

Managed Forest Project Proposal Description and Concepts

*A collaborative project between
Sandy Creek Nature Center, Inc.
and the
Athens-Clarke County Unified Government,
Leisure Services Department*

March 2014

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Executive Summary

In accordance with its forty year mission, Sandy Creek Nature Center Inc. continues to demonstrate its support of Sandy Creek Nature Center through the development of the Managed Forest Project (MFP) – a project that promotes a greater understanding of the workings of a healthy forest essential to (1) a broader appreciation of the natural world and our place in it, (2) how land management decisions impact forest ecosystems, and (3) the need for ecosystem protection and sustainable forest management for goods and services.

Proposed as part of SPLOST 4 and SPLOST 2005, exhibits inside Sandy Creek Nature Center's (SCNC) Education & Visitor Center demonstrate the complexities and wonders of the forest. The outdoor Managed Forest Project helps visitors see and experience the living forest first-hand. Ultimately, visitors will travel along a trail through demonstration plots ranging from an early successional stage to mature forest– in essence “walking through time,” spanning decades in just a few minutes.

The project includes the creation of three planted loblolly pine (*Pinus taeda*), one loblolly pine natural reseeding shelterwood harvest, and one oak hardwood crop tree/shelterwood harvest demonstration plots through the use of silvicultural techniques guided by wildlife and forestry Best Management Practices (BMPs). The area adjacent to the demonstration plots is designated as “managed buffer zones.” The type, timing and year in which each management activity takes place is based on the recommendation of a professional forester/land manager and guided by environmental and economic factors.

Sandy Creek Nature Center will seek to have the MFP property certified through a national certifying agency. Such certification will recognize ACC's commitment to professional natural resource management practices, provide a site where the public can learn more about such practices, and encourage private and public land owners to responsibly manage their lands.

To help ensure the success of the Managed Forest Project and facilitate ACCUG's ongoing land stewardship efforts, the proposed project includes an initial pledge of \$67,000 from SCNC, Inc. for installation and annual operations, a proposed cooperative agreement, and a request to authorize staff to seek and assist the SCNC, Inc. Board in their efforts to secure donations, grants, and other long-term funding mechanisms. The proposal also includes a request to dedicate revenue generated from land management activities to be deposited into a dedicated account and used for land management, wildlife habitat, and restoration efforts at Sandy Creek Nature Center.

The changes also include provisions for the use of professional wildlife and forest best management practices. Examples of such activities include invasive species control, prescribed fire, timber thinning and harvesting, tree planting, and wildlife population control as part of a professional land and habitat management plan.

Project Vision and Purpose

Forests are places of beauty, solitude and wonder. They are also life-sustaining, vibrant ecosystems essential to the survival of natural and human populations. Collectively, local human land use activities and decisions have increasingly complex global implications, highlighting the importance of ongoing community natural resource education and the enhancement of a community land ethic.

The Managed Forest Project (MFP) demonstrates natural succession in the Piedmont region of Georgia. A meadow becomes a pine forest that later becomes a hardwood forest. Both natural and human forces convert hardwood forest into meadows, starting the process once again. The MFP focuses on these successional transitions.

The MFP uses a demonstration pine forest as a focal point for several reasons. Pine forests are the intermediate stage of succession between meadow/shrub and hardwood forest. Pine trees readily respond to professional management activities, making it possible for community members to visualize and observe successional changes within a forest, facilitating interpretive and educational objectives. The project includes the use of both naturally reseeding and planted pine demonstration plots. These transitions over time include changes in the species of plants and wildlife.

As with pine forests, human activity, invasive species, and the suppression of historically periodic wildfires continue to dramatically alter southeastern hardwood forests. Outside of a few, select sites managed by large timber companies, hardwoods are typically either ignored or “mined” (i.e. the practice of logging the highest quality hardwood and leaving the site to regenerate on its own). When sites are mined, the once high quality hardwood forest is replaced with colonizers that substantially reduce the rich and diverse ecosystem of the parent stand. Even when left alone, forests are being assaulted by invasive species, significantly impacting ecological functions and habitat quality. Forests are suffering, highlighting the need for professional management. The MFP demonstrates techniques available to landowners to manage the Piedmont’s biologically rich and diverse hardwood forests.

In accordance with its forty year mission, Sandy Creek Nature Center Inc. demonstrates its commitment to Sandy Creek Nature Center through support and funding contributed to the proposed Managed Forest Project (MFP) – a project that promotes a greater understanding of the workings of a healthy forest essential to (1) a broader appreciation of the natural world and our place in it, (2) how land management decisions impact forest ecosystems, and (3) the need for ecosystem protection and sustainable forest management for goods and services. Sandy Creek Nature Center is a facility of the Athens-Clarke County Unified Government operated through the Leisure Services Department.

Sandy Creek Nature Center, Inc.’s Mission: Preservation and Education

Sandy Creek Nature Center, Inc. partners with Athens-Clarke County to support promote and protect the environmental education and preservation efforts of Sandy Creek Nature Center. The private, non-profit organization works to ensure that natural science and environmental education opportunities are available to everyone in our local and regional community.

The SCNC, Inc. Board believes that, through awareness and education, a realistic balance can be established and maintained which provides for a quality of life and social development, and ultimately the survival of all living things. Sandy Creek Nature Center, Inc. was founded in 1973 to achieve these objectives.

Project Description:

Exhibits inside the Sandy Creek Nature Center (SCNC) Education and Visitor Center demonstrate the complexities and wonders of the forest. The outdoor Managed Forest Project helps visitors see and experience the living forest first-hand. Ultimately, visitors will be able travel along a trail through demonstration plots ranging from an early successional stage to mature forest– in essence “walking through time,” spanning decades in just a few minutes.

The Project includes the creation of three planted loblolly pine (*Pinus taeda*), one loblolly pine natural seeding/shelterwood harvest, and one hardwood (mast producing) crop tree/shelterwood harvest demonstration plots through the use of silvicultural techniques guided by Georgia’s Best Management Practices (BMPs). The exact timing and the year a specific activity takes place is based on the recommendation of a professional forester/land manager and guided by environmental and economic factors.

Three planted loblolly pine demonstration plots of approximately five (5) acres each will be managed in rotations spanning 0 – 10/15, 11/16 – 25/30, and 26/31 – 40/50 years, approximately. At the appropriate time, each of the three planted plots will be harvested, cleared and replanted, using superior seedlings, in a 6’ x 12’ grid that promotes wildlife habitat. Superior seedlings are used to illustrate how modern forestry utilizes natural selection to enhance growth rate, wood quality, disease resistance, seed production and other factors. The three planted pine demonstration plots are listed below, with the oldest plot ultimately being harvested, restarting the forest successional process. The plots are:

Age of Demonstration Plot	Anticipated Outcomes
0 – 10/15 years	Creates habitat for wildlife associated with early successional environments
10/15 years – 25/30 years	Creates habitat associated with young pine forest while producing trees needed for pulpwood and lumber products
25/30 – 40/50 years	Creates habitat associated with mid-successional pine forest while producing trees needed for pole and lumber products

In addition to the three planted pine plots, one approximately five acre loblolly pine demonstration plot will be established using a shelterwood harvest technique and natural reseedling. Visitors will be able to compare the differences between naturally seeded and planted superior pine trees along with the habitat and forest products these plots produce. This plot will be managed on a 40 - 50 year rotation basis.

A five acre demonstration plot will focus on mast-producing hardwoods with a special emphasis on oaks. This oak hardwood forest management regime utilizes shelterwood techniques with crop tree management as selection criteria. The canopy surrounding the best mast producers, or “crop trees”, will be “released”, encouraging mast production and seedling growth. Using mature hardwoods to “shelter the seedlings and fire to promote root development and minimize unwanted understory competition, the plot will be harvested between 80 – 120 years using a shelterwood harvest technique. People will be able to observe the differences in wildlife habitat and forest health while learning about hardwood forest products.

Managed buffer zones may be established for site esthetic and wildlife habitat improvement purposes. To the extent funding allows, activities that may be considered in these areas include invasive species removal through the use of mechanical or chemical means, thinning, prescribed fire or other methods that protect site esthetics while improving wildlife habitat. Managed buffer areas may be used to shield the MFP from adjacent neighbors, passing motorist, or other visitors who may see the MFP without the opportunity to learn about its purpose and benefits.

Project Goals:

The goals of the Managed Forest Project are:

Forest Ecology Educational Goal

The growth of a forest is measured in decades or even centuries. The process of change from mature hardwood forest, to open field, to pines, and back to mature hardwoods is called succession. These changes result from many natural factors. Disease, drought, and insects can damage, weaken, and kill trees. Winds, ice, and snow can cause trees to fall, creating meadows or openings in the forest. Fire, once common in the Piedmont, kills some plants while others thrive. Insects, worms and other creatures decompose dead trees and leaf litter. Certain types of animals and plants can be found in each community: meadow, pine forest, and hardwood forest.

As forests grow, the ecosystem also changes. People will be able to walk a short trail and observe life in a forest, physically experiencing changes that normally take place over decades. Interpretive materials will guide and further enhance people's educational experience, leading to a greater understanding of and appreciation for management and the forest ecosystem.

Forest Management Educational Goal

When people interrupt natural processes, they alter the forest ecosystem, sometimes with devastating results. Professional management activities replicate natural processes by stopping or redirecting natural succession or minimizing the impact of invasive species. Such management preserves diversity, promotes forest health, generates forest products, creates and maintains wildlife habitat, and provides recreational opportunities. The forest produces food, fiber, paper, lumber, medicine, and other materials that people need, providing employment at many levels. Professional foresters use Best Management Practices (BMPs) to protect forest ecosystems and/or manipulate succession to produce different forest products at each stage of forest growth. Silvicultural practices are used to grow healthy trees, create a diverse understory, discourage invasive plants, promote food production, and enhance habitat for wildlife. Nature study, hiking, hunting, and other recreational activities can be enhanced when forest health is improved through silvicultural practices.

Community Natural Resource Stewardship and Land Ethic Educational Goal

Protecting forest ecosystems is critical to the health of natural and human communities. Native species need protection while people rely on the goods and services forests generate. An understanding of forest ecology provides knowledge essential to informed community planning and resource conservation decision-making. Educational materials and activities also promote an understanding of the critical role professional forest management plays in sustaining and protecting this vital community resource and how professional forest management activities are an essential component of community stewardship values.

Sustainable Forestry Goal

The MFP supports and promotes sustainable forestry practices. Sandy Creek Nature Center will seek to have the MFP property certified through a national certifying agency.

Sandy Creek Nature Center Land Management Outcomes

The MFP promotes the enhancement and development of community stewardship values through multiple objectives involving community education related to wildlife habitat management, forest ecology, forest product production, and forest recreation while teaching people about professional forest management practices: planting, harvesting, the role of prescribed fire, and other management activities. Shelterwood harvest technique use mature trees to shelter vulnerable saplings, provide natural reseeding of the site, and reestablish the pine or hardwood forest without exposing soil or creating bare earth conditions on the forest floor.

Description of Demonstration Plots and Initial Treatment (see site map for more detail)

Demonstration plots are located, as illustrated, on the attached MFP site map. Initial plot designations and anticipated initial site preparation are as follows:

- Demonstration Plot P1 (Planted 1): Will initially be established as the meadow/early successional/Old Field demonstration plot and will be harvested, cleared, burned, and replanted on an approximate 6' x 12' spacing using superior seedlings.
- Demonstration Plot P2 (Planted 2): Will initially be established as the early pine forest (10/15 – 25/30 years old) and will be thinned, burned, and have invasive plants removed for forest health and wildlife habitat enhancement purposes.
- Demonstration Plot P3 (Planted 3): Will initially be established as the mid-successional pine forest and will be thinned, burned, and have invasive plants removed for forest health and wildlife habitat enhancement purposes.
- Demonstration Plot PS1 (Pine Shelterwood 1): Will initially be thinned, burned, and have invasive plants removed for forest health and wildlife habitat enhancement purposes.
- Demonstration Plot OS1 (Oak Shelterwood 1): The most productive oak/mast producing mature trees will be identified. The mid-story will be thinned to increase forest floor light levels to approximately 18%, encouraging oak seedling growth. Invasive and undesirable plants will be removed from the understory using mechanical and chemical means and oak seedling planted as needed to establish the oak forest and target wildlife habitat.
- Managed Buffer: Buffers will be established around the MFP for aesthetic and wildlife habitat improvement purposes. To the extent funding allows, activities that may be considered inside the managed buffer include invasive species removal through the use of mechanical or chemical means, thinning, prescribed fire or other methods that protect site esthetics while improving wildlife habitat.

Revisions to the Managed Forest Plan

The MRP is not intended to be a fixed, static document, but rather to be a dynamic one. As scientific research advances, educational needs change, tools and equipment improve, new management options become available, and operational resources are enhanced, Sandy Creek Nature Center, Inc. and the staff at Sandy Creek Nature Center will work together to make associated adjustments to the plan. Such changes are considered administrative in nature and would not require additional Mayor and Commission approval.

Appendix

Proposed Budget*

Managed Forest Project - Sandy Creek Nature Center

Initial			
	Expenses	Activity	Totals
		Land Management	\$17,100
		Educational Materials and Site Amenities	\$29,400
		Trail and Fire Break Construction	\$8,600
		Certification	TBD
	Grand Total		\$55,100
	Revenue		\$11,050

Annual			
	Expenses	Activity	Projected Expenses
		Land Management	\$2,100
		Educational Materials and Site Amenities	\$800
		Trail and Project Area Maintenance	\$3,000
		Certification	TBD
	Grand Total		\$5,900

*Through the Managed Forest Project, SCNC, Inc. pledges \$67,000 in funding to include both initial installation and, to the extent funding remains, the ongoing costs associated with the project. The SCNC, Inc. Board will continue to raise funds for the long-term support of this project and expend these funds as per an annually renewable performance agreement with ACC/SCNC.

Overview of Proposed Roles and Responsibilities

Sandy Creek Nature Center, Inc.	Sandy Creek Nature Center staff/ACC Government
<ul style="list-style-type: none"> • Provides initial funding for the installation and development of five demonstration plots, approximately 5 acres each, along with an associated managed buffer. • Dedicates funding toward the MFP in the amount of \$67,000, to include the initial installation as per projected budget, with the remaining funds to be disbursed as per an annually renewable agreement based on performance standards. 	<ul style="list-style-type: none"> • Approves the establishment of the MFP along with associated forest management practices • Enters into agreements with SCNC, Inc. allowing for, assisting with, and facilitating land modification, fund raising/in-kind services, and educational development activities.
Assists with the development and evaluation of a contract for services to establish demonstration plots	<ul style="list-style-type: none"> • Develops contract for installation services • Oversees demonstration plot installation and buffer modification, assuring compliance with ACC and SCNC, Inc. goals and standards
<ul style="list-style-type: none"> • Approves and funds contract and recommended firm(s) • Issues contract and assists with the implementation of the contract. 	Evaluates, assists with, and supervises the implementation of the contract to ensure appropriate installation of MFP in compliance with ACC and SCNC, Inc. goals
<ul style="list-style-type: none"> • Assists with trail and fire/break design and construction • Assists with volunteer recruitment and coordination. 	<ul style="list-style-type: none"> • Evaluates, assists with, and supervises trail and fire break planning and construction • Provides staff to assist with recruitment and supervise/participate in trail construction.
<ul style="list-style-type: none"> • Provides assistance with educational material development; ensures that materials meet SCNC, Inc./ACC standards • Approves and orders materials as per budget. 	<ul style="list-style-type: none"> • SCNC staff develops educational materials, displays, kiosks, etc. in accordance with SCNC, Inc. and ACC standards • Coordinates and assists with purchase and is responsible for installation and dissemination of materials.
To the limit of available project funds, approves, funds, and hires, professional consultants, as necessary to create and maintain the MFP project. If available, utilizes volunteers to provide professional consulting services.	<ul style="list-style-type: none"> • Assists with locating, evaluating, coordinating, and supervising professional services. • Provides expertise/professional services to make recommendations and assist with the management of the demonstration plots and associated buffer.
Pursues ongoing, long term funding for this project by seeking additional funding, sponsorships, donations, in-kind services, and grants to go toward the MFP.	Assists with and provides support for fund raising activities, including obtaining in-kind services where appropriate and feasible. Supports SCNC Inc.'s fund raising efforts and establishes standards and procedures that allow outside agencies to sponsor the MFP and/or donate funds, materials, in-kind services, etc. Includes allowing sponsor recognition on signs, materials, webpages, etc.
<ul style="list-style-type: none"> • Periodically reviews the MFP to ensure goals are met, practices are current, and educational content is appropriate • Makes necessary changes and revisions accordingly. 	<ul style="list-style-type: none"> • Periodically reviews the MFP to ensure goals are met, practices are current, and educational content is appropriate • Makes necessary changes and revisions accordingly.

Proposed Dedicated Funding

To help ensure the success of the Managed Forest Project and facilitate ACCUG's ongoing land stewardship efforts, SCNC, Inc.'s MFP includes a request that the Mayor and Commission authorize:

1. The establishment of a dedicated Sandy Creek Nature Center Forest and Wildlife Habitat Restoration fund.
2. The allocation of any revenues or monies arising out of the sale of lumber or other wood products, permits, or other related land management activities that occur on Sandy Creek Nature Center property to an account dedicated to forest and wildlife habitat restoration activities at the Nature Center
3. ACC staff to seek and assist Sandy Creek Nature Center, Inc. with efforts to generate on-going funding through grants and donations.

Note: Donations and revenues from sales and related activities would be deposited into a designated Sandy Creek Nature Center Forest and Wildlife Habitat Land Restoration Fund account. Once restoration projects are approved, funds would be transferred into appropriate expenditure accounts to meet project financial needs. Approved restoration projects and associated funding allocations can span multiple fiscal years.

Initial Project Educational Concept Development

Time Period (approximate)	Successional Stage	Educational Concepts		Management Techniques
		Forest Ecology	Forest Management	
0-10/15 Years* *Years are provided as a guideline. The actual length of this stage will be based on the input of professional forest manager(s) and determined by rainfall, forest health, growth rate, the degree of wildlife habitat enhancement anticipated, economics, and other management considerations.	Meadow or “Old Field” and Early Pine Forest Composition: Herbaceous plants, blackberry, and early successional hardwoods (sweetgum, etc). Pines are planted in 6’ x 12’ rows	People will gain experience with, learn, and observe: 1. The land as it changes from a meadow filled with herbaceous plants to the early growth of the forest. This process depends on interactions between soil, sunlight, water, climate, available seeds, and the types of plants that can grow under these conditions. 2. That specific plants and animals thrive in and/or require the habitat created during the early transitional stage of the forest - especially those that decline with the loss of this type of habitat. (examples: blackberry, broomsedge, quail, woodcock, etc). 3. That plants and animals are interconnected and interdependent. 4. That disturbances in the forest can result from natural and human activities. 5. That there are differences in the forest structure between natural	People will gain experience with, learn, and observe: 1. That the forest produces food, fiber, paper, lumber, medicine, and other materials that people need to survive. 2. That silvicultural activities, guided by BMPs: <ul style="list-style-type: none"> ○ Protect soils, maintain water quality, and protect natural systems while promoting agricultural, wildlife, recreational and other natural resource management goals. ○ Are used by agriculturally focused landowners and businesses to increase the production levels and the volume of wood products generated by the land. ○ Are used by wildlife focused landowners to establish, maintain, and enhance habitat. ○ Are used to enhance forest health, protect ecosystems, 	1. Remove trees and understory 2. Treat site with standard chemical site preparation (ex: Arsenal) to eliminate unwanted and invasive plants. 3. Replant pines with a 6’ x 12’ spacing. For teaching purposes, can consider planting two types of trees – improved and unimproved (if available) so the differences in growth rates can be observed. 4. May include fire ant control to protect ground nesting birds 5. Prescribed fire should be used as soon as pines reach a DBH of 3 – 5 inches and lower limbs are approximately 15 feet from the forest floor, minimum (a low intensity, winter burn is recommended). 6. Students, volunteers, and the public can assist with prescribed burns and participate in/observe other management operations as appropriate.

		<p>reseeding and planted pine stands. Loblolly pine stands need to be at least 25 years of age to naturally reseed a site effectively.</p> <p>Educational Concepts: Succession, meadow ecology, microclimate, habitat, soil ecology, interdependence, interconnectivity, cycles, food chains/webs, natural history of meadow animals and plants.</p>	<p>and meet recreation, wildlife, forest protection, and other community natural resource management goals.</p> <ul style="list-style-type: none"> ○ Are used to encourage native plant and animal diversity, enhancing educational and recreational experiences. <ol style="list-style-type: none"> 3. That professional management activities such as controlled fire, proper harvesting, thinning, etc. are beneficial to both wildlife and people. 4. That professionally managed forest focused on wood production are planted with “super” or “improved” trees, those bred specifically to resist disease and to be better adapted to thrive in specific habitats. 5. The differences between planted and naturally seeding sites. Visitors will be able to compare forest production and transitional habitat on both planted and naturally seeded sites. Planting pines with a pre-planned spacing (6’ x12’) extends early successional habitat compared to the denser stocking that occurs with natural seeding. 	
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Time Period (approximate)	Successional Stage	Educational Concepts		Management Techniques
		Forest Ecology	Forest Management	
11/15 – 25/30 years* *Years are provided as a guideline. The actual length of this stage will be based on the input of professional forest manager(s) and determined by rainfall, forest health, growth rate, the degree of wildlife habitat enhancement anticipated, economics, and other management considerations.	Early Pine Forest Composition: Canopy/overstory: pine trees between 25 and 85 feet tall. Understory: Because fire is used as a management tool, the understory consists of herbaceous annual and perennial plants (such as blackberries) with few woody plants (such as hardwoods, sweetgum) other than pines.	People will gain experience with, learn, and observe: <ol style="list-style-type: none"> 1. Succession, how trees change, along with a greater perspective on the rate of change within a forest community. 2. Changes in species of wildlife and the forest understory over time. The natural history of plants and animals found in the early pine successional stage will be highlighted. 3. The relationships and interdependence between plants and animals and living and non-living elements. 4. Soil communities that thrive in the forest. Forest soils protect water quality by allowing rain to soak in the ground rather than running off, carrying sediment and other pollutants with it. 5. How fire shapes forest habitats. Before fire suppression began in the early 1900s, fire was a common element in the ecology of the Piedmont region. 	People will gain experience with, learn, and observe: <ol style="list-style-type: none"> 1. How forest management techniques enhance forest health while managing for multiple objectives (wood production, wildlife, esthetics, recreation). Silvicultural practices are chosen to achieve each of these objectives. 2. That trees aged 25 -30 years are harvested for pulpwood and saw timber production (depending on the age and health of the trees harvested and economic markets); educational materials will highlight products produced by trees in this age range. 3. That in planted forests, the spacing of the pine trees is determined by the landowner's objectives: closer together to maximize wood production and further apart if wildlife is the primary focus. 4. That professional foresters use silvicultural techniques to: <ul style="list-style-type: none"> o manage the species of plants and amount of growth that 	<ol style="list-style-type: none"> 1. Prescribed fire should be used every 2-6 years to control invasive understory plants. A winter/early spring burn is recommended and, if feasible, should be staggered so at least one plot is being burned each year in order to provide educational opportunities for the public and students). Note: winter/early spring burns allow fire to reach temperatures needed to kill undesirable plants (such as early-leafing, invasive plants) while minimizing air quality concerns. 2. Once basal area exceeds 90 -100 ft², the stand should be thinned to a basal area between 50 – 60 ft² per acre. This generally occurs when a stand is 15 – 17 years old. The process should be repeated as needed (in general, approximately every 5 years). It is recommended that thinning take place during the winter. 3. Basal area is, generally, the average per acre area occupied by the tree stems - as if one were to take a “slice” out of a tree at 4.5 feet above the ground (Diameter

		<p>6. The ways in which forests influence the micro-climate; large forests can influence weather.</p> <p>Educational Concepts: Succession, early pine forest ecology, microclimate, habitat, soil ecology, interdependence, interconnectivity, cycles, food chains/webs, natural history of pine forest animals and plants.</p>	<p>takes place in the understory.</p> <ul style="list-style-type: none"> ○ to encourage native plant and animal diversity and discourage invasive plants, enhancing educational and recreational experiences. ○ to replicate natural processes in a pine forest (ex: controlled burns or prescribed fires.) ○ to help minimize/prevent disease and insect infestations (bark beetle). <p>5. That professional management activity such as controlled fire, proper harvesting, thinning, etc. is beneficial to both wildlife and people.</p>	<p>Breast High or DBH), place all the slices on the ground, and calculate how much of an acre of ground is covered by all of the slices.</p> <p>4. Spot herbicides should be used to eliminate any invasive or undesirable plants not killed by prescribed fire (ex: sweetgum, privet, kudzu, etc.)</p> <p>5. Students, volunteers, and the public can assist with prescribed burns and participate in/observe other management operations as appropriate.</p>
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Time Period (approximate)	Successional Stage	Educational Concepts		Management Techniques
		Forest Ecology	Forest Management	
25/30 – 40/50 years* *Years are provided as a guideline. The actual length of this stage will be based on the input of professional forest manager(s) and determined by rainfall, forest health, growth rate, the degree of wildlife habitat enhancement anticipated, economics, and other management considerations.	Mid-successional pine forest Composition: Overstory: pine trees Understory: Because fire as used as a management tool, the understory consists of herbaceous annual and perennial plants (such as blackberries) with few woody plants (such as sweetgum and other hardwoods) other than pines.	People will gain experience with, learn, and observe: 1. Succession, how trees change, along with a greater perspective on the rate of change within a forest community. 2. Changes in species of wildlife and the forest understory over time. The natural history of plants and animals found in the mid-successional pine forest will be highlighted. 3. The relationships and interdependence between plants and animals and living and non-living elements. 4. Soil communities that thrive in the forest. Forest soils protect water quality by allowing rain to soak in the ground rather than running off, carrying sediment and other pollutants with it. 5. How fire shapes forest habitats. Before fire suppression began in the early 1900s, fire was a common element in the ecology of the Piedmont region.	People will gain experience with, learn, and observe: 1. How professional foresters use silvicultural techniques to manage the species of plants and amount of growth that takes place in the understory. These management practices can enhance wood production, habitat, soil protection, and other landowner objectives. 2. That forests in this age range are primarily harvested for saw timber and poles. 3. That professional foresters use silvicultural techniques to: <ul style="list-style-type: none"> ○ promote forest health and increase the quality and quantity of wood product that can be grown on a tract of land. ○ can create open forest settings that encourage wildlife-beneficial understory development and enhance wildlife habitat. Some animals and plants need such open forest settings to thrive. 	1. Prescribed fire should be used every 2-6 years (burning should be staggered with other plots so at least one plot is being burned each year in order to provide educational opportunities) 2. Once basal area exceeds 90-100 ft ² , the stand should be thinned to a basal area between 50 – 60 ft ² per acre. This generally occurs when a stand is 15 – 17 years old. The process should be repeated approximately every 5 years thereafter. It is recommended that thinning take place during the winter/early spring. Note: Basal area is, generally, the average per acre area occupied by the tree stems - as if one were to take a “slice” out of a tree at 4.5 feet above the ground (Diameter Breast High or DBH), place all the slices on the ground, and calculate how much of an acre of ground is covered by all of the slices. 3. Final harvest should be conducted after approximately 40 – 50 years. The timing of the harvest is based on the recommendation of a

		<p>6. The ways in which forests influence the micro-climate; large forests can influence weather.</p> <p>7. Seed production (wildlife food) increases with age, with trees 40 years old producing three to five times more than trees that are 25 years old.</p> <p>Educational Concepts: Succession, mid-successional pine forest ecology, microclimate, habitat, soil ecology, interdependence, interconnectivity, cycles, food chains/webs, natural history of pine forest animals and plants.</p>	<ul style="list-style-type: none"> ○ encourage native plant and animal diversity and discourage invasive plants, enhancing educational and recreational experiences. ○ use fire to replicate natural processes in a pine forest. ○ help minimize/prevent disease and insect infestations (bark beetle). <p>4. That professional management activity such as controlled fire, proper harvesting, thinning, etc. is beneficial to both wildlife and people.</p>	<p>professional forester. Considerations include: tree size, market values, soil conditions at time of harvest, availability of harvesting company, funding/ability to replant site, etc. Note: the harvesting company selected should work closely with the professional forester and adhere to BMPs throughout the harvest.</p> <p>4. Spot herbicides should be used to eliminate any invasive and unwanted plants not killed by prescribed fire.</p> <p>5. Students, volunteers, and the public can assist with prescribed burns and participate in/observe other management operations as appropriate.</p>
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Time Period (approximate)	Successional Stage	Educational Forest Ecology	Concepts Forest Management	Management Techniques
<p>0 – 40/50 years*</p> <p>*Years are provided as a guideline. The actual length of this stage will be based on the input of professional forest manager(s) and determined by rainfall, forest health, growth rate, the degree of wildlife habitat enhancement anticipated, economics, and other management considerations.</p>	<p>Shelterwood Pine harvesting technique using natural reseeded</p> <p>Composition: Overstory: pine trees</p> <p>Understory: Because fire as used as a management tool, the understory consists of herbaceous annual and perennial plants (ex: blackberry) with few woody plants (such as hardwoods) other than pines.</p>	<p>People will gain experience with, learn, and observe:</p> <ol style="list-style-type: none"> 1. Succession, how trees change, along with a greater perspective on the rate of change within a forest community. 2. Changes in species of wildlife and the forest understory over time. The natural history of plants and animals found in an open structure, mature pine successional stage will be highlighted. 3. The relationships and interdependence between plants and animals and living and non-living elements. 4. Soil communities that thrive in the forest. Forest soils protect water quality by allowing rain to soak into the ground rather than running off, carrying sediment and other pollutants with it. 5. How fire shapes forest habitats. Before fire suppression began in the early 1900s, fire was a common element in the ecology of the Piedmont region. 	<p>People will gain experience with, learn, and observe:</p> <ol style="list-style-type: none"> 1. How professional foresters use silvicultural techniques to manage the species of plants and amount of growth that takes place in the understory. These management practices can enhance wood production, habitat, soil protection, and other landowner objectives. 2. That silvicultural practices: <ul style="list-style-type: none"> ○ encourages trees to grow straight, with fewer defects. This enhances timber value and helps decreases “waste”. ○ benefit wildlife that rely on mature trees or mature pine forest habitat. Some species of plants and wildlife must have these forest habitats to survive. ○ encourage native plant and animal diversity and discourage invasive plants, enhancing educational and recreational experiences. 	<ol style="list-style-type: none"> 1. Site may be selectively thinned during the cycle. Up to three cuts may be performed prior to final harvest. Final harvest will be determined, in part, by quality and quantity of seedling reproduction. 2. Natural regeneration will be used as the reseeded/planting method. 3. Prescribed fire will be used to minimize/control invasive and undesirable species. 4. Once basal area exceeds 90-100 ft², the stand should be thinned to a basal area between 50 – 60 ft² per acre. A winter thinning should be considered. . 6. Basal area is, generally, the average per acre area occupied by the tree stems- as if one were to take a “slice” out of a tree at 4.5 feet above the ground (Diameter Breast High or DBH), place all the slices on the ground, and calculate how much of an acre of ground is covered by all of the slices.

		<p>6. The ways in which forests influence the micro-climate; large forests can influence weather.</p> <p>7. Seed production (wildlife food) increases with age, with trees 40 years old producing three to five times more than trees that are 25 years old.</p> <p>Educational Concepts: Succession, forest ecology, microclimate, habitat, soil ecology, natural regeneration, interdependence, interconnectivity, cycles, food chains/webs, natural history of pine forest animals and plants.</p>	<ul style="list-style-type: none"> ○ use fire to replicate natural processes in a pine forest. ○ help minimize/prevent disease and insect infestations (bark beetle). <p>3. That forest in this age range are primarily harvested for saw timber and poles</p> <p>4. How a forest changes when the shelterwood harvest with natural reseedling management regime is used. Educational materials will include pros and cons as well as the reasons the forest responds the way it does to this management strategy.</p>	<p>7. Spot herbicides should be used to eliminate any invasive and wanted plants not killed by prescribed fire.</p> <p>8. Students, volunteers, and the public can assist with prescribed burns and participate/observe other management operations as appropriate.</p>
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Time Period (approximate)	Successional Stage	Educational	Concepts	Management Techniques
		Forest Ecology	Forest Management	
<p>0 – 80/120 years*</p> <p>*years are provided as a guideline. The actual length of this stage will be based on the input of professional forest manager(s) and determined by rainfall, forest health, growth rate, the degree of wildlife habitat enhancement anticipated, economics, and other management considerations.</p>	<p>Oak Shelterwood with crop tree management as a selection criteria</p> <p>Composition: Focused on oak/mast tree production</p>	<p>People will gain experience with, learn, and observe:</p> <ol style="list-style-type: none"> 1. Succession, how trees change, along with a greater perspective on the rate of change within a forest community. 2. Changes in species of wildlife and the forest understory over time. The natural history of plants and animals found in an open structure, mature pine successional stage will be highlighted. 3. The relationships and interdependence between plants and animals and living and non-living elements. 4. Soil communities that thrive in the forest. Forest soils protect water quality by allowing rain to soak into the ground rather than running off, carrying sediment and other pollutants with it. 5. How fire shapes forest habitats. Before fire suppression began in the early 1900s, fire was a common element in the ecology of the Piedmont region. 	<p>People will gain experience with, learn, and observe:</p> <ol style="list-style-type: none"> 1. How professional foresters use silvicultural techniques to manage the species of plants and amount of growth that takes place in the understory. These management practices can enhance wood production, habitat, soil protection, and other landowner objectives. 2. That silvicultural practices: <ul style="list-style-type: none"> o encourages trees to grow straight, with fewer defects. This enhances timber value and helps decreases “waste”. o benefit wildlife that rely on mature trees or mature oak/hickory forest habitat. Some species of plants and wildlife must have these forest habitats to survive. o encourage native plant and animal diversity and discourage invasive plants, enhancing educational and recreational experiences. o uses fire to replicate natural processes . 	<ol style="list-style-type: none"> 5. Utilize a “Crop Tree” management strategy, including the use of a “crown touching release” where trees with crowns that compete with crop trees are removed or killed. Manage the crop trees (Oaks and related mast producers) to provide greatest wildlife, recreational, esthetics, and timber benefits (in priority order). Management techniques may include selective commercial thinning; prescribe fire, or the application of herbicides. 6. When site has reached full rotational age (80 – 120 years), prepare the site for a Shelterwood harvest. 7. The site needs to consist of or be prepared so as to have 300 – 500 oak seedlings per acre. 8. About 10 – 15 years prior to the initiation of a Shelterwood Harvest regimen as determined by a professional forester and approved by SCNC, Inc., the initial shelterwood cut is undertaken. This cut leaves approximately 25 – 50 of the best quality mast producing (primarily

		<p>6. The ways in which forests influence the micro-climate; large forests can influence weather.</p> <p>7. Seed production (wildlife food) increases with age, with trees 40 years old producing three to five times more than trees that are 25 years old.</p> <p>Educational Concepts: Succession, forest ecology, microclimate, habitat, soil ecology, natural regeneration, interdependence, interconnectivity, cycles, food chains/webs, natural history of oak-hickory climax forests and plants.</p>	<ul style="list-style-type: none"> ○ help minimize/prevent disease and insect infestations. ○ That forest in this age range are primarily harvested for saw timber. <p>3. How a Shelterwood management regime replicates succession and how the forest changes when this management method is used. Educational materials will include pros and cons as well as the reasons the forest responds the way it does to this management strategy.</p> <p>4. How “Crop Tree Management” selection strategy can be used to achieve wildlife habitat, recreation, and timber management goals. . This strategy focuses on managing and retaining the best trees on a selected site (for the MFP the focus will be on mast-producing oaks and related trees). This is an intermediated stand management strategy that removes only those trees that are in direct competition with oaks and related mast producing trees (i.e. “crop trees”).</p>	<p>oaks) per acre. This encourages oak seedlings to develop stronger root systems while out-competing less shade tolerant hardwoods.</p> <p>9. After three to five years, a medium to medium-high temperature and severity controlled burn should be initiated. This practice may continue for 2 – 3 cycles. The best burn time is during the grow season (spring to summer). This wait-period allows the mature trees to recover from the Shelterwood cut and seedlings to develop adequate root systems to be able to out-compete lower quality trees (such as sweetgum). (Alternative treatment method: herbicide)</p> <p>10. Following 2 -3 controlled burn cycles, saplings should be allowed to reach ten to fifteen feet in height (generally four to five years), at which time the remaining mature oaks should be harvested.</p> <ol style="list-style-type: none"> 1. Fire, herbicide, or thinning may be used to achieve the management objectives listed above. 2. If deer browsing is too intense, it may require
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				<p>additional wait time or require deer control methods be implemented to achieve management objectives.</p> <p>3. Students, volunteers, and the public can assist with prescribed burns and participate/observe other management operations as appropriate.</p>
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2013
Sandy Creek Nature Center

- Parcel Boundary
Sandy Creek Nature Center

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May 2014
Athens-Clarke County Leisure Services Department



2013
Sandy Creek Nature Center

Managed Forest Project Overview

	Parcel Boundary
	Sandy Creek Nature Center
	Managed Forest Project Boundary
	Managed Buffer

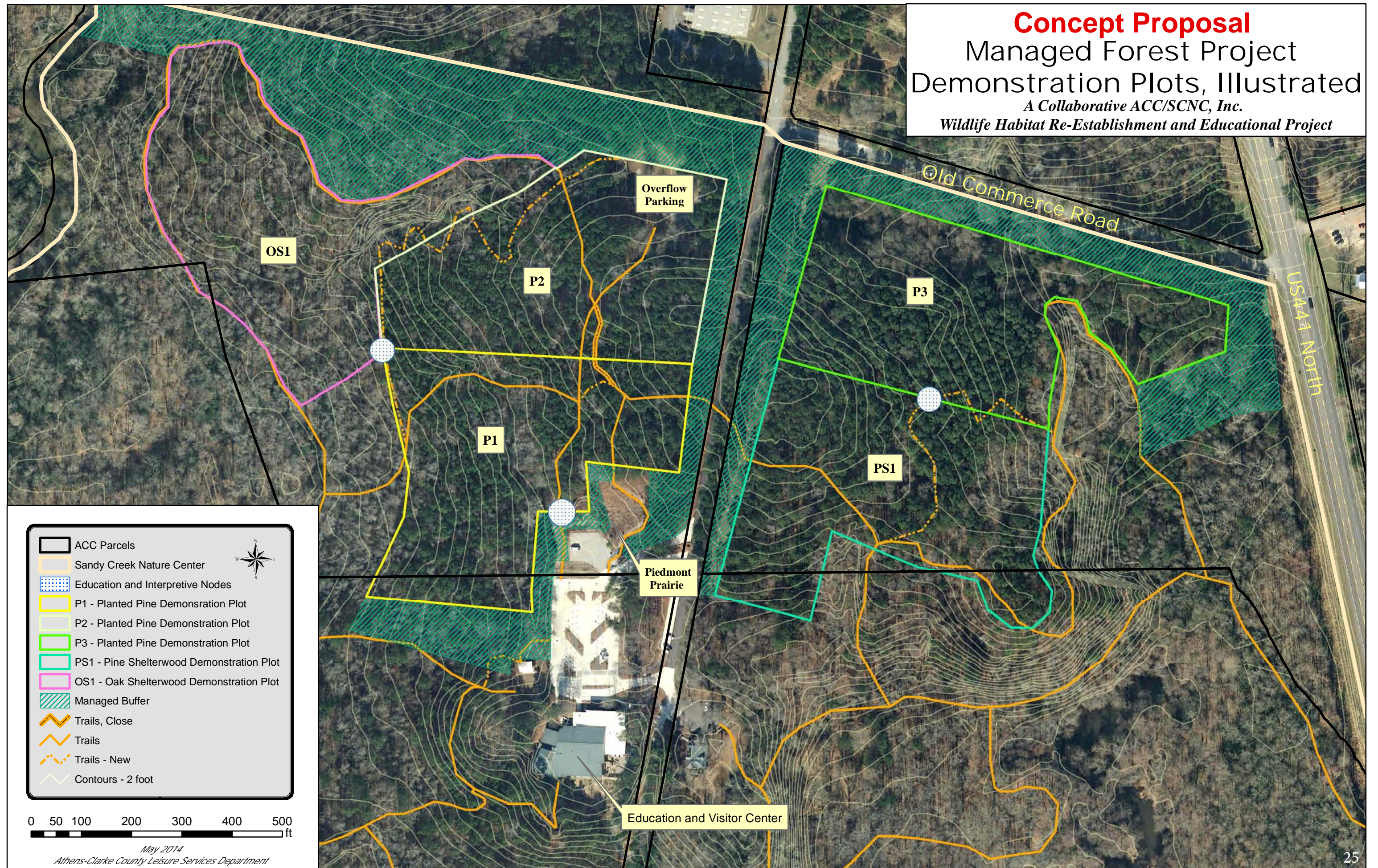
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Concept Proposal

Managed Forest Project



Demonstration Plots, Illustrated

A Collaborative ACC/SCNC, Inc.
Wildlife Habitat Re-Establishment and Educational Project





1980
Sandy Creek Nature Center

-  Parcel Boundary
-  Sandy Creek Nature Center



1980
Sandy Creek Nature Center

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| | Parcel Boundary |
| | Sandy Creek Nature Center |
| | Managed Forest Project Boundary |
| | Managed Buffer |



1960
Sandy Creek Nature Center

- Parcel Boundary
- Sandy Creek Nature Center





1960
Sandy Creek Nature Center

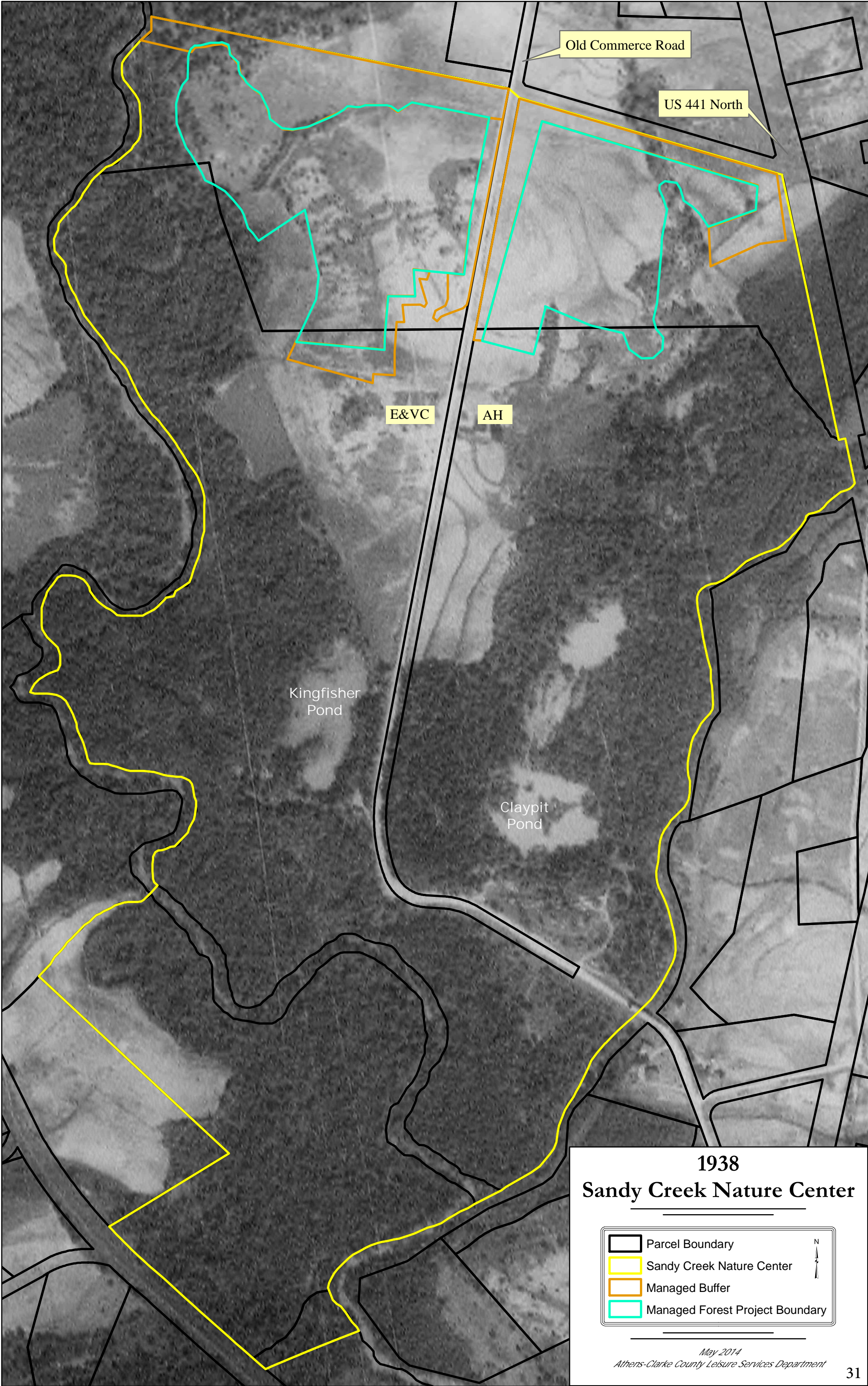
- Parcel Boundary
- Sandy Creek Nature Center
- Managed Forest Project Boundary
- Managed Buffer



1938
Sandy Creek Nature Center

-  Parcel Boundary
-  Sandy Creek Nature Center





1938
Sandy Creek Nature Center

- Parcel Boundary
- Sandy Creek Nature Center
- Managed Buffer
- Managed Forest Project Boundary

