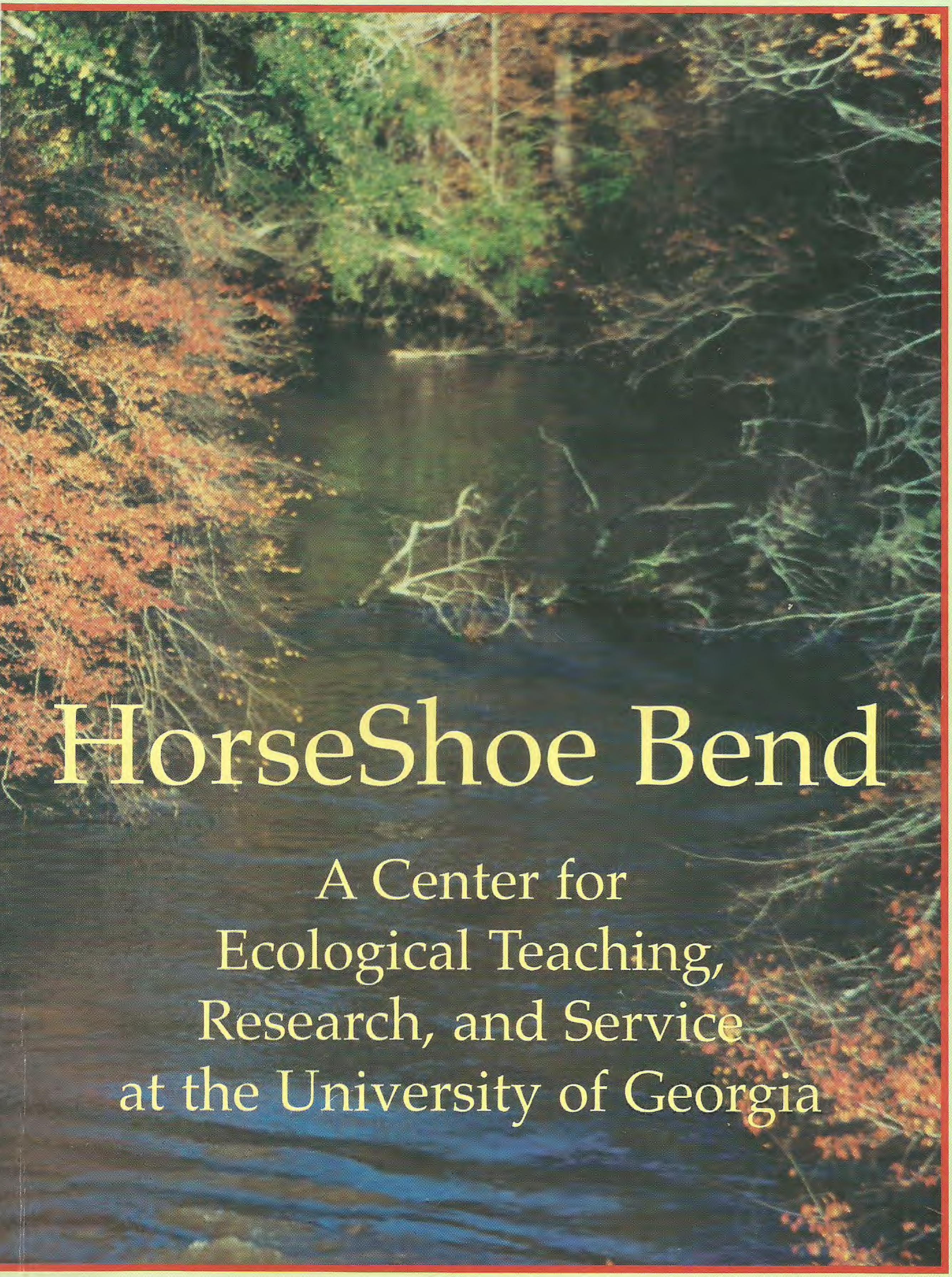

HorseShoe Bend

A Center for Ecological Teaching, Research, and Service at the University of Georgia

HorseShoe Bend

A Center for Ecological Teaching, Research, and Service at the University of Georgia

Prepared by
Jennifer Blesh and Michelle Williams

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COVER: Photograph by Jennifer Blesh (2003).

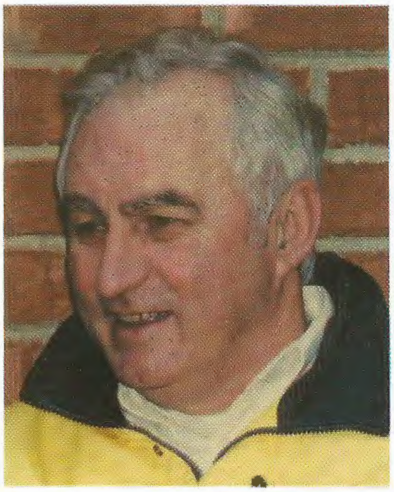
TITLE PAGE: Aerial photograph of the HorseShoe Bend Experimental Site. Note that the North Oconee River creates a 14.2-ha landscape peninsula.

Welcome to HSB

The HorseShoe Bend (HSB) ecological research site located on College Station Road, a component of the University of Georgia (UGA) east campus, Athens, Georgia, has a rich tradition of ecological research and environmental education in areas such as perturbation ecology, agroecosystem ecology, ecosystem development, population and community ecology, and environmental education. HSB, founded in 1965, has most recently developed programs and facilities which encourage participatory learning, undergraduate independent research, and university-wide academic functions such as seminars, faculty retreats, and community-related activities. Thus the HSB program is exemplary of the three missions – teaching, research, and service – established as major objectives at the University of Georgia.

This booklet describes the history, facilities, and opportunities available at HSB. In addition to classes, seminars, field/laboratory activities, and research projects (graduate and undergraduate) currently being conducted at HSB, we invite other UGA departments, schools, colleges, and community organizations to participate in sharing this unique facility. I especially thank Jennifer Blesh and Michelle Williams for conscientious research and ecological insight during the development of this booklet.

With the continual growth of the University of Georgia, and especially the new College of the Environment and Design, it is expected that HSB will increasingly serve as a site that fosters integrative science, ecological research, and interdisciplinary educational opportunities. The Administrative Committee of HSB welcomes your input and participation regarding the challenges and opportunities provided by this unique and picturesque facility. Please call (706) 542-6065 if you desire to schedule research, educational, or service functions at HSB.



Gary W. Barrett
Odum Professor of Ecology
Chair, HSB committee

THE UNIVERSITY OF GEORGIA
1785 • BICENTENNIAL • 1985

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

February 23, 1984

Dr. James L. Cooley
Executive Director
Institute of Ecology
Ecology Building
Campus

Dear Jim:

This is to confirm that use of the area in the Research Park outlined in red on the attached map has been assigned to the Institue of Ecology.

The area so assigned is that University land lying between College Station Road and the North Oconee River beginning at the East By Pass, extending northward to the Athens City Limits, and eastward to include all the area within the "Horseshoe Bend" of the North Oconee River.

Sincerely,

Bill

William O. Burke
Assistant Vice President
for Research

v
Enclosure

cc: Dr. Robert C. Anderson (w/encl)
✓ Dr. Eugene P. Odum (w/encl)

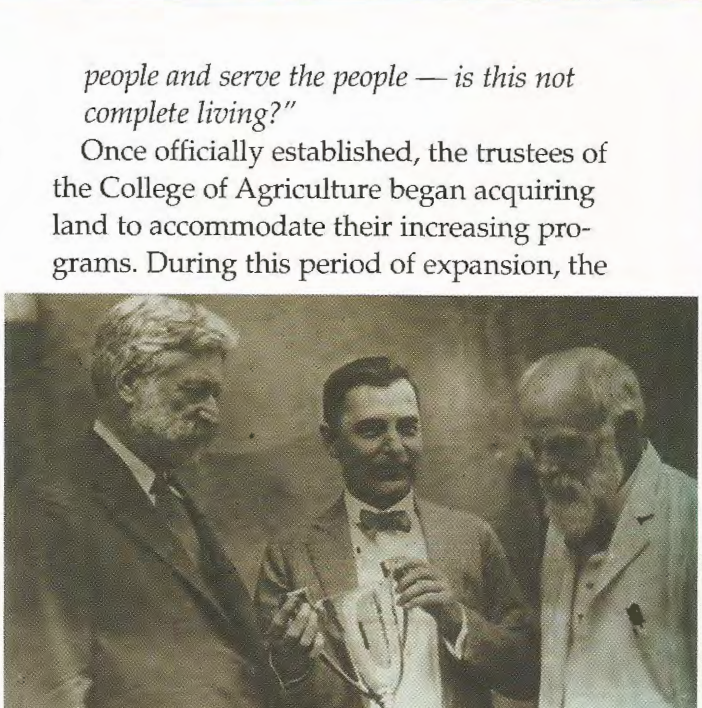
Letter of agreement between the Office of the Vice President for Research and the Institute of Ecology, assigning the Horseshoe Bend area to the Institute of Ecology.

HorseShoe Bend Research Site: A Brief History

In 1965, Eugene P. Odum, then Director of the Institute of Ecology, University of Georgia, acquired permission to use the HorseShoe Bend (HSB) ecological research area for the Institute after learning that the land would no longer be used by the College of Agriculture. This 35-acre (14.2-ha) site was officially assigned to the Institute of Ecology on 23 February 1984. However, the history of the HSB site as an educational resource for the University of Georgia had its beginnings in the early twentieth century during the administration of Chancellor David Crenshaw Barrow. Elected by the Board of Trustees in 1906, Barrow established a separate College of Agriculture with $100,000 appropriated by the Georgia General Assembly. Barrow was no stranger to farming; his father was an Oglethorpe County farmer, and Barrow continued farming during his adult life in partnership with Pope Spratlin, a boyhood friend. His devotion to farming influenced his views on the importance of agriculture as an educational discipline, expressed in his collected writings:

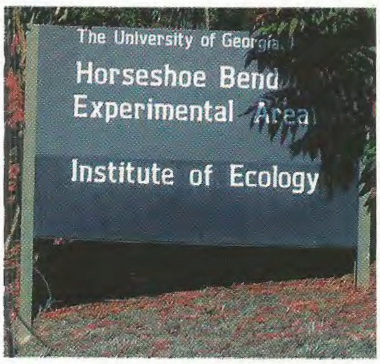
"We must start the child early in learning to observe the growth and think of its laws, to love the growth and rejoice in it, and to love the land and improve it. It is a cause of congratulation that in our Normal School special attention is given to teaching teachers agricuture... To love the land and improve the land, to love the crop and increase the crop, to love the people and serve the people — is this not complete living?"

Once officially established, the trustees of the College of Agriculture began acquiring land to accommodate their increasing programs. During this period of expansion, the



George Foster Peabody, Harry Hodgson, and Chancellor David Barrow. Harry Hodgson and David Barrow were two of the original land owners prior to the University's acquisition of the HSB site.

site now administered by the Institute of Ecology was purchased from three owners on 19 June 1928: Chancellor David Barrow, Thomas Shackelford, and Harry Hodgson. Shackelford, born in 1868, was an Athens lawyer and a graduate of the University of Georgia. His reputation as a lawyer instilled such confidence in the citizens

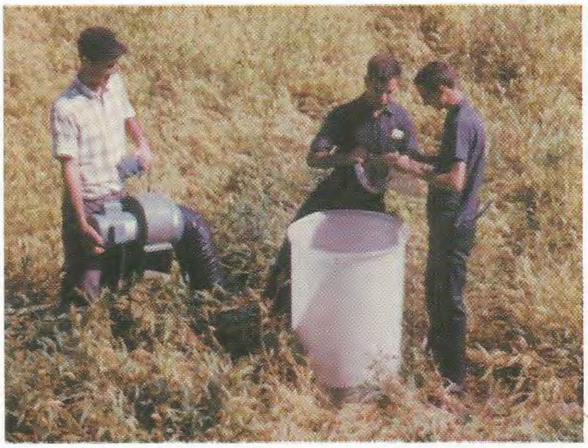


of his county that he was elected to the State of Georgia General Assembly from 1902-1904. Hodgson was also a notable Athens citizen, who graduated from the University of Georgia in 1893. He was a prominent businessman who served many years on the UGA Alumni Society, focusing on efforts to expand and diversify the University of Georgia.

The two 0.4-ha mesocosms used in early perturbation studies by researchers in the Institute of Ecology.

Initially the University Dairy Department utilized the land that is currently the site of HSB primarily for production of forage and as pasture. At the time of the acquisition of HSB by the Institute of Ecology, cattle still grazed on site and no buildings were available to provide research facilities and storage of equipment. Odum had long been concerned that Ecology students lacked a local area suitable for research and education. He believed that expansion of the Institute of Ecology at this site would provide an ideal area for continuous long-term studies, in addition to graduate and undergraduate research projects.

Gary W. Barrett, first Odum Professor of Ecology, constructed the first building at this site in 1965, a modest concrete building used mainly for storage of equipment and research data. He also constructed two 0.4-ha mesocosms to investigate the effects of a pesticide perturbation on old-field dynamics. During 1966, Barrett, then a pre-doctoral candidate, initiated the first ecological investigation at HSB with field assistance from undergraduates Steven Pomeroy, Ronald Pulliam, and Claude Turner. The group investigated the effects of a short-lived pesticide (Sevin) on a semi-enclosed grassland ecosystem, dominated by millet *(Panicum ramosum)*. They were interested in documenting the effects of this pesticide perturbation on small mammal population dynamics, plant-herbivore relationships, and rates of litter decomposition. This study was published in Ecology (Barrett 1968).



Gary Barrett, Ronald Pulliam, and Steve Pomeroy investigating the effects of a pesticide on a semi-enclosed grassland ecosystem.


The historical flood of 1966.

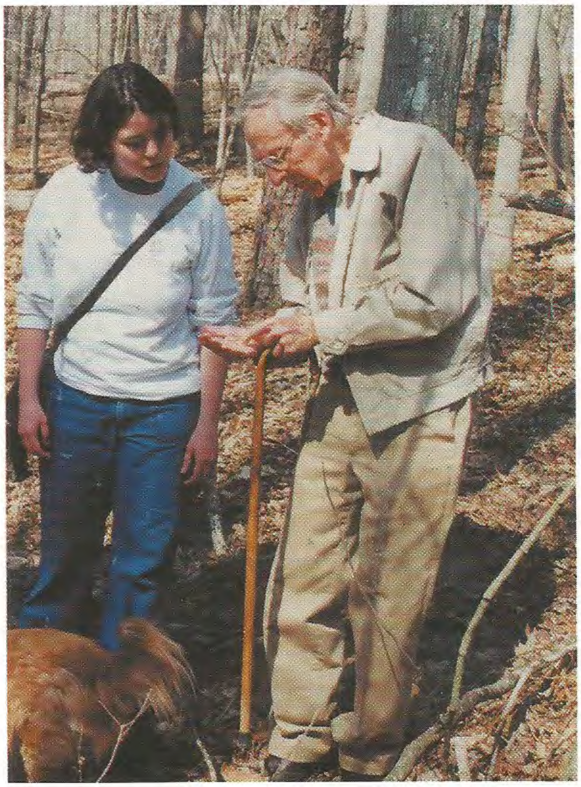
This investigation initiated a series of studies conducted between 1966 and 1977, referred to as old-field perturbation studies (Hendrix et al. 2001). During this period, these experimental mesocosms were exposed to a variety of environmental perturbations, including fire, chemical pesticides, and fertilizers. One unintended stress threatened the lives of the researchers while collecting early morning trapping data; the flood of 1966 left Barrett isolated on a shrinking plot of land with rescued small mammal species and collected traps which he had managed to contain in a drum, while Pulliam clung to a tree to avoid being swept down the North Oconee River. Fortunately, the absence of these two students was noticed by their peers, and a rescue squad was sent to retrieve them. Watermarks reflecting the height which the North Oconee River reached on that day are still in evidence upon the initial concrete facility at HSB.

In 1967, Pomeroy continued to monitor the small mammal populations in these old-field research plots for his Master's degree (Pomeroy and Barrett 1975). James Richardson, currently an Adjunct Research Professor within the Institute of Ecology, conducted his Master's research at HSB, investigating plant and arthropod populations in these plots. These initial studies laid the foundation regarding the importance of team research that persists at this site today — an approach involving graduate students at various stages of their degree program and encouraging undergraduate research frequently resulting in scientific publications.

In 1978, continuing the historical tradition of agriculture on this site, agroecosystem research was initiated by Deyree A. Crossley,

Researchers Shengli Fu and Paul Hendrix working on agroecosystem studies at HSB.

Eugene P. Odum, and R. L. Todd at this site. These researchers divided the original two one-acre (0.4-ha) plots established by Barrett into eight subplots. The focus of these studies was to compare no-tillage systems with conventionally-tilled systems. These ecosystem-level investigations served as a backdrop for subsequent nation-wide research comparing conventional-tillage with no-tillage agroecosystems. These treatments have remained functional, supporting numerous experiments and scientific publications over the years. *Agroecosystem research at HSB is one of only a few sites illustrating the need for and importance of long-term studies with long-term focus on using ecological processes in designing agricultural systems* (see Hendrix et al. 2001 for details). Research at this site has contributed to the knowledge that has led to increasing change from conventional to sustainable agricultural practices.

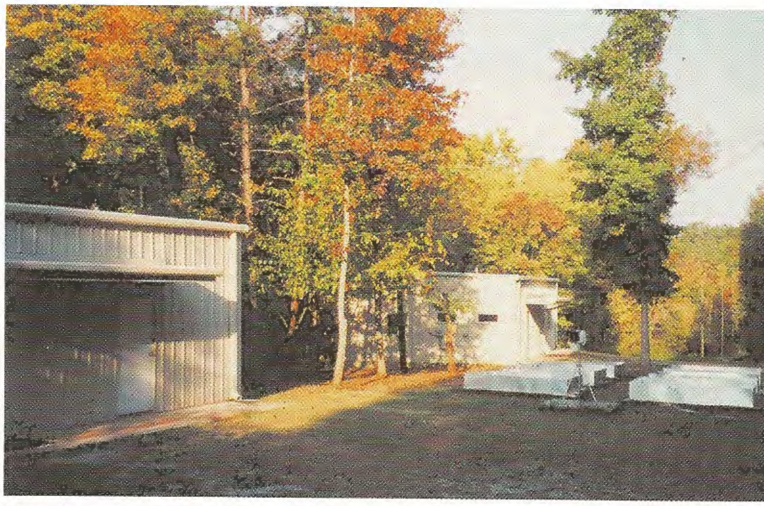


Eugene Odum, Director Emeritus and founder of the Institute of Ecology, working with a student at HSB.

Site Description

Location

The HorseShoe Bend (HSB) site (33° 57′ N, 83° 23′ W), so named for its unique location within a "horseshoe-shaped" meander of the North Oconee River, is a 35-acre (14.2-ha) field station accessed by College Station Road located near Athens, Georgia. The North Oconee River is a fifth-order stream, approximately 20 meters in width surrounding the HSB area. This site is administered and managed by the Institute of Ecology, University of Georgia.



Buildings # 1 and # 2 at HSB house facilities such as classroom and laboratory space.

Biome Traits

The climate, typical of the Georgia Piedmont, is subtropical and humid, moderated by the Atlantic Ocean, Gulf of Mexico, and Appalachian Mountains. Precipitation averages 1245 mm annually. HSB is representative of a deciduous forest biome typically found in the southeastern United States, forested primarily by mixed hardwood trees and pines. Dominant trees include water oak, *Quercus nigra*; white oak, *Quercus alba*; pignut hickory, *Carya glabra*; loblolly pine, *Pinus taeda*; sweetgum, *Liquidambar styraciflua*; and river birch, *Betula nigra*. The soils are a fine, loamy, siliceous, thermic Rhodic Kanaplundult (66% sand, 12% silt, and 22% clay) formed from alluvial plant material.

The main classroom at HSB is used for seminars, laboratories, discussion groups and facnlty retreats.

Facilities

Two 1000-square-foot butler-type buildings are located in the upland forest at HSB. Building # 1 was completed in 1995 and houses a large classroom, a computer access room, storage space, restrooms, and

The bottomland forest habitat adjoining the North Oconee River dominates much of HSB.

A well marked trail system is convenient for both researchers and nature hikers.

Labeled trees at HSB provide learning opportunities for students.

office/administrative space. Building # 2, constructed in 1996, is a laboratory for independent researchers, and for field laboratory sections that accompany lecture courses in the ecological sciences. This laboratory is equipped with drying ovens, a refrigerator, a small herbarium, and field sampling equipment. These facilities are handicapped accessible following construction of a paved walkway connecting the two buildings.

Trail System

Construction of the HSB trail system began in the spring of 1996. The system consists of trails distinguished by color identification markers. The *yellow* trail traces the north facing slope, beginning behind Building # 2 and ends near the HSB site entrance. This is a riparian trail revealing steep eroded slopes and evidenced by greater than 35 years of secondary succession. The *orange* trail begins near the gated entrance, surrounded by a canopy of privet, and follows the south-facing slope along the river ending at the parking area in front of the classroom buildings. The *green* trail leads from the buildings/parking area to the agroecosystem and old-field plots.

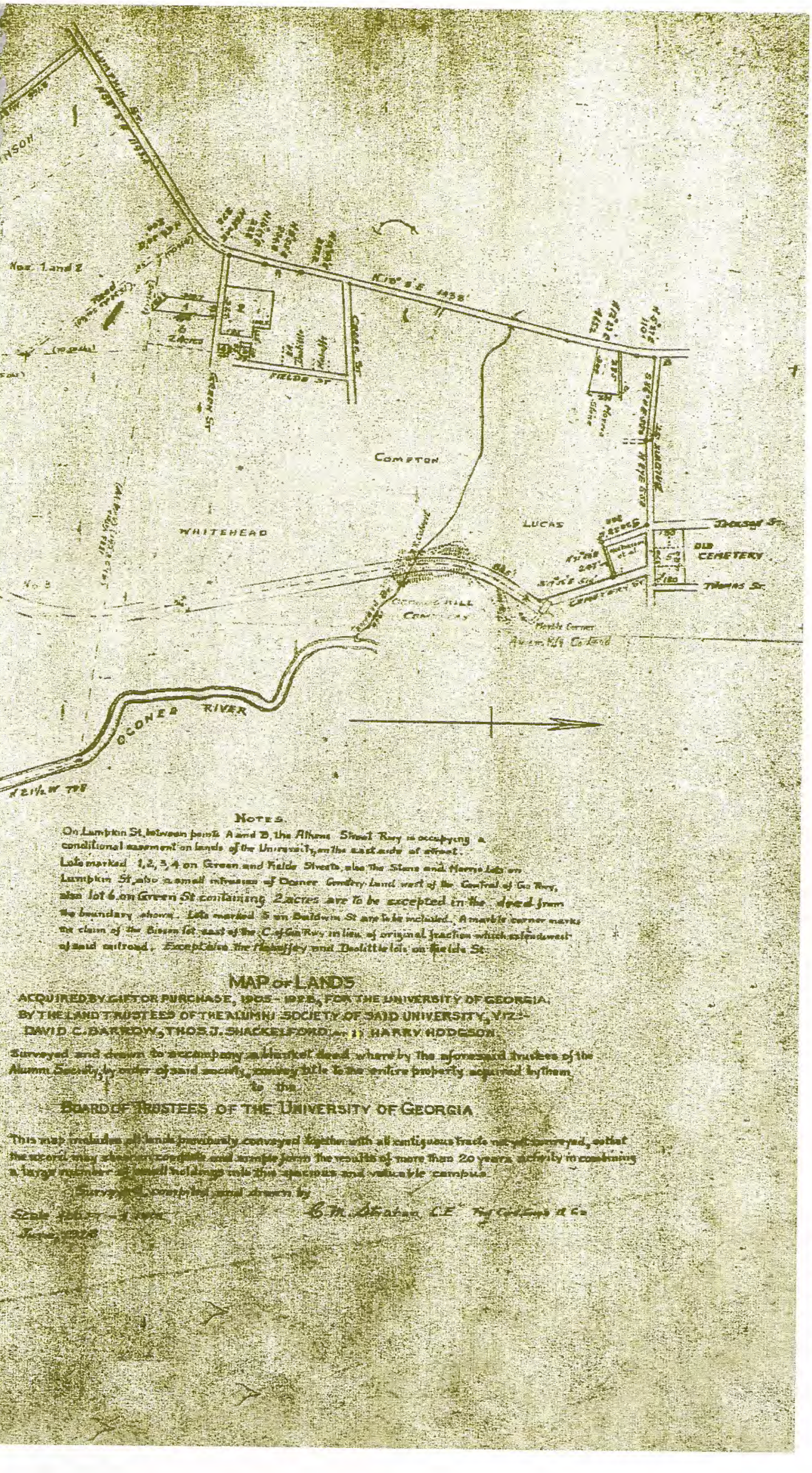
Evidence of beaver activity along the trail at HSB.

Weather Station

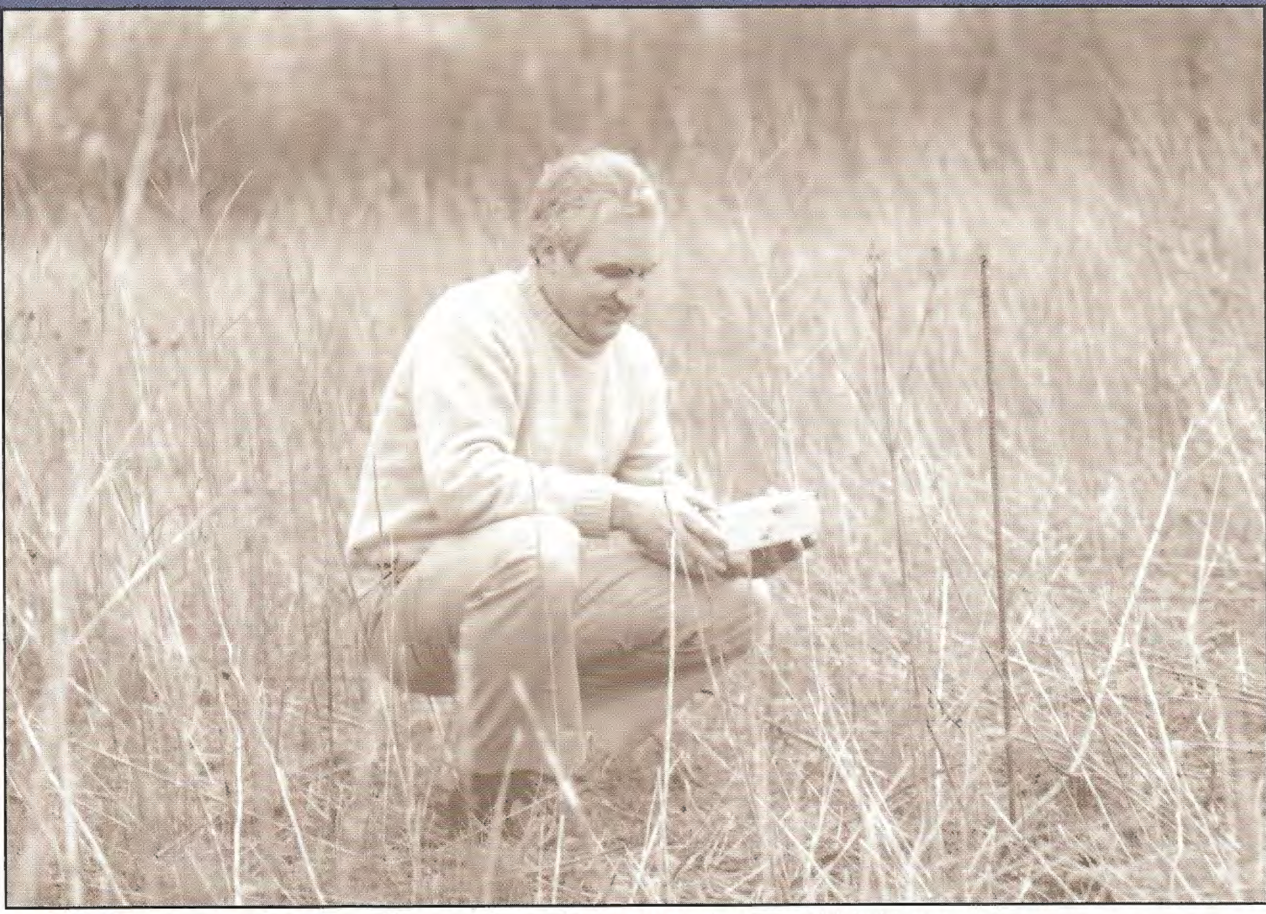
HSB is equipped with a Davis-Wireless Weather Monitor II Station designed for monitoring ambient temperature, barometric pressure, wind direction and speed, relative humidity, and dew point. The station includes a Rain Collector II which records both daily and accumulated rainfall amounts. The weather station is mounted on a galvanized steel tripod atop a moveable wooden platform.

The Davis-Wireless Weather Monitor II Station at HSB.


N 6°W 2270 Ft.
OLD CARLTON LANDS
BRITTAIN PLACE
No 5
No 4
OCONEE
RIVER
S 58 W 300'
N 60 W 300'



A historical plat map depicting the specific land parcel transferred from Barrow, Shackelford, and Hodgson to the University of Georgia.



Gary W. Barrett investigating small mammal population dynamics in an old-field ecosystem.

Old-Field Perturbation Studies 1965 - 1977

Doctoral research, begun in 1965 by Gary W. Barrett, initiated over a decade of HSB investigations that focused on the effects of various perturbations (e.g., pesticides, fire, and fertilizer) on an old-field ecosystem. Barrett's study quantified the effects of Sevin, a carbamate insecticide, that is "short-lived" (i.e., it detoxifies quickly in nature), on a semi-enclosed grassland ecosystem. Environmental degradation often results when a pesticide that has been labeled safe at a particular level (e.g., species or population) is applied without testing its effects at broader levels (e.g., community or ecosystem). The two one-acre (0.4-ha) enclosures constructed for the Sevin insecticide investigation were planted with browntop millet (*Panicum ramosum*) followed by the introduction of three small mammal populations (the cotton rat, *Sigmodon hispidus*; the house mouse, *Mus musculus*; and the old-field mouse, *Peromyscus polionotus*) into each grid. Grid I was sprayed with the Sevin insecticide and Grid II served as the control. Results from this study indicated that herbivorous insects can recover from the insecticide more rapidly than parasitic wasps and bees (Pulliam, Odum, and Barrett 1968), and also documented longer-term side effects on mammalian reproduction, rates of litter decomposition, and herbivore diversity. This study demonstrates that by considering the ecosystem as a whole, the indirect effects of a pesticide stress can be revealed.

Following this investigation, the millet enclosures were permitted to proceed into old-field secondary succession for the next ten years. The research in these plots comprised a series of "perturbation experiments" that described the responses of population, community, and ecosystem-level properties to various experimental stresses (see Hendrix et.al. 2001). All studies perturbed only one plot at a time, leaving the other plots as a control. During the first year of secondary succession James Richardson compiled a detailed analysis of the vegetation and arthropod populations in these plots. In 1970 the effect of a late winter litter burn on the fields was studied, and in 1974 R. Gary Bakelaar and Eugene P. Odum (Bakelaar and Odum 1978) investigated the community and population responses to fertilization. The 1974 investigation hypothesized that following fertilization competitively superior species (e.g., *Solidago canadensis*) were able to expand their populations at the expense of less successful species (e.g., *Aster pilosus*), thereby lowering overall species diversity. In general, Bakelaar and Odum found that adding nutrients to a system can increase productivity and biomass, but decrease diversity. The old-field perturbation studies provided an extensive base of knowledge regarding the ecosystem-level responses to stresses, in addition to affirming the feasibility of such holistic, mesocosm-level investigations.

Agroecosystem Research at HorseShoe Bend 1978 - Present

In the spring of 1978, agroecosystem research was initiated in the two original 0.4 - ha mesocosm-scale plots constructed by Gary W. Barrett (see Site History). These plots were hand cleared of woody vegetation, rotary mowed, and each plot divided into four equal experimental subplots. These eight subplots were then randomly divided into no-tillage or conventional-tillage treatments, a design that has been maintained to the present day. The cropping systems in the HSB research plots have consisted of summer grain crops, such as *Sorghum bicolor*, followed by winter green-manure cover crops, such as *Secale cerale*, or winter bare fallow. These initial agricultural investigations found that no-tillage systems share various traits with natural old-field and forest ecosystems. Conclusions drawn from these investigations include that nutrient cycles among the two systems varied yearly depending on abiotic factors, but were generally more conservative in the no-tillage systems, and that no-tillage management can produce comparable yields to conventional tillage in addition to the benefits of fewer subsidy (e.g., fertilizer, pesticide, and fossil fuel) inputs, less soil erosion, and conservation of soil organic matter and soil water. Another important observation was that soil-fauna created fungal-based detritus food webs in no-tillage systems compared to the bacterial-based webs under conventional management (Hendrix et al. 1986). These differences led to a $1,200,000 five-year grant in support of HSB research to study the accumulation of organic matter in southern piedmont soils based on soil fauna regulation. Results from this current phase of investigation have shown that most of the benefits of no-tillage systems are derived from the biological activity in the soil (i.e., soil is a dynamic living system).

Researchers at HSB have spent the past 25 years investigating agriculture based on a natural systems approach, and have documented various functions and processes of these agroecosystems, especially comparisons between ecosystem function in conventionally tilled and non-tilled experimental plots. Conventional agricultural practices have contributed to the loss of soil organic matter; however, under no-tillage management crop residues remain on the soil surface as mulch and help reduce soil erosion. Taking a holistic approach, HSB researchers have focused on diverse ecosystem components such as detritus food webs, nutrient cycling, soil carbon dynamics, and soil species composition and diversity. They have also experimented with variables such as the degree of tillage, fallowing fields, and crop rotation. In conjunction with researchers located at Bledsoe Farm, University of Georgia; Agricultural Experiment Station, Griffin, Georgia; and the Southern Piedmont Conservation Research Center, Watkinsville, Georgia these studies are among the longest, continuous, no-tillage agroecosystem research in the nation.

Agricultural research at HSB is unique because it is one of only a few long-term studies worldwide focusing on basic ecosystem function in agricultural systems. One testament to the importance of the HSB site is its recent membership to the North American Soil Organic Matter Site Network – an EPA-funded study of long-term soil organic matter responses to management. HSB research has contributed to the changing views of how agricultural systems should be managed, and to the questioning of predominant conventionally tilled systems.

Academic Endeavors at HorseShoe Bend 1995 - Present

Internationally regarded as a place where a holistic, ecosystem-level approach to ecology is researched, the Institute of Ecology influences many students, at both the undergraduate and graduate levels. It was the hope of Eugene P. Odum, the founder of the Institute of Ecology and long-time Director, that the Institute would develop a research site in close proximity to the main campus of UGA. HSB was the ideal location to foster the academic progress of students. The Institute of Ecology was officially approved as a School of Ecology by the Board of Regents in 1993. Soon after in 1995 under the direction of Gary W. Barrett, two buildings were constructed on-site at HSB that serve as classroom and laboratory facilities. The establishment of a B. S. Degree in Ecology, as well as the collaboration of respected faculty from various departments around campus, cemented the Institute of Ecology as an effective center for ecological research. Many undergraduate and graduate students have since participated independently or in team research at HSB.

The first undergraduate students at HSB, led by Chris Kittle and Cory Christopher, created a trail system and installed a weather-monitoring station which recorded the seasonal weather patterns at HSB beginning in 1998. Woody and herbaceous vascular plants were collected and labeled and a photographic key was constructed to aid in the identification of common trees at HSB. In addition, a taxonomic survey of vascular flora, led by Jennifer Lance, served as a tool for identification and distribution of plants at HSB.

Another undergraduate student, Nate Nazdrowicz, examined the effects of invasive exotic plant species, such as common privet (*Ligustrum sinense*) and bush honeysuckle (*Lonicera* spp.) on native plant species. He found that native plant


Gary Barrett working with students at HSB.

ed mouse (*Peromyscus leucopus*) and the southern flying squirrel (*Glaucomys volans*). Undergraduate students, such as, Jennifer Blesh, Ryan Klee, Anika Mahoney, Maura O'Malley, Alison Pruett, Matthew Shuman, and Michelle Williams, led by Cory Christopher, have conducted research on these small mammals. These stu-

diversity and productivity was significantly higher in experimental plots where exotic species were removed.

Another major area of research at HSB has involved the coexistence of small mammals in bottomland forests. These mammals include, but are not limited to, the golden mouse (*Ochrotomys nuttalli*), the white-foot-

dents have used radio telemetry, live trapping, as well as investigating the bioenergetics of small mammals to more clearly understand mechanisms of coexistence.

Alison Pruett investigated home range size and patterns of movement of golden mice, white-footed mice, and the southern flying squirrel. Because HSB is a peninsula


A laboratory section from the introductory Ecology course shows Scott Connelly, assisting a student in identifying and measuring tree diameters located at HSB.

created by the North Oconee River, landscape-level questions have focused on the population dynamics of small mammals inhabiting this riverine system. For example, undergraduate research spearheaded by Ryan Klee, Anika Mahoney, and Cory Christopher, investigated the homing behavior of these small mammals (Klee et al. 2004). While it was found that these mammals did not emigrate across the river, several white-footed mice did in fact immigrate across the river and return to their original habitat.

Matthew Shuman, an Ecology undergraduate student, checking nest boxes as part of a flying squirrel (*Glaucomys volans*) research project.

***Peromyscus leucopus*, the white-footed mouse, a common small mammal species found at HSB.**

Service Opportunities 1995 - Present

Students from Tuskegee University enjoy classroom discussions at HSB.

No-Till (L) and Conventional-Till (R) experimental soybean *(Glycine max)* plots at HSB have provided valuable information to farmers in the area.

Elementary and secondary teachers participating in summer field experiences at HSB. (Photo courtesy of Shawn Glynn)

Future Challenges and Opportunities

The future for HSB is bright and challenging. As questions in fields such as agroecosystem ecology, landscape ecology, restoration ecology, and conservation biology emerge, and as the teaching mission of the Institute of Ecology develops, facilities located at HSB will be essential to the education of the next generation of ecologists. Likewise, we invite and anticipate increased use of HSB by service and community groups interested in meeting the environmental literacy challenges of the twenty-first century. It is imperative that ecological literacy move to the forefront as a goal regarding an informed and educated society.

Undergraduate and Graduate students at HSB, Fall 2001, (from top left standing) Ryan Klee, Matthew Shuman, Cory Christopher, Anika Mahoney, Jennifer Chastant, Alison Pruett, Jennifer Blesh, Michelle Williams, and Alicia Rutledge; (kneeling) Walter Munn, Sabrina Willis, and Caycee Payton.

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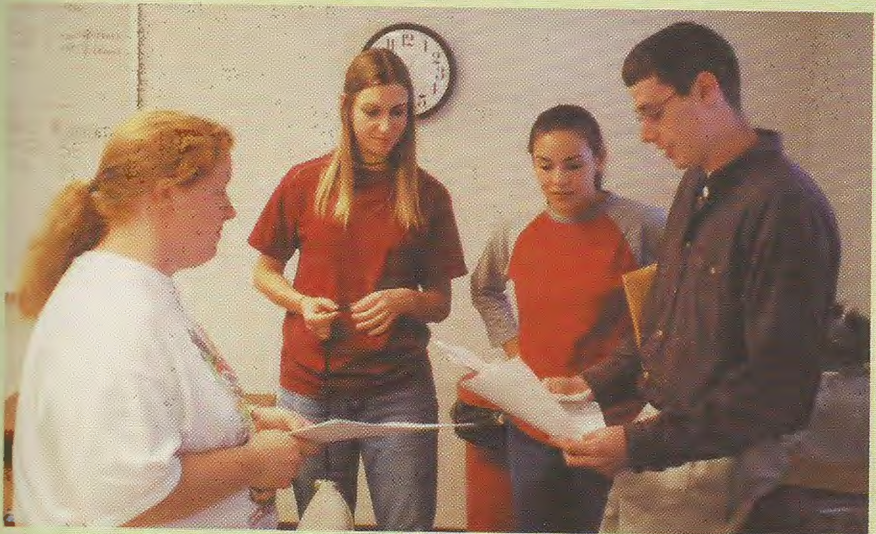
NOTE: A list of publications based on research conducted at HSB is available on site.

Flora and Fauna at HorseShoe Bend

Leaf litter traps used to measure forest biodiversity at HSB.

A Golden Mouse *(Ochrotomys nuttalli)* moving through forest canopy at HSB. (Photo Courtesy of Thomas Luhring)



Undergraduate Ecology majors discussing field data collected at HSB.

Common Small Mammal Species Live Trapped at HorseShoe Bend:

Eastern chipmunk	*Tamias striatus*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern harvest mouse	*Reithrodontomys humulis*
Eastern woodrat	*Neotoma floridana*
Golden mouse	*Ochrotomys nuttalli*
Hispid cotton rat	*Sigmodon hispidus*
House mouse	*Mus musculus*
Old-field mouse	*Peromyscus polionotus*
Opossum	*Didelphis marsupialis*
Short-tailed shrew	*Blarina brevicauda*
White-footed mouse	*Peromyscus leucopus*

Common Trees Found at HorseShoe Bend:

(most are labeled along the nature trails at the site)

American beech	*Fagus grandifolia*
American elm	*Ulmus americana*
American hornbeam (Ironwood)	*Carpinus caroliniana*
Basswood	*Tilia americana*
Black cherry	*Prunus serotina*
Black locust	*Robinia pseudoacacia*
Black walnut	*Juglans nigra*
Blackgum	*Nyssa sylvatica*
Blackjack oak	*Quercus marilandica*
Boxelder	*Acer negundo*
Chalk maple	*Acer leucoderme*
Eastern red cedar	*Juniperus virginiana*
Flowering dogwood	*Cornus florida*
Honeylocust	*Gleditsia triacanthos*
Loblolly pine	*Pinus taeda*
Mockernut hickory	*Carya tomentosa*
Northern red oak	*Quercus rubra*
Pignut hickory	*Carya glabra*
Post oak	*Quercus stellata*
Red maple	*Acer rubrum*
Red mulberry	*Morus rubra*
Redbud	*Cercis canadensis*
River birch	*Betula nigra*
Shagbark hickory	*Carya ovata*
Shortleaf pine	*Pinus echinata*
Southern red oak	*Quercus falcata*
Sweetgum	*Liquidambar styraciflua*

Sycamore	*Platanus occidentalis*
Tulip poplar	*Liriodendron tulipifera*
Water oak	*Quercus nigra*
White ash	*Fraxinus americana*
White oak	*Quercus alba*
Willow oak	*Quercus phellos*
Winged elm	*Ulmus alata*

Common Herbaceous Vegetation Found at HorseShoe Bend:

BIENNIALS AND PERENNIALS:

Common Nightshade	*Solanum americanum*
Cudweed	*Gnaphalium purpureum*
Ebony spleenwort	*Asplenium platyneuron*
Fleabane	*Erigeron philadelphicus*
Horse nettle	*Solanum carolinense*
Indian strawberry	*Duchesnea indica*
Netted chain fern	*Woodwardia areolata*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Poison oak	*Toxicodendron quercifolia*
Pokeweed	*Phytolacca americana*
Purple thistle	*Cirsium carolinianum*
Queen Anne's lace	*Daucus carota*
White clover	*Trifolium repens*
Wild blackberry	*Rubus* spp.
Wild garlic	*Allium canadense*
Wild ginger	*Hexastylis arifolia*
Wood sorrel	*Oxalis stricta*

SHRUBS:

Autumn olive	*Elaeagnus umbellata*
Deerberry	*Vaccinium stamineum*
Grape	*Mahonia bealei*
Privet	*Ligustrum sinense*
Smooth sumac	*Rhus glabra*

VINES:

Greenbriar	*Smilax rotundifolia*
Honeysuckle	*Lonicera sempervirens*
Kudzu	*Pueraria lobata*
Muscadine	*Vitis rotundifolia*
Poison ivy	*Toxicodendron radicans*
Trumpet creeper	*Campsis radica*