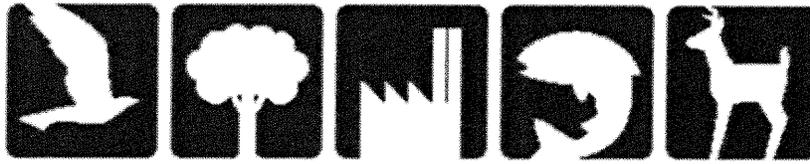
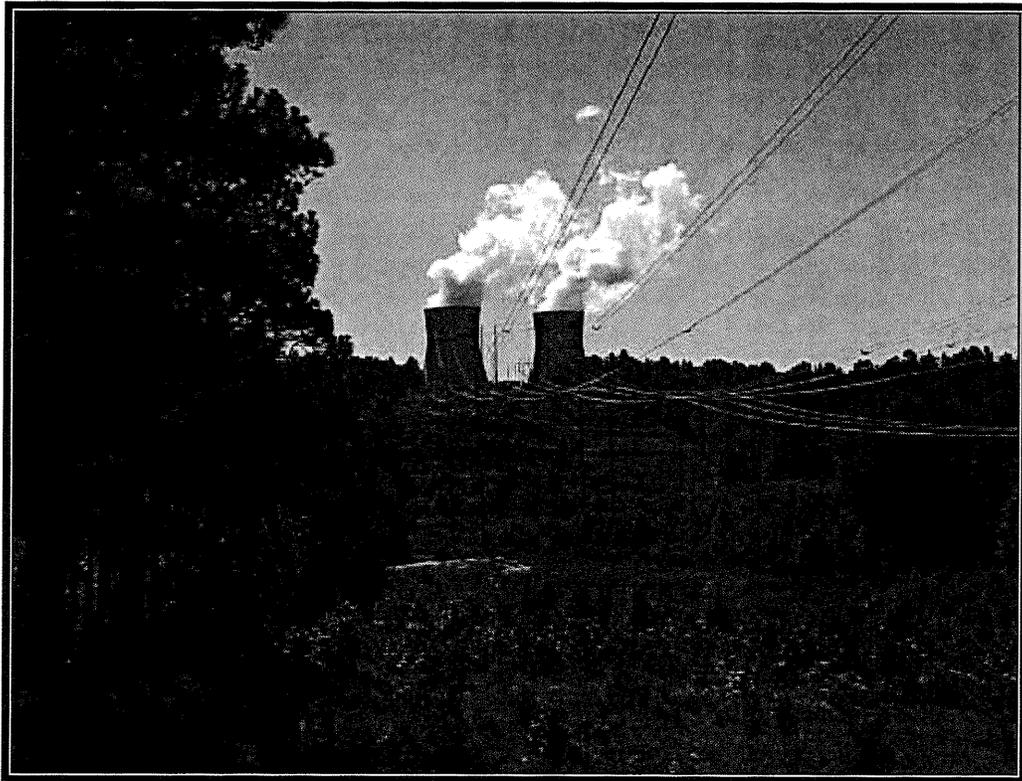


V-159



## WILDLIFE HABITAT COUNCIL

2003 Recertification Application  
for  
Vogtle Electric Generating Plant



Submitted by Southern Nuclear Operating Company



*Energy to Serve Your World®*



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**WILDLIFE HABITAT COUNCIL**

**2003 RECERTIFICATION APPLICATION**

for

Vogtle Electric Generating Plant

Submitted by  
Southern Company

July 2003

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## **SITE OVERVIEW**

### **Property History**

Vogtle Electric Generating Plant is a nuclear power plant co-owned by Georgia Power Company (a subsidiary of Southern Company), Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and the City of Dalton, Georgia. Georgia Power Company purchased property for the purpose of constructing Vogtle Electric Generating Plant in 1972. Construction began in 1974 but was not completed until 1987. In 1997, the operating license was transferred from Georgia Power Company to Southern Nuclear Operating Company, also a subsidiary of Southern Company.

### **Land Use**

The site consists of approximately 3200 acres with approximately 1800 acres available for wildlife/land management. The remaining acreage contains the generating facility and associated buildings, roads, parking lots, maintenance/construction facilities, and equipment. About 60 percent of the land area is wooded, with the remainder consisting of uplands, meadows, wetlands, ponds, and the generating plant facility. Considerable acreage is utilized as transmission rights-of-way and access roads. The generating facility and associated physical plant occupy less than one-half of the total site area. Access to the plant site is controlled by a security force, with the plant proper contained in a fenced, limited access area. In addition to the location map, a general site topographic map is included in this section.

### **Area Description**

Plant Vogtle is located in the eastern portion of Burke County, Georgia, on the western bank of the Savannah River. The site is about 15 miles east of Waynesboro, Georgia, about 34 miles southeast of Augusta, Georgia, and about 115 miles north of Savannah, Georgia. The area surrounding Plant Vogtle is very rural with most of the land utilized for farms and pastures. A location map is included.

### **Vegetation**

Prior to construction, the land was primarily farmed for cotton. The upland, deep sand soils are nutrient poor and not suitable for many agricultural applications. The Vogtle site is characterized by low, gently rolling sandy hills, hardwood-dominated stream drainages, gum-cypress floodplains and mixed pine-hardwood stands or pine woods in the upland areas. Scrub oaks (turkey, post, and willow oak) and longleaf pine occur in the upland wooded areas that were not converted to cultivation. Red oak, water oak, and maple dominate the lowland hardwood areas. Cypress and water tupelo characterize the Savannah River floodplain. Several open areas, created during construction, were planted in grasses and sericea lespedeza to prevent erosion.

### **Upland Areas**

The upland areas are former agricultural lands, cleared areas, and construction sites occurring on well-drained sandy soils. The vegetation in these areas consists of longleaf pine, slash pine, loblolly pine, turkey oak, water oak, hickory, dogwood, hawthorn, black cherry, sweetgum, blackberry, and many grasses and forbs. The upland area habitats are maintained through long rotation timber management (40 to 60 years) and prescribed burning at three- to five-year intervals. Several areas are

being re-established to native longleaf pine and hopefully will become wiregrass-longleaf pine communities, which have become rare in the region. Foodplots for deer and turkey have also been established in these upland areas.

### ***Hardwood Areas***

The hardwood areas cover approximately 515 acres of the site along the stream zones, the Savannah River floodplain, and the adjacent river bluff. The river usually covers the floodplain during the winter for about six to nine weeks. Annual flooding is irregular and results in sparse understory and ground cover under the gum-cypress overstory. The bluff adjacent to the floodplain is covered with red maple, several species of oak, hickory, ash, yellow poplar, beech, sycamore, and hackberry. The stream zones have been altered by beaver activity. Red maple, button bush, alder, willow, water gum, and cypress are common in these zones. The hardwood areas associated with the Savannah River floodplain, river bluff, and stream drainages remain protected from burning and timbering. Some select oak trees are protected to enhance acorn production.

### ***Planted Pine Areas***

Planted loblolly stands cover approximately 350 acres of lands that have been reclaimed from plant construction. Major emphasis has been placed on reestablishing the native longleaf pine, as discussed in the Project Summary section. Sericea and a variety of grasses and forbs grow beneath the pines. Sweetgum and persimmon also occur in these areas. Pine plantations are managed through prescribed burning every three to five years, timber thinning after 20 years, and aesthetic cuts after thinning. Burning is limited to 25 to 30 percent of the upland and planted pine acreage each year.

### ***Water Bodies***

There are a few creeks, streams, and man-made ponds located on site. The dominant hydrological feature of Plant Vogtle is the Savannah River, which empties into the Atlantic Ocean some 151 miles downstream. The plant site is bordered on the east by the Savannah River and on the south by Beaverdam Creek. This provides an excellent riparian environment for wildlife on site. Special care is taken to protect and enhance riparian areas. Both upland and bottomland hardwoods line these areas. The ponds include Mallard's Pond, two retention ponds, a runoff catch pond, an old process pond, and the Recreation Area pond. The water quality of each body of water is maintained in a safe, environmentally friendly manner. These ponds and associated vegetation are protected from disturbance unless warranted for a specific management practice. Waterfowl management has been the primary focus in aquatic areas. Beaver and alligator are not removed from the ponds unless warranted for safety reasons or potential problems to the structures associated with the ponds (e.g., dam safety, overflow problems).

Mallard's Pond is a five-acre, old pond located in a beautiful, heavy mast producing hardwood cove. The drainage area from Mallard's Pond to the Savannah River is a wetland that has been affected by beaver activity (dams and ponds) for many years. Wood ducks use this area throughout the year but primarily during the winter.

Retention Ponds No. 1 and No. 2 were developed prior to plant construction to collect sedimentation from runoff leaving the site. Pond No. 1 is about six acres, and Pond No. 2 is about five acres in size. Both ponds are very scenic with yellow poplar, willow, sweetgum, blackberry, sericea lespedeza, red maple, bahia grass and

loblolly pine growing along the margins of both ponds. Beaver activity is obvious at both ponds. The waterfowl habitat is excellent on and along the ponds.

A runoff catch pond was formed in a depression left from construction. This pond is about three acres in size and retains water throughout the year. The vegetation associated with this pond is willow, cattail, blackberry, sericea lespedeza and oak and pine in the adjacent uplands.

The 2-acre process pond was originally constructed as a lined chemical cleaning waste pond. The pond was never used for this purpose and future use by the plant is not anticipated. The pond is an excellent source of fresh, clean drinking water for deer, birds, and other wildlife. A large earthen ramp extends out into the pond to facilitate wildlife access to the water in the pond.

The pond at the Recreation Area is home to alligator, some wading birds, and other aquatic life. Situated near the picnic and play area, the pond provides a peaceful and calm haven for employees, their families, and community to enjoy.

### **Compliance**

Plant Vogtle is in compliance with all rules, regulations and permits required by law. There are no habitat enhancement projects associated with regulatory issues.

### **Habitat**

The habitat requirements for species of interest have been maintained. Species of interest include bluebirds, wood ducks, wading birds, wild turkey, quail, and gopher tortoise. Nesting boxes are in place for bluebirds and wood ducks. Existing habitat for wading birds is protected. Planted food plots and prescribed burning enhance habitat for wild turkey, quail, deer and gopher tortoise.

### **Other Awards**

#### ***Southern Company LEAF Award***

In 2001, Vogtle received a Southern Company LEAF (Leaders in Environmental Action for the Future) Award in recognition of the plant's efforts in restoration of the longleaf pine, extensive recycling program, and community outreach. Each LEAF Award recipient received a monetary prize to be donated to the environmental organizations of their choice. Plant Vogtle chose to distribute the prize between two organizations, Augusta State University Department of Biology and Phinizy Swamp Nature Park. Augusta State University was chosen to help provide additional educational supplies for their voluntary work in assisting Plant Vogtle in updating the species inventory onsite. Phinizy Swamp Nature Park is a 501(c)3 organization operated by the Southeastern Natural Sciences Academy dedicated to environmental education, research, and public outreach. Plant Vogtle also supported their Earth Day Augusta at the park in 2002 and 2003.

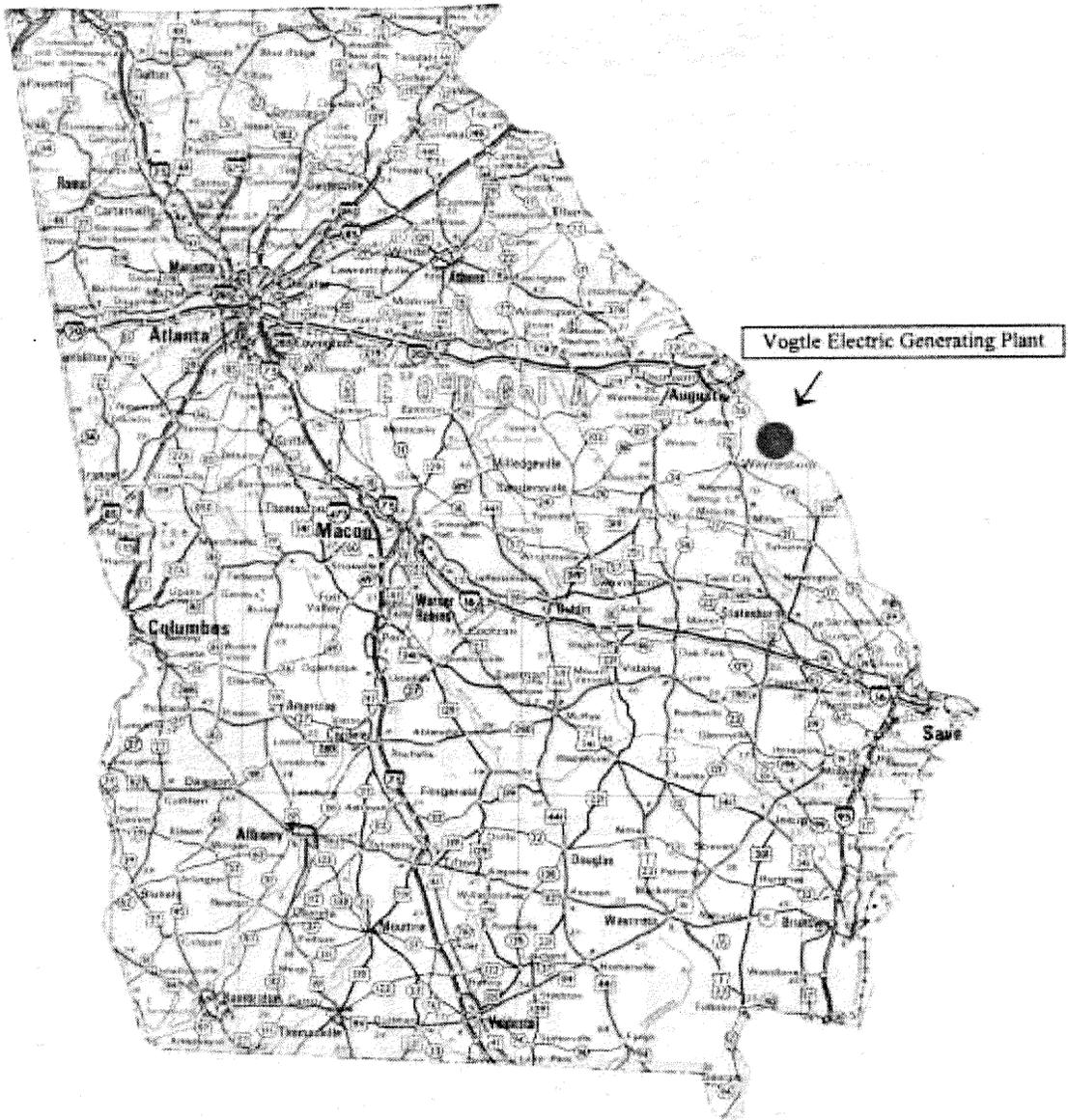
#### ***Forestry for Wildlife Partnership***

The Forestry for Wildlife Partnership Program (FWP) was formed by the Georgia Department of Natural Resources (DNR), Wildlife Resources Division (WRD) and corporate forest landowners to develop a formal, comprehensive, wildlife conservation partnership program. Georgia Power Company (GPC), a subsidiary of Southern Company and part owner of Plant Vogtle, became a FWP partner in 1999

for building wildlife conservation practices into its forest management programs and has continued to receive partnership status each year. GPC earned this partnership through its education and outreach programs, wildlife management practices, attention to sensitive sites, enhancement of wildlife habitat and outdoor recreation, and work through partnerships with outside organizations. Plant Vogtle is one of GPC's many sites that contributed to this partnership program. Appendix A contains the 2000-2001 Report for the Forestry for Wildlife Partnership Program. The figures and maps referenced throughout the report are unavailable for this application.

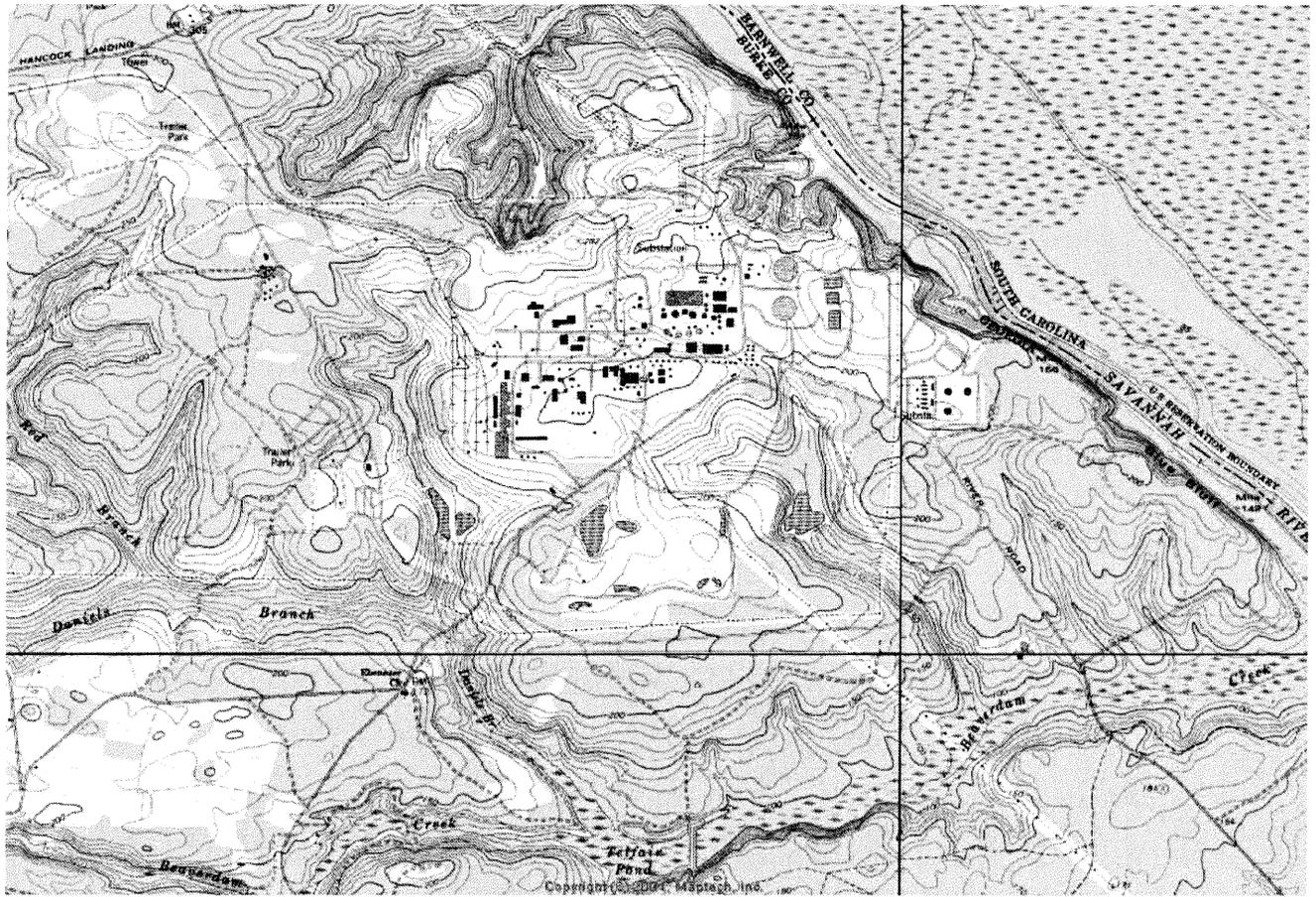
### **Community Partners**

Several partners have provided assistance with habitat management projects. Two local colleges, Augusta State University and East Georgia College, provided assistance in updating the site species inventory. A local Boy Scout troop received merit for their work on the nature trail site at the Recreation Area. Additional nesting habitat was provided at the Burke County School Complex and maintained at Vogtle's adopted school, S-G-A Elementary. Each project summary provides the applicable community partners and references.



Vogtle Electric Generating Plant

Site Location Map  
Vogtle Electric Generating Plant



Site Map

## PROJECT SUMMARY

Since initially achieving WHC certification in 1993, the Plant Vogtle wildlife program has grown and maintained its initial set of programs. A small group of employees are involved as volunteers. The program has been enhanced by improvements in bird box activities, food plot and pond maintenance, and land and animal management. Prescribed burning across the site has enhanced the prairie-like habitat in which species such as the gopher tortoise and indigo snake can thrive, and is also used to further increase the availability of food for birds, deer, and other wildlife. Natural vegetation food plots, such as honeysuckle, bramble, and other browse species, are enhanced by fertilizing native stands. Right-of-ways are generally mowed every three years. The area under each line is cleared in different years to maintain different age plant communities and assure greater habitat diversity. Sawtooth oaks have been planted and maintained along with longleaf pines in recent years. Several major stands of hardwoods exist on the site. Hardwoods dominate the floodplain along the Savannah River and across the area around Mallard's Pond. The hardwood bluff and floodplain adjacent to the Savannah River is maintained in its natural state. Other large hardwood stands can be found along River Road, which provides access to the plant site. Wildlife such as squirrels, rabbits, several furbearers, and a number of small mammals prosper at Plant Vogtle. The plant site, through the carefully planned land management practices, provides abundant food and cover for most species commonly found in the region. The benefits of enhanced emphasis on wildlife and habitat development are evident across the entire 3200-acre site. Existing and additional projects are described in the following pages.

## **Nest Monitoring Program**

### ***General Project Information***

Vogtle began both the bluebird and wood duck nest monitoring programs in 1993. Nest boxes were installed to provide additional habitat and help increase these bird populations in the Southeast. Twenty-three bluebird boxes were constructed and mounted around the site in open meadows and edges of wooded areas with the aid of a Boy Scout group in March 1993. Over time, the number of bluebird boxes has increased from 23 to 40 boxes across the plant site. Nesting boxes are installed at the generating facility, the employee recreation center, and at the training center. Originally, the wood duck program began with 15 boxes, but today provides 26 structures as homes. Wood duck boxes are located on Mallard's Pond, Retention Ponds No. 1 and No. 2, the run-off catch pond, and the river boat ramp. All boxes continue to be maintained and monitored by approximately four employees with the nesting success recorded. The nest box program enhances the existing habitat for bluebirds and wood ducks on site through by providing additional cover. Land management practices are incorporated to encourage existing food sources, provide free range, and protect water sources. Native plantings are considered when opportunities arise; however, establishing additional food source is not the primary focus of the nest monitoring program.

Plant Vogtle has also used the nest monitoring program as a means of environmental outreach and education in area schools. Additional boxes have been constructed and installed at area schools at various times since the program began. In 1996, Vogtle Electric Generating Plant adopted S-G-A (Sardis-Girard-Alexander) Elementary School in Sardis, Georgia, for participation in the plant wildlife habitat management program. The school, which opened in 1995, was selected primarily because of its commitment to reclaiming the natural habitat of the area surrounding the school. A nature trail was established; pine seedlings, maples, willows, and other native species were planted; erosion areas were stabilized with grasses; and a footbridge was built. Plant Vogtle placed three bluebird boxes along the nature trail at the school. Students became responsible for maintaining and monitoring the boxes. Two of these boxes were replaced with student assistance in the fall of 2000 due to weathering. In the spring of 2001, three additional bluebird boxes were installed for a total of six boxes for student monitoring. Two bluebird boxes were also placed at the new Screven County Elementary School in Sylvania, Georgia. Vogtle also worked with Burke County High School to establish a nest monitoring program. In the fall of 2000, Vogtle donated lumber and provided designs to the industrial technology class to construct bluebird and wood duck nesting structures. The class presented the finished products to Vogtle employees in the spring of 2001. The wood duck boxes were erected in MacIntosh Swamp at the Burke County School Complex, and the bluebird boxes were installed along the perimeter fence of the complex.

### ***Updated Monitoring and Maintenance Documentation***

Bluebird nest box activity has continued to increase at Plant Vogtle through habitat management, the introduction of diverse plant communities, and the provision of cover and abundant food. In 1993 less than half of the boxes were being used. By 1996, eggs were observed in all but two boxes, and at least 30 baby bluebirds survived to fledge. The amount of box use declined in 1997 to 14 boxes used out of 23. Only 13 birds survived to fledge. In 1998, 30 bluebirds survived to fledge from 39 eggs. Forty-three birds survived to fledge from 61 eggs in 1999. Twenty-five new boxes were purchased in 1999 to replace old and weathered boxes and add new homes. The number of fledglings decreased slightly in 2000 to 41, but significantly increased to 89 and 92 in 2001 and 2002 respectively.

***Updated Species Inventory***

Not Applicable.

***Project References***

Douglas Day  
Burke County School Superintendent  
789 Perimeter Road  
Waynesboro, GA 30830  
Phone: 706-554-5101  
Email: [cdday@burke.k12.ga.us](mailto:cdday@burke.k12.ga.us)

## **Turkey and Quail Habitat Project**

### ***General Project Information***

Turkey and quail continue to thrive on the Plant Vogtle site. Through a combination of good forest management and the establishment of food plots, these birds have become among the most common on the plant site. Spring plantings of browntop millet, rye, and chufa benefit the turkey, quail, and other birds. Plantings of bicolor lespedeza strips are provided along transmission rights of way as quail food. Prescribed burning and fertilizing have further increased the availability of food and encouraged the birds to stay on the site. Finally, activities at an adjacent State of Georgia wildlife management area have also contributed to increases in the flocks. Land management practices to benefit turkey and quail have been in place since 1983. Two employees maintain approximately 20 acres of food plots spread across the site to provide the essential habitat components of food and space. Native species serving as food sources are also encouraged to flourish where possible. A major native specie being reestablished onsite is the long-leaf pine, which benefits quail and turkey by providing cover.

### ***Updated Monitoring and Maintenance Documentation***

The prescribed burn acreage for 2002-2003 was 350 acres. Previous burns were conducted on 200 acres in 1999, 90 acres in 1996, and earlier.

### ***Updated Species Inventory***

Not available.

### ***Project References***

Dr. Donna Wear  
Department of Biology, Augusta State University  
2500 Walton Way  
Augusta, Georgia 30904-2200  
Phone (706) 737-1539  
dwear@aug.edu

Dr. Jimmy Wedincamp  
Assistant Professor of Biology  
Math/Science Division, East Georgia College  
131 College Circle  
Swainsboro, GA 30401  
Phone 478-289-2143  
Fax 478-289-2080  
wedincamp@ega.peachnet.edu

## **Nature Trail Project**

### ***General Project Information***

Construction of a nature trail at the Recreation Area was considered in 2000 for both plant employees and the public to enjoy. The trail would give opportunities for employee recreation and provide a learning environment for school groups of all ages. In the spring of 2001, two employees finalized and marked the location for the nearly 1.5 mile-trail. In April 2001, a Boy Scout troop from Harlem, Georgia camped onsite and worked for several days to clear almost two-thirds of the trail. Approximately eight scouts plus their Scout masters worked together. Light clearing of the trail was the only work performed on this project, which had a negligible impact on the existing habitat for wildlife. No plantings were performed as part of this project.

### ***Updated Monitoring and Maintenance Documentation***

This project is currently being evaluated for continuation. Plans to continue development of the trail were placed on hold following the terrorist attacks on September 11, 2001 due to security concerns onsite.

### ***Updated Species Inventory***

Not available.

### ***Project References***

Earl Huddleston  
Boy Scouts  
P. O. Box 352  
Waynesboro, GA 30830  
706-554-2114  
earlhuddleston@yahoo.com

## **Wildlife Inventory Project**

### ***General Project Information***

In the fall of 2000, Plant Vogtle contacted two area colleges to support updating the site wildlife species inventory. Augusta State University in Augusta, Georgia and East Georgia College in Swainsboro, Georgia agreed to participate. This partnership provided an excellent opportunity for students to gain experience in plant and animal specie identification. The Augusta State participants began to inventory plant and fish species, while the East Georgia College students learned to identify insects. Approximately 30 students and four professors were allowed access to the non-protected areas of the site on a mostly unlimited basis. Unfortunately, due to the September 11, 2001 terrorist attacks, all visitors were prohibited from access to the site, except under the supervision of an escort. The species inventory has been postponed indefinitely due to increased security across the site.

### ***Updated Monitoring and Maintenance Documentation***

This project is being evaluated for continuation due to security issues.

### ***Updated Species Inventory***

The plant species inventory was updated and is provided as Appendix B.

### ***Project References***

Dr. Donna Wear  
Department of Biology, Augusta State University  
2500 Walton Way  
Augusta, Georgia 30904-2200  
Phone (706) 737-1539  
dwear@aug.edu

Dr. Jimmy Wedincamp  
Assistant Professor of Biology  
Math/Science Division, East Georgia College  
131 College Circle  
Swainsboro, GA 30401  
Phone 478-289-2143  
Fax 478-289-2080  
wedincamp@ega.peachnet.edu

## **Longleaf Pine Restoration Project**

### ***General Project Information***

Plant Vogtle represents one of the largest construction projects undertaken in the state of Georgia. Many acres of land were cleared during construction, which required almost 20 years to complete. Southern Nuclear is committed to reclamation of this land. Recognizing the opportunity to play a major role in the reestablishment of a declining native specie, Vogtle incorporated the planting of longleaf pines into the land reclamation plan. Longleaf pines were once vast throughout the Southeast, but dwindled in the region during the last half of the 20<sup>th</sup> century. To restore the longleaf pine ecosystem, trees have been planted over 1,400 acres on or near the plant site by employees. These pines are managed on a long rotation basis, allowing the trees to live from 60 to 100 years. Specific species of animals and plants, such as gopher tortoise and wiregrass, now flourish in this unique ecosystem. By contributing to the overall restoration of longleaf pine throughout the Southeast, Plant Vogtle is demonstrating their commitment to environmental stewardship.

### ***Updated Monitoring and Maintenance Documentation***

The planting of pines and the maintenance of existing plots will continue. Plans are to reestablish the native longleaf pine and wiregrass-longleaf pine communities that have largely been disrupted across the region. Over 700 acres on plant property have been planted since 1990, which may be seen in the map on the following page. Thirty-two acres were planted in 2000 and 52 acres are planned for 2003.

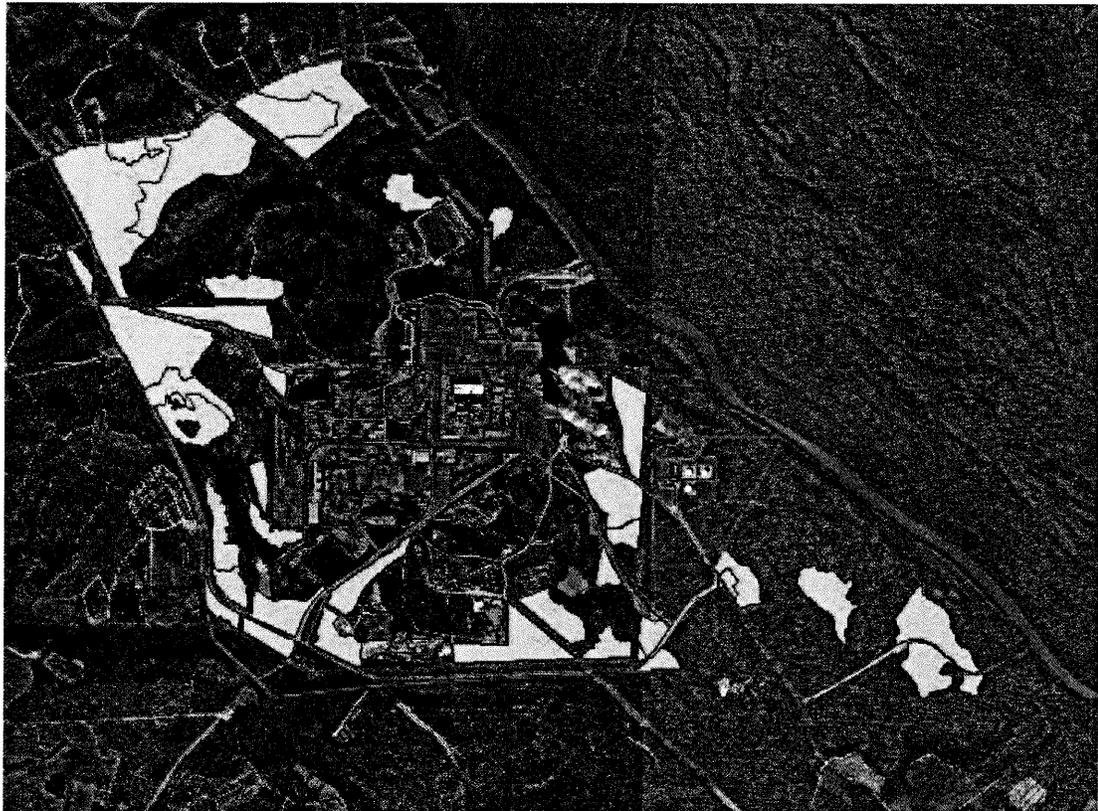
### ***Updated Species Inventory***

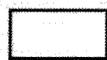
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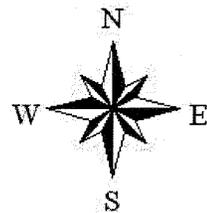
### ***Project References***

Mr. Jeff Billups  
State of Georgia Department of Natural Resources  
Game Management  
Thompson, Georgia 30824  
(706) 595-4222

# Longleaf Pine Areas



-  Plant Vogtle Boundary
-  Longleaf Pine Areas - 717 Acres



## **Education Outreach Projects**

### ***General Project Information***

The Environmental Teacher Corps program is designed to educate young people about the importance of clean air, water, and land. The program, which has been well-received since its inception in 1993, involves Southern Company employees from across the state of Georgia, including approximately 40 Plant Vogtle employees. Through the program, environmental courses are offered for children and for their teachers. A plant employee typically visits the classroom and makes an environmental presentation to the children. Slides, pictures, and/or handouts are utilized as appropriate. The current courses offered include:

Environmental Park (Recycling) Kindergarten

My Friend in the Backyard (Trees) First Grade

Water Wise (Water Quality) Second and Third Grades

Know Your Resources (Resource Management) Fourth and Fifth Grades

Clean Air Grand Prix (A Study of Electric Vehicles) Sixth Grade

Energy and Air (Energy Production and Air Quality) Seventh Grade

These courses and the program in general are designed to help teach children about environmental stewardship and wise use of resources. It is an excellent hands-on tool in education.

### ***Updated Monitoring and Maintenance Documentation***

Over the last three years, approximately 40 volunteers have given dozens of presentations in five surrounding county schools and science centers. The future of this program is currently unknown.

### ***Updated Species Inventory***

Not available.

### ***Project References***

Douglas Day  
Burke County School Superintendent  
789 Perimeter Road  
Waynesboro, GA 30830  
Phone: 706-554-5101  
Email: [cdday@burke.k12.ga.us](mailto:cdday@burke.k12.ga.us)

## **WHC Sign Project**

### ***General Project Information***

It was noticed sometime in 2000 the existing WHC sign had begun to deteriorate. Plant management takes pride in Vogtle's certification through the WHC Corporate Habitat program. To convey that message, a new sign was ordered. The site Environmental Specialist volunteered his time to design and construct the frame to display the sign. The posts were constructed with cedar lumber and timbers and sealed with a clear coat to provide protection from the weather. Eight employees came together in March 2001 to erect the new sign on the main plant access road. The sign area was later accentuated by planting some low-growing shrubs. Vogtle's environmental commitment and certification will receive excellent visibility as visitors enter the plant.

### ***Updated Monitoring and Maintenance Documentation***

The sign and surrounding area will be maintained in good condition as needed.

### ***Updated Species Inventory***

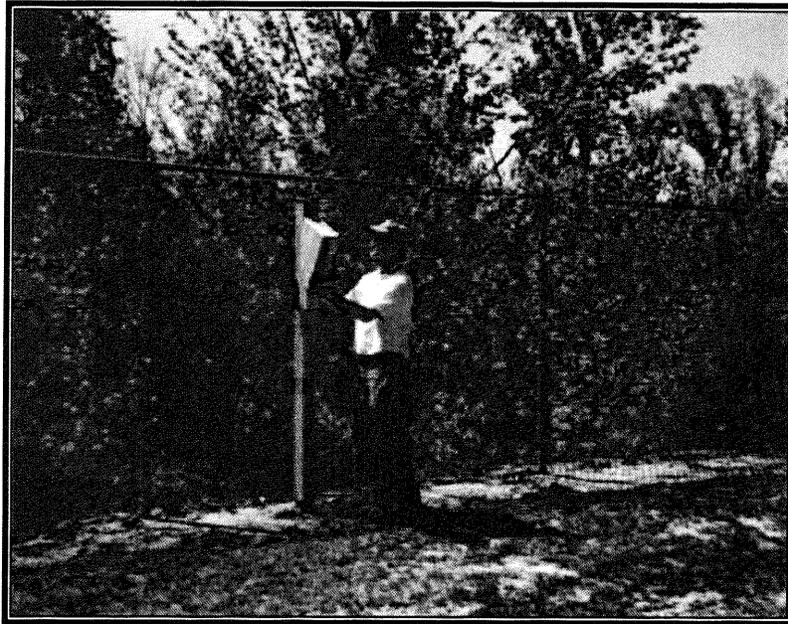
Not applicable.

### ***Project References***

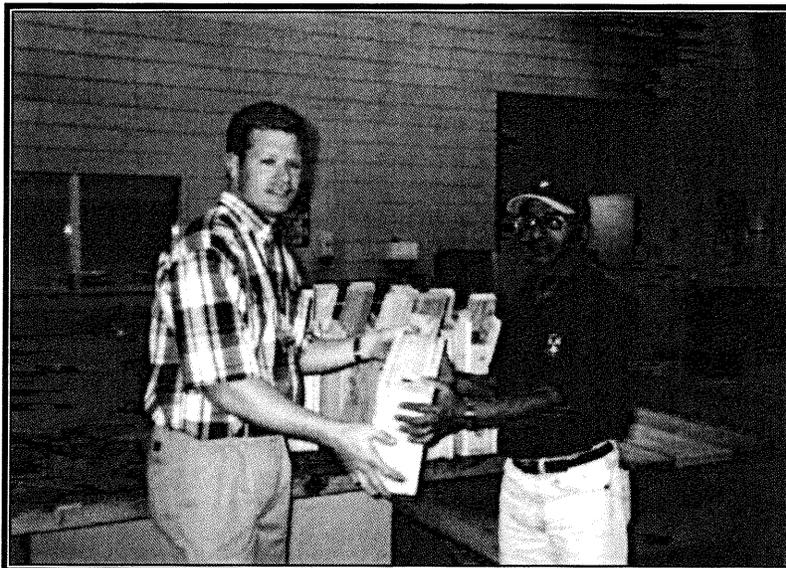
Community references not applicable.

## **RECENT PHOTOGRAPHIC DOCUMENTATION**

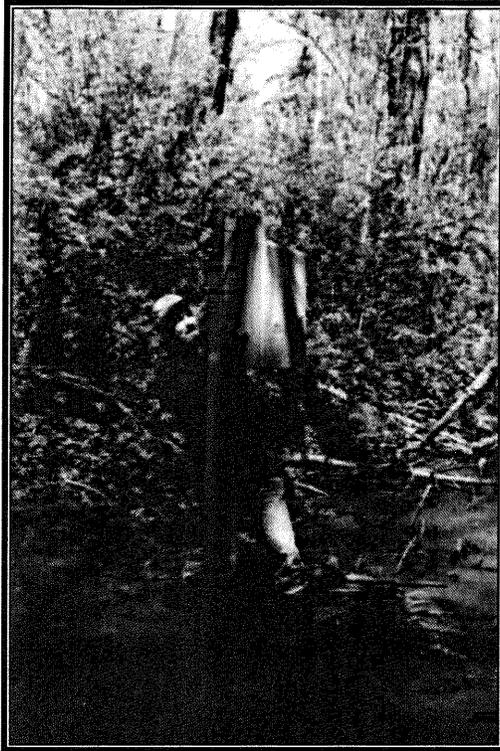
The following pages contain photographs of recent projects and sightings of wildlife. These pictures are also included on the CD for use by WHC.



Mike Burke, Environmental Specialist, installs a bluebird box at the  
Burke County School Complex – April 2001.  
Photo by Shan Sundaram, Chemistry Supervisor



The industrial technology class at Burke County High School presents  
Shan Sundaram, Chemistry Supervisor, with the finished bluebird boxes  
– April 2001.  
Photo by Mike Burke, Environmental Specialist



Carlton Chambers, GPC Land Department, installs a wood duck box constructed by the Burke County High School industrial technology class – March 2001.

Photo by Mike Burke, Environmental Specialist.



This area near the boat ramp is prepared for the planting of longleaf pines – March 2003.

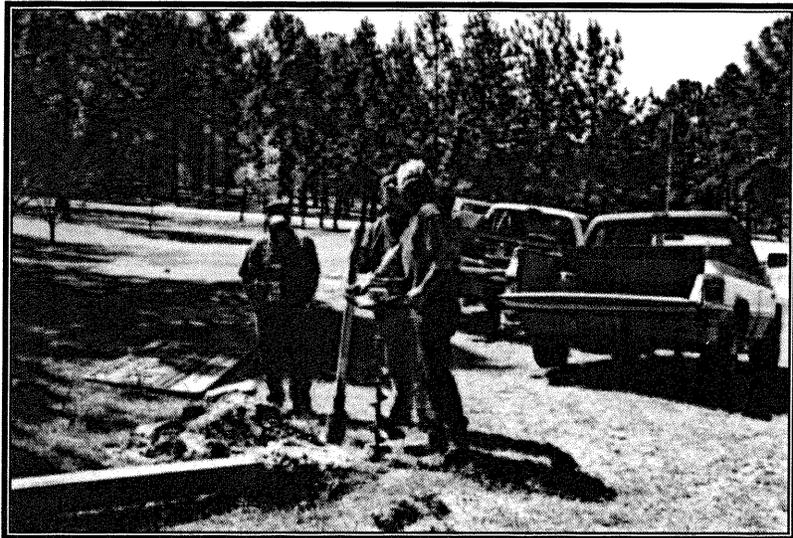
Photo by Amy Greene, Engineer.



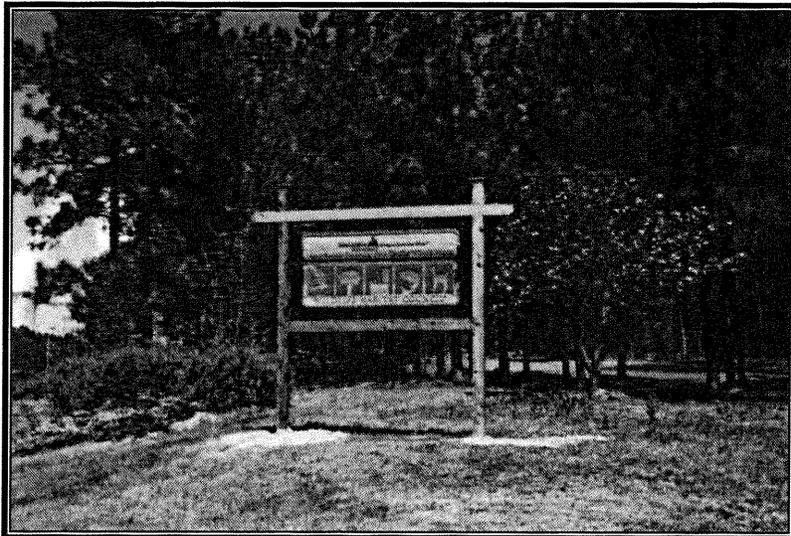
Prescribed burning enhances habitat for wild turkey – February 2003.  
Photo by Jason Redd, Engineer.



Plant Vogtle presents the LEAF award prize check to the Augusta  
State University Biology Department – December 2001.  
Photo by Ellie Daniel, Communications Specialist.



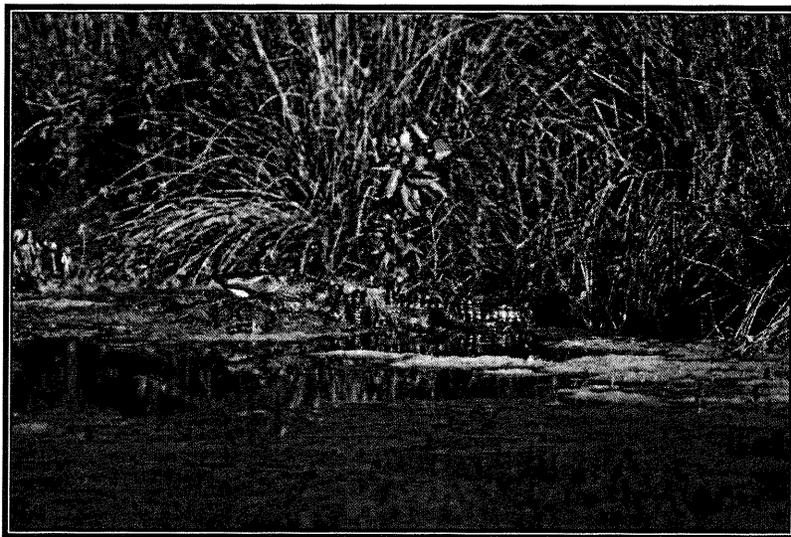
Employees prepare to erect the new WHC sign – March 2001.  
Photo by Mike Burke, Environmental Specialist.



The new WHC sign greatly enhances the plant entrance and conveys Vogtle's strong commitment to the environment – March 2001.  
Photo by Mike Burke, Environmental Specialist.



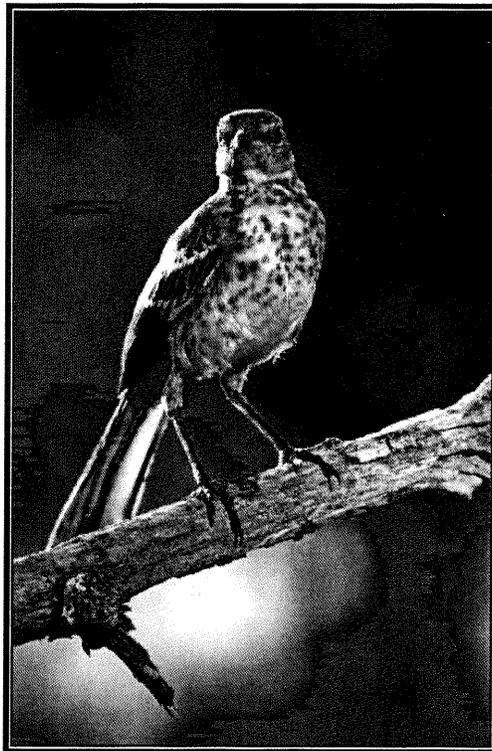
Anhinga are abundant at the Recreation Area pond – Spring 2000.  
Photo courtesy of C. Emory Moody, Customer Service Analyst.



Alligator also make the Recreation Area pond home – Summer 2000.  
Photo Courtesy of C. Emory Moody, Customer Service Analyst.



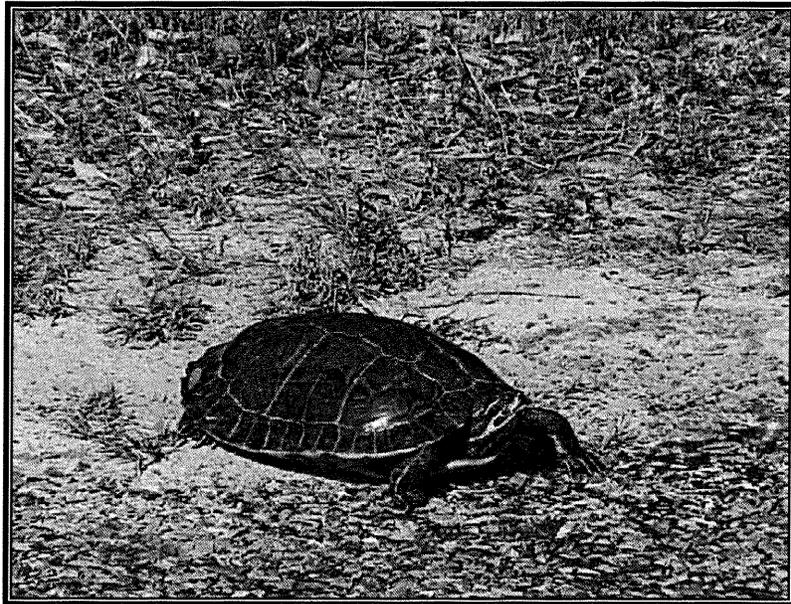
Carolina wren – 2000.  
Photo courtesy of C. Emory Moody, Customer Service Analyst.



Mockingbird – Spring 2001.  
Photo courtesy of C. Emory Moody, Customer Service Analyst.



A turtle basks in the sun at the Recreation Area pond – March 2003.  
Photo by Amy Greene, Engineer.



Slider turtles are common on the Vogtle site – February 2003.  
Photo by Jason Redd, Engineer.



Green anole – September 2002.  
Jason Redd, Engineer.

## **MEDIA MATERIALS**

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## APPENDIXES

**APPENDIX A**

**FORESTRY FOR WILDLIFE PARTNERSHIP REPORT**

# **GEORGIA POWER COMPANY FORESTRY FOR WILDLIFE PARTNERSHIP 2000 - 2001 PROGRAM REPORT**

## **INTRODUCTION**

Georgia Power Company (GPC) is an investor owned utility serving customers in 57,000 of the state's 59,000 square miles. Georgia Power owns and manages approximately 74,000 acres of land reserved for watershed protection, future utility use, and natural buffers for our generation plant sites. The Land Management Section of the Land Department and its foresters manage these lands under three basic guidelines: 1) Protection of assets and the environment. 2) Promote the use of company forestlands and lakes for the public good. 3) Wise use and utilization of our renewable natural resources to generate revenue and opportunities for outdoor recreation. Other departments in GPC also contribute to and promote wildlife awareness through various programs. The Forestry For Wildlife Partnership Program (FWP) matches well with GPC's past and present land management goals and objectives to blend wildlife and timber management on these company lands. The following report describes activities conducted by GPC in 2000/2001 that enhanced, promoted or otherwise benefited wildlife

## **Education and Outreach**

GPC foresters and wildlife biologist developed management goals and objectives using the FWP as a guide. All contract personnel are informed of the importance of following our FWP objectives and recommendations. The GPC land department has an exhibit display focusing on forestry, wildlife management and outdoor recreation to help educate internal and external customers of GPC's commitment to forestry and wildlife management. Brochures are also available describing company owned parks, lakes, and wildlife management areas. The exhibit and brochures were used at events such as the Georgia Wildlife Federation's annual meeting, Fish-a-rama and Buck-a-rama, the Georgia Forestry Association Convention, and the Georgia National State Fair. The WMA brochure is also made available to the public at company owned WMAs.

During 2000 - 2001, approximately 95 GPC employees participated in the Environmental Teachers Corps that made environmental presentations at schools across the state. These presentations reached over 37,400 students. In the Plant Vogtle area, a nature trail was developed to be used by children on school field trips as well as by employees and their families. Donations were made to the Phinizy Swamp Nature Park and to the Augusta State University Biology Department for environmental education and research. At Plant Scherer, GPC partnered with the DNR to provide a quail demonstration area using quail habitat management practices to educate private landowners in this matter.

Foresters have worked with scout groups to assist with merit badge awards for tree and wildlife identification and coordinate other scout groups on nature walks. GPC assisted with hunter education on the Oconee Wildlife Management Area and provided signage for the dove field at Rum Creek. GPC has provided lands, modified timber management plans, and supported the development of wildlife education trails at Blanton Creek, Rum Creek and Oconee WMAs. These trails provide opportunities for wildlife viewing and hiking. Several GPC employees have attended the Partners-in-Flight Bird Boot camps and participated in neotropical bird counts at Plant Hatch, Cartecay and at McGrau Ford WMA's. At Oconee WMA, GPC cooperated with the DNR to install 10 test plots for the Partners-in-Flight Program. GPC also sponsored and assisted with the Weekend for Wildlife to provide funding and support for the Ga. DNR non-game programs. GPC also used bill inserts to advertise the Wildlife Tag program in support of the non-game program. GPC and the NWTf co-sponsored a J.A.K.E.S. Program for kids at the Charlie Elliott Wildlife Education Center. GPC employees also cooked and served food at the event.

Project G.R.E.E.N. began in 1995 as a land ownership assistance program which GPC was a partner with the Georgia Forestry Commission to administer our carbon sequestration program to plant trees in Georgia. During 2000, 126 landowners were assisted in planting 2,507,863 trees on 3,883 acres. Over the next 35 years, 270,000 tons of carbon (in the form of CO<sub>2</sub>) will be removed from the atmosphere due to this planting.

The following is a list of programs supported by GPC as an outreach for wildlife:

**Upper Chattahoochee Riverkeeper** - GPC printed the brochure for the third annual Riverkeeper Golf Tournament and is a member of the organizing steering committee. Printed their River Revival fundraiser invitations for three years.

**Park Pride** - Provided program support, printed brochures and served on the Board, Executive Board, President Elect and served as Co-Chair of First Annual Parks Leadership Conference.

**Cool Communities**- Serve on the steering committee and printed brochures, financial support.

**Chattahoochee Nature Center** - Provided financial support. Printed for several years their invitations to their annual fundraiser.

**The Environmental Resource Network (T.E.R.N.)**-Serve on board of directors, chair foundation solicitation committee, and assisted with annual fund-raising at Week-End for Wildlife.

**Georgia Regional Transportation Authority**-Serve on Citizen's Academy (Performance Measures Committee).

**The Clean Air Campaign**-Serve on Task Force that monitors outreach coordinator.

**Metro Atlanta Telecommuting Advisory Council (MATAC)**-Serve on board as Past President. Provide educational information to encourage fewer vehicles on highway.

**Izaak Walton League** - Provided financial support for water quality workshops. The workshops were designed to tie the importance of water quality to its impact on aquatic life.

**Georgia Environmental Council** - Attended their annual legislative reception.

**Quail Unlimited**-Provide items for silent auction at annual fund-raiser.

**US Fish and Wildlife Service** – Sponsor the Ga. Jr. Duck Stamp Art Competition.

## Wildlife Management Practices

GPC foresters evaluate and manage each tract independently to identify the best methods of management to benefit timber production, wildlife, wetlands, endangered species, sensitive areas and the water resources of the site. Long term forest management plans that blend wildlife and timber management objectives have been written on many of our project lands. Some of the older plans were written using DNR recommendations and guidelines that exceeds today's FWP management guidelines. GPC foresters continue to follow these written plans and its harvest schedule as outlined.

GPC foresters received Arcview GIS training and have adopted its many applications. All tracts with existing forest management plans and those that were written in 2000 - 2001 have all been digitally mapped with its related roads, natural features and stand types for building our GIS database. During this report period, McGrau Ford WMA (2,430 acres) located in north Georgia, had a forest management plan written with a 30 - year harvest schedule. This plan incorporated wildlife management practices that exceed FWP guidelines. A forest management plan was also written at our Plant Vogtle site (3,200 acres) near Waynesboro, Georgia. This plan included a 20 - year harvest schedule. Plant Branch located near Milledgeville, Ga. also had a forest management plan written with a 38- year harvest schedule. At our Plant Yates site (2,350 acres) near Newnan, Georgia, a forest management plan was also written that included a 38 - year harvest schedule. On our Goat Rock Lake project (2,517 acres) near Columbus, Ga., a forest management plan was also written with a 38 - year harvest schedule. This plan includes protecting two eagle nests and some endangered and threatened species of rare plants using recommendations by the DNR.

GIS tract maps of these areas have been attached to this report in Appendix A to visually describe our overall efforts in meeting our goals. Arcview GIS provides foresters, plant personnel, wildlife biologist, and the user public valuable information, especially the extensive mapping capabilities it provides.

Listed below is a summary of the practices and associated key factors that was implemented in our silvicultural methods for 2000-2001 which will enhance habitat diversity within the site and across the landscape.

### **A. Site Preparation:**

GPC foresters prescribe various site preparation methods depending on site conditions and objectives. Due to the diverse nature of our tracts and the stands within those tracts, we must be flexible in how we site prepare these areas. In addition to chemical site preparation, we incorporate mechanical site preparation methods such as mowing, disking, subsoiling, rake and pile, etc. On a limited basis, we have incorporated intensive subsoiling methods on cutover sites. This benefits both wildlife and tree seedlings. For chemical site preparation, we use different methods of application such as aerial broadcast, backpack foliar applications, and spot soil application of herbicides. Aerial applications of Arsenal and Accord herbicides are often used on rough cutover sites. Timing of this application occurs

most often in late summer and early fall. In 2000-2001, approximately 665 acres received chemical site preparation. Another 284 acres received mechanical site preparation. A total of 949 acres were site prepared during 2000-2001.

**B. Regeneration:**

During 2000 - 2001, 1,378 total acres were artificially regenerated averaging 35 acres on 39 different sites that ranged from a low of 4 acres to the largest of 76 acres. Natural regeneration was used on two sites that totaled 160 acres. The following is a break down of species by acres planted:

Loblolly Pine	1246 acres	Slash Pine	32 acres
Longleaf Pine	228 acres	Oak	32 acres

The stand adjacency requirement is given priority when scheduling harvest cuts. In most cases, our management plans will allow a greater difference in ages between adjacent stands, using seven or eleven years as a guide. In 2000-2001, 97% of the newly established stands met the adjacency requirement. Due to these smaller sites that are being regenerated, it is very difficult to fully incorporate the other recommended practices as outlined below. These smaller sites are also irregular in shape and create much edge in relation to their size.

**C. Herbaceous and/or Woody Competition Control**

Herbicides are a very useful tool in forestry in controlling herbaceous and woody competition in newly established stands. Different methods of application are used depending on the sites. Broadcast application of herbicides for release is seldom used on company lands. However, broadcast applications of ULW herbicide have been recently used for release in young longleaf stands to control the woody competition needed for longleaf survival. On other sites and on most WMAs, band or spot applications of herbicides are used on both site preparation and release. In 2000 - 2001, a total of 907 acres were treated chemically for herbaceous and/or woody competition control. Approximately 407 acres were released using broadcast methods for woody competition.. Approximately 419 acres were banded or spot treated for woody competition control in a release application. Approximately 55 acres were banded or spot treated for herbaceous competition control in open fields while 26 acres were treated with a broadcast application to control herbaceous competition. Most all release applications for woody competition are performed in late summer and early fall. Wildlife friendly timing of chemical applications was prevalent on newly established stands. In some cases, tank mixes of herbicides for broadcast applications are altered on WMAs to make a treatment more wildlife friendly. Due to the irregular shape and small size of these newly established stands, the recommended 30' foot untreated buffers were not preserved in these stands.

*Prescribed Burning*

GPC foresters help coordinate and assist DNR personnel with prescribed burning activities on company owned WMAs. These areas managed for wildlife and public use are generally given more priority than other company lands when planning

annual burning activities. Emphasis is also given to those longleaf pine stands on company tracts in the coastal plain and on all stands that have been thinned. In 2000-2001, a total of 8,906 acres of company forestlands were prescribed burned. Site preparation burns accounted for 8%. Approximately 72% of the total acres burned were on thinned stands of pine timber, leaving 20% in unthinned stands.

### **E. Thinning**

Thinning timber stands is a major component of our forest management plans and harvest schedules. This is especially true when managing for long-term rotations as GPC does on most of its tracts. It allows us to utilize the timber resources while benefiting wildlife. Thinning enhances quail habitat as well as other game and non-game species. In 2000-2001, timber stand improvement thinnings accounted for 70% of total acres harvested for a total of 1,330 acres. In our management plans, pine stands are given thinning schedules, which are shown in the Harvest Schedule Report. With current timber market conditions and decreased availability of loggers, it will be a challenge in the future to adhere to our thinning plans. Thinning will continue to play a large role in our forest management activities.

### *Opening Management*

In 2000-2001, 59% of our newly established stands contained wildlife friendly openings either associated with access roads, loading decks, or other openings in natural vegetation. In addition to those types of opening management, approximately 424 acres are planted annually and maintained for wildlife food plots. Wheat, rye and clover mix, sunflowers, bahia grass and browntop millet are frequently used in our management plans for openings along with disking some old fields and rights-of-way.

### **G. Riparian Areas**

The management of these areas has and will continue to have a major impact on GPC land management activities since the majority of our land is associated with rivers, lakes and their tributaries. Special care is taken to protect priority riparian areas and streamside management zones (SMZs). In 2000-2001, 74% of the newly established stands exceeded BMP recommendations, while 26% met BMP guidelines. In many cases, the priority riparian areas and SMZs are often enhanced by including other bottomland and upland hardwood types to enlarge those areas for wildlife. These areas are defined and marked on the ground before harvesting begins. Any harvesting done in these areas are trees selectively marked and cut with 50% or more canopy cover maintained. The attached tract maps shown in **Exhibit A** should better describe our past and present protection of SMZs and bottomland hardwoods and its associated upland hardwood components that are often used to enhance BMPs. In the Goat Rock Lake forest management plan, Georgia Power Company and MeadWestvaco formed a partnership to protect and maintain a minimum of 100' foot SMZ on the lake shoreline and major creeks entering the reservoir. This plan, along with other forest management plans written for GPC, will enhance and exceed most recommended BMPs.

## **Snags and Hardwood Clumps**

In 2000-2001, 82% of the newly established stands contained either recommended snags or hardwood clumps where it was feasible to do so. Many snags are created after aerial application of herbicides. On some sites, individual trees greater than 10 inches in diameter are left uncut to create recruitment snags. These trees are either marked or discussed with logger at time of harvest. Approximately 24% of newly established stands retained hardwood clumps and 29% retained individual live trees. Snags and hardwood clumps may not be a priority in regeneration of small pine stands especially where ample edge has been created from such an irregular harvest cut in relation to the size of the site.

### **I. Dead or Down Woody Debris**

On sites that contained windrows, 16% of those stands established in 2000-2001 contained unburned windrows. Unburned slash piles existed on 27% of newly established stands while 33% contained unburned logging debris. On rough cutover sites, site preparation burning is prescribed to facilitate both machine and hand planting methods. Some sites also require a good burn to insure adequate stocking. The degree of burn can be manipulated by weather conditions and season of the year. Burning later in the year usually results in more woody debris left unburned. Most of our site preparation burning does occur late in the year due to late herbicide applications.

### **Sensitive Sites and Special Concerns**

This category has been and will be a major concern to GPC in all land activities. At least 9 known federally listed threatened or endangered species inhabit GPC lands. Prior to timber harvest operations, all planned timber sales are surveyed for sensitive sites and/or threatened or endangered species. In 2000/2001, GPC worked with the Ga. DNR Heritage group to exchange information and manage endangered species located on GPC transmission rights-of-ways. This information is used to identify locations of endangered species on GPC rights-of-way. Endangered species will be identified on the ground, marked and will be managed in an appropriate manner to benefit the species. Management may include burning, mowing, hand clearing or other techniques.

As a part of GPC's forest management activities, there are many opportunities for preservation or restoration of sensitive areas. A few of the preservation areas to date are the Savannah River Bluff near Plant Vogtle, the Altamaha River corridor near Plant Hatch, a Great Blue Heron rookery at Plant Hatch, all pure hardwood stands, wetland areas, and primary zones around Bald Eagle nests. All priority riparian areas and SMZs are also marked and protected during harvesting operations. GPC is cooperating with the Ga. Natural Heritage Program to protect and maintain areas along the Flint River including Pigeon Creek, Nichols and Sprewell Bluff tracts. The Tallulah Gorge and Sprewell Bluff areas are leased to the state for state parks. GPC has signed agreements with South Carolina and Georgia to manage and protect

populations of persistent trillium. GPC has located and protected areas around eight Bald Eagle nests located on or adjacent to company lands. All forestry activities in the primary and secondary zones of a Bald Eagle nest are planned according to the DNR recommendations and approvals. Gopher tortoise burrows are identified and protected on many GPC forestlands and transmission corridors. GPC has also restored longleaf pine to over 900 acres of former habitat, which will be managed on long term rotations. Many hardwood bottoms are being replanted in hardwoods. Many of our pine stands will be managed on long rotations while balancing age class distributions on our largest tracts of land. GPC has been active in Partners-in- Flight. Monitoring occurs on the Plant Hatch site, Rum Creek WMA, and Oconee WMA, McGrau Ford WMA and Cartecay WMA.

### Wildlife Recreation

Georgia Power Company is the largest private provider of public use land in Georgia. Approximately 33,000 acres (45%) of our company lands are leased and managed by the Georgia Department of Natural Resources (DNR) for Wildlife Management Areas (WMAs) and state parks to enhance wildlife habitat and provide outdoor recreation to the public. GPC foresters cooperate and coordinate with the DNR wildlife biologists and technicians to provide habitat management improvements and other forest management activities. Activities such as prescribed burning, road maintenance and construction, providing wildlife openings and nature trails are just a few activities that GPC supports that offset DNR cost on these areas. Many recreational opportunities are available to the public on these WMAs.

Across the state, GPC annually leases approximately 7,381 acres to 31 different private hunting clubs. GPC foresters allow these clubs to manage open areas for wildlife. Efforts are also made to inform and educate these clubs on hunting safety and ethics along with proper management of wildlife. Annually, approximately 343 hunting permits were issued on approximately 4,700 acres. Hunting opportunities are also available to company employees on generation plant sites. Most plant sites are limited to bow hunting only. GPC foresters have some input on making recommendations for hunting on these plant sites.

GPC is committed to providing and enhancing company lands for public outdoor recreation. The GPC land department is responsible for providing and maintaining company owned recreational sites around the state for the general public. Approximately 8 recreational parks associated with our hydroelectric projects are available for camping, boating, fishing, hiking, and bird watching. Several day use area parks are also available for lake and river access and fishing.

The GPC land management staff meets annually with the DNR Law Enforcement Division to discuss issues concerning public use of company owned lakes. The recreation specialists in our land management offices also present boating safety programs at area schools. The company's wildlife biologist and fishery biologist are also available to provide assistance and recommendations to enhance wildlife recreation on all GPC lands.

## Partnerships

Partnerships with outside organizations and agencies have been a priority in accomplishing our goals and commitments to support wildlife. These partnerships create opportunities to communicate with those wildlife organizations and the public in building relations of cooperation and understanding of forestry and wildlife management. During 2000/2001, GPC worked with Zoo Atlanta to find and provide river cane for the Pandas to eat. GPC also worked with DNR to manage some of the available creek bottoms for river cane to provide habitat for the Swanson's warbler. At Plant Scherer, GPC has worked with DNR on a warm season grass project to benefit the Partners In Flight program. Also at Plant Scherer forest management practices have been modified on 80 acres to create a quail demonstration area. Included in this management was thinning to 40-50 basal area and creating wildlife openings. GPC has formal agreements with Georgia and South Carolina to manage company land as wildlife management areas. Currently there are seven WMAs on GPC lands. Most timber management activities on these WMAs are conducted with an equal emphasis on wildlife management with long-term plans in place. Another formal agreement with Georgia and South Carolina is to manage and protect the endangered persistent trillium. Long-term studies are ongoing to assist in the recovery of the plant and protect the existing populations. Plants Vogtle and Hatch are members of the Wildlife Habitat Council. This group certifies each plant for actively managing the sites for wildlife and environmental education. Details of what activities were conducted at each site are detailed in other sections of this report. GPC has written agreements with the National Wild Turkey Federation, Quail Unlimited, and Ducks Unlimited and holds membership in the Longleaf Alliance. GPC is a member of the National Bluebird Society and is active in Partners in Flight. GPC is a partner in the Georgia Piedmont Natural Resource Cooperative, which is an effort to benefit wildlife management and environmental stewardship on a landscape scale. GPC has supported and will continue to support the Forestry For Wildlife Partnership program. GPC has an ongoing partnership with the Bass Anglers Sportsman Society (BASS) to manage our reservoirs for a productive fishery. Our Christmas tree program provides needed fish habitat and involves clubs across the state in this cooperative effort. GPC has an agreement with the DNR that provides land for state parks at Tallulah Gorge and Sprewell Bluff.

GPC's Project WINGS (Wildlife Incentives for Non-game and Game Species) is a partnership between GPC and Two Rivers RC&D Council in which groups or individuals who own or lease land that have GPC transmission lines may receive cash grants if they follow wildlife management techniques within the rights-of-way. Grant recipients have a three-year obligation to follow wildlife management plans developed from a menu, which might include brush control, permanent wildlife plantings or annual wildlife plantings. The DNR Wildlife Resources Division and the USDA NRCS developed the menu. Quail Unlimited, the National Wild Turkey Federation, Quality Deer Management Association, Audubon Society-Atlanta Chapter, Georgia Wildlife Federation, The Georgia Conservancy and the soil and water conservation districts endorse the program. Quail Unlimited is partnering with GPC to play a more active role in the future. In 2000, the program was expanded to include the entire state and currently has contracts with the public for approximately 5,600 acres for wildlife enhancement. Georgia Power has won several

environmental awards for the program including a national award from American Cyanamid in the utility category.

The following information is a summary of forestry field data collected during the 2000-2001 program years that describes the amount of diversity in habitat created at the stand level and across the landscape.

## **LANDSCAPE LEVEL SILVICULTURAL PRACTICES**

### Acres Harvested

1. complete – 576
2. partial (thinned) – 1330

### Acres Regenerated

1. natural – 160
2. artificial – 1378

### Acres Site Prepared

1. chemical – 665
2. mechanical – 284
3. total - 949

### Acres Released

1. herbaceous
  - a. banded or spot – 55
  - b. broadcast – 26
2. woody
  - a. banded – 419
  - b. broadcast – 407

### Acres Prescribed Burned

1. site preparation – 689
2. intermediate
  - a. thinned – 6,388
  - b. unthinned – 1,829

## **SILVICULTURAL ASSESSMENT FOR NEWLY ESTABLISHED STANDS**

### A. Adjacency

97% of newly established stands adjacent to stands with a minimum of 3 growing seasons or >10' average height.

B. Buffers

1. Streamside Management Zones

26% adequate (meets BMPs)

74% enhanced (exceeds BMPs)

2. Shrub Edge Structure

0% of total sites with a shrub buffer a minimum of 30' in average width adjacent to wetlands, SMZs, and other forest stands.

C. Snags/Recruitment Trees

82% of total sites that avg. >1 snag/acre > 10" dbh (hardwoods in clumps preferred)

D. Woody Debris

Percent of total sites with:

16% unburned windrows when applicable

27% slash piles

33% unburned logging debris

E. Openings

59% sites with roads, roadsides, log decks and stream crossings stabilized with native vegetation or wildlife friendly plantings (plantings other than fescue, Bermuda grass, sericea lespedeza, and weeping love grass)

F. Hardwood Leave Trees

Percent of sites with:

24% hardwood clumps

29% live cull trees

G. Corridors of Mature Trees

Percent of sites with:

72% upland corridors

67% priority riparian corridors

**APPENDIX B**

**Updated Plant Species Inventory**

acan	Dyschoriste	oblongifolia	aspi	Thelypteris	palustris
acan	Justicia	americana	aspl	Asplenium	platyneuron
acer	Acer	negundo	ast	Ambrosia	artemisiifolia
acer	Acer	rubrum	ast	Antennaria	plantaginifolia
acer	Acer	saccharinum	ast	Aster	concolor
acer	Acer	saccharum	ast	Aster	dumosus
agav	Agave	virginica	ast	Aster	linariifolius
alis	Sagittaria	latifolia	ast	Aster	pilosus
amar	Froelichia	floridana	ast	Aster	tortifolius
amar	Froelichia	gracilis	ast	Aster	undulatus
anac	Rhus	copallina	ast	Aster	vimineus
ann	Asimina	parviflora	ast	Bidens	bipinnata
apia	Angelica	venenosa	ast	Bidens	discoidea
apia	Chaerophyllum	tainturieri	ast	Bidens	tripartita
apia	Cicuta	maculata	ast	Cacalia	atriplicifolia
apia	Cryptotaenia	canadensis	ast	Chrysogonum	virginianum
apia	Daucus	pusillus	ast	Cirsium	nuttallii
apia	Eryngium	yuccifolium	ast	Cirsium	repandum
apia	Hydrocotyle	verticillata	ast	Coreopsis	lanceolata
apia	Ptilimnium	capillaceum	ast	Coreopsis	major
apia	Sanicula	canadensis	ast	Eclipta	alba
apia	Sanicula	gregaria	ast	Elephantopus	carolinianus
apia	Spermolepis	divaricata	ast	Elephantopus	nudatus
apia	Spermolepis	echinata	ast	Erechtites	hieracifolia
apia	Thaspium	barbinode	ast	Erigeron	strigosus
apia	Thaspium	trifoliatum	ast	Eupatorium	aromaticum
apia	Trepocarpus	aethusae	ast	Eupatorium	coelestinum
aqui	Ilex	ambigua	ast	Eupatorium	compositifolium
aqui	Ilex	decidua	ast	Eupatorium	cuneifolium
aqui	Ilex	glabra	ast	Eupatorium	recurvans
aqui	Ilex	opaca	ast	Eupatorium	rugosum
aqui	Ilex	verticillata	ast	Facelis	retusa
arac	Arisaema	triphyllum	ast	Gnaphalium	obtusifolium
arac	Peltandra	virginica	ast	Gnaphalium	purpureum
arec	Sabal	minor	ast	Haplopappus	divaricatus
ascl	Asclepias	amplexicaulis	ast	Helianthus	hirsutus
ascl	Asclepias	humistrata	ast	Helianthus	laetiflorus
ascl	Asclepias	rubra	ast	Heliopsis	helianthoides
ascl	Asclepias	tuberosa	ast	Heterotheca	gossypina
ascl	Asclepias	verticillata	ast	Heterotheca	graminifolia
ascl	Matalea	carolinensis	ast	Heterotheca	mariana
aspi	Athyrium	asplenioides	ast	Heterotheca	subaxillaris
aspi	Onoclea	sensibilis	ast	Hieracium	gronovii
aspi	Polystichum	acrosticoides	ast	Hymenopappus	scabiosaeus

ast	Hypochoeris	elata	ast	Hypochoeris	glabra
ast	Krigia	virginiana	brass	Arabidopsis	thaliana
ast	Kuhnia	eupatorioides	brass	Arabis	canadensis
ast	Lactuca	canadensis	brass	Cardamine	pennsylvanica
ast	Lactuca	graminifolia	brass	Lepidium	virginicum
ast	Liatriis	aspera	brom	Tillandsia	usneoides
ast	Liatriis	earlii	cact	Opuntia	humifusa
ast	Liatriis	elegans	camp	Campanula	divaricata
ast	Liatriis	tenuifolia	camp	Lobelia	puberula
ast	Melanthera	hastata	camp	Specularia	perfoliata
ast	Mikania	scandens	camp	Wahlenbergia	marginata
ast	Pyrrhopappus	carolinianus	capr	Lonicera	japonica
ast	Rudbeckia	hirta	capr	Lonicera	sempervirens
ast	Rudbeckia	laciniata	capr	Sambucus	canadensis
ast	Senecio	glabellum	capr	Viburnum	dentatum
ast	Senecio	smallii	cary	Arenaria	caroliniana
ast	Silphium	compositum	cary	Arenaria	serpyllifolia
ast	Silphium	dentatum	cary	Paronychia	americana
ast	Solidago	caesia	cary	Silene	stellata
ast	Solidago	gigantea	cary	Silene	virginica
ast	Solidago	nemoralis	cary	Stipulicida	setacea
ast	Solidago	odora	cela	Euonymus	americanus
ast	Solidago	petiolaris	chen	Chenopodium	album
ast	Solidago	tenuifolia	chen	Chenopodium	ambrosioides
ast	Sonchus	asper	cist	Helianthemum	canadense
ast	Spilanthes	americana	cist	Helianthemum	carolinianum
ast	Tetragonotheca	helianthoides	cist	Helianthemum	rosmarinifolium
ast	Verbesina	occidentalis	cist	Lechea	leggettii
ast	Verbesina	virginica	cist	Lechea	villosa
ast	Verbesina	walteri	clus	Hypericum	gentianoides
ast	Vernonia	altissima	clus	Hypericum	gymnanthum
ast	Vernonia	angustifolia	clus	Hypericum	hypericoides
bals	Impatiens	capensis	clus	Hypericum	mutilum
berb	Podophyllum	peltatum	clus	Hypericum	pseudomaculatum
bet	Alnus	serrulata	clus	Hypericum	punctatum
bet	Carpinus	caroliniana	clus	Hypericum	walteri
bet	Ostrya	virginiana	com	Commelina	diffusa
bign	Anisostichus	capreolata	com	Commelina	erecta
bign	Campsis	radicans	com	Commelina	virginica
bign	Catalpa	speciosa	com	Tradescantia	ohiensis
blec	Woodwardia	areolata	com	Tradescantia	rosea
blec	Woodwardia	virginica	com	Tradescantia	roseolens
bor	Lithospermum	carolinense	com	Tradescantia	virginiana
bor	Lithospermum	caroliniense	conv	Bonamia	patens

conv	Ipomea	coccinea	corn	Cornus	florida
conv	Ipomea	pandurata	corn	Cornus	stricta
cuc	Cayaponia	boykinii	euph	Euphorbia	ipecacuanhae
cuc	Citrullus	vulgaris	euph	Euphorbia	supina
cyp	Bulbostylis	ciliatifolia	euph	Phyllanthus	amarus
cyp	Carex	albolutescens	euph	Stillingia	sylvatica
cyp	Carex	festucacea	euph	Tragia	urens
cyp	Carex	intumescens	fab	Amorpha	fruiticosa
cyp	Carex	lupulina	fab	Apios	americana
cyp	Carex	lurida	fab	Astragalus	michauxii
cyp	Carex	tenax	fab	Baptisia	lanceolata
cyp	Carex	tribuloides	fab	Baptisia	pendula
cyp	Carex	typhina	fab	Baptisia	perfoliata
cyp	Cyperus	filiculmis	fab	Cassia	fasciculata
cyp	Cyperus	ovularis	fab	Cassia	nictitans
cyp	Cyperus	plukenetii	fab	Centrosema	virginianum
cyp	Cyperus	refractus	fab	Cercis	canadensis
cyp	Cyperus	retrofractus	fab	Clitoria	mariana
cyp	Cyperus	strigosus	fab	Crotalaria	angulata
cyp	Eleocharis	microcarpa	fab	Desmodium	ciliare
cyp	Fimbristylis	autumnalis	fab	Desmodium	fernaldii
cyp	Rhynchospora	glomerata	fab	Desmodium	glabellum
cyp	Rhynchospora	miliacea	fab	Desmodium	glutinosum
cyp	Scirpus	cyperinus	fab	Desmodium	marilandicum
cyp	Scirpus	divaricatus	fab	Desmodium	nuttallii
cyp	Scleria	ciliata	fab	Desmodium	strictum
dios	Dioscorea	villosa	fab	Desmodium	viridiflorum
eben	Diospyros	virginiana	fab	Galactia	macreei
eric	Chimaphila	maculata	fab	Galactia	regularis
eric	Gaylussacia	dumosa	fab	Galactia	volubilis
eric	Lyonia	ligustrina	fab	Glottidium	vesicarium
eric	Lyonia	mariana	fab	Indigofera	caroliniana
eric	Rhododendron	nudiflorum	fab	Lespedeza	bicolor
eric	Vaccinium	arboreum	fab	Lespedeza	cuneata
eric	Vaccinium	corymbosum	fab	Lespedeza	hirta
eric	Vaccinium	elliottii	fab	Lespedeza	intermedia
eric	Vaccinium	stamineum	fab	Lespedeza	repens
eric	Vaccinium	tenellum	fab	Lespedeza	stipulacea
euph	Acalypha	gracilens	fab	Lespedeza	violacea
euph	Acalypha	rhomboidea	fab	Lupinus	diffusus
euph	Cnidoscopus	stimulosus	fab	Medicago	lupulina
euph	Croton	glandulosus	fab	Melilotus	alba
euph	Euphorbia	cordifolia	fab	Petalostemum	pinnatum
euph	Euphorbia	corollata	fab	Phaseolus	polystachios

fab	Psoralea	canescens	fab	Rhynchosia	tomentosa
fab	Rhynchosia	difformis	fab	Schrankia	microphylla
fab	Rhynchosia	reniformis	fab	Strophostyles	umbellata
fab	Stylosanthes	biflora	lam	Scutellaria	lateriflora
fab	Tephrosia	spicata	lam	Scutellaria	mellichampii
fab	Tephrosia	virginiana	lam	Trichostema	dichotomum
fab	Trifolium	arvense	lam	Trichostema	setaceum
fab	Trifolium	campestre	laur	Sassafras	albidum
fab	Vicia	angustifolia	lil	Amianthium	muscaetoxicum
fab	Zornia	bracteata	lil	Nolina	georgiana
faga	Castanea	pumila	lil	Smilax	bona-nox
faga	Quercus	alba	lil	Smilax	pumila
faga	Quercus	falcata	lil	Smilax	rotundifolia
faga	Quercus	incana	lil	Smilax	smallii
faga	Quercus	laevis	lil	Smilax	walteri
faga	Quercus	laurifolia	lil	Yucca	filamentosa
faga	Quercus	margaretta	log	Cynoctonum	mitreola
faga	Quercus	marilandica	log	Gelsemium	sempervirens
faga	Quercus	pagoda	log	Polypremum	procumbens
faga	Quercus	phellos	log	Spigelia	marilandica
faga	Quercus	stellata	lyth	Decodon	verticillatus
faga	Quercus	velutina	magn	Liriodendron	tulipifera
gent	Sabatia	calycina	malv	Hibiscus	militaris
ger	Geranium	carolinianum	malv	Sida	rhombifolia
ham	Hamamelis	virginiana	mela	Rhexia	mariana
hipp	Aesculus	pavia	mela	Rhexia	nashii
hydg	Decumaria	barbara	moll	Mollugo	verticillata
irid	Sisyrhynchium	atlanticum	myr	Myrica	cerifera
jugl	Carya	ovalis	nyss	Nyssa	sylvatica
jugl	Carya	pallida	olea	Chionanthus	virginicus
jugl	Carya	tomentosa	olea	Fraxinus	pennsylvanica
junc	Juncus	coriaceus	onag	Gaura	filipes
junc	Juncus	dichotomus	onag	Ludwigia	alternifolia
junc	Juncus	effusus	onag	Ludwigia	leptocarpa
junc	Juncus	marginatus	onag	Oenothera	laciniata
junc	Juncus	platyphyllus	oph	Botrychium	bitermatum
junc	Luzula	sp.	orch	Corallorhiza	wisteriana
lam	Hedeoma	pulegioides	orch	Goodyera	pubescens
lam	Lycopus	virginicus	orch	Spiranthes	vernalis
lam	Monarda	punctata	orch	Spiranthes	praecox
lam	Pycnanthemum	incanum	orob	Conopholis	americana
lam	Salvia	azurea	oxal	Oxalis	dillenii
lam	Salvia	lyrata	oxal	Oxalis	stricta
lam	Scutellaria	integrifolia	pap	Sanguinaria	canadensis

pass	Passiflora	incarnata	pin	Pinus	echinata
pgal	Polygala	grandiflora	pin	Pinus	taeda
pgal	Polygala	lutea	plant	Plantago	aristata
phyt	Phytolacca	americana	plant	Plantago	hookeriana
plant	Plantago	virginica	poac	Paspalum	setaceum
plyp	Polypodium	polypodioides	poac	Paspalum	urvillei
poac	Agrostis	hyemalis	poac	Setaria	corrugata
poac	Agrostis	perennans	poac	Sorghum	halepense
poac	Andropogon	gerardii	poac	Stipa	avenacea
poac	Andropogon	scoparius	poac	Tridens	flavus
poac	Andropogon	ternarius	poac	Uniola	latifolia
poac	Andropogon	virginicus	poac	Uniola	laxa
poac	Anthaenania	villosa	poac	Uniola	sessiliflora
poac	Aristida	purpurascens	pole	Phlox	amoena
poac	Aristida	stricta	poly	Brunnichia	cirrhusa
poac	Aristida	tuberculosa	poly	Eriogonum	tomentosum
poac	Briza	minor	poly	Polygonella	americana
poac	Bromus	catharticus	poly	Polygonum	pensylvanicum
poac	Cenchrus	incertus	poly	Polygonum	punctatum
poac	Cinna	arundinacea	poly	Polygonum	sagittatum
poac	Cynodon	dactylon	poly	Polygonum	scandens
poac	Dactyloctenium	aegyptium	poly	Polygonum	setaceum
poac	Danthonia	sericea	poly	Rumex	hastatulus
poac	Digitaria	filiformis	poly	Tovara	virginiana
poac	Digitaria	sanguinalis	prim	Samolus	parviflorus
poac	Eragrostis	hirsuta	pter	Pteridium	aquilinum
poac	Eragrostis	refracta	ran	Clematis	reticulata
poac	Erianthus	alopecuroides	ran	Delphinium	carolinianum
poac	Erianthus	contortus	ran	Hepatica	americana
poac	Erianthus	giganteus	rham	Ceanothus	americanus
poac	Festuca	octoflora	ros	Agrimonia	pubescens
poac	Glyceria	striata	ros	Amelanchier	arborea
poac	Gymnopogon	ambiguus	ros	Amelanchier	canadensis
poac	Hordeum	pusillum	ros	Chrysobalanus	oblongifolius
poac	Hordeum	vulgare	ros	Crategus	flava
poac	Leersia	lenticularis	ros	Crategus	punctata
poac	Leersia	oryzoides	ros	Crategus	spatulata
poac	Lolium	multiflorum	ros	Potentilla	canadensis
poac	Melica	mutica	ros	Prunus	alabamensis
poac	Muhlenbergia	capillaris	ros	Prunus	angustifolia
poac	Panicum	virgatum	ros	Prunus	serotina
poac	Panicum	spp.	ros	Prunus	umbellata
poac	Paspalum	boscianum	ros	Rosa	bracteata
poac	Paspalum	notatum	ros	Rosa	carolina

ros	Rubus	cuneifolius	rub	Galium	obtusum
ros	Rubus	trivialis	rub	Galium	pilosum
rub	Cephalanthus	occidentalis	rub	Galium	tinctorum
rub	Diodia	teres	rub	Galium	uniflorum
rub	Galium	circaezans			
rub	Galium	hispidulum			
rub	Houstonia	longifolia			
rub	Mitchella	repens			
rub	Richardia	brasiliensis			
saur	Saururus	cernuus			
sax	Heuchera	americana			
sax	Itea	virginica			
sax	Penthorum	sedoides			
sax	Saxifraga	virginiensis			
scr	Agalinis	tenella			
scr	Aureolaria	pectinata			
scr	Aureolaria	virginia			
scr	Gratiola	virginiana			
scr	Linaria	canadensis			
scr	Mimulus	alatus			
scr	Penstemon	australis			
scr	Verbascum	thapsus			
scr	Veronica	peregrina			
sol	Physalis	virginiana			
sol	Solanum	americanum			
sol	Solanum	carolinense			
spar	Sparganium	americanum			
styr	Halesia	carolina			
symp	Symplocos	tinctoria			
turn	Piriqueta	caroliniana			
typh	Typha	latifolia			
ulm	Celtis	occidentalis			
ulm	Ulmus	americana			
ulm	Ulmus	rubra			
urt	Boehmeria	cylindrica			
urt	Pilea	pumila			
val	Valerianella	sp.			
verb	Callicarpa	americana			
verb	Verbena	brasiliensis			
verb	Verbena	carnea			
verb	Verbena	halei			
verb	Verbena	rigida			
viol	Viola	affinis			
viol	Viola	palmata			

vit Ampelopsis arborea  
vit Ampelopsis cordata  
vit Parthenocissus quinquefolia  
vit Vitis aestivalis  
vit Vitis labrusca  
vit Vitis rotundifolia  
xyr Xyris platylepis