Black Creek Scout Reservation BioBlitz:

A Vascular Plant Species Inventory

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Abstract: A one-day botanical BioBlitz (a study of species in a particular time and place) was conducted at Black Creek Scout Reservation in Screven County, Georgia on October 18, 2014. This study explores and inventories the botanical biodiversity of the camp owned by the Coastal Georgia Council of the Boy Scouts of America (BSA). A team of seven scientists, naturalists, scouts, and volunteers conducted surveys in vegetation plots to assess the species richness of vascular plants. The goals of the BioBlitz were to better understand southeastern U.S. plant communities, share forest stewardship knowledge, and document vascular plant species inventories as guides for the responsible management of our natural resources. The data provided a vision for future land management goals. Species found were representative of the Savannah River watershed. If managed properly, Black Creek Scout Reservation will provide a wonderful setting for our community to discover, explore, and connect to our Coastal Plain ecosystem.

Global biodiversity is on a rapid decline with species habitat loss facing real threats. Research indicates that human development has negatively impacted species' habitats worldwide. Over the centuries, development from human population growth has led to environmental deterioration, natural resource extraction, and depletion of biodiversity. However, environmentally conscious decisions made at the local level may slow biodiversity loss and lessen the threat to Earth's dynamic life support systems.

The Coastal Georgia Council of the BSA purchased 380 acres of Coastal Plain habitat in Screven County, Georgia in 2012. This tract of property is in phase three of a facility and high adventure development youth camp. Known as Black Creek Scout Reservation (BCSR), this land once supported native Longleaf Pine (*Pinus palustris*) forests historically found in diverse Coastal Plain ecosystems. These native forests have been reduced to less than five percent of their historic range due to timber harvest, agriculture, and urban development. The land management history of this property has involved numerous timber production companies that planted Loblolly Pine (*Pinus taeda*) as a revenue stream beginning in the 1940s. The previous forest stewardship plan prioritized revenue over biodiversity, which has resulted in areas of camp with fewer plant species. This monoculture practice appears to have decreased the botanical biodiversity of the forest ecosystem.

The decision to organize a BioBlitz arose from a collaborative effort between the BSA and Miami University of Ohio's Global Field Program (instructors/graduate students), who provided necessary guidance. The BioBlitz event provided a method to inventory various vascular plant species and assess the diversity (species richness) of different forest cover types

Pictured left to right: Robert Hattaway, Donald Hendrix, Jadon Hendrix, Jed Jewitt, and Terri James

located at BCSR. Measuring species richness is accomplished with a simple count of species. The BCSR BioBlitz provided a "snapshot in time" of the current plant life within the ecosystem. This event created a fun atmosphere of interactive learning that brought awareness to land conservation and a better understanding of habitat biodiversity. Teaching biodiversity concepts in an "outdoor classroom" has potential to increase conservation awareness in the way children view their natural surroundings. This BioBlitz was a natural spark in our burning desire to educate young people as part of the BSA mission.

One personal goal of the lead researcher is to improve the environmental education programs offered to scouts during weekend activities and resident camp. The outdoor code of the BSA states that scouts must be 'conservation minded.' A BioBlitz is the perfect conservation activity to engage scouts through active participation with a variety of professional scientists, botanists, and volunteers. This participatory approach allows scouts and other users of the camp to contribute to conservation through the scientific process. Multidisciplinary science events expose young people to different learning perspectives and give them an opportunity to work alongside researchers and scientists as they share findings made through observation and exploration. The purpose of this report, using a participatory approach, is to provide a vascular plant inventory from three study sites at BCSR. The inventory will establish baseline data for monitoring changes in plant diversity when a future forest stewardship plan is implemented.

Method: This BioBlitz activity began with the formation of a conservation team of scientists, professors, naturalists, and other professionals to help facilitate and guide the seven hour biodiversity study at BCSR. Prospective organizations of interest included the Georgia Department of Natural Resources, Georgia Forestry Commission, Army Corps of Engineers, Georgia Botanical Society, Georgia Native Plant Society, USDA Fish and Wildlife Service, and Georgia Southern University. The professionals who participated included Dr. Robert Hattaway, vascular plant botanist and board member of the Coastal Plain Chapter of the Georgia Native Plant Society and Georgia Botanical Society; Donald Hendrix, regulatory specialist with the U.S. Army Corps of Engineers and certified Georgia forester; and Linda Scovanner, certified Environmental Educator through the North American Association for Environmental Education. An aspiring naturalist, Terri James, and the lead researcher, Jed Hewitt, along with two youth siblings aged nine and twelve completed the team. Youth participation was low due to limited promotional time; however, future BioBlitz events

will encourage increased participation from the younger scout community.

Flora Data Collection: The standardized sampling technique for measuring vascular plant diversity is the nested quadrat plot, also known as the center-point corner plot. The vascular plant data was collected using three different nested subplots of $1m^2$, $10m^2$, and $100m^2$. Vascular plant sampling was first conducted in the $1m^2$ plot, then the $10m^2$ plot, and finally the $100m^2$ plot. If a vascular plant was documented in the nested $1m^2$ plot, then it was automatically documented in the $10m^2$ and $100m^2$ plots, respectively. This sampling method assists botanists in conducting species inventories and monitoring species richness over time. With a more efficient multi-scale sampling method, BioBlitz participants can document species that might be overlooked using a single-scale sampling method.

The $100m^2$ nested plots were measured and flagged at three different forest ecosystem study plots within BCSR. The study plot locations were selected based on forest cover variety and elevation. Study plot #1 was a mid-slope oak-pine forest. Study plot #2 was a bottomland riparian hardwood forest. Study plot #3 was an upland xeric planted Loblolly Pine forest. The GPS coordinates of each study plot's center point were recorded, enabling repetition for future studies at the exact locations. This method establishes a study plot on the northwest side of the magnetic north bearing. In addition, four individual trees with diameter at breast height (DBH) greater than two feet were documented at each center-point to establish a representative forest cover type and reinforce GPS locations. The closest tree to the center-point in each of the four quadrats (i.e. NW, SW, SE, and NE) was recorded and given a separate column on the Vascular Plant Species Inventory. The vascular plant data collection only documented understory plants. Understory vascular plants were defined as vegetation with DBH stems less than two centimeters and included tree seedlings. Overstory species were defined as those with stems with a DBH greater than two centimeters and were not recorded on the Vascular Plant Species Inventory.

Pictured left to right: Emma Hendrix, Robert Hattaway, Jadon Hendrix, Donald Hendrix

Materials that aided researchers during the BioBlitz included aerial photographic maps, soil survey maps, and infrared topographic maps. Reference books included the *Manual of the Vascular Flora of the Carolinas* by Radford, Ahles, and Bell (1968), the *Field Guide of the Ferns and Other Pteridophytes of Georgia* by Snyder and Bruce (1986) and the *Field Guide to the Rare Plants of Georgia* by Chafin (2007). The nested quadrat plots were established using standard forestry equipment, including GPS units, compass, orange ground flags, orange flagging tape, and diameter measurement tape. Other field data supplies that were necessary included pens, data logs, clipboards, hand lenses, and digital SLR cameras.

Results: The BioBlitz team predicted the greatest species richness in the bottomland hardwood study plot due to available water. However, the results suggested the upland planted loblolly pine forest plot had the greatest species richness with forty different vascular plant species documented (Figure 1). Disturbed areas are often more species-rich due to increased amounts of edge habitat plus the presence of weedy species that invade disturbed areas. The upland planted pine forest plot exhibited species representative of the historic Longleaf Pine forests including Licorice Bedstraw (*Galium circaezans*) and Sparkleberry (*Vaccinium arboretum*). Both the bottomland riparian hardwood

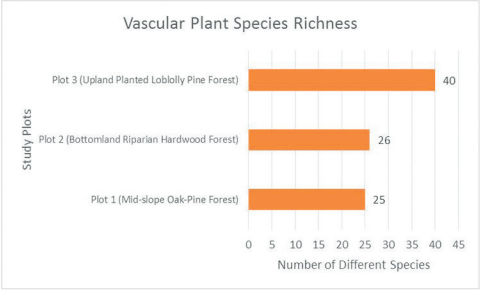

Figure 1: Species richness graph for three vascular plant study plots located at Black Creek Scout Reservation in Screven County, Georgia.

forest plot and the mid-slope oak-pine forest plot had similar species richness with 26 and 25 species documented, respectively. This was in part due to a thick mat of non-native Marsh Dayflower (*Murdannia keisak*) that dominated the wet soils along the bottomland stream. The monoculture of this invasive species successfully out-competed other hydrophilic species. Other non-native species documented included Japanese Honeysuckle (*Lonicera japonica*) in the bottomland and upland plots and Chinese Privet (*Ligustrum sinense*) in the bottomland plot. The results confirm that all plant species documented had been previously recorded in Screven County and adjacent counties.

Discussion: The BioBlitz event held at BCSR was successful at identifying vascular plant species throughout the property. Collecting botanical data using this method is new for most of the scouting community. It may take time for others to fully understand the goal of this innovative approach to land stewardship management. However, the data collection methods are easily replicated and can be used in additional study plots throughout the property. New vascular plant discoveries may be added to existing inventories through future BioBlitz events involving different groups of people. Others will be able to follow the nested quadrat plot method to inventory understory vascular plants. Data collected over time will show trends in species richness, invasive species, and overall forest ecosystem health.

The flora data collected in this study will enhance science based scouting programs and improve the environmental education experience. Our summer camp programs will use this data to monitor any changes in species as new land management practices are implemented. One such forest health initiative is the use of prescribed fire within the Coastal Plain ecosystem. A partnership with the Georgia Forestry Commission will help increase plant biodiversity. Plans will need to be approved in order for the groundcover at camp to be properly burned. Reduction of the fuel load that has built up over the years is one part of this plan. Prescribed fire will lead to greater understory plant species richness, diversity, and evenness. Members of the Longleaf Alliance, an additional partnership, will be asked to guide the reintroduction of longleaf-wiregrass communities as another action component of the land stewardship plan. Representatives from these organizations may be asked to provide presentations and lectures to enhance our environmental education programs.

A hands-on, outdoor education approach will allow the scouting community to make connections to their environment and better understand the value of biodiversity. It is important that the scouts play an active role in the scientific process of future conservation studies. Their participation will allow them to better understand the biological interactions within our Coastal Plain ecosystem by developing fundamental knowledge for the responsible use of our natural environments. Everyone involved in the collective environmental education process will be able to reference the vascular plant species inventories as guides for the responsible management of our natural resources.

Conclusion: The lead researcher is very thankful for those participants who assisted in this inaugural BioBlitz. One significant aspect of the BioBlitz is that the 45 documented volunteer hours represent more than a 40-hour week that paid field staff would have had to work in order to collect the floristic data presented in this report. The natural resource data collected by this conservation team is signifi-

cant considering there is no operating budget for natural resource projects within the Coastal Georgia Council. The BioBlitz provided $540 in cost-savings to the Coastal Georgia Council through volunteer time (at $12/hr.). These data are the first known documentation of vascular plant species at BCSR.

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