MCINTOSH SEED: A CASE STUDY FOR COMMUNITY FOREST PLANNING

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Abstract

Community forestry offers the opportunity to both strengthen sustainable environmental management while building on community assets. However, these types of forest programs require both that the community is involved in various aspects of the decision-making process, and that the community benefits economically, recreationally, and/or educationally.

McIntosh SEED, a grassroots nonprofit organization, purchased 1,159 acres of land situated in the coastal flatwoods of Georgia, with the goal of designating it as the McIntosh SEED Community Forest. The primary objective of this project is the development of *The McIntosh SEED Community Forest Master Plan*, which plays a crucial role in achieving their vision for the forest. The plan consists of three parts; the first involves an analysis of the community's interests in relation to the forest. The second part is multi-faceted and site-specific, including an environmental assessment and site plan. The third and final part is multi-faceted and moves beyond the site itself, addressing community accessibility and key communication and funding strategies.

Part 1: Community Engagement

To determine the interests and values of the community, focus groups, interviews, and surveys were conducted with members of Long and McIntosh Counties. Community strengths were identified most frequently as nature and structures (such as ballparks, tracks, etc.), while weaknesses were identified as lack of jobs/business/industry. McIntosh SEED can both capitalize on perceived strengths and tackle weaknesses with specific educational and recreational programs on the forest property.

Although there was a high level of unfamiliarity with community forestry, there was interest in bringing children to the property as well as a wider community interest in visiting the forest. Survey respondents on average anticipated driving 24 minutes and visiting the forest five times a month. A linear regression suggested that as age increases, anticipated monthly visits decrease. This means that McIntosh SEED should consider conducting programs specifically designed for older generations or incorporating incentives such as free transportation to the forest. Finally, hiking, camping, nature walks, and workshops were among the most popular activities for the property, all of which were taken into account when creating the site plan in Part 2.

Part 2: Site Assessment

An environmental assessment, including a summary of topography, soils, hydrology, vegetation and wildlife on the site, provided the basis for determining feasible programs and activities that correspond with the community's needs. The site is very flat, with nearly half of it being classified as a wetland. Slash (*Pinus eliottii*) and loblolly *(Pinus taeda)* are actively managed for timber production on the site. Primary vegetation communities include pine savanna and flatwoods, upland pine and hardwood woodland, and swamp systems.

A point count bird survey was conducted in order to determine wintering species on the property as well as identify areas of high bird diversity to target them for birding activities. The survey found 45 bird species, with two of them being regionally rare species: the brown-headed nuthatch (*Sitta pusilla*) and Henslow's sparrow (*Ammodramus henslowii*).

Optimal locations for the retreat center, parking facilities, campgrounds, longleaf pine regeneration, and sweetgrass cultivation, were determined using a GIS-based suitability envelope method. To aid in the design of the recreational trail network, a natural diversity heatmap was created, which used soils, ecological communities, and canopy cover datasets as proxies. Trails were designed so that they connected important site features and maximized access to naturally diverse areas.

Part 3: Accessibility and Outreach

A service area analysis was conducted to better understand the demographics (i.e. race and income) and spatial distribution of the community served by the forest. Trends in race paint a clear picture: population within the immediate vicinity is majority white but decreases with increasing distance from the forest. At 30 min, race composition shifts from majority white to majority Hispanic/non-white. Trends in median household income are not as drastic, but values do drop from an estimated $47,300 to $43,300 at the 30 min service area. Thus, 30 min is the critical driving threshold at which communities are most diverse in terms of race and income.

Through a related analysis, it was determined that a majority (84%) of the forest's 30 min service area is in competition with 22 recreational forests. The results inform resource allocation decisions and advertising/outreach efforts. Further recommended strategies for funding and communication include a dedicated webpage as well as a social media strategy, while reaching out to grant-making organizations, building a member base, and attracting both old and new supporters to the forest through special events.

As a case study, this process is applicable to the development of future community forests. By following the methodologically rigorous steps used in this plan, future organizations can incorporate community feedback and ecological assessments to design the ideal community forest program for their unique environmental and social circumstances.

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Introduction

What is a Community Forest?

Within the United States community forests originated in New England, only recently spreading to the Southeast. According to the Community Forest Collaborative, a community forest project "secures access and rights to the forest resource at the community level; it promotes community participation in management decisions; it ensures that communities receive value and benefits from the land that can support and reinforce community priorities and economic development objectives; and it secures permanent protection of the conservation values of the forestland" (Lyman 2007).

In American history, communal land was managed for entire populations in early settlement history, though was gradually privatized until its current state today. Modern examples of community forest projects arose in the 1970's as concerns about deforestation and climate change emerged. In the North and Southeast these concerns manifested themselves in community forestry projects that focused on land conservation.

In a recent review of 32 community forest case studies, 25 projects were in the North and Southeast, and 23 projects were on forest tracts of less than 1,000 acres, making the McIntosh SEED project model one of the largest (Cook 2014). These forests have a variety of ownership structures, including 21 that are owned by municipalities, five by nonprofits, and two by a mix of non-profit and municipality ownership or dual municipality ownership. In the West, tribal ownership is also prevalent (Cook 2014). Given the different options other community forests have utilized to manage their land, the partnership described below would be unique, as forest ownership evolved from a military and non-profit partnership.

As the American economy continues to improve, the risks of development will increase. In the 1990's, development reached one million acres per year, and in the next 20 years 11% of private forestry land will be cut for housing development (Stein et al. 2005). Community forestry is a critical tool for local communities to protect their forests while providing the economic benefits they so sorely need to improve their livelihoods now and in the future.

McIntosh SEED Community Forest: A Case Study

McIntosh SEED, a grassroots nonprofit organization in Georgia, purchased 1,159 acres of land situated in Georgia's southern coastal plain, with the goal of designating it as the McIntosh SEED Community Forest.

This project fits within McIntosh SEED's mission to "strengthen low-wealth families and improve neglected rural communities through asset-based economic development, education reform, empowerment, and environmental preservation" (McIntosh SEED n.d.). Their vision is to empower underserved communities to make decisions about the management of the forest. The forest will feature demonstrations of working lands conservation, thereby enhancing local food- or forest-related businesses and markets to improve the likelihood of both conservation and financial success.

The motivation behind the community forest is founded in the historical lack of access to public conservation programs and services by socially disadvantaged and limited-resource producers; the effect of which is the conversion of high value natural resource lands (e.g., wetlands, riparian buffers) to small working lands that are not competitive for conservation dollars due to their size or low market value.

Overview

The primary objective of this project is the development of *The McIntosh SEED Community Forest Master Plan*, which plays a crucial role in achieving McIntosh SEED's vision for the forest.

The plan consists of three parts; the first involves an analysis of the community's interests in relation to the forest. The second part is multi-faceted and site-specific, including an environmental assessment and site plan. The third and final part is also multi-faceted and moves beyond the site itself, addressing community accessibility and key communication and funding strategies. Each part considers key questions that will aid in the future development of the community forest.

Part 1: Community Feedback

- What are the community's interests and values related to the forest?
- How does the community's feedback translate into forest activities or structures?

Part 2(a): Environmental Site Assessment

- What environmental conditions (elevation, soils, vegetation, etc.) characterize the site?
- What constraints and opportunities arise from the site's environmental conditions?

Part 2(b): McIntosh SEED Community Forest Site Plan

- What are feasible activities on the site given environmental constraints?
- What is the best layout for given activities on the property?

Part 3(a): Community Access Assessment

- What geographic areas does the community forest serve?
- What are the demographics of people living in the service area?
- Where will the forest compete with other recreational forests for visitors?

Part 3(b): Communication & Funding Strategies

- What are the most effective communication strategies?
- What are the best methods to raise funds for community forest programs?

Study Area

The McIntosh SEED Community Forest of Long County in the coastal plains of Georgia boasts a unique environment, a rich history, and now an innovative partnership.

Historical Context

Natural History

Long County resides in the "Sea Island Flatwoods," a coastal region containing "remnants of coastal islands and back barrier marshlands" (Edwards et al. 2013). Over the past two million years, sea levels have risen and receded as a result of alternating glacial periods, thus the soils in this region are relatively young.

Fire has also been an important factor in shaping the coastal plain's ecosystems. In fact, longleaf pine, which once dominated Southeastern forests, is dependent on fire to restart its growth cycle. Lightning is a major source of natural fire, but Native Americans and European settlers have also played a large role in dominant fire regimes.

Native Americans settled in the Coastal Plain between 12,000 and 14,000 years ago. First to arrive were those hunting large mammals, followed by the hunter-gatherer groups 8,000-

10,000 years ago, and those settling in villages around 5,000 years ago. Agriculture increased populations, but was limited to "rich bottomlands along river corridors," and in many areas populations remained hunter-gatherers (Hutchinson et al. 2000). Still, these early settlements used longleaf pine stands for hunting, and periodically burned these areas. It is possible that such burning created meadow habitats that were used by buffalo that could have existed from the 1500's to the 1700's (Edwards et al. 2013).

In addition to forest products, early inhabitants of this area were dependent on maritime resources. Coastal populations continued to rely on these maritime resources to diversify their diet, which beginning around 1000 A.D. also included dependence on maize (Hutchinson et al. 2000).

European settlers arrived in the 18th century, beginning first with Spanish explorers and then British settlers. The ban on slavery was removed in the 1750's, after which large plantations were founded for indigo, sugarcane, and rice. Burning of the forest lands continued, only this time to provide fields for livestock to forage. After the Civil War, areas in the upper coastal plain were used for cotton, and the amount of land in agriculture increased or declined based on overall national economic conditions. Agriculture has caused widespread drainage and plowing of wetlands and marshes - the true extent of which is unknown.

Pine forests have been logged since the European settlers first arrived. In 1910, the peak of the logging boom, "nearly 8 million acres of southeastern pine forests were in production, rendering 600,000 metric tons of rosin and turpentine" (Edwards et al. 2013). As longleaf pine disappeared, slash and loblolly pine were planted to replace it. Due to the large scale nature of logging practices in this region, almost all forests have been cut multiple times. Today, 60% of the coastal plain remains forested (Edwards et al. 2013). The landscape is highly fragmented, which can be detrimental to species that require large home ranges.

Early American History

Georgia was the last of the original thirteen American colonies, and did not send any delegates to the First Continental Congress. Initially, Georgia was actually the only colony to reject slavery, but later legalized the trade in 1751.

At the time of Georgia's official founding, there were approximately 11,000 Creek Native Americans in the interior of the colony, who formed decentralized towns and villages. They utilized their relationship with different nationalities of European settlers, and by the 1760's had increased their population to 13,000 - almost twice the size of Georgia's European

inhabitants. By the American Revolution, there were 14,000 Creeks, 18,000 whites, and 15,000 African-Americans – mostly slaves but a few free individuals. Creeks were kept as slaves, but also had African-American slaves themselves (Morgan 2010).

Rice became an important export crop in the Georgia low country along with indigo and of course, cotton. Plantations were run on both the islands and the mainland, connected by roads and freshwater and maritime vessels. The region also had strong ties to the Caribbean, importing crop strains, slaves, and culture (Edwards et al. 2013).

The Gullah-Geechee & Religious Life

The Gullah-Geechee culture rose in the 18th century and had "formed a sacred landscape" in South Carolina and Georgia by the 19th century (Jones 2010). The Gullah-Geechee people have their own language, which for a long time remained a linguistic mystery. Today, many believe it is an English-Creole with a mix of words of African origin, while others believe there are no African words at all (Campbell 2000). Rice was an important staple in almost every dinner meal, and kinship and sharing of resources was also important.

The Gullah-Geechee are well-known for their crafts, such as delicate fishing nets, pottery, and the beautiful woven sea grass baskets. The coiled baskets were once used for fanning rice and storage, and are now highly sought after works of art. The baskets can be made from many natural materials, though rush and sweetgrass are preferred. Needles of longleaf pine can be used for decorative touches (Rosengarten 1987).

The Gullah-Geechee practice Christianity, but with unique rituals and customs, such as the "ring shout." Additionally, burial customs begin with a drumbeat, a custom that used to cause fear in slave-masters who anticipated an uprising. The Gullah-Geechee were and are believers in witchcraft and spirits, which they ward against in everyday life (Opala n.d.).

In this same period, the first black Baptist Church was founded and dominated urban cities like Savannah by the 1850's. The churches preached justice and equality, which had both spiritual and political ramifications. Churches and religious organizations remain an important part of Georgia's society today (Jones 2010).

The Civil War

In 1864, three years after the Civil War began and one year before it ended, Union soldiers marched through Georgia. After the war, some communities remained on Georgia's coastal islands, but other sites were abandoned as newly freed slaves moved inland and continued to practice both farming as well as their unique artistry.

Fort Stewart

Fort Stewart has a large impact on Long County and the surrounding region. The army base covers 279,270 acres in Long, Liberty, Evans, Bryan, and Tattnall Counties.

In 1940, Congress authorized funding for what eventually became the base; at the time, the local area included only 500 residents. During World War II, Fort Stewart expanded both in terms of facilities and the number of men stationed at the base. By 1944, 55,000 soldiers were stationed at what was then known as Camp Stewart. Though the base was inactivated in the period following the end of the war, it was reopened when hostilities erupted in Korea in 1950. Once again the activities at the base were expanded, and in 1956 it was officially named Fort Stewart.

Throughout the history of Fort Stewart, personnel and activity have been ratcheted up or down depending on national military priorities. Today it is an active base and an economic bastion for its extended community (Fort Stewart Museum, n.d.).

Site Ownership & Management History

The McIntosh SEED Community Forest property (1,159 acres) has been a target for conservation efforts over the years, due to its proximity to Fort Stewart and extensive wetlands. The Conservation Fund previously owned the forest and managed it for sustainable timber production. The property is permanently protected from development under its conservation easement with the Georgia Land Trust, and through the development rights owned by Fort Stewart. On February 12, 2015, through partnership with The Conservation Fund's Resourceful Communities Program, McIntosh SEED purchased the property.

Site Location & Directions

The McIntosh SEED Community Forest is located in Long County, Georgia (on Rye Patch Rd and Barn's Pasture Rd) just outside of Ludowici and 30 minutes west of Hinesville (Figure 1). From Hinesville, the forest is most directly accessible via 196 to Rye Patch Rd but is also accessible via Hwy 84 to Hwy 25/301, which passes through Ludowici. Rye Patch Rd is an unpaved, dirt road for a 3.4-mile segment. This transition begins approximately 2,000 ft from the intersection at Moody Bridge Rd and continues until it intersects Cecil Nobles Hwy 301/US Hwy 25. In wet conditions, the dirt road is passable only by trucks or four-wheel-drive vehicles with high clearance. In such hazardous conditions, it is recommended that visitors traveling from Hinesville pass through Ludowici to Hwy 301 to Rye Patch Rd, as the forest entrance is only 0.6 miles from this location.

Figure 1: McIntosh SEED Community Forest location

Part 1: Community Feedback

Before planning initial programs for the community forest, it is critical to know both the community's familiarity with the idea of a "community forest," their initial reactions to the project, and the activities they wish to see on the property. Results from community feedback were incorporated into other parts of the plan, including the Site Plan in Part 2(b) and the service area analysis in Part 3(a).

Methods

We solicited community feedback through in-person focus groups, telephone interviews, and randomized mail-in surveys. All three methods provided important, yet different information.

Though all methods asked similar questions, the focus groups and phone interviews allowed respondents to expand on their answers and ask additional questions to the interviewer, as well as speak on subjects that were not addressed specifically in the focus group questionnaires. We used feedback from the focus groups to inform the crafting of the survey instrument.

By contrast, the survey only allowed respondents to answer specific questions, the majority of which using multiple choice responses. However, the resulting data was easily analyzed using statistical software, and inferences could be drawn about the larger population of Long County.

In total, 13 individuals were interviewed in focus groups, 6 interviewed via telephone, and an additional 25 survey responses, for a total of 44 individuals (Table 1).

Table 1: Total individuals included in community feedback analysis

Focus Groups	Interviews	Surveys	Total
13	6	25	*44*

Focus Groups

Three focus groups were conducted in total, which included feedback from 13 individuals. The first was done over the phone with members of McIntosh SEED's board of directors. The second and third focus groups took place in person at McIntosh SEED's office in Darien, GA. Participants were recruited using the snow-ball method; they included board members who had attended the previous focus group as well as their friends.

Transcripts were analyzed using NVivo (NVivo 2012). Each transcript was individually coded, with different questions receiving different nodes, and responses to the question split into distinct "child" nodes. Occasionally a response type was further segmented using "grandchild" nodes. Once each transcript was coded, the nodes were tallied and compared. For each respondent, only one of their responses was coded, regardless if they repeated themselves multiple times during an interview. For example, if one respondent mentioned three times that apathy is a community weakness, that is still only coded as "one" mention of apathy, as it is all by the same individual.

Surveys

To garner feedback from a statistically random assortment of Long County residents, addresses for all residents in Long County were obtained from *Reference U.S.A.* Of these, 244 addresses were randomly selected to receive the survey with accompanying cover letter (Appendix A1). In all surveys a URL was included for those who wished to fill it out online. Using this process, 25 surveys were returned and analyzed, for a response rate of 11.4% percent. Two of the 25 respondents were asked over email to fill out the survey and thus were not selected at random.

Survey data was analyzed with descriptive statistics and multiple regression using STATA statistical software (Stata Corps 2013). Long text-answer questions in the surveys were also analyzed with NVivo, with methods explained above. A full discussion of demographics and comparisons to Long County can be found in Appendix A4.

Telephone Interviews

Interviews were conducted with members of the community, including elected officials, county staff, leaders of the religious community, and interested individuals. McIntosh SEED staff recommended two interviewees, while others were contacted due to their positions of leadership within Long County. Transcripts were analyzed using NVivo, using the same method and nodes described above.

Results

To best interpret results, specific questions were analyzed, using data from a combination of focus groups, interviews, and surveys.

How often do respondents spend time outside?

When McIntosh SEED is considering how to design educational and recreation programs, they will have to consider how familiar the local community is with outdoor activities. Given this, the first question on the survey asked respondents how much time they spend in the outdoors.

Of the respondents, 52% said they spent time outside every day, while another 32% answered a few times a week. This is positive, as McIntosh SEED will not have to convince the entire community to spend their free time outdoors, but rather that the community forest is the place to which they should go.

In terms of the McIntosh SEED community forest itself, this could be the most important question asked within the survey. Out of 25 respondents, 83% had never heard of a community forest before reading the survey questionnaire (Figure 2). McIntosh SEED from the beginning will have educate the surrounding people about the purpose of a community forest, as well as what makes it unique.

Figure 2: Prior knowledge of a community forest from survey respondents

Information from the interviews, focus groups, and surveys were analyzed together to discover what the respondents feel are their community's most valuable assets. Nature and Structures (such as ball parks, tracks, etc.) were the top two responses, while Figure 3 portrays the range of other recurring responses. McIntosh SEED could use these strengths when appealing to the community, as the forest itself would fall in the natural resources category, while trails and a conference center might fall into the structures category.

Figure 3: Recurring community asset responses

The flip side of the previous question is identifying the community's weaknesses, which were also analyzed using data from interviews, focus groups, and surveys. As seen in Figure 4, lack of jobs, business, and industry rank highest in recurring responses, followed by lack of youth activities. McIntosh SEED can address the former through natural resources and timber training, while providing specific youth programs and educational resources to address the latter concern.

Figure 4: Recurring community weakness responses

What activities should be on the forest?

It is important to know which activities community members are interested in having on the forest before planning programs. Using the focus groups and interviews, analysis included activities interviewees thought of themselves; in the survey, respondents were given specific options and asked to choose which of those they were interested in.

In the interviews and focus groups, classes, such as sweetgrass, turpentine, or natural history workshops, were the most popular response category, followed by agricultural activities and hiking (Figure 5).

Figure 5: Community forest activity responses from focus groups and interviews

Unsurprisingly, the categories that were identified by the interviewees were also popular amongst survey respondents. Using confidence intervals to make inferences about the entire Long County population, camping (84%) and nature walks (74%) were the most popular

responses, as even with the intervals these activities were selected by at least 55% of the respondents (Figure 6). Hiking was also selected by 68% of the population, with a confidence interval from just under 50% to over 80%. Based on the responses there seemed to be less interest in learning how to cultivate mushrooms, make sweetgrass baskets, or learn how to raise livestock. However, if McIntosh SEED wishes to pursue these activities, they can create a communication campaign demonstrating the benefits of these activities.

Figure 6: Community forest activity responses from survey respondents. Confidence intervals represent extrapolation to all of Long County

How likely would you be to bring your children to the community forest?

Considering the identified problem of lack of youth activities, it was especially interesting to see how likely adults were to bring their children to the community forest (Figure 7). The survey shows a high level of interest, as 60% of respondents stated that they would be somewhat or very likely to bring their children to the community forest, with a confidence interval extending from 41-77%.

Figure 7: Likelihood of survey respondents bringing children to the community forest

Would other members of the community be interested in visiting the community forest?

When constructing a survey questionnaire, it is important to recognize that some respondents may choose the answers they think the survey creators want to hear. For that reason, the questionnaire also asked if respondents felt *other* members of the community might be interested in the forest, thus taking away any pressure they may feel in choosing their response.

The responses are more mixed than in the previous question. Though over half of the respondents feel that members of the community would be interested in the community forest, over 20% felt that others would be uninterested, and another 25% did not know how the other community members would feel (Figure 8). McIntosh SEED may have to address this uncertainty, but overall it is positive that such a large proportion of the respondents felt that others would be interested.

Figure 8: Anticipated community interest level from survey respondents

The community forest will have to be accessed by car, and the length of time community members are willing to drive will partially define the forest's service area. When using survey responses to calculate the average times respondents were willing to drive, the average was 24 minutes, with 18 to 31 minutes within the 95% confidence interval (Table 2: Willingness to travel times to reach community forest). The longest anyone was willing to drive was 60 minutes. This response will directly affect the surveys area analyzed, discussed in greater depth in Part 3(a).

Table 2: Willingness to travel times to reach community forest

Mean	95% CI	Median	Range
24 min	18-31 min	25 min	0-60 min

How many times would community members visit per month?

Programs for the forest could vary based on how often the local community visited.

When asked how often they anticipated visiting the forest each month, respondents reported an average of 5 visits per month, with 3-7 visits per month in the 95% confidence interval (Table 3). Given that locals may be visiting the property more than once a week, it would be important to design programs that also occurred regularly, or were multi-week programs.

Varying programs will also be important, as that will keep regularly visiting community members engaged.

Table 3: Anticipated monthly visits to community forest

Mean	95% CI	Median	Range
5 visits	3-7 visits	4 visits	0-23 visits

How does age affect visits per month and time travelled to reach the forest?

Given the age range of the respondent population, discussed further below, it was important to know if age would affect willingness to travel distances as well as anticipated visits per month.

To answer these questions, two linear regressions were performed with age as the independent variable (after removing surveys that were missing responses). Though age does not have a statistically significant effect on distance visitors would be willing to travel, it does show a negative effect on anticipated visits per month (Table 4, Figure 9). According to the regression results, as age increases by one year, number of visits decreases by 2%. However, this regression only accounts for 18.4% of the data, and thus should be taken as a suggestion of a possible trend.

McIntosh SEED might have to design more programs for younger participants or provide added incentives to the older generations, such as transportation or specialized programs.

A discussion of linear regression methodology and assumptions can be found in Appendix A3.

Table 4: Linear regression results

Log transformed Number of Visits	Beta coefficient	P-value	R^2
Age	-.02	.052	18.4%

Figure 9: Negative linear relationship between age and number of anticipated monthly visits

Conclusions

McIntosh SEED can both capitalize on strengths identified by the community, such as the natural resources abundant on the property, while seeking to address weaknesses, such as lack of youth activities available in Long County. Specific activities that the community had a strong interest in (e.g. hiking, workshops, camping, and nature walks) were incorporated into the site plan (Part 2(b)), which defines the optimal locations for trails, campgrounds, restoration sites, and a retreat center.

Additionally, survey responses indicating willingness to travel times were critical in analyzing community access in Part 3(a). As the average willingness to travel times ranged from about 20 to 30 minutes, communities within this driving time make up the majority of potential users of the forest.

Part 2(a): Environmental Site Assessment

Whereas Part 1 of this plan provides information at the community level, Part 2 focuses on the site itself. Part 2 includes (a) an environmental site assessment and (b) the site plan. The environmental assessment provides the basis for determining the site's capabilities for infrastructure and programs that the community desires, described in the previous section. Environmental conditions considered include topography, soils, hydrology, vegetation, and wildlife. Following this section is the site plan, which is a representation of the optimal

locations for infrastructures or program elements that are feasible given the site's capabilities.

Methods

Being based in North Carolina, we were limited in the number of times we were able to visit the site, making geospatial datasets (Table 5) especially useful for assessing environmental conditions on the property. Because these datasets are sourced from macroscale, national datasets, they are limited in their interpretation at the site level. We were able to supplement the vegetation section with information from the site's Forest Management Plan (2012) and vegetation survey data. In order to account for wildlife on the property, we cross-referenced ecological communities on the site with NatureServe's rare and endangered element occurrences in Long County. We augmented this with a pilot bird diversity assessment and opportunistic wildlife sightings during our field trips.

Table 5: Datasets used in environmental site assessment

Name	Source	Type, Resolution
Elevation	National Elevation Dataset, USGS	Raster, 3m
Hydrology	National Hydrology Dataset, USGS	Vector
Wetlands	National Wetland Inventory, USFWS	Vector
Soils	Soil Survey Geographic Database (SSURGO), USGS	Vector
Cover Types	Forest Management Plan, The Conservation Fund	Vector
Ecological Communities	Terrestrial Ecological Classifications, NatureServe	Raster, 30m

Vegetation Survey

We conducted vegetation plot surveys from November 7 – 8, 2014, in order to gain a broad sense of vegetation diversity and to validate ecological community types on the property.

We intended to establish sixty-six 10 m radius plots in a grid network. Due to timing constraints and accessibility issues, we were only able to conduct surveys at 18 of these stations, and were unable to conduct surveys in the southeast region of the property because it was particularly overgrown with dense thickets. Still, the plots we surveyed captured a diversity of stand types (Table 6). For each plot, we identified the species for all trees with a diameter at breast height (DBH) greater than 10 cm. We recorded the species' DBH, which was converted into basal area for each plot. We made note of common understory vegetation,

which allowed us to validate the vegetation information contained in the soils and ecological communities data layers. Because we went in the fall season, we could not account for the full range of herbaceous vegetation that exists on the property.

Table 6: Vegetation surveys conducted per stand type

Stand Type	Plot Count
Planted pine	7
Hardwood branch	6
Pine Savanna	1
Pine Upland Hardwood	4

Bird Diversity Assessment

In the bird survey we were specifically interested in which species occur on the property. If certain rare species occurred, such as those identified by the Audubon, the forest could earn an Important Bird Area (IBA) designation through Audubon's program (Atlanta Audubon n.d.).

Bird survey stations were set up approximately 0.5 miles apart on the gravel road in different stand types, including secondary succession field and various ages of slash/hardwood pine stands. A local volunteer surveyor walked from station to station, pausing for five minutes at each marked station to record birds he could see and hear. Birds within 50 m of the surveyor were recorded, birds outside of 50 m were recorded, as well as birds flying overhead and encountered in transit between stations. Occasionally the primary surveyor would bring others to survey with him and/or use call-backs. Survey design was based on recommended monitoring approaches summarized in a paper by Ralph, Droege, and Sauer (1997).

There are a few weaknesses to the protocol. First, the surveyor only recorded observations from the dirt road, and thus edge effects were present in all survey stations. Second, there were natural deciduous stands at the edge of the property that were not included at all, as they were not accessible via the roadway. Finally, the stations were sampled in the same order on all but one day, starting with Station One and continuing numerically until Station Six; thus Station Six was consistently sampled 1.5-2 hours after Station One. Though these timing differences are less important during the winter season, they have a potential impact on the data.

However, as a pilot study this survey revealed interesting information about the wintering bird communities at this particular community forest.

Results

Topography

While mostly flat, there is a modest elevation gradient on the property, ranging from 66.9 to 78.7 m above sea level (Figure 10). The highest areas occur on the north and south ends of the property, while elevation very gradually declines and remains flat in the central areas. Still, there are relative "hills" or upland islands interspersed within the flatter areas.

Hydrology

The majority of Long County, including the property itself, occurs within the Altamaha water basin. There are numerous creeks and swamps that influence the floodplains and drainage patterns of this basin (Long County Comprehensive Plan 2005). One such creek, Jones Creek, extends throughout the property. This headwater creek floods only during and immediately after a precipitation event.

Over half of the property (634 acres) is classified as Palustrine System wetlands that flood seasonally, and are dominated by trees, shrubs, and persistent emergent plants (Cowardin et al. 1992). Two types of wetlands exist on the site, with the majority being "Forested/Shrub Wetland," and approximately 60 acres being "Emergent Wetlands." The wetland areas are generally associated with the creek's floodplain (Figure 11).

Soils

An understanding of the various soils on the property is imperative when considering suitability for various activities as well as identifying potential plant communities. There are six soil types present, according to the U.S. Department of Agriculture's Natural Resources Conservation Service. Three of the soil types (Pelham, Elabelle, and Johnston and Bibb) are hydric soils, which account for nearly 90% of the property (Figure 12). These soils are associated with floodplains, drainage-ways, and depressions. Because these soils are within close proximity to the water table and are poorly drained, they are susceptible to ponding or frequent floods during the winter months. These soil types support a wide diversity of understory vegetation and tree species (Appendix B1).

The remainder of the soils, Leefield, Mascotte, and Stilson, are primarily located on the property's border in isolated patches. These soil types are associated with flats and rises; they are not susceptible to flooding or ponding. While the understory vegetation supported by these soil types are diverse, there are only a few tree species that grow well in these soils (longleaf, loblolly, slash pine, and sweetgum). These soils are classified as "farmland of

statewide importance" for most kinds of field crops (USDA Soil Conservation Service 1961). More detailed descriptions for each of these soil types, including suitability limitations, flooding frequency, and vegetation association, can be found in Appendix B.

Vegetation

As mentioned in the Study Area section, the forest has been managed for timber for over a century. The forest is divided into nearly fifty stands, which are categorized as planted pine (33%), hardwood branch (29%), upland hardwood and pine (29%), natural pine (3%), and transition (7%) (Figure 13).

Loblolly (*Pinus taeda)* and slash pine (*Pinus elliottii)* are the primary species harvested from this forest. Approximately 300 acres of the property consist of mature natural hardwood drains. These stands, located along the creek, have remained undisturbed for over 60 years in order to preserve water quality and provide wildlife with corridors throughout the property. The transition stands are clear-cut slash pine stands, which were maintained as wildlife food plots for hunting purposes. These secondary successional fields host a variety of shrub and grass species.

Because the property is managed primarily for loblolly and slash pine, we encountered little diversity in overstory species. From our surveys, the only hardwood species that were greater than 10 cm in diameter were sweetgum (*Liquidambar styraciflua)* and sweetbay (*Magnolia virginiana*).

Basal area varied greatly amongst the plots we surveyed (0.0 – 1013.1 ft^2/ac) (Figure 14). The hardwood branch stands had by far the greatest basal area on average (1013.1 ft^2/ac), following planted pine and pine upland hardwood stands (258.1 and 202.7 ft^2/ac, respectively). The hardwood branch had greater basal area than the planted pine stands, despite the fact that there were fewer tree species on these plots (2.8 vs. 3.5 trees/plot). The planted upland hardwood stands had an average of 2 trees/plot. The secondary successional fields had no tree stems.

Other species we encountered but were either not captured by the survey plots or were less than 10 cm in diameter include red maple (*Acer rubrum),* loblolly bay (*Gordonia lasianthus),* pond cypress (*Taxodium ascendens*), and longleaf pine *(Pinus palustris)*. In terms of understory vegetation, saw palmetto was abundant (*Serenoa repens)* in the planted pine stands near the entrance of the property. Swamp titi (*Cyrilla racemiflora*) and inkberry (*Ilex*

glabra) were particularly prominent along the sides of the road. Broomsedge *(Andropogon virginicus)* was the dominating grass species in the secondary successional fields.

As McIntosh SEED considers transitioning stands out of timber production and into more natural stands that support greater biodiversity, NatureServe's ecological communities data provides useful information. There are five community types supported by the property; this was determined by summarizing each stand by its majority ecological community type, as described in the dataset's documentation (NatureServe 2009) (Figure 15).

The following ecological community descriptions are summarized from NatureServe (2009):

Wet Pine Savanna & Flatwoods (~36%)
Typical features include wet, seasonally saturated mineral soils and historic exposure to frequent low-intensity fire. These conditions naturally support open woodlands dominated by longleaf (*Pinus palustris)* or slash (*Pinus elliottii)* and/or pond (*Pinus serotine)* pine on wetter sites. Occupying approximately one-third of the property, this community is associated with the drains along Jones Creek where stands remain undisturbed.

Upland Longleaf Pine Woodland (~30%)
This community occurs on low relief uplands with natural exposure to frequent fire and is naturally dominated by longleaf (*Pinus palustris)*. Most associations have an understory of scrub oaks, with the herb layer generally well developed and dominated by grasses. The soils are largely acidic, infertile and well drained. On the property, two-thirds of this community is in planted slash or loblolly stands. The remainder is in mixed pine/hardwood stands or in a transition grass state.

Coastal Plain Swamp Systems (~20%)
The swamps consists of poorly drained, organic or mineral soil flats. These areas become saturated by rainfall and have seasonal high water tables. Cypress (*Taxodium* spp) and tupelo (*Nyssa* spp) species dominate. On the property, this community type includes the emergent wetlands (Figure 11**Error! Reference source not found.**).

Dry and Dry-Mesic Oak Forest (~10%)
Unlike the pine systems described previously, this system occurs on somewhat fire-sheltered sites (generally due to topographic position). Soils are loamy to clayey and well drained. Vegetation consists of forests dominated by combinations of upland oaks, particularly *Quercus alba*, *falcata*, *stellata*, *nigra* or *hemisphaerica*. Hickories

are also present. This community type dominates only one stand on the property, which is centrally located in a relatively elevated area.

Recently Burned Herb/Grass (~3%)
The NatureServe data displays a cluster of stands in the northeastern corner of the property as this community type. While this is not a permanent community type for this area, it is one that will continue to occur in various points on the property, since fires are a part of the natural landscape and also part of the management regime.

Figure 10: Elevation gradient

Figure 11: Wetland areas

Figure 12: Soil types

Figure 13: Forest stand types, dominant species, and year of establishment as of 2012

Figure 14: Basal area for each survey plot

Figure 15: Ecological communities summarized by majority type for each stand

Wildlife

There are many habitats for wildlife on the property, from the creek and surrounding wetlands, to the natural hardwood uplands, pine plantations, and secondary successional fields. Species we encountered include a cottonmouth snake (*Agkistrodon piscivorus*), two Eastern garter snakes (*Thamnophis sirtalis*), and southern chorus frogs (*Pseudacris nigrita*).

Under previous ownership, the property was leased for hunting. Game animals living in the forest include wild turkey (*Meleagris*), feral pigs (*Sus scrofa*), white-tailed deer (*Odocoileus virginianus)*, and bobcat (*Lync rufus*), as evidenced by tracks along the roads (Figure 16). Due to the limited amount of time we were able to spend conducting field surveys, only one rare species (Henslow's sparrow) was documented on the property. However, there are likely other important species that the forest supports, which are listed in Appendix B2, Table B2.1.

Figure 16: Wildlife tracks seen on a site visit (a) bobcat (*lyns rufus*), (b) wild turkey (*Melagris*), (c) feral pig (*Sus scrofa*), and (d) possum (*Dipelphimorphia*)

McIntosh SEED Community forest hosts a large number of wintering species from numerous avian families. Even after only limited surveys, IBA priority species for Georgia, Henslow's Sparrow and brown-headed nuthatch, were observed on the property. A total of 45 species were recorded, including woodpeckers, sparrows, warblers, vultures, raptors, one owl, and other songbirds (Appendix B2, Table B2.2).

In terms of total number of species sighted throughout the eight surveys, Station 2 had the highest number of distinct species, followed by Stations 1 and 3 (Figure 17).

Figure 17: Total bird species recorded for each sampling station

Of the species recorded, the chipping sparrow represented the largest number (92) of individuals on the property across the survey stations, followed by eastern towhee (28), hermit thrush (22), pine warbler (21), and brown-headed nuthatch (19). However, as the brown-headed nuthatch is an IBA priority species, it was very positive that this bird was one of the top five recorded species on the property.

In terms of average number of total birds and species recorded per station, there is a downward trend as the station number increases. However, when looking at the confidence intervals associated with the data (Figure 18), only Station 2 is statistically higher than Stations 3 - 6, and it is not statistically different from Station 1, though its mean is higher.

Figure 18: Average number of birds recorded per station with 95% confidence intervals

When we analyzed confidence intervals using the mean species per station, all the stations are statistically the same, with the exception that Station 2 is higher than Station 4 (Figure 19).

Figure 19: Average number of species recorded per station with 95% confidence intervals

When identifying areas of high bird diversity on the property, Station 2 is clearly the first choice, as it has the higher number of total species recorded as well as the highest number of birds actually observed.

To choose the second station, we analyzed the number of additional species captured by other stations. Station 2 and Station 3 added an additional six species to those observed at Station 2. However, Station 1 has the second highest number of total species recorded, and though in terms of its confidence intervals it is not distinct from the other sampling stations, the total birds observed per station is numerically higher.

For these reasons, areas including Stations 2 and 3 were chosen as areas of important bird diversity (Figure 20).

Figure 20: Bird survey stations and those stands that included survey stations with the highest bird diversity

Conclusions

What makes this site difficult in terms of trail and infrastructure construction (e.g. hydric soils, wetlands, and flat terrain) is also what makes it ecologically interesting and attractive to visitors. Taking full advantage of the diversity of ecological communities that the property could potentially support requires a balance of economic benefits from plantations. Our vegetation surveys reflect the little diversity in both species and size of overstory species on the property, especially within the planted pine stands. With a pilot bird survey in place, there is an opportunity to continue monitoring bird species on the property. It would be ideal to continue these surveys and perhaps augment it with other wildlife surveys as McIntosh SEED considers restoring some of the more natural communities.

Part 2(b): McIntosh SEED Community Forest Site Plan

This section encompasses our process for determining the feasibility of the community's desired activities (from Part 1) on the site, given the results of the environmental assessment (Part 2(b)). We culminate this into the McIntosh SEED Community Forest Site Plan – a map of the optimal location of the retreat center, parking facilities, campgrounds, longleaf pine regeneration, sweetgrass cultivation, and recreational trails.

Methods

We used a geospatial suitability envelope in ArcGIS (ESRI 2014) method to determine the optimal location for the above-mentioned features. The basic procedure is outlined below.

1. Research suitable criteria (or potential restrictions) for the feature
2. Translate each of these criteria into areas on the property using various datasets (Table 5 in Part 2(a))
3. Create a suitability envelope, or combined suitability area, for the feature by overlapping suitable areas
4. Designate the final location within the suitability envelope

Before diving into the methods for creating a trail network, it is important to mention the existing gravel roads on the property. While the gravel roads extend throughout a good portion of the property, they do not provide the same experience of a recreational hiking trail: they are very wide (12 ft) and straight with limited canopy cover; they primarily pass through planted pine stands providing limited access to the forest's diverse wetland areas;

they abruptly terminate and do not loop. For these reasons, a recreational trail network that addresses these limitations would be a great asset to the forest.

To create the trail network, we used a slightly different approach from the suitability envelope. Typically, the focus for trail planning is on topography and soils to ensure sustainability, however the site's particularly flat and wet characteristics greatly restrict the amount of area suitable for earthen footpaths. Instead, boardwalks should comprise the majority of the recreational trail network. Using boardwalks for trails increases the potential to access naturally diverse communities, particularly in the wetland areas.

In order to visualize naturally diverse hotspots, which make for ideal places for a trail to pass through, we created a heatmap. We used both the soils and ecological communities datasets as proxies for natural diversity; in addition, we used a canopy closure model, which we derived from LiDAR data (Table 7). The heatmap is a raster with each pixel having a value based on the number of diversity criteria met or the number of layers included in that pixel.

Table 7: Criteria used as natural diversity proxies in heatmap creation

Data layer	Included pixels
Soils	• Elabelle • Johnston and Bibb
Ecological Communities	• Dry and Dry-Mesic Oak Forest • Baygall Swamp • Coastal Plain Swamp System
Canopy cover	• > 50% canopy cover

With the heatmap as a visual aid, points of interest were connected (e.g. retreat center, campgrounds, and existing roads) via the route with higher values in the heatmap when possible.

Results

In researching the suitable conditions for each of the features (Table 8), the most common conditions were related to accessibility, soil drainage capacity, and vegetation. Accessibility, or distance from the existing gravel roads, is important for all of the features considered. This is the case even for the longleaf and sweetgrass sites, because various demonstration and educational programs will take place on these sites. The soils data included information on

soil composition, associated vegetation, and saturation potential; elevation data served as the basis for defining areas of relative upland, which are assumed to be areas of enhanced drainage capacity.

Table 8: Summary of suitable conditions for each feature

Feature	Suitability Criteria
Retreat Center	✓ Near entrance ✓ Near existing road ✓ Least limited soil type ✓ Relative Upland ✓ < 3 acres (due to conservation easement restrictions)
Parking Facilities	✓ Near entrance ✓ Dispersed throughout property ✓ Road intersection
Campsites	✓ Near parking facilities ✓ Avoids excessively saturated soils and wetlands ✓ Within natural stands ✓ Relative upland areas
Sweetgrass	✓ Sandy, acidic soil with no clay ✓ Relative upland ✓ Accessible via road or trail
Longleaf Ecosystem Regeneration	✓ Soil types with longleaf as common species ✓ Ecological communities with longleaf as dominant species ✓ Accessible via road or trail
Recreational Trail Network	✓ Connects infrastructure and program elements ✓ Passes through areas of high natural diversity ✓ Stems from existing roads or maximizes road connectivity ✓ Avoids areas restricted by the conservation easement

In the natural diversity heatmap (Figure 21), 4% of the pixels met all three diversity criteria, with the majority (46%) meeting just one. There is a distinctive trend of high diversity associated with close proximity to the creek. There is also a significant amount of diverse area in the northern section of the property. Because the conservation easement restricts creek crossings to the pre-existing road crossings, this area is inaccessible for recreational

trails (Figure 21). The easement also prohibits harvesting within a 75 ft buffer on each side of the creek. We proposed a total of approximately five miles of trails.

The resulting location for each of these features is shown in Figure 22. For specific recommendations and further information for each of these features and other programs, see Appendix C.

Figure 21: Natural diversity heatmap and proposed trail locations

Figure 22: McIntosh SEED Community Forest Site Plan

Conclusion

The proposed site plan identifies the optimal location for features based on the most accurate spatial datasets available. Locations will likely be modified as McIntosh SEED moves forward with site development. This is especially the case for the recreational trails, as the trail path will accommodate site-specific features (such as large trees or excessively dense thickets). In addition, the final site plan does not include all possible locations for longleaf on the property. In fact, areas where there are Leefield and Mascotte soils could also be targeted for longleaf. These sites may be preferred over the one proposed on the site plan, since it overlaps with areas that would potentially be good agroforestry sites.

Part 3(a): Community Access Assessment

In the previous parts of the plan, we assessed the community's interests, evaluated the environmental conditions of the property, and created a site plan for infrastructure and program elements on the property. The third part of this plan zooms out from the site level and addresses (a) community access and (b) communication and funding strategies. In order to better understand the demographics and spatial distribution of the community served by the forest, we conducted a service area analysis. Part 3(a) also includes a related analysis – a competitive landscape assessment. This analysis involved identifying nearby recreational forests that are in competition with the community forest for receiving visitors; the results of which informs decisions on resource allocation for advertising and promotional activities. Part 3(b) builds on the results of this analysis and is a compilation of communication and funding strategies that are tailored to the area's unique ecological and cultural history, as well as limited staff availability.

Methods

Service Area Analysis

The service area analysis was completed in ArcGIS with the use of the Network Analyst Extension. Service areas were determined at five driving thresholds: 5, 10, 15, 30, 45, and 60 minutes. The population and race for each service area was determined as well as an estimate of median household income in each service area.

Below is the basic workflow we used for calculating service areas in ArcGIS.

1. Use Network Analyst to generate service area polygons for the community forest at the 5 break values using the streets network dataset.

2. Perform a series of zonal statistics with population and race data to determine the demographics within each service area polygons.

3. Calculate the mean income of those census tracts with their centroid within the service area.

4. Tabulate area of each county included in each of the five service area thresholds.

Competitive Landscape Assessment

The competitive landscape assessment was also completed in ArcGIS with the use of Network Analyst Extension. The critical assumption for this analysis is that the McIntosh SEED Community Forest will compete with similarly recreational forests if their 30 min service areas overlap. A 30 min service area was used, because it reflects the approximate maximum distance visitors are willing to travel to such recreational sites (as determined in Part 1 of this plan). The results of this analysis include the identification of competition and non-competition zones as well as community facilities that may serve as important contacts for outreach and communication.

Below is the basic workflow we used for assessing the competitive landscape.

1. Select those protected areas within the nine counties served by the community forest's 60 min service area. Further refine these sites by excluding any properties that are listed as a historical site, military or boat ramp.

2. Use Network Analyst to generate 30 min service area polygons for all selected sites.

3. Identify competing sites by selecting only those that have an overlapping 30 min service area with the community forest's 30 min service area.

4. Identify areas of overlap as competition zones and areas that do not overlap as non-competition zones.

5. Tabulate area of each of the zones and use zonal statistics to derive a population estimate for each of the zones.

6. Identify community facilities (churches, nursing homes, libraries, schools only) that overlap with these zones.

Several datasets (Table 9) were critical for these analyses.

Table 9: Data used in the service area analyses

Dataset	Source	Description
Street Network	Environmental Systems Research Institute, Inc. (2014)	The street network with speed limit attributes used to determine driving time from the LCCF.
Population	EnviroAtlas Dasymetric Data (2010)	Reported as total number of people at 30x30 meter resolution. Data was summed for each service area.
Race	EnviroAtlas Dasymetric Data (2010)	Reported as number of total non-hispanic white and number of Hispanic and non-white people at 30x30 meter resolution. Data was summed for each service area.
Income	American Community Survey Median Household Income (2013)	The mean of the census tracts with their centroid in each service area was used as the reported income.
Protected areas	USGS National Gap Analysis Program (2012)	Public land ownership, management and other conservation lands, including voluntarily provided privately protected areas.
Community Centers	USGS Geographic Names Information System (2014)	Database containing name and locative information about physical and cultural features.

Results

Service Area Analysis

Figure 23 shows the spatial distribution for each of the five service areas. An estimated 240 people having access to the community forest within a five min drive reflects the low population density and rural immediate surroundings of the forest (Table 10). At 15 minutes, residents of Ludowici are incorporated into the service area. However, the largest jump in population included in the service area is between 15 and 30 min. At 30 min, Hinesville, Jesup, and Glennville are all included.

Trends in race paint a clear picture: the population within the immediate vicinity is majority white but decreases with increasing distance from the forest. The racial composition of the 5

min service area is 84% white, while the 60 min service area is 82% non-white. At 30 min, race composition shifts from majority white to majority Hispanic/non-white (Table 10). Trends in median household income are not as drastic, but values do drop from an estimated $47,300 to $43,300 at the 30 min service area. Thus, 30 min is the critical driving threshold at which communities are most diverse in terms of race and income.

Because Georgia counties are notoriously small, many counties are included in the various service areas. At the critical distance (30 min), a majority of Long County is included (68%) as well as portions of Tattnall (19%), Liberty (11%), and Wayne (5%) counties. A 60 min service area includes 9 counties. For the complete table of service area county inclusion see Appendix D, Table D1.

Table 10: Service area analysis population, race, and income results

Driving Threshold	Total People	Non-Hispanic White	Hispanic/Non-White	Median Household Income
5 min	250	84%	16%	$ 47,250.00
15 min	5,840	64%	35%	$ 47,250.00
30 min	78,840	43%	57%	$ 43,340.00
45 min	117,000	19%	81%	$ 42,630.00
60 min	161,640	18%	82%	$ 43,080.00

Competitive Landscape Assessment

There were a total of 22 recreational sites (listed in Appendix D, Table D2.2) that were identified as competing sites. Nearly all of these sites occur along the Altamaha River to the southwest of the property (Figure 24). Half of the competing sites are Wildlife Management Areas (WMA's), which are primarily designated for hunting, but they typically also have recreational trails. A vast majority (84%) of the community forest's 30 min service area is considered in competition with the 30 min service areas for the competing sites (Figure 24). The non-competition zone contains the northern portion of the 30 min service area; this area coincides with Hinesville/Fort Stewart. It is important to note that the military base does have recreational facilities and hunting grounds, however access is limited to those living on the base or military servicemen and women.

Figure 23: Results from the service area spatial analysis

Figure 24: McIntosh SEED Community Forest areas of competition and non-competition within a 30 minute service area

Table 11: Population and area estimates for zones of competition and non-competition

Competition Zone	Total Pop	Total Area (km²)	Total Area (%)
Competitive	2050	1015	84
Non-competitive	76780	192	16

There were a total of 141 community centers within the 30 min service area; only two of these were in the non-competition zone, while the remaining centers were within the competition zone. A majority (70%) of these facilities were churches, followed by schools (27%). The remaining centers include parks, a library, and a nursing home. The facilities unsurprisingly cluster around cities. For a complete list of the facilities and map of their locations see Appendix D, Table D.3.

Conclusions

Because McIntosh SEED's mission strives to support underserved and disadvantaged communities, it is critical that forest activities are advertised to those living within at least the 30 min service area. This area includes four cities and portions of four counties. Since a majority of the 30 min service area is in competition with other recreational forest sites, advertising and outreach efforts should make it clear why a visit to the community forest is worth driving the extra mile. The diverse suite of programs the community forest will host certainly make it stand out among competing sites; the challenge will be reaching target audiences.

Part 3(b): Communication & Funding Strategies

As the McIntosh SEED Community Forest is a new endeavor, it is essential to engage in outreach and begin a fundraising strategy from launch. This is important to both build a regular user base for the forest, maintain funds to run and develop programs, as well as give the surrounding community the opportunity to become involved in the forest programs and planning.

To develop a unique fundraising strategy, McIntosh SEED should build a webpage, launch social media accounts, including Facebook, Twitter, and Instagram, as well as begin a regular blog.

Communication

Website

The community forest needs its own page within McIntosh SEED's website, or its own webpage altogether. There are pros and cons to both approaches (Table 12).

Table 12: Pros and cons of website choices

Stand-alone Webpage	
Pros	**Cons**
• Using Wordpress templates, these websites are easy to manage, update, and promote. • They do not need to be managed by a web developer. • With many templates to choose from, they can look professional while remaining very inexpensive.	• Less likely to drive traffic to McIntosh SEED website. • Requires maintenance separate from that of the McIntosh SEED website.

McIntosh SEED Page	
Pros	**Cons**
• People looking for the community forest will be driven to the McIntosh SEED site and could potentially donate. • Can update community forest info and the rest of the site from one place, using one system. • Do not have to update as regularly.	• May be more difficult to build the page initially. • Format of page will be tied to the format of other McIntosh SEED pages.

Regardless of which is chosen, the website should include natural history, upcoming events, scientific information, and background on the McIntosh SEED Forest and its mission statement.

Facebook Page

Again, there can be a Facebook page for the community forest, or the community forest can be incorporated into McIntosh SEED's Facebook page. Content would have to be generated at least every other day.

Initially regular posting can seem time consuming, however, there are three ways to make posting easier.

1. Scheduling posts ahead of time allows users to create multiple posts in one day, and then spread them out over a period of weeks.
2. Information generated by other organizations can be shared. This will help build community, and relieve McIntosh SEED staff from constantly creating content.
3. Photos are hugely sharable, and take mere seconds to upload. Posting pictures multiple times a week is a great way to generate interest and gather followers.

Twitter Account

Twitter is a popular form of social media, especially with young people. Like Facebook, it is important to generate content daily, but users can also share the exact same information on Twitter as on Facebook, reducing the need to generate many posts per week. Using apps like TweetDeck, account managers can also schedule your Tweets in advance.

Blog

It is very important for the site to have a blog, even if the blog is primarily meant to showcase pictures. Interested visitors check out blogs for more information about the site, especially if the site is home to events or other news. Blogs are especially important when considering donors, as they are an online journal for everything that happens at the forest site.

Blogs do not have to be long, and as aforementioned they can primarily contain photos. They also do not need to be written by staff, but by volunteers or board members. However, it is important that a staff member reviews the blogs for content but also for grammatical errors, as it is a public product.

There are multiple platforms from which to blog.

1. If McIntosh SEED chooses a *Wordpress* webpage, the blog is featured on the main page, and can be updated from within the site.
2. If McIntosh SEED chooses to incorporate the project into the existing McIntosh SEED site, *Blogspot* can be a good option to easily link to. Example of a Blogspot blog can be found at: http://sarahpdukegardens.blogspot.com/
3. It is also possible to create a page within the McIntosh SEED website for the blog, so users do not need to access another webpage. An example of this can be found at: http://triangleland.org/the-dirt

Citizen Science Projects

Citizen science projects are a fun and intellectually stimulating way to engage children and adults alike in the natural ecology of the McIntosh SEED Community Forest. Participating in these projects will also advertise the natural resources of the site to those who would be most interested.

Examples:

1. *eBird* – If the community forest is recognized as a hot spot, then it will be listed on the eBird site as such, attracting regional and national birders.
   http://ebird.org/content/ebird/
2. *Project Budburst* – Uses citizen science data to monitor plants as the seasons change. If McIntosh SEED becomes a partner, the forest site could then listed on their website.
   http://budburst.org/becomeapartner
3. *Wildlife Log* – This site functions similarly to eBird, but can be used to document all kinds of wildlife. www.wildlifelog.org/

Birding Community

Reaching out to the birding community is a great way to attract attention to the forest. Birders are willing to travel long distances for a chance to see rare or endangered birds, and can be a valuable donor source. Given the two IBA bird species already spotted and with continued bird surveys (especially throughout migratory season), it is highly likely that this property would meet the criteria for Audubon's Important Bird Area's (IBA) site selection. Once these criteria are met, it is just a matter of submitting the nomination form (Atlanta Audubon, n.d.). Having the McIntosh SEED Community Forest listed as an Important Bird Area would undoubtedly attract additional visitors and tourist dollars.

The following is a list of Audubon's Important Bird Area priority species that have been documented in Long County, according to NatureServe's rare species natural element occurrence data.

- Swallow-tailed Kite
- Southeastern American Kestrel
- Bald Eagle
- Wood Stork
- Yellow-crowned Night-heron
- Painted Bunting
- Bachman's Sparrow
- Red-cockaded Woodpecker
- Bachman's Warbler

Funding

There are three main sources of fundraising capital, each of which can be pursued individually or simultaneously: 1) grants 2) small member-based donations 3) events. McIntosh SEED already has experience with grant applications and funding, but could develop a strong member based and network of larger personal donors to create a steady stream of income.

1. **Grants:** McIntosh SEED has been successful at pursuing large scale grants, and should continue to do so. With the additional focus on a community forest, a larger pool of funding is available. See Appendix E for a list of potential grants.

   It is important to note that Long County is considered a high priority area for the Georgia Longleaf Pine Initiative (LLPI), which is part of the USDA Environmental Quality Incentives Program (EQIP). Through this program, landowners may apply for financial and technical assistance to install Core and Supporting Practices. To apply, at least 10 acres must be regenerated using only containerized plantings, and a forest management plan must be developed and implemented (Natural Resources Conservation Service n.d.).

2. **Member-based Donations**: Organizational membership is a critical part of both attracting volunteers, communicating mission, goals, and successes, as well as generating a revenue stream. Donor bases can be a large group of individuals who give a small amount every year, and can be drawn from the local population but also from interested individuals across the country.

   In a hypothetical situation, an average member could give $25 to McIntosh SEED every year. With 1,000 regularly giving members, this amounts to $25,000 a year, enough to support a small position at the Community Forest itself or to pay for other expenses on the property. Though McIntosh SEED has a membership base, the larger it becomes the larger the revenue could be (a case study can be found in Table 13).

   However, building a membership base does take significant outreach as well as maintenance, and would be an addition to the work the Membership and Outreach Coordinator already does. In order to retain membership, members should receive benefits, such as access to staff, special events, or a special newsletter.

Organizational newsletters in general should be sent out once a month, with quarterly publications sent to members only.

The larger the membership pool, the larger amount of effort needed to organize all members and donations. Raiser's Edge and Constant Contact provide such resources, though they can be expensive to purchase for the first time. Staff time is also necessary to write/send personal thank you notes, either through the mail or on email, as well as send out mailings asking for additional or recurring pledges. Some of the extra work however, is valuable experience for an intern.

3. **Events**: Events can be important ways to retain membership, but they can also be excellent avenues to gain new members. With the beautiful community forest and the potential for an additional outdoor classroom or conference center, McIntosh SEED is in an excellent position to host fun and informative events.

For example, the Duke Campus Farm raises a significant amount of their revenue through a semi-annual dance. The dance is a great way to get people to the site, as well as raise money through ticket revenue (Table 13).

McIntosh SEED could also host classes. Sarah P. Duke Gardens, located in Durham, NC, has a network of instructors, as well as their staff members, who teach classes to paying participants. The classes range from horticulture techniques, to garden history, to photography, and not only connect people to the Gardens, but also raise revenue. Furthermore, membership benefits can include a discount on classes – an added incentive to give annually (Table 13).

To capitalize on this fundraising tactic, McIntosh SEED could offer a mix of free and fee classes. Hiring local basket weavers, beekeepers, or other professionals, McIntosh SEED could offer paying students the chance to take an in-depth look at some of these activities, either for fun or for a technique to use on their farm.

Additionally, McIntosh SEED could follow an innovative model of fundraising for specific property needs. Similar to the Heifer International model, instead of giving money to a general fund, members can choose to symbolically purchase an item or items that McIntosh SEED needs. These items can be featured in a catalogue on the web-page, and can include things like plants, animals, benches, signage, etc. When all of the items have been "purchased," the members can be alerted that that item has been successfully funded – positive giving reinforcement (Table 13).

Table 13: Funding Case Studies

Case Studies	Descriptions	Website
Duke Campus Farm	As an annual funding raising event, Duke Campus Farm hosts a contra dance to raise awareness of their programs as well as funds. Tickets are $5 each, and each dance draws over 40 people.	http://sites.duke.edu/farm/
Sarah P. Duke Gardens	Duke Gardens is an internationally recognized botanical garden, offering horticulture, history, and photography classes. Classes can range in price from $5 to over $50 each, and attract over 1,000 students each year.	http://gardens.duke.edu
Triangle Land Conservancy	Triangle Land Conservancy is a land trust located in Durham, NC with six nature preserves open to the public and two more in progress. In addition to grants and large personal donations, TLC is funded by 1,800 member households. While managing the logistics for all of the members is time consuming, it also increases a sense of ownership.	https://triangleland.org/
Heifer International	Instead of asking only for general donations (though those are accepted as well), Heifer International has developed a "catalogue" model. Donors can symbolically purchase specific animals, farm care packages, gift baskets, irrigation pumps, or other items that Heifer then distributes. Allowing donors to see what their money can purchase makes their gift more tangible.	http://www.heifer.org/

Conclusions

The community forest is a beautiful natural area with large potential for diverse educational and recreational programs. A varied communications strategy that draws both on McIntosh SEED's website as well as social media would provide a vehicle for spreading the word about the forest's launch, as well as provide additional information to a wide range of member and grant-based donors. Because of the importance of the community, as well as benefits to the surrounding population, McIntosh SEED has unique grant application potential that is absent in

many other sustainable forestry properties. By drawing on what sets the community forest apart, McIntosh SEED can develop a highly successful fundraising strategy that goes hand in hand with its communication and outreach.

Concluding Remarks

To design the best programs and site map for the new McIntosh SEED Community Forest, we asked and answered a series of questions about the community and the property itself.

To begin, we performed a community assessment to analyze overall interest in the project as well as interest in particular activities and features on the property. Using this information as well as the results from ecological assessments, features were located at optimal locations within the forest. Drawing on spatial analysis techniques and outreach experience, we also summarized where McIntosh SEED should focus their communication and development activities, as well as what an overarching strategy could look like.

The questions we asked and the steps we took to answer these questions could be applied to any organization interested in founding their own community forest, whether in the Southeast or across the United States. We have demonstrated that it is critical to use data-driven steps with methodological rigor in order to create the best site plan and outreach strategy, as well as build on community strengths and tackle community weaknesses.

There are many ways to build community, but using community forestry both creates and strengthens community assets. A community forest combines both natural assets as well as those within the people themselves, as they will have a direct stake in the success of their community forest.

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Appendices

Appendix A: Community Feedback

Appendix A1: Cover Letter & Survey Questions

The following is the cover letter and survey questions sent to 244 individuals in Long County, GA.

Cover Letter:

How do you use the outdoors in Long County? We want your feedback!

McIntosh SEED, a community-based organization focused on environmental and economic development, is partnering with the community to design a 1,148 acre community forest located in Long County.

Sustainable timber harvesting will raise money to pay for the forest and programs, but other activities could include agroforestry, raising livestock, hiking, camping, growing sweetgrass or mushrooms, and many more. **This survey is your opportunity to have a say in what programs you would like to see in this forest.** When you finish the survey, please place the questionnaire to the pre-paid return-envelope, and drop it in the mail.

For more information on McIntosh SEED, call (912) 437-7821.

Thank you so much for your time.

Sincerely,

John Littles
Executive Director,

McIntosh SEED

Cheryl Peterson
Project Manager,

McIntosh SEED

Erika Zambello
Nicholas School of the Environment,

Duke University

Audrey Archer

Nicholas School of the Environment,

Duke University

Graduate students at Duke University's Nicholas School of the Environment (Durham, NC), Audrey Archer and Erika Zambello are facilitating this process, as partial fulfillment of their master's degree.

Survey:

1) How often do you spend time doing outdoor activities?
   a) Every day
   b) A few times a week
   c) Once a week
   d) Once a month
   e) Less than once a month
   f) Never

2) How important is it to you that your children spend time outside?
   a) I do not have children
   b) Very important
   c) Somewhat unimportant
   d) Neither important nor unimportant
   e) Somewhat important
   f) Very important
   g) I don't know

3) What is your favorite place to spend time outdoors? Please list below. Your answer could be a state park, a city park, your backyard, or any other place you enjoy doing outdoor activities.

4) Have you heard of the idea of a community forest?
   a) Yes
   b) No
   c) I don't know

5) A community forest is defined as a forest managed for the benefit of a community, with open access to the community. McIntosh SEED, a local environmental organization, is planning a community forest on 1,148 acres, or about 880 football fields, in Long County, GA. This forest will be managed partly for timber harvesting, and partly for other recreational and educational activities. What kinds of activities would you like to see in your community forest? Please choose all that apply.
   a) Hiking
   b) Bird Watching
   c) Hunting
   d) Camping
   e) Gardening
   f) Nature Walks
   g) Jogging

h) Biking
i) Learning how to harvest timber
j) Learning how to grow sweetgrass
k) Learning how to make baskets
l) Learning how to grow mushrooms
m) Learning to raise livestock (chickens, goats, cows)

n) I am not interested in visiting a community forest
o) Other _____ (please list and describe below)

6) If the community forest included the activities you listed above, how many times per month do you think you would visit the forest?

_____

7) How many minutes would you be willing to travel one-way to visit the community forest?

_____

8) If the community forest included the activities you listed above, how likely would you be to bring your children to visit the community forest?
a) I do not have children
b) Very unlikely
c) Somewhat unlikely
d) Neither likely nor unlikely
e) Somewhat likely
f) Very likely
g) I don't know

9) Do you think other members of your community would be interested in visiting the community forest? Please choose a level of interest on the scale below.
a) Very uninterested
b) Somewhat uninterested
c) Neither interested nor uninterested
d) Somewhat interested
e) Very interested
f) I don't know

10) Please rank these community amenities in the order you would use them:
a) Community Park
b) Community Garden
c) Community Forest

d) Community Center
e) Community Pool
f) I don't know

11) What are the most important things/locations in your community? What best improves your community's quality of life? Please answer in a few words or sentences.

12) What do you think are weaknesses of your community? Please answer in a few words or sentences.

13) What is your age? _____
14) What is your gender?
   A) Male
   B) Female

15) What is the highest degree or level of school you have completed? If currently enrolled, choose highest degree received:
   a) No schooling completed
   b) Nursery school to 8th grade
   c) Some high school, no diploma
   d) High school graduate, diploma or the equivalent (for example: GED)
   e) Some college credit, no degree
   f) Trade/technical/vocational training
   g) Associate's degree
   h) Bachelor's degree or higher

16) What is your household income?
   a) <$25,000
   b) $25,001-$50,000
   c) $50,001-$75,000
   d) $75,001-$100,000
   e) $100,000+

17) What is your ethnicity?
   a) Black or African-American
   b) Hispanic or Latino
   c) White
   d) Native American or American Indian
   e) Asian/ Pacific Islander
   f) Other

18) Do you have any further thoughts you would like to share?

19) Would you like to be kept informed on the community forest's progress? Your information will only be used to contact you about future events, and will not be shared. If you are interested in community forest updates, please write your contact information below or check the box below if you would like us to use your mailing address.

☐

_____

Thank you so much for your time.

Appendix A2: Focus Groups & Interview Questions

The following questions were asked to the focus group and interview participants. They could then elaborate or ask additional questions.

1. How often do you spend time outside?
2. What do you feel are your community's most valuable assets? (Ex. people's talents, churches, music groups, natural environment, history, etc.)
3. Potential clarification questions on community assets.
4. What do you think is a weakness of your community?
5. Have you heard of a community forest? (If the answer is no, provide a brief description: "The community forest in Long County could have different goals or programs, but could include education, timber harvesting, sweetgrass harvesting, walking trails, some agriculture, etc.")
6. What do you think about the potential for a community forest in this area? Do you think people would be interested in being involved?
7. What would you like to see in a community forest? (If slow in answering provide the potential list of activities).
8. Would there be activities you would be interested in becoming involved in?
9. Would you be interested in speaking with us in the future as the project develops?
10. Do you have any further thoughts you would like to share with me?

Appendix A3: Linear Regression and Assumptions

To analyze if age was a factor in driving respondents' answers to questions, linear regression models were run with age as the explanatory variable. Linear regression assumes linear relationships, normally distributed residuals, independence of residuals, few outliers, no multicollinearity, and heteroskedasticity.

Initial data for age, number of minutes respondents were willing to travel to reach the community forest, and number of anticipated visits per month were all screened for normality prior to beginning analysis. Both age and number of minutes were approximately normal, while number of anticipated visits per month was log-transformed to create a more normal distribution. Using age as the independent variable, two separate models were run to see if respondents' age affected their willingness to travel greater distances, as well as how many times per month they were willing to travel.

Initial linearity was tested using scatterplots of the variables, heteroskedasticity was tested using the Breusch-Pagan / Cook- Weisberg test, multicollinearity tested using VIF calculations, while residual relationships were analyzed using rvf plots.

While the age and willingness to travel time regression was not statistically significant, when age was regressed against log transformed number of anticipated monthly visits results were both significant and met test assumptions.

Linearity: Looking at the original scatterplot (Part I, Figure 9), the relationship appears to be linear.

Outliers: There is one outlier, however it remained in the analysis due to the lower number of data points in the analysis.

Normality: Both age and log transformed anticipated monthly visits were analyzed using the Shapiro-Wilkes test. Both had p-values of .90 and .98 respectively, indicating a rejection of the null hypothesis of non-normality. Normality of residuals was also analyzed using an rvf plot, which showed normally distributed and independent residuals.

Heteroskedasticity: When using the Breusch-Pagan/ Cook Weisberg test for heteroskedasticity, the regression had a p-value of .15, indicating that the regression fails to reject the null hypothesis of heteroskedasticity, and thus not does violate the assumption.

Multicollinearity: Multicollinearity was analyzed using the variation inflation factor method, where a VIF value over 10 raises concerns over multicollinearity. However, when running a VIF command the returned value was only 1.0, and thus the assumption of no multicollinearity was not violated.

Appendix A4: Survey Demographic Analysis

Age: The average age of survey respondents is 53.4, while the average age of Long County is only 30.6 (World Media Group n.d.) (Table A4.1). However, the census of Long County takes into account minors, and of course the survey can only be completed by adults over 18. Still, it is important to keep in mind the higher age of the respondents.

Table A4.1: Age of respondents and Long County residents

Average age of respondents	53.4
Average age of Long County residents	30.6

Gender: Though more males than females responded to the survey, in general the proportions are close to that of Long County residents (United States Census Bureau n.d) (Table A4.2).

Respondents	46.0% Female, 54.0% Male
Long County Residents	51.1% Female, 48.9% Male

Education: In general, the survey respondents are more educated than Long County Residents as a whole (Figures A4.1 and A4.2). Only 12% of Long County residents have a Bachelor's Degree or higher, while 35% of survey respondents have a Bachelor's Degree or Higher (World Media Group n.d.). Additionally, while zero percent of survey respondents have less than a high school degree, 19% of Long County residents have less.

Figure A4.1: Education Levels of Survey Respondents

Figure A4.2: Education Levels of Long County Residents

Income: The average income for Long County is $42,651 (United States Census Burea n.d.), while the income of the respondents has been broken into five distinct categories (Figure A4.3). While 10% of the respondents are below this average, 30% are in the same bracket as the Long County average, and 60% are above. Along with education, this is the most significant difference between the respondents and all residents of Long County, and should be noted when interpreting the results.

Figure A4.3: Household Income of Survey Respondents

Racial Composition: In terms of racial composition, the survey respondents represent the same general categories as Long County Residents (Figures A4.4 and A4.5) (United States Census Bureau n.d.), but with a higher percentage of white respondents and a lower percentage in the Black or African American and Hispanic or Latino populations. Minorities then are slightly underrepresented in the sample.

Figure A4.4: Racial Composition of Survey Respondents

Figure A4.5: Racial Composition of Long County

Appendix B: Environmental Site Assessment

Appendix B1: Soil Type Descriptions

Below are short descriptions of the soils that exist on the property, according to USGS' SSURGO.

Pelham loamy sand (0 – 5% slope, occasionally flooded). Approximately 56% of the property is within this map unit, which includes broad flats, depressions, and drainageways. The parent material consists of marine deposits. The natural drainage class is poorly drained, with a seasonal zone of water saturation at 6 inches from January through April. Common trees associated with this soil type include blackgum, loblolly, longleaf, slash, sweetgum, and water oak. Understory vegetation includes muhly, toothache grass, inkberry, panicum, switchgrass, little bluestem, and wax myrtle.

Ellabelle loamy sand (0-2% slope, very slow or ponded runoff). 22% of the property is Ellabelle loamy sand, where there are depressions and drains. It is very poorly drained, with the water table at or near the surface for more than five months of the year. This soil type is predominantly located in the northernmost part of the property buffering Jones Creek, supporting mostly natural hardwood forest. Common trees associated with this soil type include baldcypress, pond pine, and water oak. Understory vegetation includes fetterbush lyonia, inkberry, little bluestem, plumegrass, red maple, rush sedge, slender woodoats, switchcane, and wax myrtle.

Johnston and Bibb soils (0 – 2% slope, frequent flooding and slow runoff). These soils are from two distinct soil series, but both occur on floodplains and swamps. The parent material for Johnston soils is alluvium. They account for approximately 12% of the property, existing along the floodplain of Jones Creek. These soils are very poorly drained and only within eight inches of the water table for a majority of the year (6 – 11 months). Due to its association with floodplains, these soils are used for watershed protection and wildlife property and are therefore kept in natural hardwood forest on the property. Common trees associated with this soil type include baldcypress, loblolly, swamp tupelo, sweetgum, water oak, water tupelo, yellow-poplar, Atlantic white cedar, and black gum. Common understory vegetation includes American holly, downy blueberry, greenbrier, inkberry, switchcane, little bluestem, cutover muhly, slender woodoats, grassleaf godlaster, beaked panicum, and panicum.

Leefield loamy sand (0 – 12% slope). Along the edges of the property are small areas of somewhat poorly drained Leefield soils, accounting for 5% of the property. They formed in

deposits of sandy and loamy marine sediments. These soils occur on flats, and while the soil does not flood or pond, there is a seasonal zone of water saturation at 25 inches during January, February, March, and December. This soil type is commonly cultivated or converted to pastures, but supports primarily pines as well as transitioning grass communities on the property. Common trees associated with this soil type include loblolly, longleaf, and slash. Common understory vegetation includes inkberry, lespedeza, little bluestem, muhl, slender woodoats, grassleaf goldaster, beaked panicum, and panicum.

Mascotte fine sand (0 – 2% slope). Mascotte is also found in small patches along the edges of the property, accounting for 5% of the property. They formed in sandy and loamy marine sediments, occurring on flats. It is a deep, poorly drained soil found on flats and depressions. Planted pines and seedlings represent a majority of this soil type on the property. Common trees associated with this soil type include loblolly, longleaf, and slash pine. Common understory vegetation includes chalky bluestem, creeping bluestem, yellow Indiangrass, other annual forbs, panicum, pineland threeawn, and saw palmetto.

Stilson loamy sand (0-8% slope). Occupying just over one and a half acres along the northeastern edge of the property is this soil type. The parent material is sandy over loamy marine deposits, occurring on marine terraces or rises. It is moderately well drained and supports hardwood forests on the property. Common trees associated with this soil type includes loblolly, longleaf, slash, and sweetgum. Common understory vegetation includes beaked panicum, inkberry, little bluestem, panicum, pineland threeawn, and wax myrtle.

Appendix B2: Wildlife on the Property

The following table (Table B2.1) lists potential rare or endangered amphibians, mammals, reptiles, and birds that could exist on the property, due to similar habitat conditions and its occurrence in Long County (NatureServe 2009). Table B2.2 lists bird species encountered during the point count survey.

Table B2.1: Rare or endangered animal species that potentially occur on the property (NatureServe 2009)

CLASS	COMMON NAME	SCIENTIFIC NAME	HABITAT DESCRIPTION
Amphibian	Flatwoods Salamander	Ambystoma cingulatum	Pine flatwoods; moist savannas; isolated cypress/gum ponds
Amphibian	Eastern Tiger Salamander	Ambystoma tigrinum tigrinum	Isolated wetlands; pine dominated uplands; open fields
Amphibian	Striped Newt	Notophthalmus perstriatus	Pine flatwoods, sandhills; isolated wetlands
Amphibian	Broad-striped Dwarf Siren	Pseudobranchus striatus	Swamps; marshes; limesink ponds; cypress ponds
Mammal	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	Pine forests; hardwood forests; caves; abandoned buildings
Reptile	Spotted Turtle	Clemmys guttata	Heavily vegetated swamps, marshes, bogs, and small ponds; nest and possibly hibernate in surrounding uplands
Reptile	Eastern Indigo Snake	Drymarchon couperi	Sandhills; pine flatwoods; dry hammocks; summer habitat includes floodplains and bottomlands
Reptile	Eastern Coral Snake	Micrurus fulvius fulvius	Hardwood forests; pine flatwoods; dry hammocks; sandhills
Reptile	Slender Glass Lizard	Ophisaurus attenuatus attenuatus	Open woods; savannas; old fields; sandhills
Reptile	Mimic Glass Lizard	Ophisaurus mimicus	Pine flatwoods; savannas; seepage bogs
Reptile	Florida Pine Snake	Pituophis melanoleucus mugitus	Sandhills; scrub; old fields
Reptile	Northern Florida Swamp Snake	Seminatrix pygaea pygaea	Swamps; ponds; marshes; lakes
Bird	Bachman's Sparrow	*Aimophila aestivalis*	Mature open pinewoods, regenerating clear-cuts, old pastures with dense ground cover (wiregrass, bluestem, broomsedge) and forbs, or palmetto scrub.
Bird	Henslow's Sparrow	*Ammodramus henslowii*	Tallgrass prairie, lowland prairie, marshes, meadows and weedy pastures. Tall, dense grasses and forbs, well-developed litter layer, little or no woody vegetation
Bird	Swallow-tailed Kit	*Elanoides forficatus*	Foraging habitats include bottomland forests, cypress and mixed cypress-hardwood swamps, hardwood hammocks, pine flatwoods, wet prairies
Bird	Southeastern American Kestrel	*Falco sparverius Paulus*	Large open habitats including pastures and open pine forests

| Bird | Red-cockaded Woodpecker | *Picoides borealis* | Mature, open pine forest, particularly longleaf, slash or loblolly pine; pine savannas |
| Bird | Painted Bunting | *Passerina ciris* | Lower coastal plain in thickets, woodland borders, and brushy areas |

Table B2.2: Birds recorded on the property (blue = songbirds, green = raptors and owls, yellow = waterfowl, red = woodpeckers, white = other)

House Wren	Eastern Phoebe	Northern Cardinal
Carolina Wren	Hermit Thrush	Blue Jay
Carolina Chickadee	Gray Catbird	Red-shouldered Hawk
Tufted Titmouse	Eastern Towhee	Turkey Vulture
Chipping Sparrow	American Robin	Black Vulture
Swamp Sparrow	Brown-headed Nuthatch	Great Horned Owl
Savannah Sparrow	White-breasted Nuthatch	Wood Duck
Fox Sparrow	Ruby-crowned Kinglet	Canada Goose
Song Sparrow	Golden-crowned Kinglet	Downy Woodpecker
Yellow-rumped Warbler	American Goldfinch	Red-bellied Woodpecker
Black-and-white Warbler	Eastern Bluebird	Pileated Woodpecker
Orange-crowned Warbler	Mourning Dove	Northern Flicker
Pine Warbler	Common Grackle	Yellow-bellied Sapsucker
Common Yellowthroat	Northern Mockingbird	American Crow
White-eyed Vireo	Red-winged Blackbird	Wild Turkey

Appendix C: Site Infrastructure & Program Elements Summaries

The following paragraphs include summaries and recommendations of infrastructure and program elements for the McIntosh SEED Community Forest.

Playground

Survey respondents often said that they wished there were more places to take their kids. A "nature play space," like the one constructed at the Prairie Ridge Ecostation in Raleigh, North Carolina, provide kids a great place to play while beginning to learn about the natural world (NC Museum of Natural Sciences n.d.).

The play space should be built as much as possible out of natural materials, and can still include a slide and swings, but also naturally built structures, mazes, sandpits, and large logs and boulders to play on. As with the outdoor classrooms discussed below, these natural play spaces can cost different amounts depending on what is included. However, it is important that the play area be evaluated for safety concerns, and that insurance covers any risk of injuries.

Earthplay Design is a firm specializes in these types of nature-based playscapes with the added bonus of a "community built" process which "not only creates amazing spaces for children, but saves money, strengthens ties to the community, builds lasting friendships, fosters a sense of pride and ownership in the project, and helps ensure playscape's long term care and maintenance" (Earthplay Design n.d.). The Highlander School playscape in Atlanta, GA is a result of this process (Grant Park Neighborhood Association n.d.). Earthplay is available to help in a variety of ways, from remote design consultations to developing a detailed design and planning guide.

Community Gardens

Community gardens are excellent ways to involve community members who love gardening, as well as beginners. However, all gardens need initial investment and upkeep, which can cost thousands of dollars.

Basic elements of a community garden (Surls 2001):

- Plots for community members, placed in full sun
- Raised beds should be 8-12 feet long and 4 feet wide or less; in-ground plots can range from 10x10 to 20x20 feet.
- Every four plots should have a faucet
- Pathways between plots must be wide enough for wheelbarrows (3-4 feet)

- Fence around the perimeter to keep out deer and other wildlife
- Tool shed for supplies
- Picnic table for community members to rest and gather
- Shared compost area

These basic elements can cost between $2,500 and $5,000.

Additional options for a community garden are below, with their associated costs (Nagai 2010, Bradley & Baldwin n.d., Denver Urban Gardens 2012). Annual maintenance costs can run approximately $200.

- Compost: $300-$400 a truckload
- Soil Analysis: around $15-$20, more for heavy metal analysis
- Temporary, plastic shed: $500
- Sophisticated irrigation system: $3,000+
- Chain link fence (400 ft) and signs: $12,000+
- Benches: $125 each
- Picnic table: $150 each
- Dwarf fruit trees: $100 each
- Hedge trees: $15 each

Native Tree Orchard

Fruit trees often have significant start-up costs. Small trees (3-4 feet) cost $15-$20 each. Long County is in Hardiness Zone 8, and recommended trees for the area include: native cherry trees, a Georgia grape vine, peaches, pears, pecans, and plums. Raspberries and blueberries are also recommended (Arbor Day Foundation n.d.).

Fruit orchards require annual training and pruning. To prune a tree, gardeners remove branches or other portions of the tree in order to create proper tree structure. Pruning only needs to be done if training, in which a gardener directs tree growth, has not worked (NC Cooperative Extension & North Carolina State University n.d.).

Agroforestry

"Silvopasture" systems combine timber production with cattle production, diversifying income from the land, reducing risk, and increasing quality of timber. It is appropriate for stands of loblolly, longleaf, and slash pine (Hamilton 2008). Normally trees are planted on

pastureland, but the trees are already growing on McIntosh SEED Community Forest. Systems in place today normally cultivate goats, sheep, and cattle.

However, livestock management in silvopasture systems is intensive, and requires rotating cattle to different forest areas. Single and double row tree plantings are optimal for silvopasture; anything above that is not good for the timber trees.

In a silvopasture system, "Canopy density…is generally managed between 25 to 60 percent, which provides larger open spaces for forage production and management" (Hamilton 2008). If agroforesters pasture the livestock in young stands, they may reduce growth or damage trees if the grazing is too severe. When the tops of the trees grow above the height that livestock can graze, and the bark has become thick, the likelihood of severe grazing is reduced.

Grazing periods can range from one day to one week, but if they are too long livestock can overforage an area. Recovery periods, then, range from 2-5 weeks for cattle. Five paddocks of cattle should be the minimum, as anything less is probably not economically viable (unless it is just for demonstration purposes). Each paddock also needs a water source, in the form of a water tank or trough. Fencing is a critical component for the different paddocks.

Most silvopasture systems require planting of forage. Forage periods and which grasses should be planted are dependent on the conditions in each pasture, and are required by the easement to be native.

The same principles apply to goats, but they obviously need less forage and thus shorter paddock rotations (Hamilton 2008).

It is important to note that the property's conservation easement states that "The production of domestic farm animals shall be conducted on a traditional scale such as characterized uses of farms of this size in Georgia in the past and shall not be conducted as industrial or factory-type agricultural operations or by the continuous confinement of domestic farm animals or fish in tightly confined environments for the purpose of raising, feeding, and fattening for market, such as chicken houses, pig lots, feed lots," etc. The terms of the easement must be kept in mind when designing silvopasture systems on the McIntosh SEED community forest.

Camping

Camping is a popular activity desired by the community. While the proposed location for a campground in the site plan is not located within a wetland, it is likely that the soil will

saturate in the wet season. Having raised tent pads or continuing the platform from a boardwalk trail would allow for year-round campground access (Figure C.1). Campsites should include water access (either a spigot or water tank), a fire ring, picnic table, and a bathroom facility.

www.Roanokeriverpartners.org   www.fpdcc.com

Figure C.1: Examples of raised tent platforms

Longleaf Pine

Longleaf pine (*Pinus palustris)* is an important species both culturally and ecologically. Longleaf pine forests once dominated southeastern coastal plains, occupying 90 million acres (Longleaf Alliance n.d.). Known as the "Tree that Built America," the species' tall, straight trunks were used as masts for the shipping industry. Longleaf was also harvested for naval stores (e.g. tar, pitch, and turpentine). Agricultural fields and development transformed the landscape and at the expense of longleaf pine forests; with only 3% remaining, it is the most threatened ecosystem in the United States (Longleaf Alliance n.d.). This fire-dependent ecosystem supports high plant diversity in groups such as sedges, grasses, carnivorous plants, and orchids; more than 40 species per square meter have been documented (Peet and Allard 1993). These ecosystems provide habitat for many rare animal species, including Bachman's sparrow (*Aimophila aestivalis*), the red-cockaded woodpecker (*Picoides borealis*), the Eastern indigo snake *(Drymachron corais*), and the gopher tortoise (*Gopherus poyphenums*) (Carter 2012).

Regenerating this ecosystem on the McIntosh SEED property would not only contribute to the extensive conservation efforts, but would also provide visitors with the opportunity to learn about managing longleaf pine for timber production. This species has many favorable characteristics: it is the most insect-, disease-, fire-resistant southern pine species with the greatest longevity (Demers et al. 2013). Potential programs related to longleaf include prescribed burn training, pine straw harvesting (see next section for further information), turpentine production demonstration, natural history education, and herbaceous plant identification.

Substantial restoration projects are underway taking place around Fort Stewart, along the Altamaha River corridor, and points in between. This makes McIntosh SEED a significant point of interest to partners in the regeneration project, including GA DNR, Department of Defense, the Georgia Land Trust, and the Longleaf Alliance. Randy Tate, the Fort Stewart/Altamaha Longleaf Partnership Coordinator with Longleaf Alliance, created the recommendations below for longleaf restoration on the site.

1. The areas shown for longleaf planting in the final site plan map seem appropriate and would make a good demonstration area for longleaf pine. Leefield and Mascotte soils elsewhere could also be targeted.
2. Use of the existing beds is highly recommended for planting as opposed to re-bedding. Use of the existing beds would help keep the native groundcover that has survived the original bedding. Maintaining any existing groundcover aids in fire carry and is beneficial to wildlife. If there are areas not previously bedded within the planned longleaf area, we would encourage not bedding for the above reasons.
3. If at all possible without causing further soil disturbance, flattening out the beds is recommended. Bedding can hamper fire carry since the rows between the beds may remain moist.
4. A good complete prescribed burn is highly recommended for site prep prior to planting longleaf seedlings.
5. Planting 605 longleaf seedlings per acre is recommended. This density would aid in straight growth and better form for the longleaf seedlings. It would also allow for a thinning in approximately 16 to 17 years yielding financial return.
6. It is important to plant containerized seedlings vertically and with the plug exposed. Given the soil types, 1 to 1.5 inches of plug could be exposed. This avoids covering the

terminal bud post planting. If bareroot seedlings are used, machine planting is recommended.

7. Regular prescribed burning is necessary for maintenance of any planted longleaf. Given the richness of this site a 2 year return interval would be best.

Pine Straw Harvesting

Pine straw is an example of a non-timber forest product sold to mulching facilities and consists of the long needles that fall from loblolly, slash, and/or longleaf pine. According to a study from the University of Georgia, cited by Dyer and Barlow (2012), loblolly pine straw ranges from $0.25 to $0.30 per bale while pine straw from longleaf ranges from $0.40 to $1.00 per bale. Pine straw can be collected from both natural stands and plantations, but most common in plantations where evenly spaced trees (at least 8 feet apart) facilitate mechanical gathering by a tractor-powered baler. Hand raking, however, is the preferred method for pine straw harvesting, because it is less detrimental to ground cover. Pine needles on the forest floor provide many important environmental benefits, in terms of soil nutrients and organic matter (NRCS 2011). Regular harvests can disrupt the forest's ecosystem; therefore, if the objective is to restore longleaf pine ecosystems this may not be a suitable endeavor.

Sweetgrass Cultivation

Sweetgrass (*Muhlenbergia filipes*) has long been used in the region for creating traditional sweetgrass baskets. However, as a result of overharvesting, natural stands of this grass have become increasingly rare, and basket weavers are turning to cultivated varieties.

Normally, sweetgrass grows close to the high tide mark in maritime dune ecosystems, but it can survive on "well-drained, sandy uplands bordering brackish marshlands and in open maritime forests" (Grabowsk, J. 2009). It can also grow farther inland in "seasonally wet prairies and pine barrens" (Grabowsk, J. 2009).

Plants should be grown using 3x3 or 4x4 foot spacing, and crowns planted two inches below the surface. Plants must be irrigated weekly when planted inland. Growers can use certain fertilizers during planting, but little afterwards, and no pesticides. If planting seeds, they should be planted close to the surface, and they should germinate on their own. Soil should not have a high concentration of clay, and receive full sun.

Giant Miscanthus Grass

Giant Miscanthus (*Miscanthus x giganteus*) is a grass that is native to Asia and can be planted and managed as a biomass crop. Planting of this crop is not in compliance with the conservation easement on the property, which forbids any exotic species. Additionally, it is not recommended that this species be planted on floodplains or sites with high water tables in the winter or early spring. This is because of the heavy machinery required to harvest the grass during these times (USDA Natural Resources Conservation Service 2011).

Interpretive Education

With trails, planted and natural stands, and wildlife, the McIntosh SEED Community Forest has an opportunity to provide interpretive education programs for children and adult alike. The most basic type of interpretive education is an educational trail, with signs explaining to visitors what they are seeing. Signs can cost upwards of $100 each, including professional layout and illustrations, and require maintenance to make sure the signs remain uncovered and clean. However, initially McIntosh SEED can use QR-codes (Figure C.2).

Figure C.2: Example of a QR code

QR-codes are generated by various online programs, and contain a unique network of black and white squares. When scanned by smart phones, the QR codes generate informational pages that the users can then view and read. Generating QR codes is free, and staff can print them on regular computer paper, laminate the pages, and attach them to simple wooden stakes that can be easily moved.

In addition to signage throughout the park, having an outdoor classroom would also be a good way to have students learn about nature while *in* nature. The classroom could be close to the Conference Center, or placed farther out into the woods.

Outdoor classrooms can be as simple as semi-circle seats around a common area. Seats can be made from sawed logs, or from logs placed on their sides and used as benches. More formal classrooms can consist of sawed wood to create seats and benches, a covered roof in case of

inclement weather, and a platform for instructors or speakers. Some outdoor classrooms also come equipped with computer stands, which are especially useful if the outdoor classroom is located in an area with Wifi internet access.

Because of the range of options, costs of an outdoor classroom range as well. For example, students can form a "bucket brigade," in which they each bring a portable five gallon bucket to use as a set anywhere in the woods. There are benefits to these super portable classrooms, and the buckets cost only $6 each (Environmental Education Alliance of Georgia n.d.).

For a more permanent classroom, prefabricated gazebos – with seating for a class – can be delivered on-site for $3,000-$6,000 (Environmental Education Alliance of Georgia n.d.). As an alternative, to create an amphitheater feel benches and seating can be constructed by local craftsmen or volunteers. There are pros and cons to each type of classroom, and it is up to McIntosh SEED staff to decide which would fit their needs.

Birding Activities

To allow visitors better viewing opportunities for birds, a simple bird blind can be constructed to allow visitors to observe the birds without disturbing feeding or other habits. Blinds can be simple or complex, but provide a wall between viewers and the birds, usually with a few openings for binoculars.

Though simple, bird blinds can be decorated to blend in with the background vegetation, include seating for observers, or even act as canvases for artwork or a mural.

Appendix D: Community Access

Table D.1 lists the percent of each county included in McIntosh SEED Community Forest service areas. Table D.2 lists those competing recreational forests that resulted from the competitive landscape assessment. Figure D.1 is a map of the community centers found within the competition and non-competition zones. These centers are listed in Table D.3.

Table D.1: Service area county inclusion

County	Population	Drive Time (min)				
		5	15	30	45	60
Long	14,464	2%	25%	68%	94%	100%
Tattnall	25,520		1%	19%	50%	80%
Liberty	63,453			11%	44%	73%
Wayne	30,099			5%	40%	92%
Evans	11,000				32%	96%
McIntosh	14,333				4%	27%
Appling	18,236				3%	25%
Bryan	30,233					17%
Pierce	18,758					8%
Toombs	27,223					8%
Bulloch	70,217					4%
Brantley	18,411					4%
Glynn	79,626					2%

Table D.2: Competing sites

Competing Site Name	Area (ac)
Altamaha-rayonier State Natural Area	1,935
Altamaha-rayonier State Natural Area	32
Altamaha River Scenic Easements	41
Altamaha River Scenic Easements	226
Griffin Ridge Wildlife Management Area	16
Little Satilla Wildlife Management Area	4,110
Altamaha River Scenic Easements	30
Altamaha River Scenic Easements	32
Richmond Hill Wildlife Management Area	3,219
Sansavilla Wildlife Management Area	16,777
Richmond Hill Wildlife Management Area	1,342
Big Hammock State Natural Area	785
Gordonia-alatamaha State Park	470
Big Hammock Wildlife Management Area	6,224
Altamaha River Scenic Easements	175

Richmond Hill Wildlife Management Area	101
Jerico River State Natural Area	557
Richmond Hill Wildlife Management Area	14
Evans County Public Fishing Area	375
Richmond Hill Wildlife Management Area	11
Griffin Ridge Wildlife Management Area	5,780
Atamaha River Townsend Wildlife Management Area	2,378

Figure D.1: Community centers within the competition and non-competition zones of McIntosh SEED Community Forest 30 minute service area

Table D.3: Community centers list

ID	Name	Type	City	County	Latitude	Longtitude
1	Allenhurst Chapel	Church	Hinesville	Liberty	314717N	0813628W
2	Friendship Church	Church	Hinesville	Liberty	314556N	0813723W
3	Liberty Church	Church	Walthourville	Liberty	315134N	0814332W
4	Live Oak Church	Church	Walthourville	Liberty	314929N	0813828W
5	Mount Zion Church	Church	Hinesville	Liberty	314914N	0813604W
6	Pleasant Hill Church	Church	Walthourville	Liberty	314619N	0813736W
7	Saint Lukes Church	Church	Walthourville	Liberty	314831N	0813935W
8	Williams Chapel	Church	Hinesville	Liberty	315001N	0813638W
9	Bacon Church	Church	Hinesville	Liberty	314532N	0813627W
10	Bradwell Institute	School	Hinesville	Liberty	315056N	0813615W
11	Flemington Church	Church	Hinesville	Liberty	315211N	0813415W
12	Jordye Bacon Elementary School	School	Hinesville	Liberty	315016N	0813605W
13	Button Gwinnett Elementary School	School	Hinesville	Liberty	315131N	0813605W
14	Faith Church	Church	Walthourville	Liberty	314846N	0813903W
15	Grace Church	Church	Walthourville	Liberty	314751N	0813834W
16	Gum Branch Baptist Church	Church	Walthourville	Liberty	315133N	0814328W
17	Heritage Chapel	Church	Hinesville	Liberty	315203N	0813620W
18	Hineshaw School	School	Hinesville	Liberty	315117N	0813553W
19	Hinesville Methodist Church	Church	Hinesville	Liberty	315055N	0813527W
20	Lyman Hall Elementary School	School	Hinesville	Liberty	314743N	0813646W
21	Sandy Run School	School	Hinesville	Liberty	315046N	0813436W
22	Victory Church	Church	Hinesville	Liberty	314533N	0813632W
23	Walthourville Baptist Church	Church	Walthourville	Liberty	314609N	0813730W
24	Walthourville Presbyterian Church	Church	Walthourville	Liberty	314604N	0813803W
25	Taylors Creek Elementary School	School	Walthourville	Liberty	314834N	0813852W
26	Frank Long Elementary School	School	Hinesville	Liberty	314846N	0813547W
27	Lewis Frasier Middle School	School	Hinesville	Liberty	314850N	0813557W

28	Trinity Christian Academy	School	Walthourville	Liberty	314905N	0813731W
29	First Presbyterian Church School	School	Hinesville	Liberty	315055N	0813554W
30	Joseph Martin Elementary School	School	Hinesville	Liberty	315159N	0813456W
31	Snelson - Golden Middle School	School	Hinesville	Liberty	315203N	0813503W
32	Waldo Pafford Elementary School	School	Walthourville	Liberty	314911N	0813914W
33	Armstrong Atlantic State University	School	Hinesville	Liberty	315110N	0813455W
34	Brewton - Parker College Liberty Site	School	Hinesville	Liberty	315134N	0813330W
35	Westside Baptist Christian School	School	Hinesville	Liberty	315057N	0813557W
36	Bethel African Methodist Episcopal Church	Church	Hinesville	Liberty	315114N	0813559W
37	Church of Christ	Church	Hinesville	Liberty	315054N	0813604W
38	The Church of Jesus Christ of Latter Day Saints	Church	Hinesville	Liberty	315043N	0813451W
39	Faith Temple Holiness Church	Church	Walthourville	Liberty	314631N	0813752W
40	First Calvary Baptist Church	Church	Hinesville	Liberty	315103N	0813555W
41	Hinesville First Baptist Church	Church	Hinesville	Liberty	315057N	0813537W
42	Hinesville Korean Full Gospel Church	Church	Hinesville	Liberty	315047N	0813439W
43	House of Prayer Christian Church	Church	Walthourville	Liberty	314700N	0813802W
44	House of Refuge Church	Church	Hinesville	Liberty	315047N	0813602W
45	Korean Mission Church	Church	Walthourville	Liberty	314936N	0813903W
46	Korean United Methodist Church	Church	Hinesville	Liberty	315058N	0813546W
47	Liberty Christian Fellowship Church	Church	Hinesville	Liberty	315118N	0813554W
48	South Main Baptist Church	Church	Hinesville	Liberty	314846N	0813620W
49	Saint Philips Episcopal Church	Church	Hinesville	Liberty	315121N	0813525W
50	Saint Stephen Catholic Church	Church	Hinesville	Liberty	315103N	0813523W
51	Trinity Missionary Baptist Church	Church	Walthourville	Liberty	314906N	0813731W
52	Baconton Missionary Baptist Church	Church	Hinesville	Liberty	314532N	0813627W
53	Pillar in Zion Apostolic Church	Church	Walthourville	Liberty	314607N	0813736W
54	Marne Chapel	Church	Hinesville	Liberty	315205N	0813659W
55	First Presbyterian Church	Church	Hinesville	Liberty	315055N	0813529W

56	Full Gospel Tabernacle Church	Church	Hinesville	Liberty	315006N	0813714W
57	Powerhouse of Deliverance Church	Church	Walthourville	Liberty	314839N	0813856W
58	Elim Church	Church	Walthourville	Long	314723N	0814057W
59	Jones Creek Church	Church	Glennville SE	Long	314522N	0814841W
60	Macedonia Church	Church	Glennville SE	Long	315108N	0814820W
61	Middleton Church	Church	Bug Island	Long	313700N	0813807W
62	Monticello Church	Church	Walthourville	Long	314735N	0814355W
63	Pigott Branch Church	Church	Glennville SW	Long	314954N	0815419W
64	Poplar Head Church	Church	Glennville SE	Long	315201N	0814727W
65	Rye Patch Church	Church	Glennville SE	Long	314853N	0814627W
66	Saint Thomas Church	Church	Glennville SE	Long	314824N	0815146W
67	Walthourville Church	Church	East of Ludowici	Long	314501N	0813649W
68	Grace Church	Church	Glennville SW	Long	315010N	0815429W
69	Long County High School	School	Ludowici	Long	314223N	0814433W
70	Mount Sinai Church	Church	Ludowici	Long	314435N	0814123W
71	Pleasant Hill Church	Church	Ludowici	Long	314424N	0814143W
72	Walker Middle School	School	Ludowici	Long	314216N	0814429W
73	Elem Church	Church	Doctortown	Long	314358N	0814615W
74	Smiley Elementary School	School	Ludowici	Long	314140N	0814350W
75	Faith Baptist Christian Academy	School	Ludowici	Long	314242N	0814443W
76	Church of God	Church	Ludowici	Long	314251N	0814435W
77	Three Rivers Regional Library System Long County Public Library	Library	Ludowici	Long	314234N	0814442W
78	Faith Baptist Church	Church	Ludowici	Long	314221N	0814433W
79	Altamaha School	School	Jesup West	Wayne	313555N	0815244W
80	Christian Park Academy	School	Jesup West	Wayne	313625N	0815504W
81	Martha Smith Elementary School	School	Jesup West	Wayne	313648N	0815311W
82	Orange Street School	School	Jesup West	Wayne	313631N	0815333W
83	Ritch School	School	Jesup West	Wayne	313528N	0815236W

84	Saint Pauls Church	Church	Jesup West	Wayne	313523N	0815241W
85	Spring Grove Church	Church	Jesup NW	Wayne	313827N	0815347W
86	Bennett Union Baptist Church	Church	Jesup West	Wayne	313637N	0815304W
87	Calvary Baptist Church	Church	Jesup West	Wayne	313608N	0815241W
88	Church of God	Church	Jesup West	Wayne	313613N	0815231W
89	First Methodist Church	Church	Jesup West	Wayne	313614N	0815249W
90	First Presbyterian Church	Church	Jesup West	Wayne	313610N	0815253W
91	Hal Richardson Recreation Center	Park	Jesup West	Wayne	313700N	0815249W
92	Mount Moriah Methodist Church	Church	Jesup West	Wayne	313629N	0815239W
93	Saint Pauls Episcopal Church	Church	Jesup West	Wayne	313609N	0815244W
94	Wayne County Junior High School	School	Jesup West	Wayne	313700N	0815410W
95	Crossroads Church of God	Church	Jesup NW	Wayne	313925N	0815444W
96	First Free Will Baptist Church	Church	Jesup West	Wayne	313605N	0815346W
97	Jesup Elementary School	School	Jesup West	Wayne	313554N	0815244W
98	New Testament Baptist School	School	Jesup West	Wayne	313705N	0815352W
99	James E Bacon Elementary School	School	Jesup West	Wayne	313700N	0815411W
100	Altamaha Technical College	School	Jesup West	Wayne	313719N	0815435W
101	Arthur Williams Middle School	School	Jesup West	Wayne	313501N	0815233W
102	First Baptist Church School	School	Jesup West	Wayne	313612N	0815252W
103	Jesup First United Methodist Church School of Discovery	Church	Jesup West	Wayne	313614N	0815249W
104	Anderson Drive Baptist Church	Church	Doctortown	Wayne	313901N	0815132W
105	First Baptist Church	Church	Jesup West	Wayne	313610N	0815253W
106	Memorial Baptist Church	Church	Jesup East	Wayne	313522N	0815223W
107	New Generation Baptist Church	Church	Jesup West	Wayne	313632N	0815234W
108	New Life Christian Center	Church	Jesup East	Wayne	313551N	0815227W
109	Northside Baptist Church	Church	Jesup West	Wayne	313646N	0815234W
110	Saint John Holiness Church	Church	Jesup West	Wayne	313654N	0815246W
111	Trinity Baptist Church	Church	Jesup NW	Wayne	313922N	0815331W
112	Wayne County Public Library	Library	Jesup West	Wayne	313643N	0815415W

113	Epworth United Methodist Church	Church	Jesup West	Wayne	313611N	0815338W
114	New Life Ministries Church	Church	Jesup East	Wayne	313621N	0815218W
115	Parkway Church of God	Church	Jesup East	Wayne	313447N	0815104W
116	Ebenezer Church	Church	Glennville SW	Tattnall	315230N	0815529W
117	Glennville Middle School	School	Glennville	Tattnall	315557N	0815511W
118	Hopewell Church	Church	Tison	Tattnall	315348N	0820149W
119	Kicks Playland	Park	Glennville	Tattnall	315706N	0815705W
120	Love Church	Church	Glennville	Tattnall	315854N	0815659W
121	Smyrna Church	Church	Deans Crossing	Tattnall	320032N	0815455W
122	Watermelon Church	Church	Tison	Tattnall	315540N	0820114W
123	Zaraigh Church	Church	Glennville	Tattnall	315344N	0815624W
124	Faith Church	Church	Glennville	Tattnall	315421N	0815557W
125	First Christian Church	Church	Glennville	Tattnall	315715N	0815719W
126	Glennville Middle School	School	Glennville	Tattnall	315636N	0815602W
127	Mendes Missionary Baptist Church	Church	Glennville	Tattnall	315946N	0815812W
128	Seckinger Primary School	School	Glennville	Tattnall	315600N	0815534W
129	White Pines Church	Church	Glennville	Tattnall	315731N	0815739W
130	Berea Church	Church	Glennville	Tattnall	315849N	0815326W
131	Ella Grove Church	Church	Glennville	Tattnall	315623N	0815351W
132	First Baptist Church	Church	Glennville	Tattnall	315611N	0815545W
133	Glennville Methodist Church	Church	Glennville	Tattnall	315607N	0815540W
134	Glennville Elementary School	School	Glennville	Tattnall	315636N	0815603W
135	Glennville Christian Academy	School	Glennville	Tattnall	315533N	0815530W
136	Glenvue Nursing Home	Nursing Home	Glennville	Tattnall	315643N	0815529W
137	Center of Life Fellowship Church	Church	Glennville	Tattnall	315657N	0815550W
138	Greater Zachariah Church	Church	Glennville	Tattnall	315659N	0815709W
139	Mount Zion Outreach Center	Church	Glennville	Tattnall	315648N	0815535W
140	Northside Baptist Church	Church	Glennville	Tattnall	315632N	0815533W
141	Little Rock Church	Church	Glennville NE	Long	315243N	0815219W

Appendix E: Fundraising Strategies

The following tables include grant organizations that could support McIntosh SEED. Table E.1 includes organizations that funding sustainable forestry and management, while Table E.2 includes organizations that fund trail construction and maintenance.

Table E.1: List of organizations that fund land management and conservation projects (Communities Committee n.d.).

Organization	Description
Merck Family Fund	Will give grants to support sustainable forestry and protecting ecologically important land.
Norcross Wildlife Foundation	Will provide funding for the tools, materials, and equipment necessary for land management practices that support wildlife habitat.
Roy A. Hunt Foundation	Will make grants to support sustainable forest management.
Weyerhaeuser Family Foundation	Will give grants to organizations that "implement integrated approaches to enhancing ecology, the local economy, and community" (Communities Committee n.d.).

Table E.2: Organizations that will fund trail construction and maintenance

Organization	Description
American Trails	Provide trail funding ideas and resources. Some grants and information out of date.
National Park Service	Will provide funding for trail construction through their Rivers, Trails, and Conservation Assistance Program, provided community benefits, partnerships, and inputs are well documented.
Georgia State Park Service	Will provide funding for trail construction through their Recreational Trails Program. However, because the funds generally go to state agencies or governments, McIntosh SEED might have to include a city partner or Fort Stewart in the application.