Ecosystem Vegetation Narratives

Open Piedmont Prairies

Open Piedmont prairies were once an integral component of the original landscape fabric that made the upstate region of South Carolina unique. The tall, warm-season grasses and flowering forb communities were maintained through a combination of herbivary and fire. They have been greatly reduced since European settlers began to use more and more of the land for agriculture. Poor agricultural practices, particularly cotton farming, resulted in mass scale losses of nutrients and top-soil.

Here at Nalley Brown Nature Park, the establishment of Piedmont prairies shall combine the art of landscape design and the science of restoration ecology by blending native prairie grasses and flowering forbs with moisture gradients, slope aspects, and soil types. The prairie restoration and establishment begins with setting back the successional clock by removing all woody material including trees, saplings, and stumps. Secondly, the meadow areas will be finely graded to a consistency that allows for native seeds to be sown and established. The third step involves the careful selection of native grass and forb species based upon reference communities found locally. These seed mixes shall also take into consideration slope aspect, soil texture, and moisture gradients. The seeds shall be sown at a rate of 15 lbs per acre using a Tru-ax seed drill ensuring good soil to seed contact. Once seedlings come up, care should be taken to control invasive weeds before they cause problems.

The general overview of the maintenance is to prevent woody tree saplings, shrubs, and invasive perennials from invading the prairie meadow. This shall be accomplished through one, or a combination, of three methods. The preferred method would be to burn the site every one to three years, with burning in the late spring. The alternative to burning would be to mow or bush hog the meadow site on a set rotational basis. The mowing rotation should be a late spring mow or late fall. The final option involves the chemical treatment of invasive weeds such as lezpedeza, kudzu, morning glory or crown vetch using Plateau or equivalent herbicidal treatments.

Secondary Ridge Top Pine-Oak Forest

Nalley Brown has two areas where land succession has allowed pines to become established in a dense thicket, The overall height of these maturing pines are approaching 35-40 feet and the under story is very sparse, with a few small hardwood saplings beginning to establish. The height and character of the semi-open pines can contribute to the educational opportunities by demonstrating how successional forests work over time.

The pine forest exists on site and is maturing at a measured pace. The establishment aspect involves selective thinning to allow more light into the forest floor and creating a park-like feel and character. Further additions of under story shrubs such as huckleberry and sparkle-berry would add diversity.

The general maintenance of the Pine Forest consists of monitoring the health and strength of the pine stand. Pines are susceptible to pine beetles, borers, and wind damage. Upon monitoring, if pines are showing signs of beetles or borers, or are dead or leaning, then these trees should be removed as needed. As light gaps are created, early successional plants will come in as part of the natural processes. The goals and actions should be to maintain the early succession plants in such a way as to promote a neat visual appearance, yet maintain the essence of the desired mature pine forest. Some hardwoods should be allowed to remain to provide diversity.

Secondary Oak Hickory Forest

The existing secondary hardwood forests are beginning to show signs of transition from early successional character into secondary hardwood conditions. Currently, these areas can be characterized as scattered maturing hardwood trees with some pines still present in the landscape. There are very few shrubs, ground covers, or perennials within this forest eco-type. Through active and selective management a desired mix of hardwoods, shrubs, and ground covers can be achieved.

The existing conditions dictate that selective thinning of saplings 3" caliper or less would open the forest up and allow additional light onto the forest floor, thereby raising the level of diversity in the shrub and ground planes. This active management will also allow young maturing trees to fill out and become healthier specimens. The addition or introduction of native shrubs and ground covers into selected areas will be necessary to begin the process of restoring the desired Piedmont character to this ecosystem. Any erosional areas should be addressed using bio-engineering techniques coupled with native re-vegetation.

The secondary hardwood forests should be maintained by removing dead, dying, or leaning trees and keeping exotics out of the shrub and ground plain layer. Again, any new erosional areas should be addressed using bio-engineering products and native vegetation. Any exotic plants should be removed via mechanical or physical means. The use of chemical herbicides should be used as a last resort.

Granitic Outcrop Plant Community

The area designated as Granitic Outcrop shall represent an eco-type unique to Pickens County and the Piedmont regions of the southeast. These outcrops are granitic extrusions due to geological plate shifts and erosional factors which have eroded the softer materials around the hard granite surfaces, exposing the parent rock material. The factors influencing the rock surface are erosion, freeze-thaw cycles, and mass-wasting. These factors create depressions and varying soil depths that allow unique plant assemblages to occur. These are herb-lichen plant communities which thrive on the harsh conditions and thin soils on the rock surface.

These areas shall be established by bringing in large local granite boulder stones and placing them in the ground to create a rolling topography with gentle grades and various levels of depressions. The various levels of depressions shall provide the local habitats for the granitic outcrop plant species. The plants and planting of these granitic outcrops shall be done by collecting seeds from local sources and allowing natural processes to proceed. To keep this fragile ecosystem pristine, there will be a boardwalk that traverses the outcrop so as to keep foot traffic off the fragile lichens, plants, and bryophytes. The evolution of this plant community shall be highly educational and represent a natural plant community of Pickens County.

The general maintenance of the granitic outcrop shall be to prevent exotic plants from invading the site. This should be done manually. As the system evolves, trees and shrubs should be carefully evaluated to ensure succession processes favors the desired granitic outcrop species. There should be **no** fertilizers or chemicals associated with maintenance of this ecosystem.

Climax Beech Forest Community

The Nalley Brown Nature Park has a significant area of mature oak-beech forests. These stately oaks and beeches indicate a forest that is reaching the climax stage of succession. These towering trees and forests along the western edge of the park display majestic canopies and strong trunks.

These forest type plant communities do not need establishment because the mature canopy trees are already in place. There are some areas that have thickets or groves of small caliper trees that will need to be selectively thinned to allow maturing trees to continue filling out and reach their potential. The understory layer of these forests is lacking in diversity. As such, supplemental trees such as dogwood, redbud, and/or serviceberry can be added. The shrub layer can be enhanced with sweet shrub, hearts a' burstin, and native azaleas. The ground plane can be enhanced with green and gold, crested iris, blue cohosh, trilliums, and ferns.

The routine maintenance should be focused on maintaining the health of the trees by selective removal of dead, dying, or leaning trees coupled with the application mycorrhyzial fungi as needed. The maintenance should include monitoring and the removal of any exotic invasive plant species. Remove dead, dying, or leaning trees as they become hazards. All trees that are cut because of dead, dying or leaning should have the limbs removed and place the logs back into the landscape. Limbs may be chipped and returned to paths or the landscape.

Mature Oak Hickory Forest

Oak Hickory Forest were once the most abundant upland plant communities in the Piedmont. They are still very common but it is rare to find original forests that have been unaltered. At Nalley Brown Nature Park, there are maturing examples of this Piedmont plant community that offer a great opportunity for educational experiences.

The establishment goals include working with existing trees to aide their health and viability while also adding to the diversity of the under-story and ground planes. The establishment of this key plant community begins with assessment of the health of individual trees and mapping the under-story species to get a distribution model. The second task is to locate a mature undisturbed Oak-Hickory Forest and map the distribution of species to determine species and species densities. This will be compared to the Nalley Brown model so restorative determinations can be made to enhance and set the Nalley Brown forest model on a path toward maturity.

The maintenance of the of the Nalley Brown Oak Hickory forest community shall be to monitor for dead, dying, leaning trees, or fallen trees. Monitor for and address disease or invasive species that may come into the forest. Remove dead, dying, or leaning trees as they become hazards. All trees that are cut because of dead, dying or leaning should have the limbs removed and place the logs back into the landscape. Limbs may be chipped and returned to paths or the landscape.

Secondary Post Oak Savannah Community

Post Oak Savannas are historical plant communities in the Piedmont regions of South Carolina. Presently there are no intact Post Oak Savannas in Pickens County. There are only partial remnants of these plant communities. Post Oak Savannas are characterized by open areas with native warm-season grasses and forbs, interspersed with Post Oak (*Quercus stellata*) and Black Jack Oak (*Quercus marliandica*). The goals are to bring this plant

community model into Nalley Brown Nature Park to serve as an educational resource and to re-introduce this plant community to Pickens County.

Establishment begins with selection of the proper site to locate the restoration effort. The site selected will be selectively cleared of trees and plants that do not fit the desired plant community. Once the areas are cleared and lightly graded, the establishment of Post Oaks and desired native grasses will begin. The trees will be established in groves allowing open spaces for the grasses and perennial forbs. The warm-season grasses will be sown as seed and will take 1-3 years for desired appearance and cover.

The core of the maintenance for the first few years shall be to ensure the health and survival of the planted trees and warm season grasses. This shall include keeping out unwanted exotic invasive species. This plant community eco-type is a fire maintained community, thus a controlled burn every three years would be best, however a mowing regime can be adequate.

Cataract Seepage

Cataract Seepage plant communities are rare occurrences often associated with sloped granitic outcroppings. These plant communities are characterized by carnivorous pitcher plants, grass pinks, and terrestrial orchids. This plant community will make an excellent educational and visual addition to the Nalley Brown Nature Park.

The Cataract Seepage shall be established by bringing in granitic boulders of large size and placing them in an appropriately graded area to achieve the right pitch and water movement over and through the system. This plant community shall be located within the Post Oak Savannah plant community where clearing will already be part of the establishment strategies. The key components are getting the water retention into depressions to hold the moisture for the planting to thrive.

During the establishment period the maintenance shall be comprised of monitoring moisture amounts and invasive species management. Once the seep is established, continued monitoring and control of invasive species will be required.

Piedmont Springhead Seepage Forest

Springhead Seepage Forest community types are found through out the upper Piedmont of South Carolina. Springhead forests typically begin as seepage at the base of slopes and extend down-slope in varying distances. They are often found to have seepage channels that have year-round, slow moving cool water which cuts and braids the landscape. Here at Nalley Brown Nature Park is a great example of this plant community eco-type with deep ravines opening to broad alluvial areas. The plant community at Nalley Brown has nearly an enclosed canopy consisting of red maple and tulip poplar tree as the dominant species. These deep ravines offer an educational opportunity to observe hydrological effects on the landscape and how past agricultural practices also influence the recovery of the landscape.

The establishment of this central area of Nalley Brown Nature Park begins with addressing the slope stability in the ravines. Stabilization can be achieved with bio-engineering. Horizontal placement of geo-textiles and/or saplings harvested from other on site restoration activities will provide initial stabilization. Additional native vegetation will be added to supplement bank stability and to increase the diversity of the community. The plant choices and numbers shall be determined as details on stabilization of the banks develops. There are also

invasive plant such as multi-flora rose that exist along the lower water course area that will need to be removed and replaced with indigenous shrubs and herbaceous perennials.

The maintenance of the Springhead Seepage Forest begins with maintaining the stability of the slopes and keeping invasive exotic plants out of the area. As with other forest eco-types, removal of dead, dying or leaning trees should be done to decrease hazards and liability. These removed trees should be stripped of limbs and and the logs applied back into the ecology of the site.

Ruderal Plant Community

Ruderal plant communities are loosely defined as early successional vegetation areas that are brambly in character and usually found along roadsides. In a loosely managed state they can promote beautiful wildflower and wildlife habitat. The designated ruderal areas on the periphery of the Nalley Brown Nature Park are already moving toward this plant community eco-type and shall provide a low maintenance buffer and wildlife corridor.

The establishment of the ruderal community eco-type shall be to bush hog/mow the areas designated. Once mowed, allow vegetation to begin re-establishment and identify plants and tree re-sprouts to edit from the landscape.

The general maintenance shall be to mow once to twice per year in the late spring and late fall. Monitoring and removal of invasive exotic plants and undesired tree saplings should be on-going.

Landscape and Display Gardens

The Nalley Brown Nature Park entrance, parking, and visitors center areas will be landscaped to provide a visual and sensory experience for the all who visit the park. By showcasing beautiful and diverse native plants, the display gardens and landscape elements shall be visually pleasing, highly educational, and demonstrate sustainable applications such as rain gardens, bog gardens, and xeric landscapes.

The landscape display gardens shall be established through detail designs that work in concert with built elements such as the parking lot, walkways, and water features. These areas shall be prepared by grading and adding proper soils and quality native plants.

As the face of the park, these areas will be highly maintained to present a great appearance and provide for a visual experience. This shall be accomplished by proper weed control, dead-heading spent flowers, and applications of mulches and amendments when necessary.