

Missouri State
UNIVERSITY

**Bull Shoals Field Station
Annual Report
2016**



February 2016

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.

Mini-grants

BSFS was able to offer the first two mini-grants of \$500, each, to graduate students conducting research at BSFS. Dylan Maag and Tyler Remick were the first two awardees. This funding is provided by donations to our account at the MSU Foundation.

Expenditures

We were able to renovate the shed at the Drury House that houses the laboratory. One side is a new office and the other is secure storage space. We did not have any secure storage of equipment at the Drury House site. The major expenses continue to be for personnel. Other major expenses include (1) maintenance of the facilities (utilities for the Mincy House, propane for the heat at the Drury House, boat maintenance and marina rental); (2) travel to conferences and Project WET, Learning Tree, and Flying WILD workshops; and (3) partner of GLADE.

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 staff and the BSFS Staff also communicate about maintenance issues and the timing of group events.

Celeste Prussia works with the USDA-Forest Service and GLADE graduates on glade restoration and site improvements at the Dabbs Creek Spring Turkey Walk-in Area of the Mark Twain National Forest. Additional efforts in 2016 include building fence at the USFS site.

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 and counting birds 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.

Janice Greene serves as Vice President on the Greater Ozarks Audubon Society Board and is a member of the Springfield Environmental Advisory Board. Beth Bowles serves on the James River Basin Partnership Board to 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.

Beth Bowles is working with Pipkin Middle School and the Discovery Center on STEM projects for girls.

Classes, Workshops, & Meetings held at BSFS

- MSU
 - Identification of Woody Plants
 - Plant Ecology
 - Plant Taxonomy
 - Fisheries Management
 - Mammalogy
 - Herpetology
 - Ozarks Natural Communities
 - Geography, Geology, and Planning

- Workshops, meetings, and other academic uses
 - Missouri Herpetological Association Annual Meeting
 - Green Leadership Academy for Diverse Ecosystems (GLADE)
 - Boy Scouts
 - Ozarks Technical Community College
 - Kirbyville Middle School summer school program
 - Chert Glades Missouri Master Naturalists
 - MDC-AGFC Chronic Wasting Disease Training & Planning
 - STEEL – elementary & middle school teachers for Lichen study with C. Prussia

BSFS Use Statistics for 2013 (person-days): Total = 1289

- Classes (MSU and non-MSU classes): 675
- Meetings and workshops: 94
- Research (Missouri State faculty and staff and non-MSU groups): 373
- Maintenance, security, or staff work day: 145
- Tour: 14

Research

Faculty/Staff

Bowles, B.D. and D. Bowles. Plant Diversity of Ozark springs.

Greene, J.S. Monitoring Avian Productivity and Survivorship at BSFS – bird banding and health data collection

Graduate and undergraduate students

Baillie Shebesta (U). A summary of the 2015 bird banding data at the Bull Shoals Field Station.

Katy Gardner (U). Antipredator responses of larval Ringed Salamanders.

Sarah Heimbach (G). Effects of territorial pressure on the behavior of the Ozark Zigzag Salamander.

Colton Lynn (G). Comparison of behavior between two species of Plethodon salamanders.

Kane Sheek (U). Overstory Primary Production in an Oak/Hickory Woodland as a Function of Prescribed Fire.

Dylan Maag (G). Spatial ecology and habitat selection of Pygmy Rattlesnakes at the Drury/Mincy Conservation Areas.

Emily Beasley (G). Island Biogeography & Metacommunity Structure of Ozark Small Mammals.

Tyler Remick (G). The effects of bot fly parasitism on average daily movement in white footed mice, with implications for a social network.

Publications

Green, E. N., D.M. Green, S.P. Maher, & L. W. Robbins. 2016. Seasonal circadian rhythm shift and lunar chronobiology of the nine-banded armadillo (*Dasypus novemcinctus*). *The Southwestern Naturalist*. 61: 251-256. DOI: 10.1894/0038-4909-61.3.251

Wait, D.A. 2016. Effects of burning and folivory on growth of oak saplings for oak advance regeneration and commercial use in oak forests and savannahs. *International Journal of Applied Science and Technology*. 6(2):1-10.

Presentations

Greene, Brian. Preliminary Results on a Radiotelemetry Study on Pygmy Rattlesnakes (*Sistrurus miliarius*) in Southwestern Missouri. Missouri Herpetological Society.

Beasley, EM and SP Maher. Island Biogeography & Metacommunity Structure of Ozark Small Mammals. Central Plains Society of Mammalogists. Poster

Remick, T and SP Maher. The effects of bot fly parasitism on average daily movement in white footed mice, with implications for a social network. Central Plains Society of Mammalogists. Poster

Shebesta, Baillie. A summary of the 2015 bird banding data at the Bull shoals field Station. CNAS undergraduate research forum. Missouri State University

Dalton, Reeder, Bortosky, & Mathis, 2016. Differences in response to disturbance by two species of terrestrial salamanders: A field test. Animal Behavior Society, Columbia, MO — Poster Presentation

Heimbach & Mathis, 2016. The Effect of Varying Levels of Predation Risk on Territorial Behavior by Male and Female Ozark ZigZag Salamanders, *Plethodon angusticlavius*. Missouri Herpetological Association, BSFS – Oral Presentation

Gardner, Dalton, & Mathis, 2016. Response to Conspecific Alarm Cues by Larval Spotted Salamanders. Missouri Herpetological Association, BSFS – Oral Presentation

Lynn, Mathis, & Dalton, 2016. Differences in Agonism in Two Species of *Plethodon*. Missouri Herpetological Association, BSFS – Oral Presentation

Heimbach & Mathis, 2016. The effect of predation pressure on the territorial behavior of Ozark zigzag salamanders. 3 Minute Thesis Competition — Oral Presentation

Grant proposals and awards.

Beasley, E. Island Biogeography & Metacommunity Structure of Ozark Small Mammals. Graduate Thesis Funding Award.

Maher, S. Small mammal communities across southern Missouri: Assessment of past anthropogenic change and potential implications of continued change. Missouri State University Faculty Research Grant. 2016. \$7500.

Remick, T. The effects of bot fly parasitism on average daily movement in white footed mice, with implications for a social network. Graduate Thesis and Bull Shoals Grant Awards.

Wait, D.A. Missouri Department of Conservation. Glade Research. Declined.

Activity Highlights

Long-term monitoring for climate change

Bull Shoals Field Station's phenocamera continues to collect forest canopy pictures every 30 minutes during the daylight hours at Shanda's Point. These pictures are sent real-time to the Phenocam Network (<http://phenocam.sr.unh.edu>), hosted by Harvard University and the University of New Hampshire. The pictures can be used to monitor canopy phenology (the dates of leaf development and leaf fall every year) and can serve as a link to remote sensing information. Phenology, the study of the annual timing of life cycle events of plants and animals, is a powerful indicator of climate change.

We continue to collect long-term data weather station data, which is updated on the BSFS website. In addition, A. Wait continues to conduct yearly monitoring for the “Drought Open-Source Ecology” (DOSE) network. The purpose of DOSE is to collect information about the response of plant physiology to drought. Long-term temperature data are being collected from four BSFS ponds and new temperature loggers were installed this year to continue that process.

A thermistor string and buoy were purchased in 2016 to monitor temperature across depth in Bull Shoals Lake at K-Dock Marina and transmit it real-time. We are currently working to find a stable connection to transmit the data near real-time to the BSFS website.

Flying WILD, Project WET and Project Learning Tree Workshops

7 PLT Workshops: 131 participants
11 WET Workshops: 214 participants
2 Growing up Wild/Early Childhood PLT workshops: 27 participants
4 Project Wild/Wild Aquatic Workshops: 65 participants

Total 24 workshops and 437 participants

Green Leadership Academy for Diverse Ecosystems (GLADE)

The 8th year of the week-long GLADE brought 15 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. This year Janice Greene stepped down as Co-Director; Andrew Kinslow and Tammy Trantham are the new Co-Directors. Greene still helps coordinate speakers, welcomes parents and students, helps lead students through bird banding, etc. Celeste Prussia teaches lessons on lichens and others and helps with facilities. The GLADE website is:
<http://www.greenleadershipacademy.org/index.htm>

Girl Infinity STEM Program for Girls

Bull Shoals Field Station launched a STEM program for middle school girls. The program mission is self-efficacy and empowerment for girls in science, technology, engineering, and math. Two summer camps were held at the Discovery Center of Springfield (17 girls) and an after-school program was held at Pipkin Middle School on a weekly basis beginning in August (12 girls).

Additional BSFS Activities by BSFS Faculty and Staff

- Janice Greene serves as the State Coordinator for Flying WILD. Janice and Erica Cox are Co-Coordinators for Project Learning Tree, and Erica is the State Coordinator for Project WET. All three are national environmental education

programs focusing which use the themes of birds, trees, and water to help youth understand science and the complexity of environmental issues.

- Use of Project Learning Tree and Project WET at teacher conferences (see above for numbers of full workshops) (E. Cox)
- Exhibit at Missouri Natural Resources Conference (J. Greene)
- Exhibited the Projects (WET, Learning Tree and Flying WILD) at the Missouri Interface A and B Conference (E. Cox and J. Greene)
- Monitoring Avian Productivity and Survivorship at BSFS – bird banding and health data collection (J. Greene)
- Northern Saw-whet owl banding (J. Greene)
- Christmas Bird Count in cooperation with the Greater Ozarks Audubon Chapter (J. Greene)
- GLADE sponsor and instructor (J. Greene and C. Prussia)
- Homeschool Outdoor Fair(s): 5/5 @ Water Valley Mill Equestrian Center (290) and 10/6 @ The Botanical Center (195) (C. Prussia)
- Discovery Center – consultation with education staff re: Tardigrade exhibit/activities 2/8 (C. Prussia)
- Volunteer Tour @ BSFS (2) 4/7 (C. Prussia)
- Assistance to MDC with Rx burn of Mincy Unit in Drury CA 3/29 (C. Prussia)
- MEEA-MOGSEE Conference – Planning Committee; conference 11/5@ Botanical Center (C. Prussia)
- Land Ethic Leaders Workshop – Attendee to prep for LEL in MO @ BSFS and Watershed Center 6/23-25 (C. Prussia)
- Land Ethic Leaders Workshop – Planning with Watershed Center; Assistance to ALF facilitators 11/14-16 (C. Prussia)
- GLADE presentation: Lichens 6/21 @ BSFS (C. Prussia)
- Presentation: Lichens (Janice's class) 10/5 @ MSU (C. Prussia)
- OBFS Annual Meeting – Sitka, AK – Represent BSFS 9/20-24; iDigBio workshop (C. Prussia)
- Guest lecture Limnology (B. Bowles)
- Career Day, Pipkin Middle School (B. Bowles)
- Volunteered at River Jam to benefit the James River Basin Partnership (B. Bowles)

Goals for 2017

We are continuing to search for funding opportunities for a dormitory to work with Terry Chase and his land. This would provide an excellent meeting space for groups.

Celeste Prussia will move her office down to the newly renovated office space in the shed at BSFS.

We will continue the installation of the lake buoy to monitor the temperature gradient and thermocline and the posting of the data to the BSFS webpage. We will advertise this at the K-Dock Marina as well.

The continuation of the GLADE Academy continues to be a priority of BSFS. The 2017 Academy is funded with the fundraising of the Greater Ozarks Audubon Society.

We will continue to recruit additional universities and conservation-related groups to use the field station to increase the usage of BSFS. We continue to update the website as part of this effort.