

Bull Shoals Field Station Annual Report 2010



February 2011

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 to 1109 in 2010. Four workshops, including a week-long leadership academy workshop for high school students, were held at the field station. Eight Missouri State classes were held partially or completely on-site.

Expenditures

The major expenses 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).

Partnerships

BSFS staff continues to work closely with the U.S. Army Corps of Engineers and Missouri Department of Conservation staff. We routinely correspond on research and monitoring questions. The Drury-Mincy site manager and the BSFS Director 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 Greene and Celeste Prussia worked closely on the Green Leadership Academy for Diverse Ecosystems (GLADE). Janice has worked with MSU administrators to develop a Memorandum of Understanding with Terry Chase of Chase Studio. Chase Studio is an internationally-known maker of natural history museum displays. The field station will work to develop cooperative activities with Chase Studio including having GLADE students tour the studio, connected mammalogy graduate students and Lynn Robbins with Terry Chase to conduct a bat survey of his cave, potential museum studies classes, and others.

Beth Bowles continued 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 2010 Status of the Watershed Report. J. Greene continued as President of the James River Basin Partnership Board 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
 - Riparian Ecology
 - Winter Ecology
 - Plants of Ozark Culture

- Workshops
 - Sustainability Curriculum Workshop: March 20, 2010
 - Wildlife Society Student Workshop: April 9-10, 2010
 - Green Leadership Academy for Diverse Ecosystems (GLADE): June 20-26, 2009
 - Americorps Training: September 12-18, 2010

- Professional and student meetings
 - Organization of Biological Graduate Students: October 2-3, 2010

BSFS Use Statistics for 2010 (person-days): Total = 1109

- Classes and workshops (including students and faculty): 800
- Professional and student meetings: 62
- Research (undergraduate, graduate, and staff research): 87
- Maintenance, security, or staff work day: 153
- Tour: 7

Research

Faculty/Staff

Bowles, B.D. and D. Bowles. Biodiversity of aquatic vegetation in Ozark springs.

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

Graduate and undergraduate students

Janelle Bowcock, Joseph R. Lemen, and Benjamin Hale. Bat mist net and acoustic detection surveys to determine the presence/absence of species at BSFS.

Mary Ann Blinkhorn and Brad Culberson. Fire, Oak Regeneration, and Understory Flora Development in Managed Ozark Forests: Mechanistic Assessments for Managers
Advisor: Dr. Alexander Wait.

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

Rob Hunt. Chemical communication of the spotted salamander. Advisor: A. Mathis.

Valerie Jones. Heart rates of salamanders exposed to predator cues. Advisor: A. Mathis

Michael Lampe. Responses of salamanders to stress secretions of earthworms. Advisor: A. Mathis

Nicole Miller, Washington University Missouri Botanical Garden, Plant-pollinator interactions and stress adaptation: Implications for glade endemism.

Mammalogy class. Small mammal surveys. Advisor: L. Robbins.

Stout, K. 2010. M.N.A.S. A follow-up evaluation of the Green Leadership Academy for Diverse Ecosystems (GLADE). Advisor: J. Greene.

Manuscripts and reports

Allen, D. J. and J. S. Greene. Submitted. Watershed festivals increase environmental knowledge and attitudes of 5th grade students. J. of Interpretation Research.

Bowles, B., and J. Greene. 2010. Upper White River Basin Monitoring Analysis: Year 3. Report submitted to Upper White River Basin Foundation.

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

Crane, A.L. and A. Mathis. Landmark learning by the Ozark zigzag salamander, *Plethodon angusticlavius* (in press).

Crane, A.L. and A. Mathis. Behavioral and physiological responses of Ozark zigzag salamanders (*Plethodon angusticlavius*) exposed to armadillo stimuli (in prep).

Crane A.L. and A. Mathis. Predator recognition and social facilitation of antipredator behavior by ringed salamanders (*Ambystoma annulatum*) (in prep).

Lampe, M., A.L. Crane, and A. Mathis. Responses of Ozark zigzag salamanders, *Plethodon angusticlavius*, to stress secretions of earthworms, *Lumbricus terrestris* (in prep).

Prussia, C. "Sky Dance – Missouri Style!" article published in Strides – Spring 2010

Wilbers Lueckenotto, A., and J. Greene. (Winter 2009-2010). For Slugs Sake: Making a refuge for slugs, bugs & other invertebrates. Green Teacher. 87:23-26.

Presentations

Bowles, B.D. Reservoirs versus natural lakes in phytoplankton community ecology. Phycological Society of America Annual Meeting, July 2010. 20 minute oral presentation.

Cox, Erica. "Taking Students Outdoors—The INS and OUTS of Outdoor Experiences"

Crane AL, McGrane C & Mathis A. Ongoing studies on the responses of Ozark zigzag salamanders exposed to armadillo stimuli. Missouri Herpetological Association (2010) (oral)

Crane AL & Mathis A. Landmark learning by the Ozark zigzag salamander (*Plethodon angusticlavius*). (poster) Animal Behavior Society (2010)

Greene, J. September, 2010. Green Leadership Academy: High school students and habitat restoration. North American Association for Environmental Education Annual Conference. Niagra, New York.

Hunt R & Mathis A. Response of spotted salamanders to alarm cues and diet-based predator cues. (poster) Animal Behavior Society (2010)

Hunt R & Mathis A. Response of spotted salamanders to alarm cues and diet-based predator cues. (oral) Missouri Academy of Science (2010)

Parsons J & Mathis A. Predation risk has condition-dependent effects of territorial behavior. (poster) Animal Behavior Society (2010)

Parsons J & Mathis A. Predation risk has condition-dependent effects of territorial behavior. (oral) Missouri Herpetological Association (2010)

Parsons J & Mathis A. Predation risk has condition-dependent effects of territorial behavior. (oral) Missouri Academy of Science (2010)

Prussia, C. "Rules of Wild Things" presentation (oral) at LEP State Coordinator Meeting – March 2010

Prussia, C. Green Leadership Academy for Diverse Ecosystems (GLADE) – oral presentation at National Leopold Education Project Conference, Baraboo, WI – June 2010

Grants

Bowles, B.D. and J. Greene. 2010. Upper White River Basin Foundation. Long-term monitoring of water quality and ecological condition of the Upper White River basin in Arkansas and Missouri. Funded for \$23,612.

Cox, E., and J. Greene. Submitted, 2010. \$103,383. Improving nonpoint source pollution education through Project WET workshops. Missouri Department of Natural Resources.

Prussia, C., and Greene, J. 2010. \$14,200. Greene Leadership Academy for Diverse Ecosystems: Year 2. Greater Ozarks Audubon Society.

Prussia, C. Pheasants Forever/LEP Grants for Community Projects – submitted and funded – proposal to provide LEP workshops to pre-service teachers (SCI414) and home schooling parents

Wait, A. Missouri Department of Conservation. Fire, Oak Regeneration, and Understory Flora Development in Managed Ozark Forests: Mechanistic Assessments for Managers. 7/11-6/12. Funded for \$3,500.

Missouri State University: Faculty Center for Teaching and Learning. Sustainability in the Curriculum Workshop: Toward Sustainability in the Curriculum at Missouri State University. 4/10-12/10. \$8,031. (A. Wait)

Research use outside of the university

Nicole Miller. Washington University Missouri Botanical Garden.

Upper White River Basin water quality monitoring project

The Bull Shoals Field Station completed the third year of a major water quality monitoring analysis project for the Upper White River Basin Foundation. The project has and will continue to provide funding for an analysis of water quality and macroinvertebrate data from the Upper White River basin in Arkansas and Missouri. The activities completed in the third year 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.

Construction of a wet laboratory

BSFS was awarded \$61,101 from the National Science Foundation in 2009 to build a wet laboratory from an existing stone shed at the field station. Renovations included adding plumbing, electrical wiring and connection to the solar power system, insulation, new roof, new windows, and new door. The addition of a wet laboratory will increase productivity in research and training for students, provide more opportunities for course use, increase the pool of potential users from inside and outside the university, and enhance the current water quality

research that is useful to the local community. The lab was completed in the Fall of 2010. See photos of the new wet laboratory appended to this report.

Green Leadership Academy for Diverse Ecosystems (GLADE)

The 2nd year of the week-long GLADE brought 11 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 giant river cane which is home to the endangered Swainson's warbler. As part of the Academy, they each could receive up to \$500 to go back into their community and conduct some type of environmental project. Projects from the 2010 group have included refurbishing the outdoor classrooms for Ozark Elementary schools, developing native plant gardens for schools and communities, building bat houses for schools, and others. The GLADE website is: <http://www.greenleadershipacademy.org/index.htm>

Additional BSFS Activities

- J. Greene is President of the James River Basin Foundation Board
- B. Bowles served on a National Science Foundation review panel
- Christmas Bird Count January 2010 (J. Greene)
- Continuation of algae and zooplankton collection at two sites on Bull Shoals Lake to complement the data collected by the Lakes of Missouri Volunteer Program. (B. Bowles and C. Prussia)
- Aquatic ecology presentation to Missouri Wildlife Society student workshop (B. Bowles)
- Exhibit at Missouri Natural Resources Conference. (J. Greene)
- Established bird banding station at BSFS in conjunction with the Monitoring Avian Productivity & Survivorship Program (MAPS) (J. Greene)
- Helped establish partnership with Chase Studio. (J. Greene)
- Field Trips On/Off Campus – oral presentation to SCI404 class – May 2010 (C. Prussia)
- Bull Shoals Lake Ecology – oral presentation to BIO597/697 class – July 2010 (C. Prussia)
- Helped seek funding for and follow-up with GLADE students. (J. Greene)
- Project WET presentation to Americorps workshop (E. Cox)
- Assisted with Americorps workshop (C. Prussia)
- LEP workshop held for homeschool group (C. Prussia)

Facilities

A new high-efficiency furnace and air conditioning unit was bought for the Mincy house in 2010. This will reduce our electricity bills in the winter months. Additionally, a thermostatically controlled blue flame heater was installed in the Drury House kitchen to reduce propane consumption while maintaining water availability in colder months.

A Raven XTV modem was installed in the data logger enclosure of the BSFS weather station and service was established with Verizon Wireless for a static IP address. Ken McCrory of MSU set up a server that now receives daily downloads of the latest weather data daily at 12:05 pm. Thus from campus, access to this data is possible by request from the server; and from remote locations using software from Verizon Wireless and Campbell Scientific (contact C. Prussia for software access and instructions).

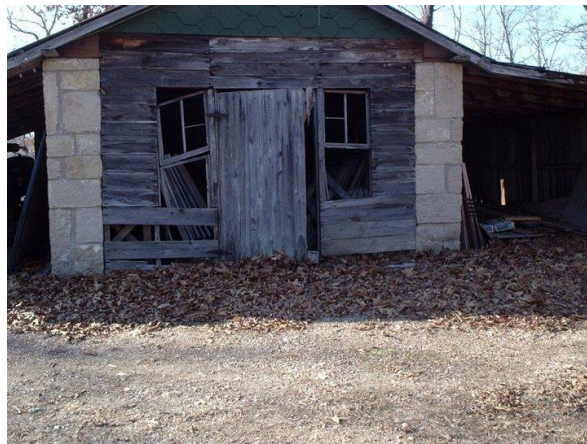
Goals for 2010 and list of needs for the future

We are beginning to buy equipment for the new laboratory. Additional equipment funds will need to be found for larger items.

The continuation of the GLADE Academy continues to be a priority of BSFS. The 2011 Academy is funded but funding will be needed for the 2012 year and beyond. We will continue to work with the Greater Ozarks Audubon Society for funding sources.

We are working with a Drury Architecture class to get ideas for housing that would allow us to phase growth instead of one large dormitory. It will be interesting to see the outcomes of their projects.

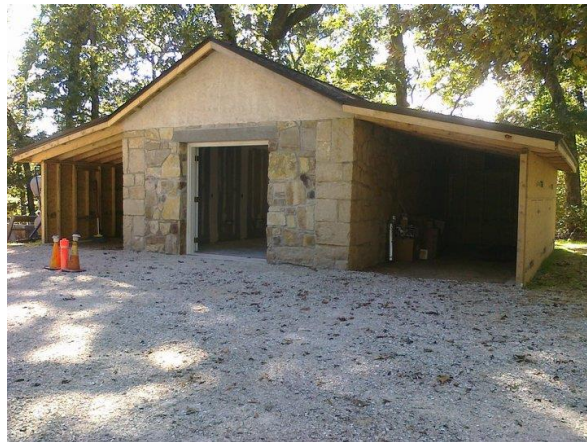
Wet laboratory construction photos



Original stone shed at BSFS



Start of construction preserving the original stone walls



Completed exterior of the new wet laboratory at BSFS