WILDLIFE MANAGEMENT PLAN

SOUTHERN NUCLEAR OPERATING COMPANY

Edwin I. Hatch Nuclear Plant

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2014

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Summary

Edwin I. Hatch Nuclear Plant is owned by Georgia Power (50.1%), along with co-owners Oglethorpe Power Corporation (30%), Municipal Electrical Authority of Georgia (17.7%), and the City of Dalton (2.2%); and is operated by Southern Nuclear Operating Company. Southern Nuclear and Plant Hatch, both subsidiaries of Southern Company, are committed to managing corporate lands for the benefit of wildlife while maintaining a focus on nuclear safety. The Plant Hatch team is comprised of office workers, foresters, environmental staff, plant staff and management. The dedicated staff at Plant Hatch has maintained long standing projects as well as implemented new demonstration areas committed to educating employees and local residents on the benefits of sound land management.

1.0 Background

Plant Hatch has been a member of the Wildlife Habitat Council (WHC) since 1993, a standing that exemplifies its commitment to improving wildlife habitat through the enrichment of pre-existing habitat and the establishment of new and improved habitat on the company's landholdings. Continuation of the *Wildlife at Work* program will enable Plant Hatch to get assistance from the Wildlife Habitat Council in its efforts to improve the site's wildlife habitat. Furthermore, partnership with WHC provides Southern Nuclear with an opportunity to demonstrate responsible corporate environmental stewardship by formulating and implementing a balanced and operative wildlife management program.

1.1 Corporate Environmental Stewardship

Southern Nuclear is a division of Southern Company. As the Southeast's premier super-regional energy company, Southern Company's challenge and responsibility are clear; provide reliable and affordable energy for the people across our region. In doing so, the health of our employees, customers and the public and the protection of our natural environment are among our highest priorities. Southern Nuclear and Southern Company have a large portfolio of environmental stewardship partners including the National Fish and Wildlife Federation (NFWF) managed programs Long Leaf Legacy and Power of Flight. Southern Company is a partner with WHC, National Association of Counties, EPA and NFWF to provide wetland restoration grants through the Five Star Program. Southern Nuclear entered into a Red Cockaded Woodpecker Safe Harbor program through the U.S. Fish and Wildlife and Georgia Department of Natural Resources for Plant Hatch and Plant Vogtle.

1.2 Site Description

Edwin I. Hatch Nuclear Plant is Georgia's first nuclear power plant. It is one of two nuclear plants in the state, and one of three nuclear facilities in the Southern Company. Plant Hatch is 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. The plant property was acquired completely by 1968. Construction began on Unit 1 in 1968 and was completed in December 1975 when commercial operation started. Unit 2 was completed and began commercial operation in September of 1979.

In 1997, the operating license was transferred from Georgia Power Company to Southern Nuclear Operating Company (SNC), also a subsidiary of Southern Company. SNC obtained a renewed operating license in 2002, which allows an additional 20 years of operation. The units are rated at 924 megawatts electric (MWe) each.

The site consists of approximately 2244 acres with 1963 acres available for wildlife and timber management. Wetlands and river bluff areas make up approximately 14% of the total site area. The remaining acreage contains the generating facility and associated buildings, roads, parking lots, maintenance/construction facilities, and equipment. The generating facility and associated physical plant buildings occupy approximately 20% 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.

Land management activities are focused in three distinct habitats; forests, right-of-ways and wetlands. The forested lands can be further divided into two areas, the upland pine forests and the lowland hardwood forest. Pipeline and power line right-of-ways (ROW) crisscross Plant Hatch creating open grassland corridors. The wetland areas include the Altamaha River riparian area, large cypress slough and smaller ponds found around the property. Plant Hatch shares its eastern border with Moody Forest, a Nature Conservancy managed forest. Plant Hatch is home to a large population of gopher tortoise, eastern flying squirrels, eastern bluebirds, purple martins, wild turkey, deer and a common resting area for Neotropical migrants.

Plant Hatch is fortunate to be located in a remote area along the Altamaha River that is home to many species of wildlife that will readily flourish as long as the necessary habitat is available. The projects undertaken as part of the WHC Wildlife at Work Program have resulted in increased habitat, both natural and artificial, for many species of birds and land animals and provided a rewarding experience for the employee volunteers involved in the program.

1.2.1 Wildlife Team

The wildlife team is comprised of employees from across the plant site. Plant Hatch's Team Leader is the site environmental specialist. General oversight and assistance comes from the Environmental Affairs organization at the corporate office. There are multiple team leaders each associated with the different site projects.

1.2.2 Ecological Background

Ecoregions are a geographically based system for organizing our knowledge about ecosystems and ecosystem responses to our management. They provide a theoretical basis for science-based planning and adaptive management. They provide a framework for prioritizing land conservation, preservation and restoration projects. They are used to organize and integrate resource inventories of all kinds. Ecoregions are based on the integration of biotic and abiotic characteristics above and below ground that yields a given ecological potential.

The USFS National Hierarchy is a regionalization, classification, and mapping system for stratifying the earth into progressively smaller areas of increasingly uniform ecological potential. The classification system includes eight levels of nested map units of which 4 are commonly used in site habitat projects: Domain, Division, Province and Section. Conditions at a higher level of organization set a context for understanding ecosystem patterns and processes at lower levels.

Undertaking habitat enhancement projects on a corporate site adds ecological and functional value to both the immediate area and the entire ecosystem. Furthermore, connective efforts have shown greater results than isolated actions. It is important to understand the site's ecologic location and its relation to native flora and fauna. The following section provides information necessary to understand the ecological background of the land surrounding Plant Hatch. Plant Hatch sits in a unique location encompassing two ecoregions, the Southeastern Plain north of the Altamaha River and the Southern Coastal Plain south of the river.

The Plant Hatch site is characterized by low, rolling sandy hills that are predominately forested. The site includes forested areas, 75 acres of wetlands including cypress slough and beaver ponds, several acres of open meadow, and river frontage. The forested areas are comprised primarily of pine and hardwood. Hardwood species include cherrybark oak, willow oak, green ash, and cypress.

Approximately 48% of the manageable forest area on the property is comprised of pine stands. The largest portion of these are south of the river. The stands provide for many types of wildlife including deer, turkey and gopher tortoise. Where feasible, long leaf pine will be replanted creating diversity within the plant site.

The hardwood stands comprise approximately 52% of the managed forest areas. Most of these areas are north of the river. The hardwood areas provide excellent habitat for most species found in Georgia. The objective of this area is to convert as much as possible to quality hardwoods. Any upland ridges will be planted into long leaf pine. Natural regeneration is the preferable regeneration method but where not feasible quality hardwood stock will be planted.

There is a 300 foot permanent buffer along the Altamaha River. This buffer runs the total length of the property. Forestry and other operations are kept at a minimum in this area to preserve the environmental and aesthetical integrity of the property. The sloughs and wetlands throughout the property will be protected with proper stream zone management when forestry operations are in the nearby areas.

The forest managers actively collect information of stand age, height, growth rate, basal area, stems per acre, pine regeneration priority and timber volume estimates. Most of the timber is in an un-even age management regime. Prescribed burning will be used in the pine and pine-hardwood stands to reduce forest floor litter and herbaceous competition, decrease wildfire, insect and disease problems and to stimulate growth in the pine stands. The forest managers use both winter and growing season burns on a two to five year rotation. Selective thinning is utilized as a silviculture method of improving stand quality and increasing light penetration in the pine and pine-hardwood stands. Small areas have been carved out of the forest to allow for food plot planting and to create naturally regenerated grassy areas. These open areas in the forest are also home to the local gopher tortoise population.

2.0 Development

2.1 Facility Inventory

In 1999 a comprehensive site species inventory was conducted using an outside consultant. Since 1999 volunteers have conducted broad “spot checks” of the species inventory list. See Appendix A.

2.2 Timeline of Completed Activities

The earliest projects consisted of Eastern Bluebird and Wood Duck nesting boxes started in 1993 and 1994. There have been numerous projects over the years, many still going, with the latest being the Bobwhite Quail Habitat Demo area in 2009.

3.0 Implementation

3.1 Mission of the Hatch Nuclear Plant Wildlife at Work Program

Plant Hatch strives to be a good steward of the land and wildlife. Through habitat restoration, improvement, and protection Plant Hatch endeavors to promote wildlife abundance, heath and quality of life. In striving to meet this mission the following projects are currently being pursued:

Project 1: Restoration and Maintenance of the Long Leaf – Wiregrass Ecosystem

Reasoning Behind Project:

The Long Leaf pine and wiregrass ecosystem, once the dominant ecosystem and home to many species, has long since been extricated from the coastal areas of the southeast the southeast. The restoration of this ecosystem provides much needed habitat for a variety of species found around Plant Hatch including, Red Cockaded woodpeckers, gopher tortoise, wild turkey and bob-white quail.

Background Information:

As a whole Southern Company has established a goal to restore the long leaf pine, where appropriate, on company properties. Four thousand acres of company land has been planted with over 2,000,000 long leaf pine seedlings thus far. Plant Hatch has expanded upon that goal to include restoration of the long leaf-wiregrass ecosystem. The upland areas around Plant Hatch have approximately 200 acres of established long leaf pine and another 484 acres of planted pines (such as loblolly). The planted pines will be harvested as they mature and these areas will be replanted in long leaf pine.

Essential Habitat Components:

Food: Food and Cover are provided by the trees and the natural understory that develops as a result of controlled burns.

Water: There is no water in the immediate restoration area due to the layout of the land and the restoration area being an upland area, but there are numerous ponds and wetlands located on the site property.

Cover: Food and Cover are provided by the trees and the natural understory that develops as a result of controlled burns.

Space: Thinning of the trees results in open spaces in which animals can forage, hunt, burrow, etc.

Project 1 – Objective 1: Longleaf Pine should be the priority species considered when planting or replanting forested areas.

Prescription	Status
Georgia Power Forestry has established a land management plan for Plant Hatch that includes management of existing longleaf pine stands and planting of longleaf pine wherever feasible.	Program was started in 1993. Two hundred acres of existing longleaf pine are managed. Existing loblolly pine stands have been identified for harvesting and will be replaced with longleaf pine.

Project 1 – Objective 2: Good Longleaf pine forestry management should be practiced in existing areas in order to promote habitat creation for native species.

Prescription	Status
Proper forestry management such as thinning and a prescribed burning regiment, including growing season burns, will be utilized to control invasive species and to encourage growth of natural undergrowth vegetation.	Prescribed burns of various areas have been conducted in 2012 & 2013.
Explore opportunities to increase the foraging area of existing colonies of Red Cockaded Woodpeckers living at the nearby Moody Forest.	Plant Hatch site does not maintain a colony of woodpeckers at this time but we have worked in conjunction with The Nature Conservancy, which manages the Moody Forest on the plants eastern border, to ensure minimum requirements for thinning, herbicide treatment, prescribed burning and general forest maintenance are practiced.
In 2005 Plant Hatch created a 20 acre Longleaf pine and Wiregrass demonstration site utilizing an existing longleaf pine stand along US Highway 1. This site is very visible to passing traffic and has a large sign to inform the public of this habitat type.	Prescribed burns are conducted as needed on a continuing basis. This area is home to many species found on plant Hatch including bob-white quail and wild turkey.

Project 1 – Monitoring: Georgia Power Forestry and the Site Environmental Specialist will maintain responsibility for monitoring these areas and determining proper course of action for continued management of these areas.

Monitoring Action	Status
Ongoing monitoring to evaluate the overall health of the longleaf pine areas and to determine if the prescribed burns are effective or need to be adjusted.	A prescribed burn was conducted on a small stand of longleaf/loblolly mix near the Recreation Area in the winter of 2012. The longleaf/wiregrass demo area was thinned and underwent a prescribed burning regimen in 2009 and in the winter of 2013.

	Plant Hatch along with the US Fish and Wildlife and the Georgia Department of Natural Resources entered into a Safe Harbor Agreement for Red Cockaded Woodpeckers in 2007. Through this agreement Plant Hatch promises to maintain large tracts of pine forest in a manner that is most advantageous for the Red Cockaded woodpecker.

Project 1 – Documentation: Documentation is included on the accompanying CD.

- Map showing current and future Longleaf Pine tracts around the property and the scheduled pre-scribed burns from the previous three years.
- Photos – A prescribed burn being conducted; Wiregrass plantings after a prescribed burn; Snakes, including the threatened Indigo Snake, which are located on site in and around the longleaf habitats.

Project 1 – Summary

- Project Start Date: The Longleaf Pine Management Program was started in 1993. 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 Hatch, 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.
  The longleaf pine demonstration area was established in 2005.
  The Safe Harbor Agreement for the Red Cocked Woodpecker was entered into in 2007.
- Employees/Volunteers Involved: Three employees typically oversee the project although additional volunteers have been utilized occasionally. The site has worked with the Nature Conservancy and the Georgia Department of Natural Resources in the management of this project.
- Plants Used: Longleaf Pine and native Wiregrass.
- Invasive Species Controlled: Prescribed burns are used to help control invasive species.

- Evaluation: The Longleaf Pine Management Program has resulted in proper management of 200 acres of existing longleaf pine stands located on the Plant Hatch property. As a result of this management plan the site was able to enter into a Safe Harbor Agreement with the US Fish & Wildlife Service and the Georgia Department of Natural Resources for the Red Cockaded Woodpecker in 2007.
- Future Objectives: Continued management of the existing longleaf pine stands and planting of longleaf pine in areas where existing loblolly pines are located as those areas are harvested. Dependent on timber prices a 20-30 acre stand of loblolly pine near the Recreation Area is scheduled to be harvested in 2014, or a 15 acre track of pine/hardwood mix located across the highway. Both of these areas will be replanted in longleaf pine after they are harvested. A warm weather burn, which is less common than a cold weather burn but has its own benefits, may be conducted on the demo area to help the wiregrass in 2014, weather permitting.

Project 2: Provide nesting opportunities for resident and migratory bird populations using Plant Hatch lands

Reasoning Behind Project:

Urbanization has caused loss of habitat for all of our chosen bird species.

Background Information:

Artificial nesting sites have long been used as a tool to promote nesting success for blue birds, purple martins, wood ducks, and raptors. Plant Hatch offers a great location for all four of these species.

Essential Habitat Components:

Food: Bluebirds and martins catch insects in the open areas around their structures. Wood ducks have ample food in the form of aquatic plants and mast producing hardwoods. Large open areas and the river offer great hunting areas for raptors.

Water: There are numerous ponds and wetlands located on the site property, along with the Altamaha River located on the northern border of the property.

Cover: Nesting boxes provide cover for bluebirds, wood ducks, and kestrels, while plastic gourds provide the necessary cover for martins.

Space: Bluebird, martin, and kestrel nesting structures, along with the Osprey platform are located in open spaces that allow room to fly and hunt. Wood duck boxes are located in lowland areas, including Moody Swamp. All structures are strategically located in order to provide proper spacing.

Project 2 – Objective 1: Maintain bluebird trail success.

Prescription	Status
Provide nesting boxes around plant site in appropriate locations.	There are currently 42 bluebird nest boxes located at the site.

Project 2 – Objective 2: Increase Wood Duck nest box availability and

Prescription	Status
Increase the number of wood duck boxes located at the site and actively monitor each year.	The program consists of 15 nest boxes placed around the site wetlands on both sides of the Altamaha River. Seven new boxes were installed in 2011 along with repairs and replacement of some of the older boxes.

Project 2 – Objective 3: Increase Purple Martin nesting structures and monitoring

Prescription	Status
Increase the number of Purple Martin nesting structures located at the site and actively monitor each year.	In 2007 two purple martin structures were added at the Plant Visitor center. Two additional structures were installed at the Plant Hatch Recreation Center in 2011. There are a total of 72 nesting gourds on 4 towers at 2 locations.

Project 2 – Objective 4: Provide raptor nesting and perching sites

Prescription	Status
Provide raptor nesting platforms, predator bird boxes, and perching sites where feasible.	An Osprey nesting platform has been erected along the Altamaha River and several Kestrel nest boxes have been installed along the ROW's on the site.

Project 2 – Monitoring: Plant employees will monitor and log activity at each of the nesting structures.

Monitoring Action	Status
Bluebird boxes are monitored throughout the nesting season.	The bluebird nest boxes have not been monitored as consistently as in the past due to fewer volunteers. The boxes were inspected at the end of the last nesting season and activity recorded.
The Wood Duck team is responsible for maintenance, replacement and monitoring of the nest boxes. The team typically monitors the boxes from a distance during the winter nesting season. The boxes are cleaned out, maintenance performed, and activity logged prior to the next nesting season.	Nesting activity was observed in 3 boxes during the most recent nesting season.

The martin nesting structures are observed occasionally during the nesting season and are typically inspected and cleaned out after the nesting season.	The martin nesting gourds are being heavily used at both locations, with the majority of the gourds producing chicks.
The Osprey nesting platform and the Kestrel nest boxes are observed by the site environmental specialist.	Ospreys have built a nest on a nearby tower in the river but there has not yet been any activity on the osprey nesting platform. The kestrel boxes are not actively monitored due to their locations and the potential for impacting the birds, but kestrels are often spotted hunting along the Plant's perimeter fence, in the open grassy areas.

Project 2 – Documentation: Documentation is included on the accompanying CD.

- Map showing the bluebird nesting box locations.
- Bluebird, martin, and duck box monitoring logs.
- Photos – Bluebird box; purple martin nesting gourds; duck box being mounted; osprey platform.

Project 2 – Summary

- Project Start Date: Nesting projects started as early as 1993 with Plant Hatch's longest running project, the Eastern Bluebird nesting trail. Since that time other nesting projects have been implemented for Wood Ducks (1994), Raptors (2000), and Purple Martins (2007).
- Employees/Volunteers Involved: Plant employees are involved with monitoring the nesting boxes and structures. Currently 3 employees help monitor the bluebird boxes. Two volunteers monitor the purple martin gourds. Two volunteers monitor the duck boxes. The Osprey nesting platform and the Kestrel nest boxes are observed by the site environmental specialist.
- Plants Used: None
- Invasive Species Controlled: The nesting structures are designed to discourage invasive species such as European sparrows.
- Evaluation: The nesting box program is the sites oldest, continuous program. Several of the bluebird boxes have been infiltrated by flying squirrels and will need to be replaced or abandoned and relocated. The wood duck boxes have had some activity but not as much as hoped for. This may be due to the drought in 2010 – 2013 that resulted in much of the swampy area losing water. The area is recovering from the drought which in turn should help the swamp areas where the boxes are located. The purple martin boxes are heavily used, and a new location was established in 2011. The osprey platform has not been used but a pair of ospreys built a nest nearby on a structure in the river so hopefully the platform will be used next year.

- Future Objectives: The bluebird program is due to be updated. There are several boxes that need to be replaced or abandoned in place with new boxes located in more productive locations. This is our most volunteer oriented program. Several volunteers have retired or changed jobs and are no longer active; therefore new volunteers for this program should be recruited. Continue to monitor the other nesting boxes.

Project 3: Wild Turkey Management

Reasoning Behind Project:

Turkeys are not an endangered species but they are a good indicator of effective forest management and provide readily visible evidence of good wildlife management.

Background Information:

Turkeys have always been an important species to the Plant Hatch team. Turkey management influences Right of Way and forestry management practices. Plant Hatch has formed two partnerships aimed at turkey management. Energy for Wildlife is a program with the National Wild Turkey Federation. The program assists utilities with management strategies along their pipeline and electrical line right-of-ways. Forestry for Wildlife with the Georgia Department of Natural Resources, discussed in Project 1, focuses on managing forest lands for terrestrial wildlife including turkey. Right of Ways and pine forests around the site have been utilized to support wild turkey management.

Essential Habitat Components:

Food: Properly managed pine stands and selective mowing provide areas to forage for food. Food plots are also provided in the winter months as a supplemental food source.

Water: Water is provided by numerous ponds, streams and wetlands around the site.

Cover: Cover is provided by the trees and the natural understory that develops as a result of controlled burns.

Space: Thinning of the trees and selective mowing (typically one random strip per five acres mowed between rows of trees) provide open spaces for wildlife, including turkeys, to roam and forage.

Project 3 – Objective 1: The forests on the property and the ROWS should be managed to promote the turkey population.

Prescription	Status
Utilize proper forestry management in accordance with recognized programs to develop and maintain habitat that will promote the turkey population.	Using resources from the National Wild Turkey Federation, Georgia Department of Natural Resources and others, Plant Hatch and Georgia Power (property owner) have developed ROW and timber management strategies to benefit the turkey population.

	The strategy includes tree thinning, prescribed burning, herbicide treatment, herbaceous or woody competition control, food plots, and integrated vegetative management. In addition to the managed areas, there are 10 acres set aside each year for dedicated food plots. These food plots are maintained by the team. The plots vary in size but are usually one acre or smaller. Chufa, a favorite of wild turkeys, is planted in the summer to provide food throughout the winter. Other plantings include oats, wheat, and clover for both deer and turkey. The different crops are rotated among the food plots.

Project 3 – Monitoring: Georgia Power Forestry and the Site Environmental Specialist will maintain responsibility for monitoring these areas and determining proper course of action for continued management of these areas.

Monitoring Action	Status
The success of the management program should be evaluated each year based on the health of the forest and wildlife observations.	The overall health of the forest is evaluated each year by a certified forester. Plant employees, including the site environmental specialist and the Recreation Area Supervisor, conduct casual wildlife observations during their regular work activities in these areas. Trail cameras are set up on the supplemental food plots to collect close-up photos of turkeys and deer as a means of evaluating their health based on their size & appearance.

Project 3 – Documentation: Documentation is included on the accompanying CD.

- Map showing the Longleaf Pine tracts around the property and the scheduled pre-scribed burns from the previous three years. These areas are managed for both longleaf pine and wild turkey.
- Photos – A mature longleaf pine habitat, along with wiregrass plantings, that make up ideal wild turkey habitat. Food plot with deer & wild turkey.

Project 3 – Summary

- Project Start Date: Southern Company, including Plant Hatch, became a charter member of the National Wild Turkey Federation Energy for Wildlife Program in 2006.
- Employees/Volunteers Involved: The Georgia Power Land Department oversees the project although additional plant volunteers are utilized occasionally, particularly for wildlife observations.
- Invasive Species Controlled: Prescribed burns are used to help control invasive species.
- Evaluation: The National Wild Turkey Federation, Energy for Wildlife program is a comprehensive turkey management program aimed to help utilities utilize their ROW lands to be maximum benefit to turkeys and other species which use similar habitat. Plant Hatch maintains a working relationship with the Energy for Wildlife Coordinator, with the most recent site visit conducted in June 2008.
  The Integrated Vegetation Management (IVM) described above is used to control undesirable vegetation on the ROW floor. IVM is defined as "controlling vegetation by using a process that balances the use of mechanical, biological and chemical methods to establish and maintain a vegetative cover that is compatible with the environment, economically feasible and socially acceptable." The wildlife objective is to establish early succession vegetation that benefits most species – game and non-game. A properly managed ROW will provide various food sources, nesting cover and protection from predators for many species of wildlife.
- Future Objectives: A warm weather burn may be conducted on the demo area to help the wiregrass plants in 2014, weather permitting. A 20-30 acre stand of loblolly pine near the Recreation Area is scheduled to be harvested in 2014 and will be replanted in longleaf pine. Another 15 acres across the highway may be harvested and replanted.

Project 4: Proper management of Gopher Tortoise habitat

Reasoning Behind Project:

The U.S. Fish and Wildlife Service currently list the Gopher Tortoise as "Under Review" in its eastern population that includes Georgia along with South Carolina and Florida.

Background Information:

Plant Hatch has a significant population of gopher tortoises. There are already management programs in place, such as the restoration of the longleaf pine habitat that are supportive of gopher tortoise habitat, but the site had never actively managed the gopher tortoise population. Plant Hatch has worked with the Georgia Department of Natural Resources (DNR) non-game division to initiate land management recommendations on how Plant Hatch could improve areas to maximize the population viability. These recommendations are being utilized in the area around the plant recreation center.

Essential Habitat Components:

Food: The thinned forest areas and the surrounding grassland areas provide a natural source of food.

Water: Gopher tortoises rarely drink from standing water. They get most of their water from the food they eat, but the area is open such that normal rainfall provides any additional water needs.

Cover: The thinned forest areas and the surrounding grassland areas, combined with the sandy soil, provide ideal habitat for digging their burrows for cover.

Space: The thinned forest areas and the surrounding grassland areas provide the partially open space needed for foraging for food.

Project 4 – Objective 1: Manage the pine forests and surrounding areas in a manner that is supportive of the gopher tortoise populations.

Prescription	Status
Proper forestry management such as tree thinning, prescribed burning, and proper mowing.	A 15 acre section of pine trees was thinned to a basal area near 60% to support tortoise habitat. A prescribed burn was initiated to enhance the management area. Sections between the planted pines were mowed to encourage borrowing. Sections are typically mowed three times per year to maintain foraging area.

Project 4 – Monitoring: The area is monitored for gopher tortoise activity and to make recommendations for adjustments to the management strategy.

Monitoring Action	Status
The area is loosely monitored by the site environmental specialist and the resident Georgia Power land management employees to ensure conditions remain favorable for gopher tortoises.	There has not been a formal count of burrows in the area but there has been an increase in their number of borrows since the program was started.

Project 4 – Documentation: Documentation is included on the accompanying CD.

- Map showing the area that is actively managed for gopher tortoises.
- Photos – A gopher tortoise as it returns to its burrow.

Project 4 – Summary

- Project Start Date: The Gopher Tortoise Management Program was initiated in 2009.
- Employees/Volunteers Involved: Three employees typically oversee the project although additional volunteers have been utilized occasionally.
- Plants Used: Longleaf Pine and native Wiregrass.

- Invasive Species Controlled: None
- Evaluation: Plant Hatch has a significant population of gopher tortoises. In April 2008, Georgia Department of Natural Resources (DNR) non-game division visited the site to observe the habitat and management practices. DNR then provided land management recommendations on how Plant Hatch could improve areas to maximize the population viability. A Gopher Tortoise Management program was initiated in 2009. A 15 acre section of pine trees was thinned to a basal area near 60% to support tortoise habitat. Sections between the planted pines are mowed to encourage borrowing. A prescribed burn was initiated to enhance the management area.
- Future Objectives: In the future Plant Hatch hopes to create a gopher tortoise conservation and management agreement similar to the Red Cockaded woodpecker Safe Harbor program with the US Fish & Wildlife Services and/or Georgia Department of Natural Resources.

3.2 Future Goals

Plant Hatch has a small quantity of bobwhite quail on site. Large amounts of bob-white quail habitat in the southeast have been lost to residential and commercial development. A Bobwhite Quail demonstration site was cultivated and planted in 2009 in accordance with guidance from the Georgia Department of Natural Resources Bobwhite Quail Initiative, but unfortunately most of the plants died within two years due to the severe drought that south Georgia was enduring during that time. This is a project that we may want to pursue again.

Appendix A – Species Inventory

	Common Name	Scientific Name
Birds	Anhinga	*Anhinga anhinga*
	Night Heron	*Ncycticorax sp*
	Green-backed Heron	*Butorides striatus*
	Little Blue Heron	*Egretta caerulea*
	Great Egret	*Casmerodius albus*
	Great Blue Heron	*Ardea herodias*
	Killdeer	*Charadrius vociferus*
	Summer Tanager	*Piranga rubra*
	Red-Winged Blackbird	*Agelaius phoeniceus*
	Eastern Bluebird	*Sialia sialis*
	Blue Jay	*Cyanocitta cristata*
	Cardinal	*Richmondena cardinali*
	Carolina Chickadee	*Parus carolinensis*
	Chuck-Wills-Widow	*Caprimulgus carolinensis*
	Whip-poor-will	*Caprimulgus vociferus*
	Indigo Bunting	*Passerina cyanea*
	Common Crow	*Corvus brachyrnynchos*
	Brown-headed Cowbird	*Molothrus ater*
	Mourning Dove	*Zenaida macroura*
	Mallard Duck	*Anas platyrnhyncos*
	Wood Duck	*Aix sponsa*
	Egret	*Bubulcus ibis*
	Northern Flicker	*Colaptes auratus*
	Red-shouldered Hawk	*Buteo lineatus*
	Red-tailed Hawk	*Buteo jamaicensis*
	Great Blue Heron	*Ardea herodias*
	Mississippi Kite	*Ictinia mississippiensis*
	Ruby-throated Hummingbird	*Archilochus colobris*
	American Kestrel	*Falco sparverius*
	Golden-crowned Kinglet	*Regulus calendula*
	Ruby-crowned Kinglet	*Regulus calendula*
	Purple Martin	*Progne subis*
	Mockingbird	*Mimusploy glottos*
	Nuthatch	*Sitta sp.*
	Osprey	*Pandion haliaetus*
	Barred Owl	*Strix varia*
	Eastern Screech Owl	*Otus asio*
	Great Homed Owl	*Bubo virginianus*
	Eastern Phoebe	*Sayornis phoebe*
	Northern Bobwhite Quail	*Colinus virginianus*
	American Robin	*Turdus migratorius*
	Bachman's Sparrow	*Aimophila aestivalis*
	Chipping Sparrow	*Spizella passerina*
	Hermit Thrush	*Catharus guttatus*
	Tufted Titmouse	*Parus bicolor*
	Rufous-sided Towhee	*Pipilo erythrophthalmus*
	Wild Turkey	*Meleagris gallopavo*
	Black Vulture	*Coragyps atratus*

Birds (Continued)	Turkey Vulture	*Cathartes aura*
	Pine Warbler	*Dendroica coronata*
	Prothonotary Warbler	*Protonotaria citrea*
	Yellow-rumped Warbler	*Dendroica coronata*
	Downy Woodpecker	*Picoides pubescens*
	Pileated Woodpecker	*Dryocopus pileatus*
	Red-cockaded Woodpecker	*Picoides borealis*
	Red-headed Woodpecker	*Melanerpes carolinus*
	Carolina Wren	*Thryothorus ludovicianus*
Mammals	Armadillo	*Dasypus novemcinctus*
	Beaver	*Castor canadensis*
	Bobcat	*Felis rufus*
	White-tailed Deer	*Odocoileus virginianus*
	Gray Fox	*Urocyon cinereoargenteus*
	Mink	*Mustela vison*
	Cotton Mouse	*Peromyscus gossypinus*
	Golden Mouse	*Peromyscus nuttalli*
	Oldfield Mouse	*Peromyscus polionotus*
	Virginia Opossum	*Didelphis virginiana*
	Eastern Cottontail Rabbit	*Sylvilagus floridanus*
	Marsh Rabbit	*Sylvilagus palustris*
	Raccoon	*Procyon rotor*
	Striped Skunk	*Mephitis mephitis*
	Fox Squirrel	*Sciurus niger*
	Sherman's Fox Squirrel	*Sciurus niger shermani*
	Flying Squirrel	*Glaucomys volans*
	Gray Squirrel	*Sciurus carolinensis*
	Southeastern Pocket Gopher	*Geomys penetis*
Reptiles and Amphibians	Alligator	*Alligator mississippiensis*
	Bullfrog	*Rana catesbeiana*
	Eastem Diamondback	*Crotalus adamanteus*
	Eastern Coachwhip	*Masticophis flagellum flagellum*
	Eastern Cottonmouth	*Agkistrodon piscivorus piscivorus*
	Eastern Glass Lizard	*Ophisaurus ventralis*
	Southern Cricket Frog	*Acris gryllus gryllus*
	Southern Leopard Frog	*Rana pipiens sphenocephala*
	Gopher Tortoise	*Gopheris polyphemus*
	Green Anole	*Anolis carolinensis carolinensis*
	Racerunner	*Cnemidophorous sexlineatus*
	Marbled Salamander	*Ambystoma opacum*
	Slimy Salamander	*Plethodon glutinosus glutinosus*
	Three-lined Salamander	*Erycea longicauda guttolineata*
	Skink	*Eumeces*
	Broad Headed Skink	*Eumeces laticeps*
	Five Lined Skink	*Eumeces fasciatus*
	Ground Skink	*Lygosoma laterale*
	Black Indigo Snake	*Drymarchon corais couper*
	Corn Snake	*Elaphe guttata guttata*
	Eastern Coral Snake	*Micrurus fulvius*

Reptiles and Amphibians (Continued)	Eastern Hognose Snake	*Heterodon platyrhinos*
	Eastern King Snake	*Lampropeltis getulus*
	Eastern Indigo Snake	*Drymarchon corais couperi*
	Florida Pine Snake	*Pituophis melanoleucus mugitus*
	Gray Rat Snake	*Elaphe obsoleta spiloides*
	Rainbow Snake	*Abastor erythrogrammus*
	Red-bellied Water Snake	*Nerodia erythrogaster*
	Scarlet Snake	*Cemophora coccinea*
	Southern Black Racer	*Coluber constrictor*
	Southern Ringneck Snake	*Diadophis punctatus punctatus*
	Gulf Coast Softshell	*Trionyx spinifer asper*
	Spring Peeper	*Hyla crucifer*
	Eastern Narrow-mouthed Toad	*Gastrophryne carolinensis*
	Southern Toad	*Bufo terrestris*
	Barking Treefrog	*Hyla gratiosa*
	Green Treefrog	*Hyla cinerea*
	Squirrel Treefrog	*Hyla squirella*
	Common Snapping Turtle	*Chelydra serpentina serpentina*
	Eastern Box Turtle	*Terrapene carolina carolina*
	Eastern Mud Turtle	*Kinosternon subrubrum subrubrum*
	Striped Mud Turtle	*Kinosternon subrubrum*
	Yellow-Bellied Turtle	*Pseudemys scripta scripta*
Fish	Largemouth Bass	*Micropterus salmoides*
	Bowfin	*Amia calva*
	Smallmouth Buffalo	*Ictiobus bubalus*
	Common Carp	*Cyprinus carpio*
	Channel Catfish	*Ictalurus punctatus*
	White Catfish	*Ictalurus catus*
	Lake Chubsucker	*Erimyzon sucetta*
	Black Crappie	*Pomoxis nigromaculatus*
	White Crappie	*Pomoxis annularis*
	Spotted Gar	*Lepisosteus oculatus*
	Longnose Gar	*Lepisosteus osseus*
	Greater Jumprock	*Moxostoma lachneri*
	Chain Pickerel	*Esox niger*
	Redfin Pickerel	*Esox americanus*
	River Redhorse	*Maxostoma carinatum*
	Gizzard Shad	*Dorosoma cepedianum*
	Threadfin Shad	*Dorosoma petenense*
	Blacktail Shiner	*Notropis venustus*
	Bluestripe Shiner	*Cyprinella callitaenia*
	Brook Silverside	*Labidesthes sicculus*
	Spotted Sucker	*Minytrema melanops*
	Bluegill Sunfish	*Lepomis macrochirus*
	Green Sunfish	*Lepomis cyanellus*
	Orangespotted Sunfish	*Lepomis humilis*
	Redbreast Sunfish	*Lepomis auritus*
	Redear Sunfish	*Lepomis microlophus*
Trees	Ash	*Fraxinus spp.*
	Eastern Red Cedar	*Juniperus virginiana*

Trees (Continued)	Black Cherry	*Prunus serotina*
	Carolina Cherrylaurel	*Prunus caroliniana*
	Chinquapin	*Castanea pumila*
	Common Chokeberry	*Prunus virginiana*
	Red Chokeberry	*Aronia arbutifolia*
	Crabapple	*Malus spp.*
	Bald Cypress	*Taxodium distichum*
	Flowering Dogwood	*Cornus florida*
	Winged Elm	*Ulmus alata*
	Groundsel Tree	*Baccharis halimifolia*
	Black Gum	*Nyssa sylvatica*
	Hackberry	*Celtis occidentalis*
	Hawthorn	*Crataegus spp.*
	May-haw	*Crataegus aestivalis*
	Mockernut Hickory	*Carya tomentosa nutt*
	Southern Magnolia	*Magnolia grandiflora*
	Red Maple	*Acer rubrum*
	Blackjack Oak	*Quercus marilandica*
	Bluejack Oak	*Quercus incana*
	Chapman Oak	*Quercus chapmanii*
	Cherry bark Oak	*Quercus falcata*
	Laurel Oak	*Quercus laurifolia*
	Live Oak	*Quercus virginiana*
	Myrtle Oak	*Quercus myrtifolia*
	Overcup Oak	*Quercus lyrata*
	Post Oak	*Quercus stellata*
	Sand Post Oak	*Quercus margaretta*
	Southern Red Oak	*Quercus falcata*
	Swamp Chestnut Oak	*Quercus michauxii*
	Turkey Oak	*Quercus laevis*
	Water Oak	*Quercas nigra*
	White Oak	*Quercus alba*
	Willow Oak	*Quercus phellos*
	Ogeechee Lime	*Nyss. ogeche*
	Common Persimmon	*Diosporys virginianus*
	Loblolly Pine	*Pinus taeda*
	Longleaf Pine	*Pinus palustris*
	Shortleaf Pine	*Punus echinata*
	Slash Pine	*Pinus elliottii*
	Spruce Pine	*Pinus glabra*
	Red Bay	*Persea borbonia*
	Eastern Redbud	*Cercis canadensis*
	Sassafras	*Sassafras albidum*
	Swamp Black Gum	*Nyssa biflora*
	Sweetbay	*Magnolia virgianiana*
	Sweetgum	*Liquidambar styraciflua*
	Sycamore	*Platanus occidentalis*
	Tag Alder	*Alnus serrulata*
	Tuliptree	*Liriodendron tulipifera*
	Willow	*Salix sp*
	Virginia Willow	*Itea virginica*
	Red Buckeye	*Aesculus pavia*

Shrubs	American Beautyberry	*Callicarpa americana*
	American Snowbell	*Styrax americana*
	Bittersweet	*Celastrus scandens*
	Swamp Azalea	*Rhododendron viscosum*
	Blackberry	*Rubus sp.*
	Elliot Blueberry	*Vaccinium elliottii*
	Highbush Blueberry	*Vaccinium corymbosum*
	Shiny Blueberry	*Vaccinium mercenites*
	Coast Pepper-bush	*Clethra alnifolia*
	Common Buttonbrush	*Cephalanthus occidentalis*
	Common Chokecherry	*Prunus virginiana*
	Trumpet Creeper	*Campsis radicans*
	Deerberry	*Vaccinium stamineum*
	Common Elderberry	*Sambucus canadensis*
	Fetter-bush	*Lyonia lucida*
	Gopher Apple	*Licania michauxii*
	Hairy Fever-tree	*Pinckneya pubens*
	Hoary Azalea	*Rhododendron canescens*
	American Holly	*Ilex opaca*
	Bay-gall Holly	*Ilex coriacea*
	Deciduous Holly	*Ilex decidua*
	Yaupon Holly	*Ilex vomitoria*
	Bush Honeysuckle	*Lonicera japonica*
	Trumpet Honeysuckle	*Lonicera sempervirens*
	Horse-sugar	*Symplocos tinctoria*
	Ink-berry	*Ilex glabra*
	Lilac	*Syringa spp.*
	Sweetbay Magnolia	*Mangolia virginiana*
	Ohoopee Buckthorn	*Bumelia sp. (unnamed)*
	Pawpaw	*Asimina longifolia*
	Dwarf Pawpaw	*Asimina parviflora*
	Piedmont Stagger-bush	*Lyonia mariana*
	Wild Plum	*Prunus americana*
	Possum-haw	*Viburnum nudum*
	Possumshaw	*Ilex decidua*
	Rusty Black-haw	*Viburnum rufidulum*
	Rusty Lyonia	*Lyonia ferruginea*
	Saw Palmetto	*Serenoa repens*
	Sebastian Bush	*Sebastiana fruticosa*
	Sparkleberry	*Vaccinium arboreum*
	Spicebush	*Lindera benzoin*
	St. John's-wort	*Hypericum sp.*
	Titi	*Cyrilla parvifolia*
	Virginia Willow	*Itea virginica*
	Wax Myrtle	*Morella cerifera*
	Weak-leaf Yucca	*Yucca filamentosa*
	Winged Sumac	*Rhus copallinum*
	Winterberry	*Ilex verticillata*
	American Witch-hazel	*Hamamelis virginiana*
	Dwarf Palmetto	*Sabal minor*
	Swamp Rosemallow	*Hibiscus grandiflorus*
Annuals	Annual Gaillardia	*Gaillardia pulchella*

	Dicerandra	*Dicerandra linearifolia*
	Dodder	*Cuscuta sp.*
	Dog-fennel	*Eupatorium capillifolium*
	Dwarf-dandelion	*Krigia sp.*
	False-foxglove	*Agalinis sp.*
	Lady's Wood-sorrel	*Oxalis stricta*
	Partridge Pea	*Cassia fasciculata*
	Smartweed	*Polygonum spp.*
	Sunflower	*Helianthus*
	Tickseed Sunflower	*Centaurea cyanus*
	Dayflower	*Commelina* sp
Perennials	Climbing Aster	*Aster caroliniana*
	Smooth Aster	*Aster laevis*
	Stiff-leaved Aster	*Aster linariifolius*
	Beardtongue	*Penstemon grandifloris*
	Bedstraw	*Galium pilosum*
	Purple Bergamot	*Monarda media*
	Spotted Beebalm	*Monarda punctata*
	Blazing Star	*Liatris graminifolia*
	Blazing Star	*Liatris pycnostachya*
	Blazing Star	*Liatris tenuifolia*
	Boykin Cluster-pea	*Dioclea multiflora*
	Butterfly Weed	*Asclepias tuberosa*
	Canada Milk Vetch	*Astragalus canadensis*
	Catbells	*Baptisia perfoliata*
	Clover	*Trifolium spp.*
	Purple Coneflower	*Echinacea purpurea*
	Lance-leaved Coreopsis	*Coreopsis lanceolata*
	Dollar-weed	*Rhyncosia reniformis*
	Cutleaf Harvest-lice	*Agrimonia incisa*
	Elephant-foot	*Elephantopus tomentosus*
	Bracken Fern	*Pteridium aquilinum*
	Cinnamon Fern	*Osmunda cinnamomea*
	Resurrection Fern	*Pleopeltis polypodioides*
	Royal Fern	*Osmunda regalis*
	Figwort	*Scrophularia spp.*
	Fireweed	*Epilobium angustifolium*
	Georgia Bear-grass	*Nolina georgiana*
	Wild Geranium	*Geranium maculatum*
	Fragrant Goldenrod	*Euthamia tenuifolia*
	Carolina Wild Petunia	*Ruellia caroliniensis*
	Scented Goldenrod	*Solidago odora*
	Innocence	*Hedyotis procumbens*
	Ironweed	*Veronia altissima*
	Yellow Jessamine	*Gelsemium sempervirens*
	Spring Larkspur	*Delphinium tricorne*
	Fawn Lily	*Erythonium americanum*
	Cardinalflower	*Lobelia cardinalis.*

Perennials (Continued)	Morning Glory	*Ipomaea sp*
	Swamp Milkweed	*Asclepias incarnata*
	Muscadine Grape	*Vitis rotundifolia*
	Needle-rush	*Juncus sp.*
	Netted Chainfern	*Woodwardia areolata*
	Indian Paintbrush	*Castilleja coccinea*
	Partridge Berry	*Mitchella repens*
	Pepper-vine	*Ampelopsis arborea*
	Pineland Wild Indigo	*Baptisia lanceolata*
	Pinweed	*Lechea tenuifolia*
	Plantain	*Plantago spp.*
	Poison Ivy	*Toxicodendron radicans*
	Poison Oak	*T. toxicarium*
	Evening Primrose	*Oenothera biennis*
	Rattlesnake-master	*Eryngium yuccifolium*
	Rockrose	*Helianthemum sp.*
	Lyre-leaved Sage	*Salvia lyrata*
	Saw Greenbriar	*Smilax bona-nox*
	Sedge	*Carex sp.*
	Three-way Sedge	*Dulichium arundinaceum*
	Shooting Star	*Dodecatheon meadia*
	Skullcap	*Scutellaria sp.*
	Slender Gayfeather	*Liatris gracilis*
	Spanish Moss	*Tillandsia usneoides*
	Summer Farewell	*Dalea pinnata*
	Sweet William	*Dianthus barbatus*
	Thistle	*Cirsium spp.*
	Trailing Bean-vine	*Phaseolus polystachios*
	Trailing Morning Glory	*Stylisma humistrata*
	Morning Glory	*Ipomoea sp*
	Tread Softly	*Cnidoscolus stimulosus*
	Red Turtlehead	*Chelone obliqua*
	Violet	*Viola sp.*
	Virginia Creeper	*Parthenocissus quinquefolia*
	Wild Sarsaparilla	*Smilax pumila*
	Wool-grass	*Scirpus cyperinus*
	Yankee Weed	*E. compositifolium*
	Purple Passionflower	*Passiflora incarnata*
	Yellow Passionflower	*Passiflora lutea*
	Angularfruit Milkvine	Matelea gonocarpos
	Swamp Leather Flower	*Clematis crispa*
Grasses	Alfalfa	*Medicago sativa*
	Little Bluestem	*Andropogon scoparius*
	Broomsedge	*Andropogen virginicus*
	Giant Cane	*Arundinaria gigantea*
	Sheep Fescue	*Festuca ovina glauca*
	Long-leaf Spikegrass	*Chasmanthium sessiliflorum*
	Nettle	*Urtica spp.*
	False Nettles	*Boehmeria cylindrica*
	Panic Grass	*Panicum scoparium*

Grasses (Continued)	Pineywoods Dropseed	*Sporobolus junceus*
	Plume Grass	*Erianthus sp.*
	Switchgrass	*Panicum virgatum*
	Three-awn Grass	*Aristida sp.*
	Wiregrass	*Aristida stricta*
	Yellow Indian Grass	*Sorghastrum nutans*
	Lopsided Indian Grass	*Sorghastrum secundum*
	Zebra grass	*Miscanthus sinensis gracillimus*
	Shortleaf Basketgrass	*Oplismenus setarius*