

# Bull Shoals Field Station

## Missouri State University

### Annual Report

#### 2005



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## Overview

The Bull Shoals Field Station (BSFS) of Missouri State University entered its 6<sup>th</sup> year of operation in 2005. In addition to establishing a new external Advisory Committee, we were able to procure a number of acquisitions to enhance our ability to meet the needs of field station users. These include: pontoon boat, garden tractor-mower, bunk beds and dressers for the new house, and heavy duty picnic tables for the shelter at the Drury House. Renovations on the Drury House have continued throughout 2005 and a federal appropriation necessitated additional planning efforts this year for the expanded remodeling efforts to be undertaken in 2006.

## Classes, Workshops, & Meetings

- MSU
  - Geohydrology
  - Herpetology
  - Mammalogy
  - Mammal Ecology
  - Plant Ecology
  
- Other Universities
  - Entomology – Kansas State University
  - Limnology – Arkansas State University

General site-use statistics for 2005:

Tours: 4 with 9 visitors

Classes: 6 with 69 overnight residents

Graduate Research: 6 visits with one overnight

Maintenance/Security: 55 day use visits

The reduced use of the Field Station in the vicinity of the Drury House in 2005 was due to restrictions from construction & remodeling work underway at that facility.

## Research

- Graduate Students
  - **McMinn, Brian; Angela Bandy** – Water quality monitoring of Beaver Creek and Bull Shoals Lake – Project samples water from five sites for the Upper White River Basin Foundation. Each site is sampled 33 times a year for dissolved oxygen, total nitrogen, total phosphorus, and *E. coli* colony forming units. Two years of data collection have shown that there is tremendous variability in the parameters in Beaver Creek. Most of the time, values fall within state guidelines, however, high values tend to follow rain events (*Janice S. Greene, advisor*)

- **Brad Mormann** – “Winter Roosting Ecology of Red Bats (*Lasiurus borealis*) in Southwest Missouri” – Brad’s work provided evidence of the need to consider the use of winter/spring forest burns and the availability of oak/cedar forests in the management of over-wintering red bats. Graduated Spring, 2005 (*Lynn Robbins, advisor*)
- **Pam (Brown) Lucas** – “Foliar Herbivory on Understory Oaks as a Function of Forest Type and Prescribed Burning” – Pam’s research data suggest that Ozark oak forest habitats are potentially more susceptible to herbivore damage than savanna habitats, especially following a prescribed burn. Graduated Spring, 2005 (*Alexander Wait, advisor*)
- **Miranda Milam-Dunbar** – “Ecophysiology of Hibernating Eastern Red Bats (*Lasiurus borealis*)” – Miranda’s lab work complemented Brad’s field work. Her goals were to describe the correlation between winter arousals and ambient temperature and to track changes in metabolism and body temperature during hibernation and arousals at various ambient temperatures to estimate a winter energy budget for this species. Graduated Spring, 2005 (*Lynn Robbins, advisor*)
- **Corinne Schoppet** – “Acorn Contribution to Mammalian Energetics” – In her investigation of the consumption of acorns by mammals of an oak forest, Corinne separately calculated consumption by mice, squirrels, and deer. Her data was used to estimate the importance of acorns on their winter survival and the impact of these mammals on acorn survival. Graduated Fall, 2005 (*Thomas Tomasi, advisor*)
- Undergraduate Students
  - **Mari Shuler** - Overstory leaf production and leaf litter as a function of forest type and prescribed burning (*D. Alexander Wait, advisor*)

## Manuscripts

- Aubrey, D.P. and D.A. Wait. Prescribed burning in Ozark forests increases understory light availability and favors white oaks. *Forest Ecology and Management*. IN PREP. (expected submission February 2006)
- Greene, J. S. Submitted. Reading the landscape: Or knowing where you are. *Green Teacher*.
- Greene, J. S., and R. Aram. In preparation. The FIELDS Project: Teacher Training in Outdoor Research and Monitoring Activities
- Lucas, P.L. and D.A. Wait. Foliar herbivory on understory oaks in Ozark forests as a function of forest type and prescribed burning. *American Midland Naturalist*. IN PREP. (expected submission January 2006).

## **Presentations & Outreach**

- Greene, J. 2005. Knowing Where You Live: Getting students to understand their world. National Association of Biology Teachers Annual Conference. Milwaukee, Wisconsin.
- Saunders, G. and J. S. Greene. 2005. GLOBE Project: Soils Introductory session. Interface: Science and Mathematics Conference. Lake Ozark, Missouri.

## **Community Outreach**

Grant Woods of Woods and Associates, Inc. started his research on white-tailed deer at the Drury/Mincy Conservation Area (pre-BSFS) as a graduate student at SMSU (now Missouri State). He returned to the area as a favor to BSFS to present a seminar on deer management. Approximately 30 individuals, most from the local community, attended on a rainy, cold night in February at the Mincy Community Center which is just outside the Drury Wildlife Conservation Area. Grant's presentation included a discussion of deer biology and behavior with how landowners and hunters can use this information to improve deer herd quality. BSFS staff sent participants an invitation to a follow-up session held by Dr. Woods in Branson as a courtesy to them and him.

We scheduled several workshops, including Winter Ecology for Families, Bluebird Box Building, and a Wildflower Walk, but did not get any registrants. Although a press release was issued from the University, it appears that we need to develop a more effective strategy for marketing the workshops. We will keep trying and will establish contacts in the local community to “spread the word.”

## **Grants**

- Greene, J. 2004-05. \$14,361. Missouri Watershed Information Network. Watershed Education Class Implementation and four 4-H watershed workshops for Missouri Watershed Information Network (MOWIN).
- Greene, J. 2005. \$1,575. Missouri State University, University Grant. Curriculum Development at the Bull Shoals Field Station.
- Greene, J., and E. Redd. 2004. \$42,000. National Science Foundation. Facilities improvement at the Bull Shoals Field Station.
- Greene, J. 2004 – 2008. \$97,933. Water quality monitoring of Beaver Creek and Bull Shoals Lake. Upper White River Basin Foundation.

- Greene, J. \$450,000. Not Funded. Investigations of Aquatic and Terrestrial Ozark Ecosystems: From Microbes to Mammals. National Science Foundation.
- Federal Appropriation through Representative Roy Blunt. \$300,000 for renovations to the Drury House.

## **Additional Activities Related to BSFS**

- Greene, Janice S.:
  - Presented update on facilities to College of Natural and Applied Sciences Convocation. October 2005.
  - Presented to Scientific Writing Class and to Senior Seminar Class.
  - I have been working with Design and Construction and the Corps of Engineers on renovations at the Drury House – numerous meeting.
  - Report to Upper White River Basin Foundation: Water Quality Monitoring Results of Beaver Creek and Bull Shoals Lake. Year 2 – 8/04 to 7/05.

## **Facilities**

The National Science Foundation Field Station and Marine Laboratory grant (**DBI-0330657**) has allowed us to drill a new well, install a solar-powered pump and a peat moss-based septic system, and replace the plumbing and electrical wiring at the Drury House. In addition, a federal appropriation to the U.S. Army Corps of Engineers, through Representative Roy Blunt's office, will help us to complete many of the renovations on the Drury House. Replacement and insulation of the exterior plaster and lath walls, new windows, installation of a solar power system for the house and a back-up generator will allow the house to be fully functional as a place for graduate students, visiting researchers, and classes to use. In addition, an additional ADA bathroom is planned. Depending upon the costs of these improvements, there may be enough money to build a classroom building. We want flexible space that can be used for meetings and formal presentations or for class activities and labs. If there is not enough money to construct the building this year, we will be searching for funds to do this. The Corps of Engineers will be starting their renovations early in 2006.

## **New Acquisitions**

We were very fortunate this year to be able to make some much-needed purchases that have improved our ability to meet the needs of classes or maintenance operations. These include:

Bunk beds and dressers – Beautifully made by workers under the care of the Missouri Department of Corrections, ten wooden bunk beds with mattresses and three wooden dressers were purchased for the bedrooms of the “new house”. The bunks give overnight residents a better night’s sleep and improves our image as a professional operation.

Garden tractor/mower – Last summer we were hard-pressed keep up with mowing using a walk-behind mower. While neighbors kept asking, “When are you going mow that place?”, we kept pushing away with the little mower as best we could. The new mower glides over the terrain (well, the parts of it without the usual allotment of Ozark stones) and we can now mow behind the house as well.

Pontoon boat – The old boat used for access to the open waters of Bull Shoals Lake for classes and research was on loan from the University of Missouri at Rolla. After stranding the captain and crew a number of times (fortunately not while classes were on board), she’s been replaced with a gently-used 10 passenger pontoon boat from the rental fleet of K-Dock Marina. The new boat carried Dr. Wait’s Plant Ecology class and a Limnology class from Arkansas State. She’s received good grades from both classes and the BSFS water quality monitoring team as a reliable and lake-worthy craft.

Picnic Tables for Shelter at Drury House - We received our heavy-duty recycled plastic picnic tables in December and were surprised at their weight and state of disassembly. Five standard tables and one that will accommodate wheelchairs compose the bulk of “furniture” we needed for classes and groups using the shelter.

Additionally, two gifts were given to the BSFS this year. A microwave for our new house was given by Joe McMillian, Biology Department alumnus, in honor of Dr. Robert Wilkinson, Jr. A kitchen range for the Drury House was donated by Paul Frese.

## **New External Advisory Committee**

We have established an external Advisory Committee to help advise BSFS staff on community outreach and to provide ideas and help in fundraising. Current members include Mr. Don Baker, retired Branson businessman and former resident of the Drury House; Mr. David Cook, President of First Community Bank of the Ozarks in Branson; Mr. Buddy Roberts, Buddy Roberts Sales Co. in Forsyth, and Dr. Grant Woods, Woods and Associates, Inc. and Missouri State Alumni. Mr. Baker has been a big help in getting this committee established and in providing information about the Drury House.

## BSFS Logo

Jeanne Stephens has been enlisted to design a BSFS logo that will combine elements of our mission and present an attractive identifier. A number of drafts have been reviewed by the internal advisory committee and this is the most recent concept design. It is not the final version but gives an overall feel for the direction of progress on a BSFS logo.



## Christmas Bird Counts

Once again BSFS participated in the Annual Taney County Christmas Bird Count (CBC) held on January 2, 2005, with the help of the Greater Ozarks Audubon Society. On the Drury Wildlife Area, the most numerous avians were the Dark-eyed Junco (number one for two years in a row!), American Crow and Canada Goose (tied for second), plus American Goldfinch, Northern Cardinal, Carolina Chickadee, and Bluebird (tied for third). The complete list of birds recorded for Dec. 2002, Jan. 2004, and Jan. 2005 are presented in the Appendix.

## Future

### New Geoscience Equipment

We are working with **Kevin Mickus**, Geography, Geology and Planning Department, to try and get a permanent seismic station and a magnetotelluric station at the BSFS as part of the national Earthscope Project. The magnetotelluric station measures the earth's time-varying electrical and magnetic fields in order to determine the earth's conductivity structure with depth (down into the middle mantle). We are working on getting details ironed out. This will be a great addition to the station if we can get it to happen.

# Appendix

<b>Christmas Bird Count</b>			<b>12/1/02</b>	<b>1/3/04</b>	<b>1/2/05</b>
American Crow	<i>Corvus</i>	<i>brachyrhynchus</i>	7	31	20
Carolina Wren	<i>Thryothorus</i>	<i>bewickii</i>	3	2	1
Blue Jay	<i>Cyanocitta</i>	<i>cristata</i>	4	14	10
American Goldfinch	<i>Carduelis</i>	<i>tristis</i>	4	3	13
Robin	<i>Turdus</i>	<i>migratorius</i>		0	1
Dark-eyed Junco	<i>Junco</i>	<i>hyemalis</i>	15	72	30
Northern Cardinal	<i>Richmondia</i>	<i>cardinalis</i>	8	13	13
White Throated Sparrow	<i>Zonotrichia</i>	<i>albicollis</i>	20	8	8
Tufted Titmouse	<i>Parus</i>	<i>bicolor</i>	6	15	11
Red-bellied Woodpecker	<i>Centurus</i>	<i>carolinus</i>	4	6	8
Pine Warbler	<i>Dendroica</i>	<i>pinus</i>		4	0
Carolina Chickadee	<i>Parus</i>	<i>atricapillus</i>	2	14	13
Yellow-bellied Sapsucker	<i>Sphyrapicus</i>	<i>varius</i>	1	2	0
White Breasted Nuthatch	<i>Sitta</i>	<i>carolinensis</i>		6	8
Yellow Rumped Warbler	<i>Dendroica</i>	<i>coronata</i>	1	2	0
Downy Woodpecker	<i>Dendrocopos</i>	<i>pubescens</i>	2	3	8
Northern Flicker	<i>Colaptes</i>	<i>auratus</i>	2	2	7
Bonaparte's Gull	<i>Larus</i>	<i>philadelphia</i>	11	3	0
Killdeer	<i>Charadrius</i>	<i>vociferus</i>	2	2	0
Song Sparrow	<i>Melospiza</i>	<i>melodia</i>	30	4	4
Belted Kingfisher	<i>Ceryle</i>	<i>alcyon</i>	1	1	0
Common Loon	<i>Gavia</i>	<i>immer</i>		0	0
Bluebird	<i>Sialia</i>	<i>sialis</i>		12	13
Pileated Woodpecker	<i>Dryocopus</i>	<i>pileatus</i>	1	3	4
Red-winged Blackbird	<i>Agelaius</i>	<i>phoeniceus</i>	25	1	0
Canada Goose	<i>Branta</i>	<i>canadensis</i>		6	20
Bald Eagle	<i>Haliaeetus</i>	<i>leucocephalus</i>	6	1	1
Mourning Dove	<i>Zenaidura</i>	<i>macroura</i>		1	0
Red-headed Wood Pecker	<i>Melanerpes</i>	<i>erythrocephalus</i>	5	1	0
Golden Crowned Kinglet	<i>Regulus</i>	<i>satrapa</i>	3	3	7
Turkey Vulture	<i>Cathartes</i>	<i>aura</i>		8	3
Red-tailed Hawk	<i>Buteo</i>	<i>jamaicensis</i>	2	0	1
Fox sparrow	<i>Passerella</i>	<i>iliaca</i>		0	1
Savannah sparrow	<i>Passerculus</i>	<i>sandwichensis</i>		0	2
Brown Thrasher	<i>Toxostoma</i>	<i>rufum</i>		0	1
Purple Finch	<i>Carpodacus</i>	<i>purpureus</i>		0	3
Kinglet species	<i>Regulus</i>	<i>calendula</i>		0	3
Red Shouldered Hawk	<i>Buteo</i>	<i>lineatus</i>		0	1
House Finch	<i>Carpodacus</i>	<i>mexicanus</i>		0	1
Black Vulture	<i>Coragyps</i>	<i>atratus</i>		0	1
Ring-billed Gull	<i>Larus</i>	<i>delawarensis</i>	1		
Hermit Thrush	<i>Hylocichla</i>	<i>guttata</i>	1		