

**Missouri State.**  
U N I V E R S I T Y

**2020**  
**Bull Shoals Field Station**  
**Annual Report**



## **1.0 Bull Shoals Field Station Mission**

The mission of the Missouri State University (MSU) Bull Shoals Field Station (BSFS) 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.

## **2.0 Partnerships**

BSFS staff correspond with the U.S. Army Corps of Engineers (USACE) and Missouri Department of Conservation (MDC) personnel on research and monitoring questions. USACE also does an annual inspection every year. Moreover, MDC and BSFS staff communicate about maintenance issues and the timing of group events at the Drury-Mincy Conservation Area.

Partnerships have also sprung out of the annual Green Leadership Academy for Diverse Ecosystems (GLADE) program. MDC, BSFS staff, and the Greater Ozarks Audubon Society (GOAS) work together to plan and conduct the event. 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.

The Mincy House is also the host site for GOAS' Taney County Christmas Bird Count. This annual event includes counting birds on the Drury Conservation Area and hosting the compilation dinner in the evening (although the pandemic cancelled the dinner in 2020).

## **3.0 Field Station Resources**

### **3.1 Staff**

In 2020, primary BSFS staff consisted of:

- Director - Janice Schnake Greene; and,
- Manager - Patricia Reed.

The university has yet to hire a new EE Program Coordinator.

### **3.2 Facilities and Equipment**

As of 2020, BSFS consists of three facilities, the new Ozarks Education Center (OEC), Drury House and Mincy House. The Ozarks Education Center includes a split building with a classroom, kitchen and office on one side and a bunkroom and bath/shower rooms on the other. There are also three cabins with bunks. The Drury House property includes a two-story stone house; pavilion; classroom; shed containing a wet lab, office, and maintenance storage; and, a generator/photovoltaic system building. The Mincy House property includes a one-story ranch-style house and a stand-alone garage. BSFS Manager Patricia Reed conducted inventories of the Mincy and Drury properties in 2018. She uploaded summary inventory sheets to the website in 2019. An inventory of the OEC will be conducted this spring with the final summary sheets loaded onto the website this summer.

### **3.3 Vehicles and Other Vessels**

MSU Motor Pool has three passenger vehicles and two boats listed for the field station. These include:

- 2008 Chevrolet Uplander van;
- 2007 Ford Ranger pickup;
- 1994 Ford F-150 truck;
- 1999 Lowe 20-foot Suncruiser pontoon boat with a 2019 60 hp Johnson outboard motor; and,
- 1994 Generation III 12-foot Jon boat.

Other field station vehicles and vessels include a 2007 Cub Cadet UTV and four aluminum canoes.

The Uplander is typically stationed at MSU, while the two trucks, the jon boat, the aluminum canoes, and the UTV are at Mincy House. The pontoon boat is kept at the K-Dock Marina. The jon boat and aluminum canoes will be sent to MSU Surplus spring of 2021.

The battery in the Uplander was replaced in September and the Ford F150 had its transmission replaced in December.

## **4.0 Expenditures**

### **4.1 Past Expenses**

BSFS has an approximately \$75,000 annual budget. The field station's major expense continues to be staff salaries. Other expenses include (1) facilities costs such as maintenance and utilities (e.g. Mincy House electricity and Drury House propane); (2) vehicle maintenance and boat slip rental; (3) travel expenses for conferences and Projects WET, Learning Tree, and WILD workshops; (4) GLADE sponsorship costs; and, (5) membership and conference fees.

The BSFS Manager spent approximately \$10,847 last year. The bulk of expenses incurred (almost \$7,000) were classified as maintenance. Large facilities maintenance expenses (over \$3,100) included OEC landscaping, rebuilding the Mincy House deck, and purchase of tools such as a Dewalt 10 piece tool kit. Large vehicle maintenance costs (over \$3,400) included work on both the Ford Ford F-150 and a battery replacement in the Chevy Uplander (see section 3.3 for a description). The remaining expenses went to supplies (about \$1,243), pontoon boat slip rental (\$1,200), and utilities (about \$1,455).

### **4.2 Anticipated Expenses**

The following projects will require funding next year:

- A new buoy modem;
- Repair of the Drury House screened in porch and repainting the house trim;
- Renting a dumpster to complete removal of the Mincy House pigeon coop;
- Continued work on the OEC landscaping; and,
- Beginning to construct a fire pit/picnic area at the OEC.

There are also several larger projects that could be completed in 2021, such as an OEC storage building, if additional funding is possible.

## 5.0 BSFS Use Statistics

BSFS use statistics are compiled from sign-in sheets at the OEC, and Mincy and Drury Houses. These sheets are combined to calculate the following use statistics. Please note that if an individual pays a visit to both houses or the OEC in the same day (e.g. for maintenance or research) this is only counted as one person-day.

<b>Table 1: BSFS Use Statistics</b>			
	<b>2020*</b>	<b>2019</b>	<b>2018</b>
<i>Total</i>	897	975	570
Classes	558	472	282
Meetings/Workshops	0	253	48
Tours	45	30	7
Research	114	83	154
Maintenance/Staff Workdays	171	137	79
Contractor Workdays**	9	0	0
*Pandemic rules limited usage **After the OEC was completed in June 2020			

As a reminder, the calculation methodology was altered last year to better define a “person-day” so any usage comparisons can only be made since 2018.

## 6.0 BSFS Activities

### 6.1 Classes

The pandemic limited usage of the BSFS so faculty did not hold class field trips. The only fulltime class in 2020 was a Geology Field Camp held over the summer spread across all three facilities.

### 6.2 Meetings, Workshops, Tours, and Other Uses

As with many field station uses, the pandemic ruled out hosting any meetings and workshops, and limited tours. Tours were provided to:

- David Bowles and colleagues;
- Dr. Matt McKay and others for a summer geology camp;
- April Trotter of BNIM and colleagues who designed the OEC; and,
- Jen Cox and others to appraise the Mincy House.

The field station was also used by two personal groups for overnight stays to make sure the facilities are at least used once each semester. In December, the Greater Ozarks Audubon Society

conducted their annual Christmas Bird Count at the Drury Mincy Conservation Area. Due to the pandemic, the tabulation dinner was not held and field station facilities not used.

### **6.3 Research and Monitoring**

#### Undergraduates

- None

#### Graduate

- None

#### Faculty and Staff

- Sean Maher - SnapshotUSA camera traps (<https://emammal.si.edu/snapshot-usa-2020-home-page>).

#### Long-Term Monitoring

Dr. Janice Greene has been capturing and banding birds for the Monitoring Avian Productivity and Survivorship (MAPS) program at BSFS since 2010. MAPS is a national effort to monitor demographic trends in birds. Dr. Greene's contribution includes setting out ten nets for ten days every summer and capturing required demographic data and banding the birds. Dr. Greene has also spent several years participating in a Northern Saw-Whet Owl monitoring project.

Over the past 19 years, Dr. Alexander Wait and numerous graduate and undergraduate students have been collecting leaf litter and acorn production across three BSFS woodland types: (1) not burned in over 60 years, (2) burned every 2-4 years since 1999; or, (3) burned every 2-4 years since 1980. He has also been monitoring spring ephemeral species richness since 2008. The data are used to assess the effects of fire, precipitation, and temperature on community and ecosystem processes in woodlands. For instance, the data indicate:

- The reintroduction of prescribed fire has decreased total overstory leaf production, mostly because of thinning. Overstory cover has decreased from 90% to 80% and 60% for burns since 1999 and 1980, respectively.
- All three woodland types have similar total acorn production, which suggests that the reintroduction of prescribed fire has not increased acorn production, which relates to opportunities for oak regeneration.
- Litter fall is one of the main factors that contributes to nutrient cycling and carbon input into the soil. Prescribed fire decreasing the amount of leaf litter input results in decreases in rates of nutrient and carbon recycling.

Bull Shoals Field Station's phenocamera continues to collect forest canopy pictures every 30 minutes during the daylight hours at Shanda's Point. The phenocam sends these pictures in real-time to the Phenocam Network (<http://phenocam.sr.unh.edu>), hosted by Harvard University and the University of New Hampshire. Researchers can use the pictures to monitor canopy phenology (the dates of leaf development and leaf fall every year) and 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. In late summer 2020, the cellular modem for the

phenocam stopped working. The BSFS manager will install a new modem in early 2021 to get the phenocam back in operation.

BSFS staff continue to collect long-term data weather station data, which they update on the BSFS website monthly. The battery for the weather station failed in November 2020 and the BSFS Manager replaced it in December 2020.

Dataloggers collected long-term temperature data at four BSFS ponds from May 2011 through June 2017. Researchers installed new temperature loggers July 2017 in Ponds 1, 2, and 4 to continue this process. Summer 2021 the new field station manager intends to set up the last logger in Pond 3 and upload the most recent data to the BSFS website.

## **6.4 Facility Maintenance**

BSFS staff conduct general home maintenance, cold weather and security checks, mowing, and cleaning throughout the year as necessary. This work makes up the bulk of maintenance/staff workdays. The staff spend the remaining days troubleshooting emergencies that crop up and working through a list of larger home maintenance tasks. Examples of other work done at the field station include:

- Rebuilding the Mincy House deck;
- Tearing down the Mincy House pigeon coop;
- Removing the Drury House outdoor sink and shower;
- Painting the Mincy House main room, office, and kitchen;
- Clearing cedars at Mincy House; and,
- Conducting landscaping activities at OEC including building pathways and stairs.

## **7.0 Offsite Activities**

### **7.1 Environmental Education Programs**

Missouri State University is the state sponsor of several environmental education (EE) programs, including Projects WET, WILD, and Learning Tree (PLT), Flying WILD, and early childhood education for each major program. Additionally, Janice Greene is the state coordinator for Leopold Education Project, Flying WILD, and Projects Learning Tree and WILD. MSU offers training to educators so they may use the activities with students. This year, with COVID, the number of workshops was down. Teachers were designing virtual learning and had little time for additional trainings. MSU did have 12 individuals take the Growing Up WILD training and five take the Flying WILD training. A virtual Facilitator training for Project WILD, Aquatic WILD and Flying WILD was given to five individuals from the St. Louis area.

### **7.2 Conferences**

The pandemic halted conference attendance in 2020.

### **7.3 Additional Activities by BSFS Staff**

The pandemic limited additional activities by BSFS staff in 2020.

## **8.0 Publications and Presentations**

### **8.1 Publications**

Sean Maher noted that the data from the 2019 SNAPSHOT USA effort are part of a submitted manuscript:

SNAPSHOT USA 2019: A coordinated national camera trap survey of the United States.  
Cove et al

### **8.2 Presentations**

The following presentation efforts associated with the field station occurred in 2020 or will occur in 2021:

- Wait, D.A. 2020. Carbon inputs and turnover in Ozark oak/hickory woodlands: managing at various scales to maximize ecological function into the future Missouri Natural Resource Conference. Osage Beach, MO.
- Grace Hall (undergraduate) will present her research project at two conferences this spring: Relationships between primary productivity, precipitation and phenology in an Ozark oak/hickory woodland.

## **9.0 Grant proposals and awards**

There were no grant proposals and awards associated with the field station in 2020.

## **10.0 Future Goals**

Below is a long list of future goals for the field station. It is the intent of the BSFS staff to accomplish as many of these goals as possible in 2021. Any tasks not fully accomplished will be carried into future years.

### **10.1 Drury House**

Plans for the upcoming year at Drury House include reconstructing the screened in porch and painting all the trim on the house.

### **10.2 Mincy House**

The University is selling Mincy House in 2021 to provide funds for broadband internet at the OEC.

### **10.3 Ozarks Education Center**

Field station staff intend to continue working on the OEC landscaping, construct a fire pit/picnic area, and, with future funding, a storage shed and several additional cabins. Additionally, BSFS management will start to map out and construct a trail system on the property.

### **10.4 Research**

Research plans for the upcoming year include:

1. Updating pond information;

2. Launching the buoy at K Dock Marina;
3. Erecting a new weather station at the OEC site; and,
4. Developing and implementing a sampling plan for Bull Shoals Lake.

### **10.5 Administrative**

Administrative plans for the upcoming year include:

1. Continue working on a new plan for the field station to help guide upcoming decision-making, including a long-range budget;
2. Implement a field station application system;
3. Finalize and print a series of natural history brochures for the field station; and,
4. Create a video highlighting field station assets.

### **10.6 Fundraising**

The primary fundraising need for the upcoming year is to construct more cabins at the OEC. BSFS staff intend to develop this fundraising campaign in 2021.