located on 2,000 acres of woods, prairies and wetlands, the Edward Lowe Foundation is an ideal place to study botanical and animal life. As part of its land-stewardship mission, the foundation makes its property, known as Big Rock Valley (BRV), available to academic researchers and environmental organizations.

Snake study
Among current research initiatives at BRV is an ongoing study that the Eastern Massasauga Rattlesnake Species Survival Plan (EMR SSP) launched in 2009. A consortium of zoos, the EMR SSP has a dual mission: to enhance the captive population of massasaugas (a species listed as endangered or of special concern in many states) and promote the snakes’ conservation in the wild.

Each May the EMR SSP holds its annual meeting at BRV, and members review breeding practices for their zoos’ snakes, which are managed collectively. The group also spends considerable time outdoors, searching for massasaugas and taking detailed measurements of the snakes and environments in which they are found. The data is being used to build population models to enhance conservation management practices.

Restored prairies
To better understand conditions that impact species in restored prairies, such as different soil and land-use history, a group of researchers from Michigan State University (MSU) and Eastern Michigan University (EMU) have been studying plant communities at Big Rock Valley and other southwest Michigan sites since 2011. Among initial findings, the researchers have shown prior land use can affect which species thrive in restored prairies. “Nonnative grasses, which tend to suppress diversity, were more abundant in prairies that have been sown into old fields or pastures — acreage that was ag fields at one time but was then let go,” says Emily Grman, an assistant professor at EMU who is leading the project.

Building upon their previous work, the researchers are now looking at the effects of herbicide to see if dominant plants in a prairie can be killed so more newly sown species can flourish. They’re also studying the effects of phosphorus, a soil nutrient that may be excessive in former agricultural fields. “We suspect some species are negatively affected by phosphorus, which prevents them from being established in restored prairies, while other less affected species become dominant,” says Grman.

To test the hypothesis, in 2015 the researchers introduced seeds from 22 prairie species into different plots at BRV. Some plots served as a control group, a phosphorus fertilizer was used in other plots, and a herbicide was applied in others. Initial measurements were taken last summer, and phosphorous treatments were reapplied in May 2016.

The research is aimed at advancing both fundamental and applied ecology. “We want to provide a better understanding of plant communities — why some are more diverse than...
others and why some species are more abundant,” Grman says. “We also hope to answer important land management questions, such as how do you restore a diverse prairie and maintain it so it stays diverse.”

**Ants’ role in grasslands**

In 2015 a group of MSU researchers began studying ant populations in grasslands at BRV.

Ants, which represent a significant proportion of animal biomass, influence ecosystems by being both consumers and ecosystem engineers. They eat other invertebrate predators, decomposers and plant pests, and also aerate the soil and modify habitat for other organisms.

The researchers initially evaluated different ant communities at BRV and other grassland sites to see if ants’ role in biocontrol (reduction of invasive pest populations) varies with plant community composition. After identifying about eight core plant species and 12 variable species, they determined that ants provide a similar level of pest reduction services — regardless of the plant community make-up.

The researchers are now investigating potential consequences if ant populations are reduced, which could occur if grasslands are converted to croplands. In addition to biocontrol, they are also looking at ants’ impact on seed dispersal, decomposition and herbivory.

The overarching goal is to explore how important ants are in grasslands, explains Bill Wills, an MSU postdoctoral researcher who is leading the study. “Other studies have been done in the tropics or subtropics, where ants have very specialized roles,” he says. “But in temperate zones where ants are more generalists, their significance hasn’t been as well established in grasslands.”

A quick look at some past research projects conducted at BRV include:

- MSU doctoral student Jeff Evans conducted several studies on garlic mustard, a highly invasive plant.
- Kelly Marsack, a graduate student at Central Michigan University, conducted a two-year genetic study of eastern box turtles, a species on Michigan’s special-concern list.
- Jim Ball, a private researcher and herpetologist, studied salamanders at BRV for several years. Among his discoveries was a rare hybrid salamander with genes from three different species.

**Diversity is a plus**

Researchers say that BRV’s habitat and species diversity is a big asset.

“This is only the second time I’ve worked at a site that is truly actively managed,” says Eric Hileman, a doctoral student at Northern Illinois University, who is working on the EMR SSP study as well as conducting his own research. “Because of the foundation’s land-management practices, succession doesn’t take hold at Big Rock Valley, which increases the likelihood that what we’re trying to find will be there.”

By opening up BRV to researchers, the foundation hopes to broaden the knowledge base of conservation science. The studies also have helped the foundation learn more about various species that inhabit its property, says Mike McCuistion, the foundation’s vice president of physical resources. “We know where some populations of rare species are concentrated on the property, which helps us target land-management initiatives to benefit them.”

Case in point, in areas where rare plants are growing, woodland thinnings are customized to avoid disturbing the sites. And in areas frequented by rare reptiles and amphibians, the foundation conducts prescribed burns during cooler temperatures when those species are underground.

“We’re fortunate to have a great diversity of ecosystems and species on our property,” says McCuistion. “Partnering with researchers has enabled the foundation to learn more about these habitats and species and raise our standards of good land management.”

Researchers interested in conducting projects at BRV should contact Mike McCuistion at mike@lowe.org. The foundation typically provides researchers with housing, access to a field lab with high-speed Internet and additional logistical support.