.

### **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. In addition, we are trying to establish more long-term monitoring stations including those for climate, lake conditions, and phenology

The continuation of the GLADE Academy continues to be a priority of BSFS. The 2013 Academy is funded. 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.