



OH DEER!

Many students and residents of Sewanee have noticed the high population of deer ambling across campus, nibbling in the gardens, or even colliding with cars. They might not realize that the deer may also be causing a significant change in Sewanee's forests.

Deer were hunted to local extinction for food during the Great Depression. Later, however, they were reintroduced to the area. But the numbers of natural predators had decreased: mountain lions had been hunted to extinction and bobcat numbers were much lower than they had been. Because of this, the only limit to the deer population was the availability of food. Their numbers grew rapidly. According to the literature, the sustainable number of deer for this area is 20 to 25 per square mile. University Domain Manager Nate Wilson has estimated that the Domain now supports nearly 150 deer per square mile.

This summer with Dr. Jon Evans I studied the consumption of woody plants by deer and its effects on forest communities. The more deer, the more browse and the larger the effect the deer will have on the forest. We hypothesized that browse intensity would be heterogeneous at a landscape level because of edge effect, migration routes, and browsing preference.

For the months of June through August I conducted fieldwork along Breakfield Road in the northwestern section of the Domain to quantify the effects of deer on woody vegetation in both residential and forest environments. I measured numbers of seedlings and saplings, percent vegetative cover, percent recruitment (trees moving from one size class to another over time), and tree species richness and diversity. I found that deer browse is significantly affecting

the forest regeneration. As deer browse increases there is a significant decrease in tree species richness, density of saplings, percent recruitment, and percent cover.

While many species are affected, we found Blackgum (*Nyssa sylvatica* Marshall) to be the most sensitive species. In high browse areas we found no blackgum. Based on the extremely high negative correlation between



deer browse and number of blackgum seedlings and saplings, we concluded that blackgum is favored by deer and cannot recover quickly after being browsed.

Edge habitat is defined as areas where the forest is fragmented by roads, power lines, and fields. Studies show that as distance from the forest increases, search costs decrease and food quality increases. Deer love grazing in your back yard because it is ideal foraging habitat. Deer also enjoy browsing cultivated crops.

Our data showed a strong correlation between edge habitat and intensity of browse. We found more deer browse as our sampling moved from the continuous forest along Breakfield Road to the residential areas around Lake Cheston. There were fewer saplings, lower vegetative cover, and lower tree regeneration in the forest close to these edges. Overall this research suggests that deer are most heavily foraging in edge habitat near fields, roads, or development.

Although the deer cull on the Domain has been increased over the years and continues to help manage the populations, the deer are reducing the forest's ability to replace itself with younger trees. (See related article below.)

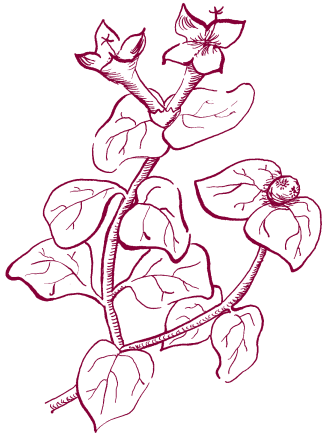
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White-tailed Deer

Currently, the population of white-tailed deer on the Domain is almost five times the average density recommended by Tennessee Wildlife Resources Agency for high quality habitats in the state. Estimates by the Office of Domain Management have the sex ratio of the population in town close to six does for every buck.

Sewanee has been actively controlling the deer population through hunting since 2002. Since 2009 the hunting focus has been on lowering the population and balancing the sex ratio. Simultaneously various college classes have been quantifying browse and the effects of that browse on the species composition.

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Toward a Sustainability Master Plan

As a university, Sewanee's primary commitment is to the education and development of its students. Thus, education is the primary lens through which all of the University's actions, decisions, and policies are to be evaluated. Everything serves the end of empowering students with the knowledge and tools necessary for them to go out into the world and make a positive and lasting contribution.

Serving this ultimate goal demands leadership through example. It is all but impossible for an institution to impress upon its students the issues that most challenge our contemporary society if that same institution is unwilling to act on those same issues. It is from this position that in 2008 Sewanee adopted an addendum to our Strategic Plan that calls for us to become

a national leader in teaching about the environment and in living and operating sustainably. Also, Sewanee has signed the Presidents' Climate Commitment, establishing a firm resolve to reduce our carbon emissions to zero. To offer direction and vision for how the University will uphold this commitment, the Office of Environmental Stewardship and Sustainability has undertaken the drafting of a Sustainability Master Plan.

Sustainability, generally defined, is not so much an end in itself. Rather, it is a process directing the relationship between social and natural systems so that future generations are afforded access to the quality of life that we have. While ostensibly this may seem to have little to do with the work of a Herbarium, much of how Sewanee interprets our commitment to sustainability demands being an exemplar of effective land management, striving to preserve ecological values and promote biodiversity and ecosystem function. These are goals that can have a real and lasting impact on plant communities.

This dedication to ecological values, which forms one of the most robust sections of the drafted plan, includes the pledge to protecting rare, threatened, and endangered species and the habitats in which they are found;

properly managing utility corridors; studying and ameliorating the impacts of poaching and incidental take; addressing the realities and effects of deer overpopulation; and assessing and managing the spread of exotic species.

Each of these issues has widespread implications for plant diversity and plant communities. The Flora of the Domain, the inventory of plants that are native to or have become naturalized on University land, shows that there are a number of native species once found here that have not been seen in years, or in some cases, in decades. To do all we can to ensure that plants currently found don't succumb to that same fate, managing each of these issues will be necessary.

The sustainability of plant populations depends on addressing threats to populations and by taking proactive measures to promote plant communities. The Flora of the Domain quantifies the great diversity of plants and plant communities on the Domain. It will be the work of the Sustainability Master Plan and those called upon to carry out that plan to ensure the preservation of that diversity.

Sustainability relies on the interconnectedness of many issues, actions, and goals.

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Winter Calendar of Events

Mountathon—Sewanee Herbarium, Spencer Hall—Sat., Feb. 9, 9:30-11:30 AM, Mary Priestley

Spending a morning mounting pressed plants can be a satisfying and fun experience. The finished product is always useful and often quite beautiful. Come help us mount our backlog of specimens. Learn methods that have been passed down through generations and are still used today, and take home a guide to mounting pressed plants. Meet in the herbarium on the first floor of Spencer Hall. The main entrance is across from DuPont Library and there is parking behind the library.

Hunt for the First Hepatica—Shakerag Hollow—Sun., Feb. 17, 1:30 PM, Yolande Gottfried

A walk to see what might be out early in Shakerag—maybe some hepatica, pepper-and-salt, or star chickweed. If flowers are scarce on the ground, we'll look at mosses, liverworts, lichens, clubmosses, and even some ferns, which are not fazed by winter weather. Meet at Green's View for this moderate-to-strenuous 2-mile walk that may include a steep rocky section of the trail. Come prepared for muddy, wet, icy, and/or rocky conditions.

Sewanee's H Tree—Old Cowan Road—Sat., Mar. 2, 1:00 PM, George Ramseur

This unusual tree is really two trees that appear as an "H" because of a natural graft between two white oaks about 15 feet above ground (see the spring 2004 issue of *The Plant*

Press). These trees may not both remain in good health for much longer, so this is a good opportunity to see this phenomenon. Meet at the War Memorial Cross for about a half-mile walk down the Old Cowan Road.

Early Spring Wildflowers—Shakerag Hollow—Sun., March 24, 2 PM, Jon Evans

The first day of spring is almost here and it's time to head out to Shakerag Hollow. If you don't get out about now you might miss the beginning of the big show -- bloodroot, trout lily, Dutchman's breeches, and spring beauties bloom early and fade fast. The walk will also include an introduction to winter botany as the woody plants will still mostly be bare of leaf. Meet at Green's View for this moderate-to-strenuous 2-mile walk that may include a steep rocky section of the trail.

Nature Journaling—A nature journaling group, sponsored by the herbarium, meets Thursday mornings, 9-11 in the herbarium. An informal gathering, participants share observations and writing, and sketch plants or other natural objects. Everyone is welcome.

All times are CST or CDT.

Wear appropriate shoes on all of these walks. Risks involved in hiking include physical exertion, rough terrain, forces of nature, and other hazards not present in everyday life. Picking flowers and digging plants are prohibited in all of the above-mentioned natural areas.

For more information on these or other Sewanee Herbarium events, please contact Yolande Gottfried

THE SEWANEE PLANT PRESS

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Drawings, by Mary Priestley, are of blackgum, partridgeberry, an oak seedling, and white-tailed deer.

at the Herbarium (931.598.3346) or by email at ygottfri@sewanee.edu. Directions are available on the Herbarium website, lal.sewanee.edu/herbarium/, under the calendar of events.

Friends of the Sewanee Herbarium

The Friends of the Sewanee Herbarium support the work of the Herbarium: education, research, and conservation. A \$10.00 annual contribution would be very much appreciated. The date of your most recent contribution is printed on your address label.

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Master Plan, continued from p. 2

So while the connections may not always be apparent, the plan as a whole has real implications for the Flora of the Domain. The goal of carbon neutrality serves to assert Sewanee's commitment to the battle against global climate change, which is becoming an increasingly pressing threat to biodiversity around the world.

Meeting these goals demands the participation of many in the university community. It provides tremendous opportunities for students to become a part of initiatives seeking to make a real and lasting impact on the world in such a way that will empower them and inform them to continue to speak on behalf of and work towards sustainability wherever they may find themselves.

— *Nathan Bourne*
Post-baccalaureate Fellow

Oh Deer!, continued from p. 1

It is important to do further research to maintain an understanding of the effect of deer on the forest community and to ensure that our management decisions are science-driven. If nothing is done, the literature shows that high populations of deer can cause lasting species composition changes and an overall decline in forest health. Deer browse decreases the density of the understory of the forest, eliminating it in some areas. Birds that are dependent on the understory will see a decrease in reproductive success as deer have a larger effect on the understory.

The deer population is affecting the sustainability of the forest habitat on the Domain. If we value the ecological and educational services that the forest provides, addressing the issue of this high deer population needs to be a priority.

— *Meg Armistead, C'14*

White-Tailed Deer, continued from p. 1

These efforts will continue with the following goals in mind:

- Establishing a density of 20-30 deer per square mile measured through annual census.
- Pushing the sex ratio as close to 1:1 as possible.
- Manipulating harvest regulations to promote an older age structure with mature buck harvests of 3.5-6.5 years old at harvest.
- Establishing annual vegetation monitoring to classify browse impacts and hunting impacts on vegetation in a diversity of habitats.

— *Domain Manager Nate Wilson*

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