Big Cypress Bayou Monitoring Network
Forest Plot Results: 2012-2016

December 31, 2016

Tom Hayes, Ph.D., Texas Conservation Science, Inc.
P. 0. Box 150894, Austin, TX 78715-0894

Prepared for:
Caddo Lake Institute, 707 Rio Grande, Ste. 200, Austin, Texas 78701

Collaborator:
USGS National Wetlands Research Center, 700 Cajundome Blvd., Lafayette, LA 70506

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (concluded)

1. Introduction

This report summaries five years (2012-2016) of forest-plot monitoring at three long-term riparian research sites. The project is located on private property along Big Cypress Bayou (BCB) between Lake O' The Pines (LOP) and Jefferson, in northeast Texas near the Louisiana border.

The monitoring effort examines the sustainability of riparian forest communities within the BCB study reach. The objective is to establish a monitoring network of long-term forest plots, create a baseline of quantitative vegetation data for the plots, and, thus, initiate the monitoring of forest condition, in order to detect downstream responses of riparian forest during reservoir operations, including environmental releases.

The subject monitoring effort by Texas Conservation Science (TCS) and the USGS National Wetlands Research Center (NWRC) is an extension of the USACE-TNC Sustainable Rivers Project (SRP) flows study in the Cypress-Caddo Basin. Since 2005, the SRP research has focused on the quantification and restoration of hydrologic regimes, in order to maintain riparian forest and wetland habitats and fisheries habitat. Recent TCS research for the Caddo Lake Institute (CLI), a SRP partner, mapped wetted surfaces using satellite imagery, over a full range of flow magnitudes, to produce habitat inundation maps and facilitate related regression analyses for the overall Cypress Basin.

The five-year monitoring effort (2012-2016) reported here indicates that LOP environmental releases produce inundation frequencies and durations sufficient to maintain low-elevation bald cypress and overcup swamps. However, likely due to the inability of LOP to release flows greater than 3,000 cfs, environmental releases may not sustain the more elevated and extensive bottomland forests, dominated by willow oak and water oak.

The three BCB study sites initiated not only a landscape-scale riparian study within the Caddo-Cypress watersheds above Caddo Lake, but also a regional effort by TCS, which is funded by the Texas Parks and Wildlife Department and the Texas Water Development Board. Utilizing

methods similar to the BCB study, including forest monitoring plots and habitat inundation analyses, the larger project establishes eleven additional long-term riparian study sites mostly on private ranches and farms in the Guadalupe, Brazos, and Trinity River basins.

The BCB project assesses the impact of the regulated flow regime of LOP on the sustainability of downstream habitats, including riparian forests and the globally significant fish and wildlife habitats of Caddo Lake. As discussed by King et al. (2009), impacts to riparian habitats and connectivity on private lands also pose serious threats to downstream resources, including aquatic and terrestrial habitats, and the quantity and quality of stream flow. To improve our understanding and management of the spatiotemporal complexity of floodplain habitats and their connections, King et al. (2009) identified the integration of different disciplines as the critical need in the restoration and conservation of floodplain habitats. In response, the BCB project integrates different approaches, including hydrology, remote sensing, and quantitative plant ecology.

2. Background

2. 1 Riparian Habitats

In undisturbed floodplains, habitats are dominated by a diversity of swamp and riparian forests, along with shrub and herbaceous wetlands, and both lentic and lotic aquatic habitats. More than any other factor, the sustainability of ecosystem processes within floodplains depends upon connectivity among these different habitat patches via water level fluctuations (Thoms et al. 2005, Junk et al. 1989).

Species composition varies among these habitats primarily due to different species tolerances to site-specific regimes of inundation and soil saturation. When researching connections between tree growth and inundation, Smith et al. (2013) showed that river flow variables impacted tree growth more than climate. A higher frequency of floods either directly increases riparian forest growth rates or indirectly does so by impeding less flood-adapted competitors. In addition to hydrology, the location of riparian forest stands within the diverse floodplain mosaic of

geomorphology, soils, and available plant species also causes variation in species composition and structural characteristics across floodplains. A consequence of the interplay among these factors is that the biodiversity of riparian forests is usually double that of nearby upland forests (Gosselink et al. 1981).

This study focuses on the connection of high and overbank flows to riparian habitats, in order to examine how the frequency and duration of environmental flows may maximize riparian benefits, even as water availability is altered. Despite the attenuated flow regime within the BCB study reach, the re-establishment of a more natural flow regime is essential to restore riparian forest functions (Alldredge and Moore 2012; Merritt et al. 2010). Due to the large coordinated effort required to modify the flow regime of major rivers, floodplain restoration has mostly been implemented through smaller local projects, where disturbed vegetation and hydrology are re-established (King et al. 2009). The SRP-BCB study takes the less common approach of coordination among multiple collaborators and flow management.

Examining plant population traits of a single species or a community at the river-reach scale, as in the current BCB research, allows examination of the long-term effect of a flow regime (Merritt et al. 2010). At this scale, metrics more sensitive to hydrologic change in this study include species composition, canopy cover, the ratio of relative importance values for live trees versus snags, and the percentage of wetland indicator species among dominant plant species. All of these metrics are addressed in the BCB riparian-forest monitoring effort.

Faced with the elevated species and community diversity of riparian areas, Merritt et al. (2010) coined the term "response guild" to describe plant communities consisting of species sharing similar functional attributes in response to environmental variables. In this sense, the four riparian tree communities, which are the primary research subjects in this study, are forest-flow response guilds. The primary BCB guilds (bald cypress swamp, overcup oak swamp, willow oak riparian forest, and water oak riparian forest) are comprised of species with similar responses to the duration and frequency of inundation and related soil saturation. In this manner, the four guilds are also segregated according to surface elevations within the floodplain.

2.2 Riparian Forest Hydrology

The site-specific combination of duration, frequency, timing, and depth of flooding is called the "hydroperiod." The hydroperiod is the determining factor for species composition of both plants and animals in riparian forests, due to the evolutionary matching of species distributions and hydrologic cycles (Bedinger 1981, King and Allen 1996). In east Texas riparian forests, flood duration is the most important influence of the hydroperiod on tree species composition (Dewey et al. 2006). The competitive sorting of species during annual tree recruitment is mostly determined by the spring hydroperiod, which exerts a disproportionate influence on seedling establishment and the early stages of succession.

2.2.1 Overbank Events

Annual or nearly annual flooding is the defining feature of riparian forests. Within the Mississippi-Red River region, which includes BCB, most riparian forests along relatively unregulated rivers flood once per year for about 40 days on the average (Gosselink et al. 1981). In one of the most intensive studies of a natural flood regime in the southeastern U.S., the Ogeechee River in Georgia flooded greater than 50 percent of the natural floodplain for a minimum of least 30 days annually (Benke et al. 2000). Generally, as floodplain size increases, floods tend to decrease in frequency, but increase in duration and seasonal predictability (Junk et al. 1989).

Annual flooding maximizes the increasingly valuable ecosystem and related economic benefits of riparian areas, including primary production, plant diversity, animal habitat use, organic matter export, and improved water quality (Gosselink et al. 1981, Hunter et al. 2008, Opperman et al. 2010). For example, a reduction in overbank flows results in the loss of backwater areas that comprise a primary source of labile carbon, which forms an essential foundation of riverine and downstream estuarine food chains (Thoms et al. 2005). In this manner, the maintenance of river-floodplain connections results in consistently higher freshwater fishery yields (Bayley 1995).

2.2.2 Biological Requirements for Overbank Flows

On the Cache River in Arkansas, intensive hydrologic studies reveal that more than 90 percent of the annual water budget for riparian forests consists of river inflows and outflows (Walton et al. 1996). These and other studies show that water fluxes not derived from stream flow, such as groundwater, precipitation, and evapotranspiration, are insignificant inputs to the riparian-forest water budget.

Overbank flows are essential to sustain riparian forests. Rood et al. (2005) describe such flows as "flood pulses," which can be operationally managed to maintain or revitalize floodplain habitats. For many riparian plant species, seed germination and seedling establishment must follow floods severe enough to create new seedbeds from bare soil, and distribute seeds and vegetative propagules (Bendix and Hupp 2000). The timing of seed dispersal and germination varies by tree species, so that the spatial and temporal variation of forest-reviving floods configures riparian forests as mosaics of different ages and species compositions (Hughes and Rood 2003).

Managing "regeneration flows" is accomplished by: (1) timing inundation to coincide with the phenology (seed dispersal and germination) of target tree species, (2) varying the interannual timing of floods to increase plant diversity, (3) adjusting the rate of flood-water recession, and (4) promoting channel movement and sedimentation to create new seedbeds (Hughes and Rood 2003). Overbank regeneration events should slowly recede to maintain soil moisture for seedling germination and establishment (Rood et al. 2005). Through their research, Hughes and Rood (2003) show that the stream stage elevation should not drop faster than the average rate of seedling root growth, which is less than one inch or 2.5 cm per day. Therefore, overbank and high flows should recede slowly, so that the stream stage elevation does not drop faster than one inch per day.

Overbank flows need to be frequent and long enough to exclude upland species, in addition to regenerating riparian species. Townsend (2001) found that prolonged inundation during wet years best maintains riparian species composition, largely as a result of more adverse impact to upland species. To attain equal control of upland tree species, Gosselink et al. (1981) conclude

the total length of intermittent flooding should be greater than that of continuous flooding. To be most effective, both in terms of maintaining riparian tree species and discouraging invasive upland species, early spring floods following leaf emergence should last a total of two to four weeks.

Figure 1 presents flood duration and frequency targets to maintain each riparian habitat type in the study area.

2.3 Variable Flows for Sustainability

Riparian forest productivity is augmented by the combination of high species diversity and high flows (Bayley 1995). An extensive literature review by Conner et al. (1990) shows that primary production of riparian forests with natural hydrology is greater than 1000 $g/m^2/y$, which ranks these forests among the most productive wetland ecosystems. The link between annual tree productivity and flood duration is statistically significant, but only when examined over a combined two-year period (Anderson and Mitsch 2008). Prior growing conditions are important, since stem growth occurs early in the growing season and, therefore, depends upon stored energy from the prior growing season. Current-year flooding also affects growth.

2.3.1 Ecosystem Services

The health of riparian forests affects local and downstream nutrient loading. Riparian forests with natural hydroperiods have high and long-term capacities to remove nitrogen (N) and retain phosphorus (P) from floodwaters (Ardon et al. 2010). Due to longer residence times to absorb large nutrient pulses during storms, broad active floodplains are important to reverse pollutant loading.

One of the most important benefits of riparian forests to society is increased water quality, most notably through the removal of high N concentrations. The wet-dry fluctuations of floodplain soils create successive aerobic and anaerobic environments. Nitrification is an aerobic or dry-cycle process, which through microbial oxidation basically converts ammonia compounds to

nitrate compounds. During the succeeding wet period, anaerobic soil conditions are created, which promote denitrifying bacteria that, in turn, convert the nitrate compounds to N gases such as nitrous oxide. In this fashion, high N concentrations in river flows are reduced.

Junk et al. (1989) show that the predictable seasonal timing of long-duration floods allows biotic adaptations to more efficiently utilize resources, allowing floodplain water flux to foster rapid recycling of organic matter and nutrients. As with seedling establishment, drawdown following a flood is likely more important to production than rising water levels in many temperate systems (Bayley 1995). In addition to the rate of rise and fall, the timing of overbank flows relative to rising temperatures influences annual productivity. Since most floods in the southeastern United States occur in winter or spring, water temperatures are more conducive to high biotic productivity during drawdown, as opposed to the rising phase of the hydrograph.

When the post-flood infusion of carbon and nutrients from productive habitats coincides with warming spring temperatures, the fertility of in-stream and downstream waters is enhanced. Significantly more organic matter and detritus are exported by retreating winter and spring floods in the temperate US, compared to summer floods (Gosselink et al. 1981, Junk et al. 1989). The productivity and diversity of aquatic macrophytes is also greater after spring floods, than after summer floods (Robertson et al. 2001).

2.3.2 Habitat Productivity

Overbank flows sustain the high productivity of riparian forests, by elevating rates of annual litterfall and nutrient turnover, increasing decomposition rates, and flushing of accumulated detritus and metabolic waste products (Conner et al. 1990, Hunter et al. (2008). The temporal distribution of overbank flows is the primary determinant of not only habitat types, but also regulates biogeochemical processes in bottomland soils, such as decomposition, sedimentation, and N cycling (Hunter et al. 2008).

The exchange of organic matter and nutrients among different habitats, starts with variable river levels that trigger switches between biological production and transfer phases within floodplain

habitats (Amoros and Bornette 2002). Flood pulsing causes successive oxic and anoxic soil conditions within floodplain riparian forests, which drive nutrient processing. Hunter et al. (2008) document positive linear correlations of soil moisture in riparian forests with heterotrophic microbial activity, readily mineralizable carbon, and soluble organic carbon.

In addition to significant biogeochemical benefits and erosion protection, riparian forest structure represents significant carbon storage. Elevated primary productivity due to overbank flows allows riparian forests and wetlands to achieve the highest biomass per area of any temperate ecosystem (Gosselink et al. 1981). Research in northeast Louisiana found the range of carbon storage in riparian forests to be 90-124 Mg C/ha (Hunter et al. 2008). The potential role of riparian forests in mitigating climate change is substantial.

2.3.3 Fish and Wildlife Stewardship

For fish and wildlife, the primary function of the main river channel is not production, but is access to adjacent floodplain resources during storms, and associated overbank and tributary flows. Such access is critical, since almost all animal biomass within riverine systems is produced within floodplains, not river channels (Junk et al. 1989). For instance, even for smaller streams, 67-95 percent of invertebrate production takes place in the floodplain, not the stream channel (Smock et al. 1992). Consequently, many researchers find that bird, mammal, and fish populations decline in riparian ecosystems, when flood frequency decreases (Gosselink et al. 1981).

When the amount of accessible floodplain expands, fish production increases greatly (Junk et al. 1989). Fish spawning is often coordinated with rising floodwater, with spring spawners targeting the seasonal coincidence of rising floodwaters and warmer temperature. Similar to the effect on tree recruitment, following spring floods good fish recruitment depends on the gradual retreat of flood waters during the warm growing season (Junk et al. 1989). A slow drop in water levels also allows invertebrate prey populations, which increase due to coincidental nutrient runoff, to reach even higher densities. Bayley (1995) documented that the earlier and briefer overbank events in recent decades, largely due to anthropogenic floodplain disturbance, disrupts the evolutionarily

synchronized timing of fish spawning and invertebrate prey availability. Similarly, mallards are adversely impacted by decreased flood frequency, due to decreases in habitat accessibility, food availability, and nutritional quality (Heitmeyer 2006).

3. Methods

In order to determine the efficacy of environmental releases from LOP and establish a baseline for long-term monitoring of forest composition (species and structure), the following approach and quantitative methods are applied within the three permanent study sites BCB.

The initial field work in 2012 ground-proofed prior inundation results, which guided the subsequent initiation of soil-moisture, groundwater, and forest-plot monitoring. Figure 2 provides the location of the three riparian study sites on BCB between Jefferson and LOP, while Figures 3-5 detail each study site, including plot and groundwater-well locations. Within the three riparian study sites, plant-community composition (species and structure) is measured within permanent vegetation plots during field surveys. Ongoing land management, such as cattle grazing, continues within the study areas, to be representative of local land use.

In this study, the spatial configuration of riparian forest types, i.e., forest-flow guilds, was determined by 100% ground surveys, in order to locate vegetation plots according to a stratified random design. The strata in this study consist of the four forest-flow guilds (Figure 1): Lower Swamp (LS) - bald cypress, Upper Swamp (US) - overcup oak, Seasonally Flooded Forest (SFF) - willow oak, and Temporarily Flooded Forest (TFF) - water oak. The following is an overview of the vegetation plot methods. Additional detail regarding field methods may be found in the field protocol (Appendix C). Figures 6-9 are photographs of various inventory crew members surveying plots and taking measurements such as tree diameter. An interesting feature of Figures 6 and 9 is the pervasive waterline, which marks the 3,000-cfs stage elevation. This is the maximum discharge rate from LOP, so that the waterline occurs throughout the two swamp guilds within the BCB study areas.

<u>Plot Benchmarks</u> - The precise location of each end of the randomly selected 50-m transects is recorded by GPS coordinates and by triangulation from witness trees or other prominent features.

These transects are the centerline for the 10m X 50m macroplots. Five macroplots are randomly located in this manner in each of the four forest-floor functional guilds, or forest types, within the three BCB study sites. The only exception is Study Area 2, where only 4 of the LS and HS forest types were available.

As appropriate, labeled iron-rebar sections (0.35 cm diameter, 45.72 cm long) are driven flush to the ground surface at each end of the central 50-m transect, in order to serve as permanent benchmarks. Benchmarks will increase the precision of relocating sampling locations in the future, as facilitated by metal detectors, witness-tree triangulation, and photo points. The use of the same sampling locations significantly increases the statistical power of change detection, when subsequent samples are compared to baseline conditions.

Tree Layer - Within each 10m X 50m macroplot, the diameter at breast height (DBH, 1.37 cm above ground) is recorded by species for all live and dead woody perennial vegetation (trees) with at least 1 stem equal to or greater than 5 cm DBH. In this manner, multi-stemmed trees with at least 1 stem equal to or greater than 5.0 cm DBH are included along with single-stemmed trees. Diameter measurement is to the nearest 0.1 cm, rounded as appropriate. For multi-stemmed trees, DBH and basal area (BA) are calculated based on the respective sum totals for stems. All measured trees are marked with aluminum tag. In this manner, all trees within 5 m of either side of the center 50-m transect are inventoried.

Vigor Class – For live and dead trees, a vigor class is recorded representing % live canopy volume. The lower the vigor class the fuller and healthier the live tree crown. For example, vigor class 1 represents the healthiest trees, and 6 represents the unhealthiest live trees.

Location – The location (nearest meter) of stems along the center 50-m transect is recorded, including whether the stem is left or right of the center transect, when facing the 50m end of the transect. This facilitates the creation of stem maps and relocation of measured trees.

Shrub Layer - Tree saplings and shrub species are quantified within ten 10-m^2 quadrats (5 m X 2 m) centered at 5m centered at 5m increments along the central 50-m transect within the 10m X

50m macroplots. Tree and shrub species (live and dead) greater than 1.37 m in height and with a DBH of less than 5 cm are recorded as described in the tree layer method, including species, vigor, and DBH at a height of 1.37 m. DBHs for multiple stems connected above ground are recorded separately. Measured stems are located in the field as practical, either by tree tags (DBH > 3 cm) or by recorded location (DBH < 3 cm).

Herb Layer - The herb layer (live woody seedlings and herbs) is quantified using a total of ten 1-m^2 quadrats located along the central 50-m transect in each 10m X 50m macroplot. These quadrats are centered at the centered at 5, 10, 15, 20, 25, 30, 35, 40, 45, and 50 m along the central 50-m transect within the macroplots.

Calculations - Several variables for both species and layers are calculated from the above data, including basal area (tree and shrub layers), canopy cover (herbs and woody seedlings) density (all layers), and frequency (all layers). Frequency is calculated as the percentage of 5m segments or quadrats, along the long axis of the forest-structure plot, which are occupied by a given species or microhabitat. In addition, relative importance is defined as the average of percent relative basal area (tree layer), percent relative density, and percent relative frequency, where the percent relative value equals the value for the species divided by the sum of values for all species times 100.

Plot Inventory Database – Plot inventory data (2012-2016) for all three of the study sites (58 macroplots total) are summarized in Appendix B, with more detailed tabulations available as Excel and other digital files.

4. Results

4.1 Tree Layer

For each of the four forest-flow guilds, Tables 1.1.1 through 3.4 (Appendix B) present summaries of tree-layer field data for each of the three field sites and as three-site averages. Among live trees, low-elevation bald cypress swamps (Tables 1.1.1-1.1.4) are strongly

dominated by bald cypress (63.31% average importance value), though water elm is also important (18.72% average importance). A total of 11 tree species were inventoried within this guild in the BCB study area. Based on the percentage of snags versus live trees in terms of basal area (Table 2), species that are declining in bald cypress swamps include swamp privet (42.99%), sweetgum (37.51%), and water hickory (22.34%). In this guild, most tree mortality occurred 2-3 years prior to the 2013 plot inventory, though 2013-2016 mortality in water elm continued at a high rate compared to other species (Table 3.1).

Within the upper overcup oak swamp guild (Tables 1.2.1-1.2.4), overcup oak is dominant (40.73% average importance) among the 17 live tree species in this guild. Other important live tree species include bald cypress (9.97%), sweetgum (8.47%), water oak (7.19%), and rough dogwood (5.62%). Snags are dominated by water hickory, American hornbeam, common persimmon, and water elm (Table 1.2.4). Based on the basal area of snags versus live trees (Table 2), six tree species appear to be in jeopardy within the guild, though river birch (260.91%), swamp privet (52.65%), and American hornbeam (50.77%) are in sharpest decline. Relative to 2013, mortality appears to be reduced for all species in the guild during 2013-2016 (Table 3.2).

Among live trees, the willow oak bottomland forest guild (Tables 1.3.1-1.3.4) is dominated by willow oak (37.87%) and sweetgum (25.62%), based on average importance in the three sites (Table 1.3.4). In terms of average importance, willow oak (40.85%) and American hornbeam (21.46%) dominate snags in this guild (Table 1.3.4). Based on the relative percentage of basal area of snags versus live trees (Table 2), five tree species are in sharp decline in this guild with American hornbeam (103.47%), water oak (61.80%), and red maple (57.39%) leading the way. During 2013-2016, tree mortality is reduced, with the striking exception of willow oak in site 2, where the basal area loss of 5.05 m^2/ha represents a loss of 25.74% of the 2013 live-tree basal area for this dominant species.

Of the four guilds inventoried, the water oak bottomland forest is most in jeopardy due to the high mortality of its dominant species, water oak. Based on relative importance in the guild, water oak is most important (36.96%) among live trees, though sweetgum (19.64%) and

American hornbeam (17.79%) are also important (Table 1.4.4). Mortality rates (percent snags versus live tree basal area, Table 2) are higher for more tree species in this guild compared to other guilds, including the overall dominants American hornbeam (116.87%) and water oak (43.21%). Though generally lower for other tree species, water oak mortality appears unabated in 2013-2016 in this guild, with site 1 particularly hard hit by a loss of 6.03 m^2 (33.02%) of 2013 live basal area (Table 2). During this three-year period, lost live basal area for this species is 5.52% and 9.54%, in sites 2 and 3, respectively.

4.2 Shrub-Sapling Layer

Tables 4.1.1 through 5.4.3 summarize baseline inventory results for the shrub-sapling layer in the four guilds during two years, 2015-2016. Though quite sparse compared to other guilds, buttonbush, pawpaw, common persimmon, and sweetgum are most common in this layer within bald cypress swamp (Tables 4.1.1-4.1.3 and 5.1.1-5.1.3).

Shrub-sapling diversity and basal areas increase in the overcup oak swamp guild, where deciduous holy, common greenbrier, and crossvine dominant (Tables 4.2.1-4.2.3 and 5.2.1-5.2.3). In 2015, deciduous holly is the overall dominant in the shrub layer in overcup oak swamp, while in 2016 common greenbrier is most common.

In the willow oak bottomland forest (Tables 4.3.1-4.3.3 and 5.3.1-5.3.3), deciduous holly and common greenbrier are the most common species in the shrub-sapling layer in both 2015 and 2016. In 2015 sweetgum is a co-dominant, though in 2016 common persimmon replaces sweetgum as a co-dominant.

Water oak bottomland forest (Tables 4.4.1-4.4.3 and 5.4.1-5.4.3) maintains the highest shrub-sapling species diversity (11-20 species) within the inventoried guilds, with sweetgum, deciduous holly, common greenbrier, muscadine, and American beautyberry most common. Interannual variability in shrub-sapling species composition is again in evidence, with deciduous holly and sweetgum most common in 2015, and common greenbrier most common in 2016.

4.3 Herb-Seedling Layer and Ground Cover

Both woody and herb species in the herb-seedling layer vary significantly in canopy cover between 2015 and 2016 (Tables 6.1.1.1 -7.3.3.2). However, in 2016, inundation prevented the sampling of this layer in bald cypress swamp.

Woody Seedlings - In 2015 in bald cypress swamp, woody species that are most dominant in the relatively low canopy cover of the herb-seedling layer are American buckwheat vine and water elm, with common persimmon also common. The most important woody species in this layer within overcup oak swamp in 2015 are, in order of dominance, American buckwheat vine, common greenbrier, and common persimmon. However in 2016, willow oak, American buckwheat vine, overcup oak, and Chinese tallow are most important.

In willow oak bottomland forest, dominant woody species in the herb-seedling layer in 2015 include willow oak, American buckwheat vine, and both saw and common greenbrier, again in order of importance. In 2016, willow oak remains the overall dominant woody seedling in willow oak bottomland forest, with crossvine emerging as a co-dominant along with common greenbrier.

Water oak bottomland forest has by far the most diverse woody seedling species, including crossvine, saw and common greenbrier, and water oak. In 2015, crossvine, saw greenbrier, and muscadine are most in important (in order of importance), while in 2016 water oak, crossvine, and common greenbrier are.

Herb Species - Though this layer is sparse in bald cypress swamp, in 2015 herb species are dominated by smallspike false nettle, catchfly grass, and lizard's tail. Most common herb species in overcup oak swamp are catchfly grass, southern waxy sedge, inland seat oats, and caric sedge, with catchfly grass and southern waxy sedge most dominant in both 2015 and 2016.
In 2015, common herbs in willow oak bottomland forest are the same as in overcup oak swamp, except that lizard's tail joins southern waxy sedge and catchfly grass as a co-dominant. Herb

species composition in willow oak forest undergoes significant change in 2016, when caric sedge and inland sea oats dominate.

In water oak bottomland forest, herb species composition is relatively stable, with caric sedge and longleaf wood oats dominant in both 2015 and 2016, although inland sea oats is a co-dominant in 2015.

Ground Cover – In 2015, forest floor (organic) and large woody debris are consistently ranked one and two among ground cover types in both swamp guilds and in willow oak bottomland forest, with bare mineral soil ranked third in overcup oak swamp and willow oak bottomland forest. Forest floor is the predominant ground cover in water oak bottomland forest in 2015.

Though bald cypress swamp was not sampled due to inundation, in 2016 large woody debris is no longer important as ground cover in the other three guilds. Forest floor is most common, thought bare soil is also important in overcup swamp.

5. Discussion

In both bald cypress and overcup oak swamps, the decline of water privet and water hickory may be of most concern, due a widespread and relatively significant loss of live basal area and low regeneration for these species. Also of concern due to increased mortality are river birch and American hornbeam in overcup oak swamps. However, regeneration is sporadic in swamps, so tree decline may need to be monitored over a long period in order to be accurately assessed.

Tree mortality of most concern is the precipitous decline of water oak in both the willow oak and water oak bottomland forest guilds. Though American hornbeam is also in sharp decline in these guilds, its relatively high generation of both saplings and seedlings may reduce risk for this species. These two relatively elevated guilds, particularly water oak bottomland forest, are infrequently connected to environmental flows from LOP, as evidenced by inadequate surface inundation during the growing season (except possibly the lowest elevations of the willow oak

guild), and the absence of a response in the groundwater-monitoring wells in the willow oak and water oak guilds during environmental releases.

Tree mortality following the 2010-2012 peak of the recent drought and the resulting absence of high-flow LOP releases appear responsible for significant losses among dominant riparian tree species. During the initial 2013 inventories, the percentages of snags versus live trees are high for swamp privet in bald cypress swamp (42.99%) and overcup oak swamp (52.65%). The highest losses of native tree species recorded in 2013 are for river birch (260.91%) in overcup oak swamp, and American hornbeam in willow oak (103.47%) and in water oak (116.8%) bottomland forests. Other dominants in rapid decline based on percentages of snags versus live trees, include willow oak and water oak, in both willow (61.80% and 26.51%, respectively) and water oak (50.01% and 43.21%, respectively) bottomland forest.

Delayed mortality of these dominant riparian tree species are evident in the 2016 tree-mortality inventory. From 2013-2016, the basal areas of mature water elm and overcup oak decreased an additional 50% in bald cypress and overcup oak swamps, respectively. The 2013-2016 loss of basal area for willow and water oak is more striking at 65% and 67%, in willow oak bottomland forest and water oak bottomland forest, respectively.

The apparent increase in importance for two invader tree species is of concern. Since it is the only overstory species that is important among seedlings and saplings, sweetgum appears to be the emerging dominant that may replace water oak and to a lesser extent willow oak over time in the willow oak and water oak forest guilds. Sweetgum is adapted to drier habitats, compared to these two oak species. The other tree species that is increasing in relative importance is the exotic invader Chinese tallow, due to high reproduction coupled with low mortality, especially in disturbed areas with more open overstory canopies. The exception for this species is its high morality in the water oak forest guild, apparently due to its intolerance to the drier conditions in this guild at least during drought conditions.

The general paucity of seedlings and saplings of overstory trees in the herb- and shrub layers, as discussed above, indicates that increased attention to guild restoration is necessary in the near

future, in order to maintain native tree dominants adapted to riparian conditions and slow the increase in invader tree species, such as sweetgum, Chinese tallow, and native upland tree species.

Quantitative goals are necessary to measure the success of habitat management and restoration. Species composition targets for long-term stewardship of the four BCB guilds are proposed in Figures 10-13. The targets are based on the 2013 field inventories soon after the 2010-2012 drought and resulting extended low-flow period, and therefore may depict a more resilient forest structure. Baseline inventory data developed during the current study provide a reference point for quantifying management objectives, along with monitoring trends in riparian forest health and individual species.

6. Conclusion

Riparian Forest Hydroperiod Requirements - This study focuses on the connection of regulated flows to riparian forest guilds, in order to examine how the frequency and duration of environmental flows may sustain ecosystem processes and provide ecological benefits. As discussed above, Figure 1 summarizes the inundation regimes necessary to sustain riparian forests and other floodplain habitats within the BCB study reach between Jefferson and LOP. Despite recent drought conditions, which resulted in the most severe restriction upon LOP high-flow releases since LOP became operational over 50 years ago, the bald cypress and overcup oak swamps remain relatively sustainable. However, based on forest-monitoring results, the higher elevation bottomland forests (willow oak and water oak guilds) appear unsustainable under extended low-flow periods without any high and overbank LOP releases for two or more years.

Lower Swamp: Dominated by bald cypress and to a lesser extent water elm, lower swamps are only intermittently exposed during a natural flow regime, and require a total annual combination of inundation plus soil saturation of more than half, or at least four months, during each growing season. The drought-induced increase mortality rates for the dominant water elm and other species in this guild is likely caused by reservoir-induced reductions in high river flows.

Upper Swamp: At elevations above the previous forested wetland type, the riparian zone is dominated by overcup oak, which requires frequent flooding every one or two years, in order to maintain a total duration of inundation and soil saturation during more than 25% (> two months) of the growing season (Figure 1). Quantitative vegetation data from the study's forest-plot network show a decline in the dominant tree species in this upper swamp type, due to increased mortality of mature trees and low sapling establishment. However, as discussed above, reproduction in swamp guilds is sporadic, so that both swamp guilds along the study reach are likely sustainable under current conditions, unless drought conditions and extended low-flow events become more frequent in the future.

Seasonally Flooded Forest: This riparian forest guild is dominated by willow oak and a diversity of wetland indicator tree species. Currently, seasonally flooded forests appear to be in transition to a drier type dominated by sweetgum, as wetland indicator species decline in importance during extended drought conditions. Same as the upper swamp guild, this riparian forest guild requires inundation or soil saturation within the growing season every one to two years (Figure 1). However, compared to upper swamps, seasonally flooded forests require significantly less growing-season flood duration (1-2 months). Plot monitoring data indicate that the active floodplain does not reach this guild during low- and medium-flow events, leading to the significant decline of dominant tree species during extended drought conditions.

Temporarily Flooded Forest: Temporarily flooded forests inhabit the more elevated, drier flats within study reach. Water oak is the dominant tree species, along with willow oak and sweetgum. With a natural flow regime, this forest type is sustained where inundation and saturated soils persist 5-30 days (2-12.5%) during the growing season (Figure 1). Required flood frequency is approximately every two to nine years (11-50% annual frequency). Temporarily flooded forest is the most impacted of the four riparian guilds in the BCB study reach, due its requirement for overbank events with stage elevations that reach the most elevated flats, and the proximity of invading upland species.

6.1 Future Research Needs

Forest Monitoring - An important result of the MLBR study is the initiation of long-term forest monitoring necessary to relate vegetation dynamics and hydrology. Forest-plot monitoring should continue to track forest response to regulated flows, including tree species at highest risk, such as swamp privet and water hickory (B & O), American hornbeam (O, WI, & WA), and water oak & willow oak (WI & WA). Increaser species should also be tracked, such as sweetgum & Chinese tallow. In this manner, forest monitoring provides the basis for empirical and quantitative performance standards, which are needed to confirm success in terms of riparian management and restoration.

Inundation mapping and forest-flow response guilds - Increased focus on inundation mapping and the status of forest-flow response guilds should be the focus of future research, so that riparian assessments and associated restoration techniques may become broadly applicable (Merritt et al. 2010). A shift in the species composition of guilds usually indicates an environmental variable, such as hydrology or geomorphic flood disturbance, has been altered.

Floodplain water budget - The lack of connectivity during environmental releases below Jefferson may warrant further study. Both above and below Jefferson, additional analyses may discern the relative contributions of BCB flows, tributary flows, alluvial groundwater, and direct precipitation to the floodplain water budget. If possible, additional Study Sites (soil moisture, groundwater, and vegetation) on BCB below Jefferson may be required to complete a water budget for the floodplain downstream of LOP.

Aerial survey of upcoming environmental releases - The difficulty of boat-and-foot observations of inundation along transects during high-flow and overbank events may be largely avoided with the use of an infrared camera mounted below a small plane or a drone. Such an aerial survey with fixed-wing aircraft may take only 60-90 minutes during an event. Subsequent image classification and GIS analysis may then provide more complete and accurate delineations of basin-wide habitat inundation.

In regard to an aerial survey of an active environmental release, a release before the growing season may not be as ecologically beneficial as a release during the first two months of the

growing season. However, if a winter release peaked near or at 3000 cfs, then an aerial survey could extend the 2012 event assessment of environmental-flow connections. The leafless canopy during winter allows wetted-surface classification of the high-flow event for the entire downstream Big Cypress watershed, including above and below Jefferson. Such an inundation analysis would be particularly valuable during a release without co-occurring precipitation, in order to focus on environmental flows. Landsat needs to be turned on or an over-flight (small plane or drone) needs to occur during the event.

Classification of past environmental releases - All of the present aerial analysis of inundation is for precipitation events, not environmental releases. Analysis of Landsat or other imagery during historical dam releases without precipitation-induced tributary flooding is recommended to focus on environmental releases. This would require an examination of historical imagery since the mid-1980s for usable coverage during specific environmental releases. If needed to supplement leaf-off release imagery, wetted-surface classifications during the growing (leaf-on) season, using selected spectral data, may be sufficient to estimate the extent of habitat connectivity during past high-flow and overbank releases.

Regional monitoring network - Expanding the permanent monitoring network to a regional scale would complement the current BCB study sites. Little Cypress and Black Cypress bayous have relatively undeveloped watersheds. Little Cypress Bayou is more similar to BCB in terms of floodplain morphology and habitat types, though it may be threatened by increasing water development. In the near term, three more study sites on Little Cypress Bayou would provide important baseline data, as a relatively undisturbed control for the BCB monitoring effort.

7. References

Alldredge, B., G. Moore. 2012. Assessment of riparian vegetation sensitivity to river hydrology downstream of a major Texas reservoir. River Research and Applications. Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/rra.2625.

Amoros, C., and G. Bornette. 2002. Connectivity and biocomplexity in waterbodies of riverine floodplains. Freshwater Biology 47: 761–776.

Anderson, C.J., and W.J. Mitsch. 2008. Tree basal growth response to flooding in a bottomland hardwood forest in central Ohio. J. Am. Water Resources Assoc. 44(6): 1512-1520.

Ardon, M., J.L. Morse, M.W. Doyle, and E.S. Bernhardt. 2010. The water quality consequences of restoring wetland hydrology to a large agricultural watershed in the southeastern Coastal Plain. Ecosystems 13:1060-1078.

Bayley, P.B. 1995. Understanding large river-floodplain ecosystems. BioScience 45(3): 153-158.

Bendix, J., and C.R. Hupp. 2000. Hydrological and geomorphological impacts on riparian plant communities. Hydrological Processes 14: 2977-2990.

Benke, A.C., I. Chaubey, G.M. Ward, and E.L. Dunn. 2000. Flood pulse dynamics of an unregulated river floodplain in the southeastern U.S. coastal plain. Ecology 81(10): 2730-2741.

Bedinger, M.S. 1981. Hydrology of bottomland hardwoods in southeastern United States. In: Clark, J.R., and J. Benforado (Eds.). Wetlands of Bottomland Hardwood Forests. Elsevier Scientific Publishing Co., New York, N.Y.

Connor, W.H., R.T. Huffman, and W. Kitchens. 1990. Composition and productivity in bottomland hardwood forest ecosystems: The report of the vegetation workgroup. In: Gosselink, J.G., L.C. Lee, and T.A. Muir (Eds.). Ecological Processes and Cumulative Impacts: Illustrated by Bottomland Hardwood Wetland Ecosystems. Lewis Publishers, Inc., Chelsea, Michigan.

Dewey, J.C., S.H. Schoenholtz, J.P. Shepard, and M.G. Messina. 2006. Issues related to wetland delineation of a Texas, USA, bottomland hardwood forest. Wetlands 26(2): 410-429.

Diamond, D. 2009. FIA bottomland summaries. Unpublished manuscript, Missouri Resource Assessment Partnership (MoRAP), School of Natural Resources, University of Missouri, Columbia, MO.

Gosselink, J.G., S.E. Bayley, W.H. Conner, and R.E. Turner 1981. Ecological factors in the determination of riparian wetland boundaries. In: Clark, J.R., and J. Benforado (Eds.). Wetlands of Bottomland Hardwood Forests. Elsevier Scientific Publishing Co., New York, N.Y.

Heitmeyer, M.E. 2006. The importance of winter floods to mallards in the Mississippi Alluvial Valley. The Journal of Wildlife Management 70(1): 101-110.

Huffman, T., and S.W. Forsythe. 1981. Bottomland hardwood forest communities and their relation to anaerobic soil communities. In: Clark, J.R., and J. Benforado. Wetlands of Bottomland Hardwood Forests, Elsevier Scientific Pub. Co., New York, NY.

Hughes, F.M.R., and S.B. Rood. 2003. Allocation of river flows for restoration of floodplain forest ecosystems: A review of approaches and their applicability in Europe. Environmental Management 32(1): 12-33.

Hunter, R.G., S.P. Faulkner, and K.A. Gibson. 2008. The importance of hydrology in restoration of bottomland hardwood wetland functions. Wetlands 28(3): 605-615.

Junk, W.J., P.B. Bayley, and R.E. Sparks. 1989. The flood pulse concept in river-floodplain systems. In: Dodge, D. P. (ed.). Proceedings of the International Large River Symposium. Can. Spec. Publ. Fish. Aquat. Sci. 106.

King, S.L., and J.A. Allen. 1996. Plant succession and greentree reservoir management: Implications for management and restoration of bottomland hardwood wetlands. Wetlands 16(4): 503-511.

King, S.L., R.R. Sharitz, J.W. Groninger, and L.L. Battaglia. 2009. The ecology, restoration, and management of southeastern floodplain ecosystems: a synthesis. Wetlands 29(2): 624-634.

Merritt, D.M., M.L. Scott, N.L. Poff, and G.T. Auble. 2010. Theory, methods and tools for determining environmental flows for riparian vegetation: Riparian vegetation-flow response guilds. Freshwater Biology 55: 206–225.

Opperman, J.J., R. Luster, B.A. McKenney, M. Roberts, and A.W. Meadows. 2010. Ecologically functional floodplains: connectivity, flow regime, and scale. J. American Water Resources Assoc. 46 (2): 211-226.

Robertson, A.I., P. Bacon, and G. Heagney. 2001. The responses of floodplain primary production to flood frequency and timing. Journal of Applied Ecology 38: 126-136.

Rood, S.B., G.M. Samuelson, J.H. Braatne, C.R. Gourley, F.M.R. Hughes, and J.M. Mahoney. 2005. Managing river flows to restore floodplain forests. Frontiers in Ecology and the Environment. 3(4): 193-201.

Smith, M.C., J.A. Stallins, J.T. Maxwell, and C.Van Dyke. 2012. Hydrological shifts and tree growth responses to river modification along the Apalachicola River, Florida. Physical Geography 34(6): 491–511.

Smock, L.A., J.E. Gladden, J.L. Riekenberg, L.C. Smith, and C.R. Black. 1992. Lotic macroinvertebrate production in three dimensions: channel surface, hyporheic, and floodplain environments. Ecology 73: 876-886.

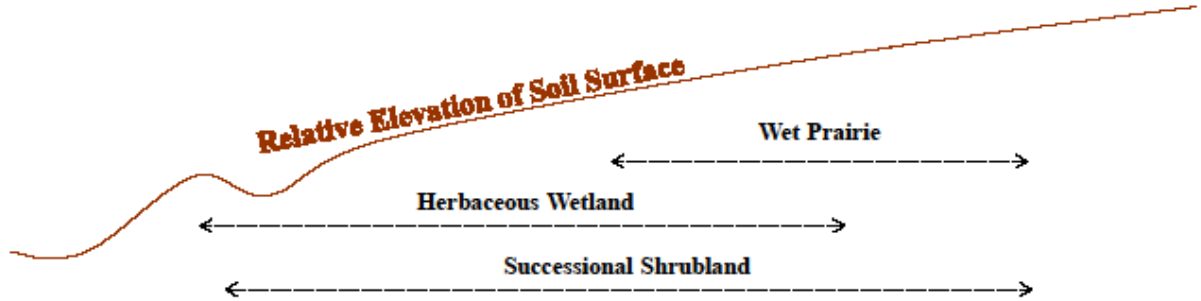
Thoms, M.C., M. Southwell, H.M. McGinness. 2005. Floodplain-river ecosystems: Fragmentation and water resources development. Geomorphology 71: 126-138.

Townsend, P.A. 2001. Relationships between vegetation patterns and hydroperiod on the Roanoke River floodplain, North Carolina. Plant Ecology 156: 43-58.

Walton, R., J.E. Davis, T.H. Martin, and R.S. Chapman. 1996. Hydrology of the Black Swamp wetlands on the Cache River, Arkansas. Wetlands 16(3): 279-287.

Appendix A: Figures

Figure 1. Landscape context of Cypress-Caddo bottomland habitat types[1]: Relative elevation, hydrologic regime, flood frequency, and growing season inundation.



Riparian Forest-Flow Guilds:	Stream & Other Open Water	Swamp: Lower Swamp	Swamp: Upper Swamp	Seasonally Flooded Forest	Temporarily Flooded Forest	Transition to Uplands
Dominant Tree Species:	None	Bald cypress Planertree Overcup oak Common buttonbush	Overcup oak Sweetgum Bald cypress Planertree	Willow oak Sweetgum American hornbeam Water hickory	Water oak American hornbeam Sweetgum Winged elm	Sugarberry Sweetgum Water oak White oak
Hydrologic Regime [2]:	Permanently Flooded	Intermittently exposed	Semipermanently flooded	Seasonally flooded	Temporarily flooded	Intermittently flooded
Flood Frequency-percent of years [2]:	100%	~ 100%	51-100%	51-100%	11-50%	1-10%
Growing-Season Inundation-total duration [2]:	100% (~ 8 mos.)	~ 100% (~ 8 mos.)	>25% (> 2 mos.)	12.5-25% (1-2 mos.)	2-12.5% (5-30 days)	< 2% (< 5 days)

Footnotes:

[1] Diamond, D. 2009. FIA Bottomland Summary: East Texas. Unpub. document, Missouri Resource Assessment Partnership, School of Natural Resources, U. Mo. - Columbia.

[2] Huffman, T., and S.W. Forsythe. 1981. Bottomland hardwood forest communities and their relation to anaerobic soil communities. in: Clark, J.R., and J. Benforado. Wetlands of Bottomland Hardwood Forests, Elsevier Scientific Pub. Co., New York, N.Y., pp. 187-196.

Figure 2. Big Cypress Bayou Monitoring Network:
Locations of Riparian Study Sites on Big Cypress Bayou between Lake O' the Pines and Jefferson, Texas.

Figure 3. Big Cypress Bayou Monitoring Network:
Riparian Study Site #1 (Sanders and DeWare parcels), including Long-Term Forest Plot Locations.

Figure 4. Big Cypress Bayou Monitoring Network:
Riparian Study Site #2 (Locke parcel), including Long-Term Forest Plot Locations.

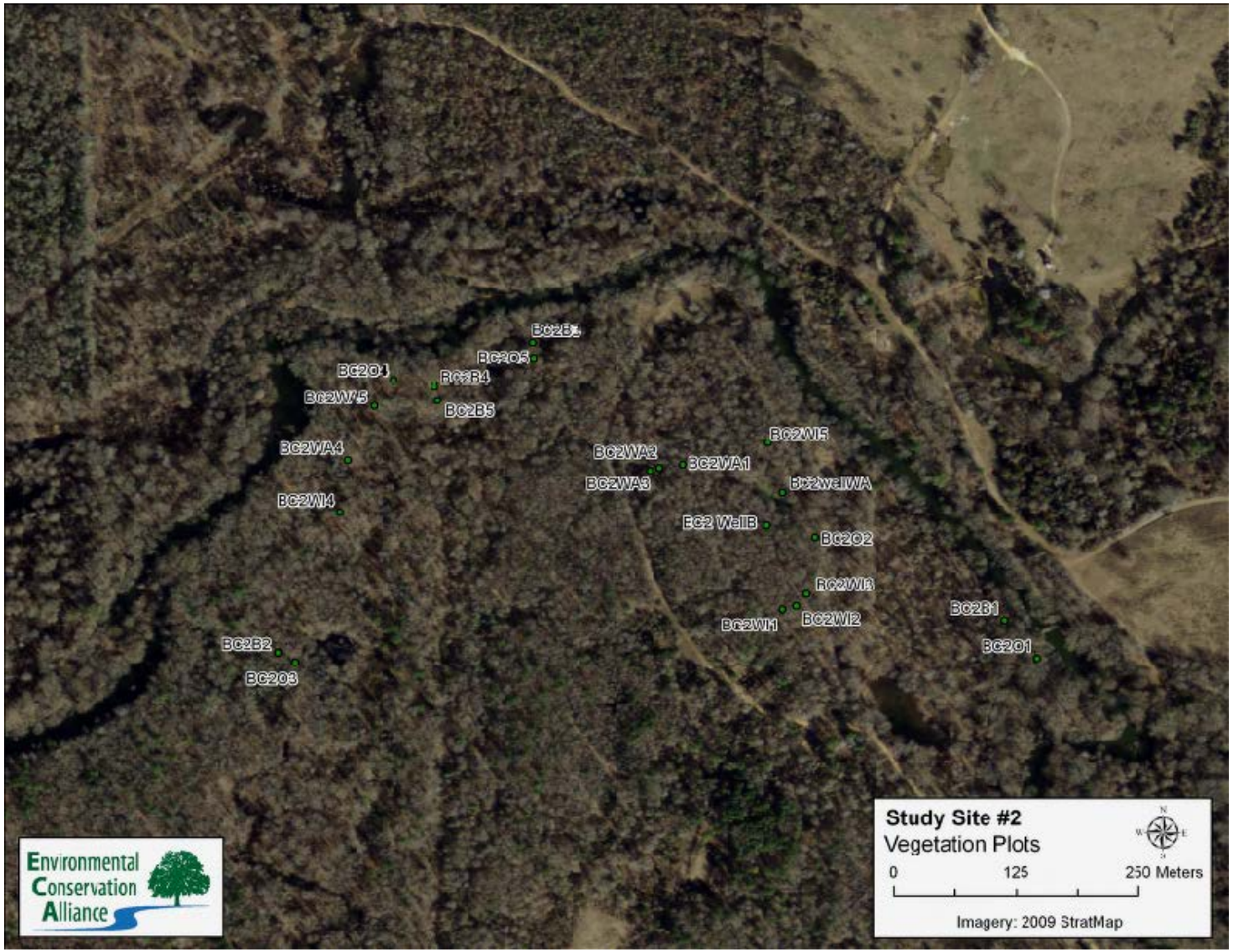


Figure 5. Big Cypress Bayou Monitoring Network:
Riparian Study Site #3 (Thomas parcel), including Long-Term Forest Plot Locations.

Figure 6. Water line (3,000 cfs), Bald Cypress Swamp, Site 1, August 2016

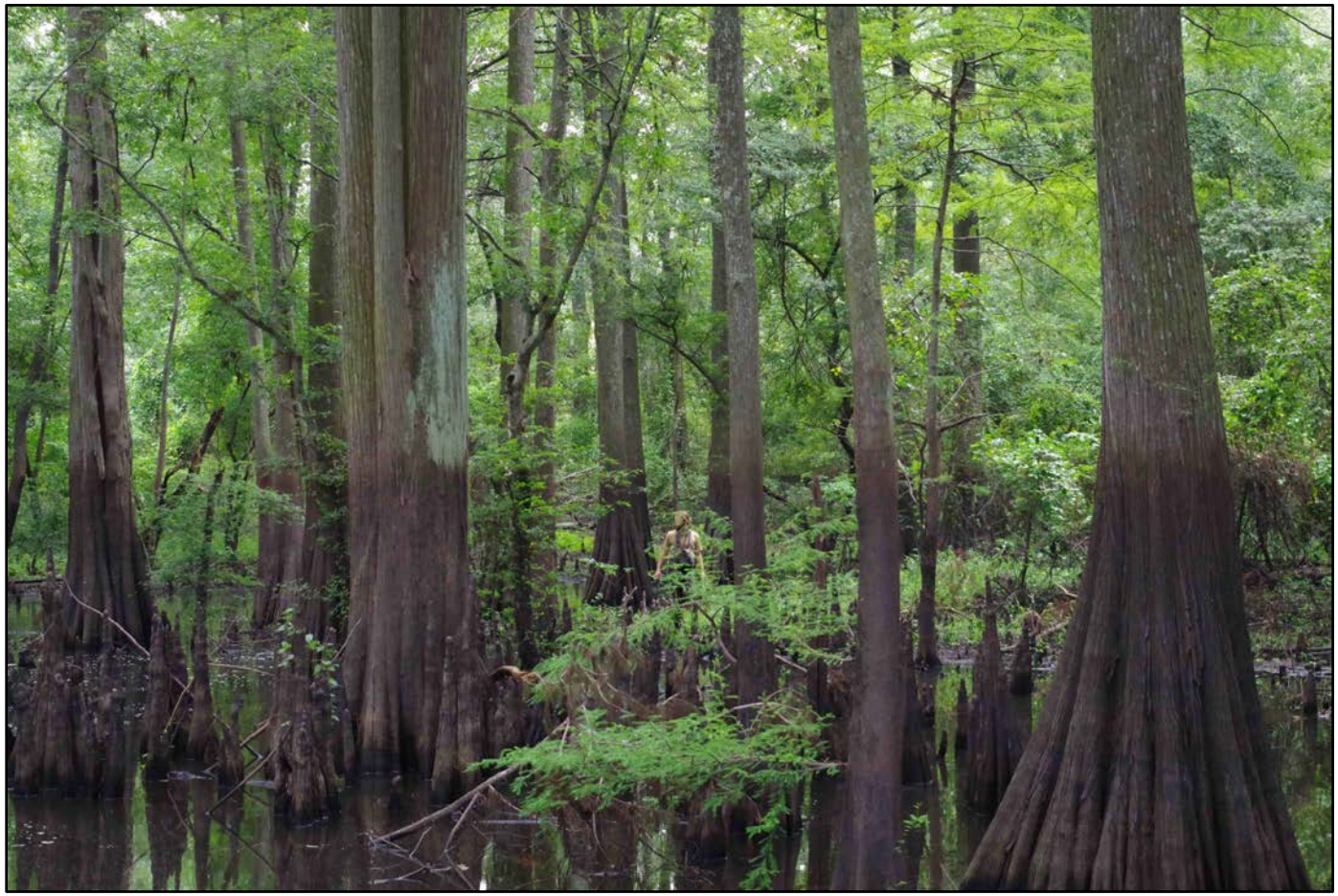


Figure 7. Diameter Measurement, Bald Cypress Swamp, Site 3, Fall 2013.

Figure 8. Forest Plot Survey, Bald cypress swamp, Site 3, Fall 2013.

Figure 9. Waterline (3000 cfs), Overcup Oak Swamp, Site 3, Fall 2013

Figure 10. **Bald Cypress Swamp Species Composition as Stewardship Target**
Big Cypress Bayou between Jefferson and Lake O' the Pines, Texas

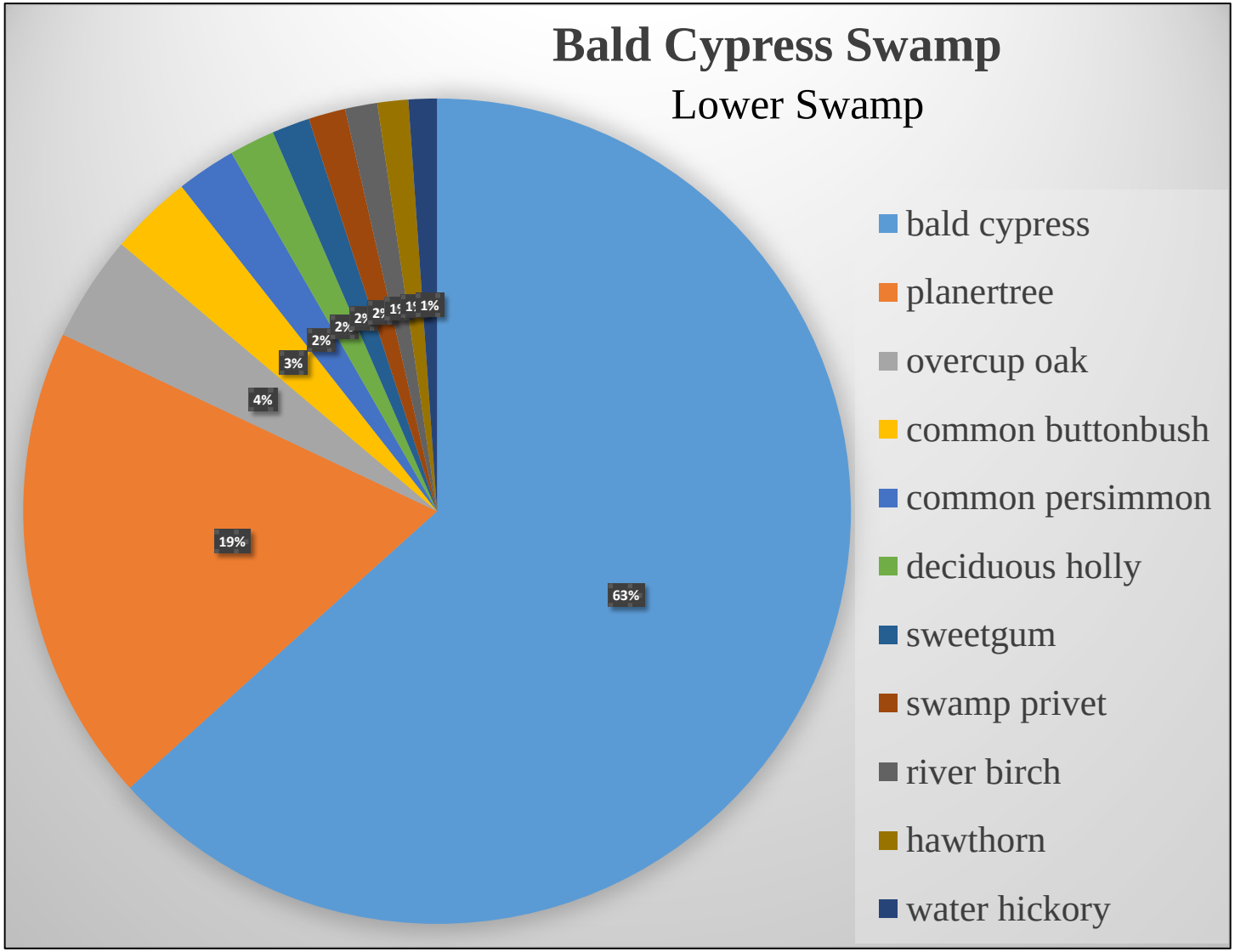


Figure 11. **Overcup Oak Swamp Species Composition as Stewardship Target Big Cypress Bayou between Jefferson and Lake O' the Pines, Texas**

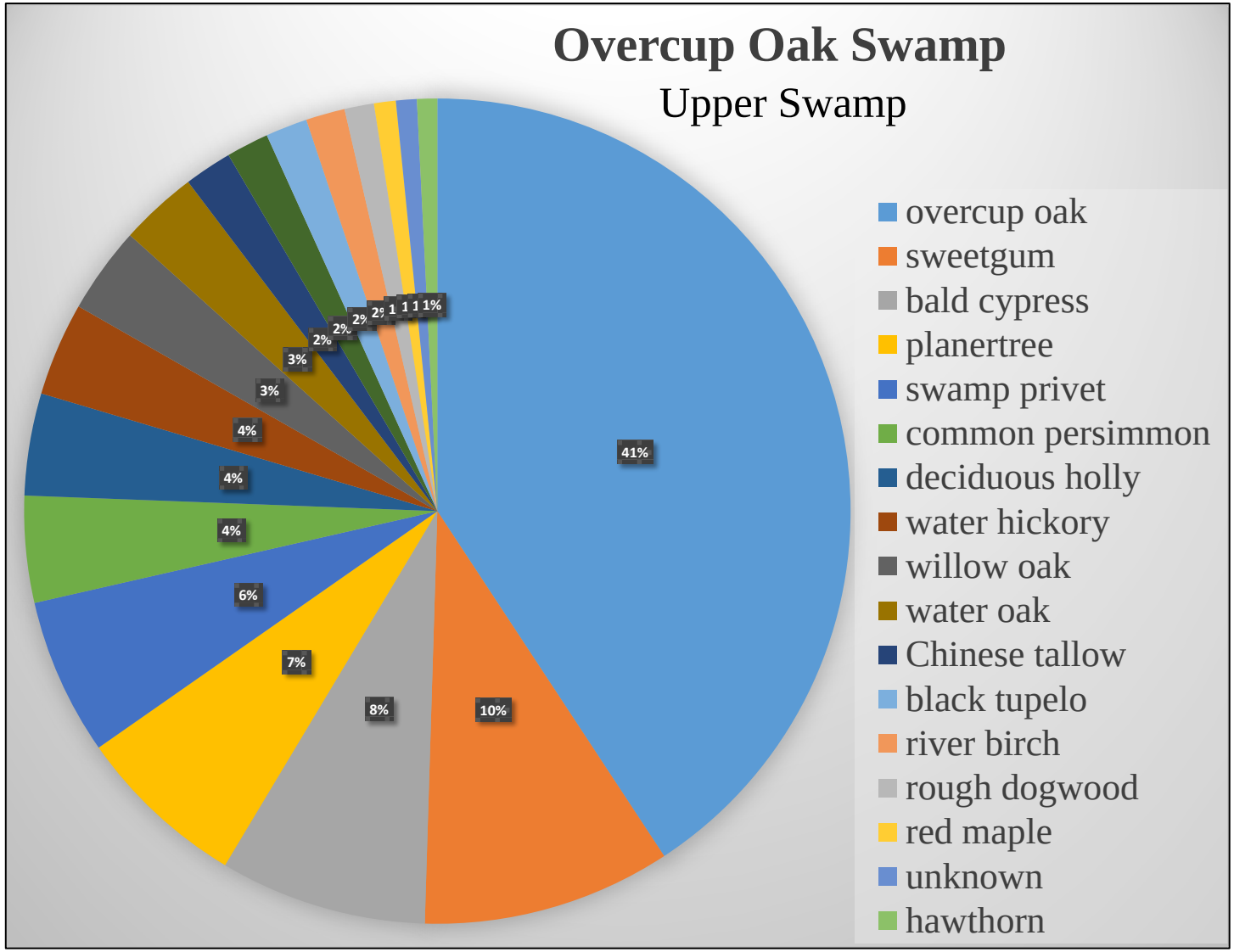


Figure 12. **Willow Oak Bottomland Forest Species Composition as Stewardship Target Big Cypress Bayou between Jefferson and Lake O' the Pines, Texas**

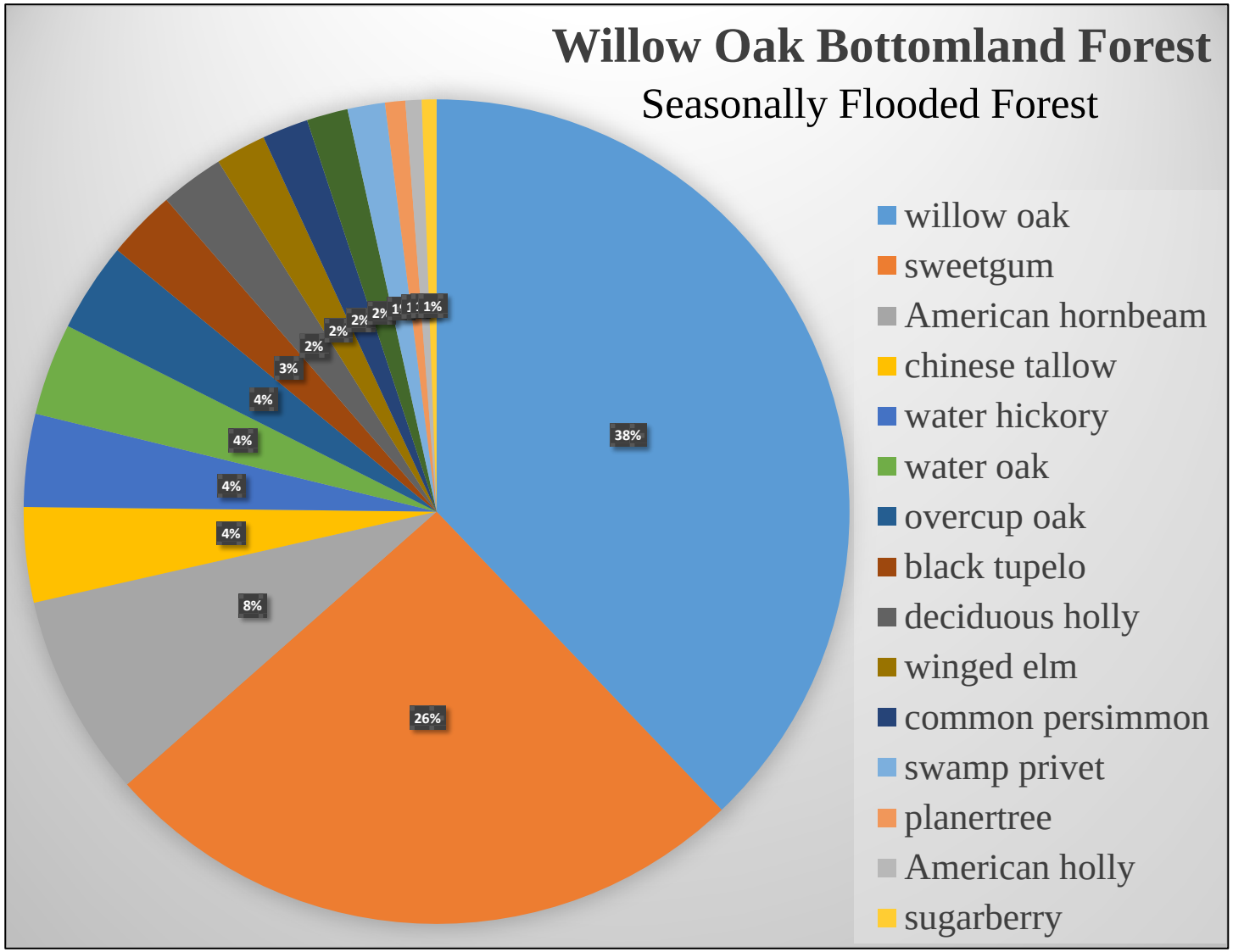
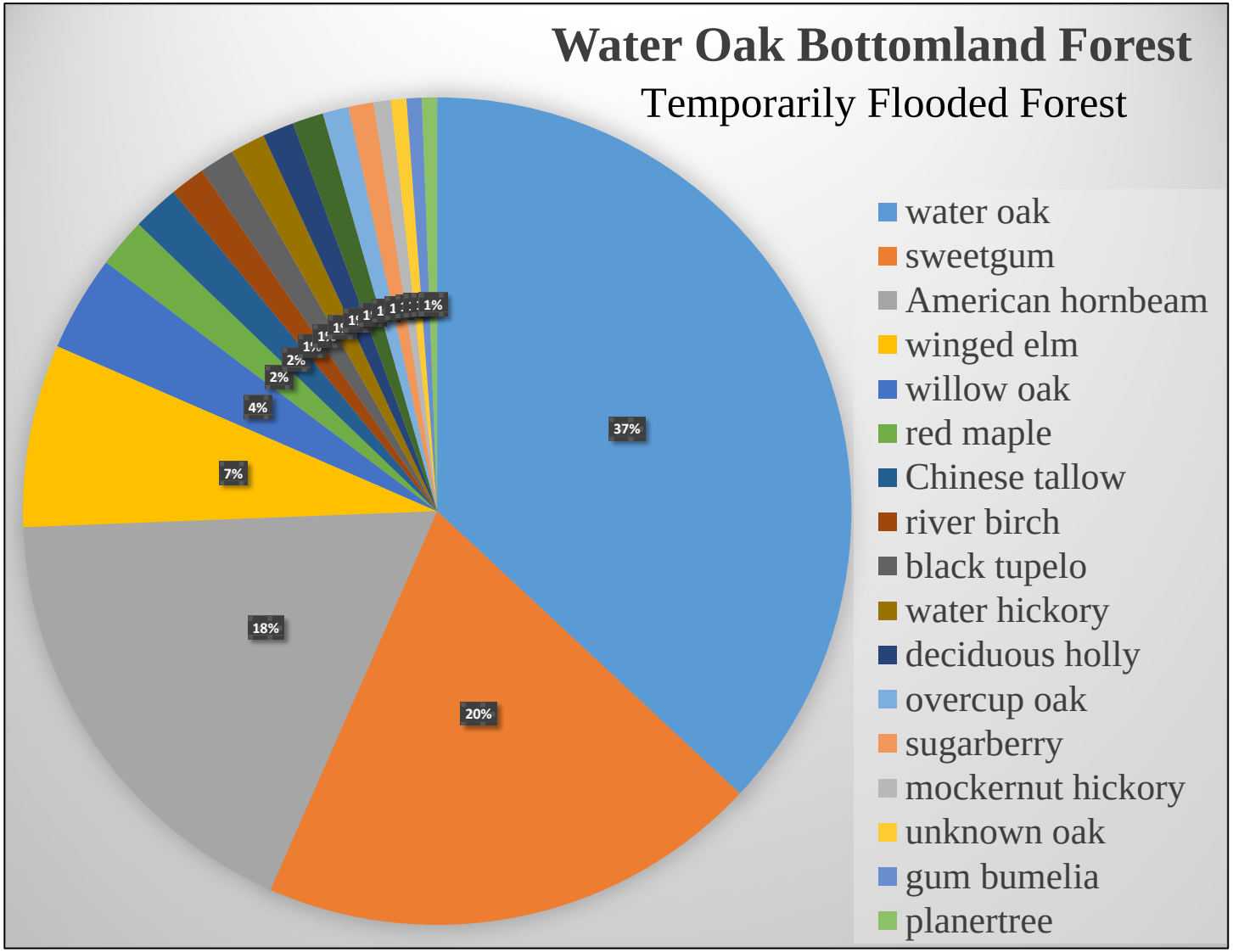


Figure 13. **Water Oak Bottomland Forest Species Composition as Stewardship Target Big Cypress Bayou between Jefferson and Lake O' the Pines, Texas**



Appendix B: Tables

Table 1.1.1 Big Cypress Bayou: Summary of Tree Layer Field Data, Bald Cypress Swamp, 2013
Site #1: Sanders and DeWare Parcels

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
bald cypress	*Taxodium distichum*	61.53	82.00	404.00	90.18	62.12	75.37	75.89
planertree	*Planera aquatica*	5.94	32.00	92.00	8.71	24.24	17.16	16.71
common persimmon	*Diospyros virginiana*	0.33	6.00	12.00	0.49	4.55	2.24	2.42
overcup oak	*Quercus lyrata*	0.15	6.00	12.00	0.22	4.55	2.24	2.33
Swamp privet	*Forestiera acuminata*	0.24	4.00	8.00	0.36	3.03	1.49	1.63
river birch	*Betula nigra*	0.03	2.00	8.00	0.05	1.52	1.49	1.02
Live Total		68.23	132.00	536.00	100.00	100.00	100.00	100.00
Snag:								
planertree	Planera aquatica	0.86	16.00	28.00	72.21	61.54	53.85	62.53
bald cypress	Taxodium distichum	0.28	6.00	16.00	23.32	23.08	30.77	25.72
Swamp privet	Forestiera acuminata	0.05	4.00	8.00	4.48	15.38	15.38	11.75
Snag Total		1.19	26.00	52.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.1.2 Big Cypress Bayou: Summary of Tree Layer Field Data, Bald Cypress Swamp, 2013
Site #2: Locke Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
bald cypress	*Taxodium distichum*	30.82	52.50	215.00	65.09	43.75	56.58	55.14
planertree	*Planera aquatica*	11.72	40.00	95.00	24.74	33.33	25.00	27.69
overcup oak	*Quercus lyrata*	2.59	12.50	35.00	5.47	10.42	9.21	8.37
deciduous holly	*Ilex decidua*	0.10	5.00	10.00	0.21	4.17	2.63	2.34
common persimmon	*Diospyros virginiana*	0.92	2.50	10.00	1.95	2.08	2.63	2.22
sweetgum	*Liquidambar sytraciflua*	1.06	2.50	5.00	2.24	2.08	1.32	1.88
littlehip hawthorn	*Cretagus spathulata*	0.11	2.50	5.00	0.23	2.08	1.32	1.21
Privot swamp	*Forestiera acuminata*	0.03	2.50	5.00	0.06	2.08	1.32	1.15
Live Total		47.35	120.00	380.00	100.00	100.00	100.00	100.00
Snag:								
bald cypress	*Taxodium distichum*	3.81	40.00	100.00	45.18	44.44	45.45	45.03
planertree	*Planera aquatica*	3.19	20.00	40.00	37.86	22.22	18.18	26.09
water hickory	*Carya aquatica*	1.09	10.00	40.00	12.89	11.11	18.18	14.06
American hornbeam	*Carpinus caroliniana*	0.28	10.00	20.00	3.34	11.11	9.09	7.85
Privot swamp	*Forestiera acuminata*	0.06	10.00	20.00	0.73	11.11	9.09	6.98
Snag Total		8.44	90.00	220.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.1.3 Big Cypress Bayou: Summary of Tree Layer Field Data, Bald Cypress Swamp, 2013
Site #3: Thomas Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
bald cypress	*Taxodium distichum*	30.32	60.00	168.00	93.83	75.00	75.00	81.28
common buttonbush	*Cephalanthas occidentalis*	0.11	4.00	24.00	0.33	5.00	10.71	5.35
planertree	*Planera aquatica*	0.12	4.00	8.00	0.37	5.00	3.57	2.98
common persimmon	*Diospyros virginiana*	0.11	4.00	8.00	0.35	5.00	3.57	2.97
overcup oak	*Quercus lyrata*	0.90	2.00	4.00	2.79	2.50	1.79	2.36
sweetgum	*Liquidambar sytraciflua*	0.36	2.00	4.00	1.12	2.50	1.79	1.80
water hickory	*Carya aquatica*	0.32	2.00	4.00	0.98	2.50	1.79	1.75
deciduous holly	*Ilex decidua*	0.08	2.00	4.00	0.24	2.50	1.79	1.51
Live Total		32.31	80.00	224.00	100.00	100.00	100.00	100.00
Snag:								
bald cypress	Taxodium distichum	0.66	5.00	10.00	50.38	28.57	28.57	35.84
sweetgum	*Liquidambar sytraciflua*	0.33	5.00	10.00	25.36	28.57	28.57	27.50
planertree	*Planera aquatica*	0.23	2.50	5.00	17.63	14.29	14.29	15.40
unknown	*unknown*	0.06	2.50	5.00	4.44	14.29	14.29	11.01
deciduous holly	*Ilex decidua*	0.03	2.50	5.00	2.19	14.29	14.29	10.25
Snag Total		1.32	17.50	35.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.1.4 Big Cypress Bayou: Three-Site Averages for Tree Layer Field Data, Bald Cypress Swamp, 2013
Sites #1-3

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
bald cypress	*Taxodium distichum*	38.83	61.33	248.00	75.25	52.46	62.23	63.31
planertree	*Planera aquatica*	9.39	25.33	65.00	18.20	21.67	16.31	18.72
overcup oak	*Quercus lyrata*	1.21	6.83	17.00	2.35	5.84	4.27	4.15
common buttonbush	*Cephalanthas occidentalis*	0.11	4.00	24.00	0.21	3.42	6.02	3.22
common persimmon	*Diospyros virginiana*	0.46	4.17	10.00	0.88	3.56	2.51	2.32
deciduous holly	*Ilex decidua*	0.30	3.50	7.00	0.58	2.99	1.76	1.78
sweetgum	*Liquidambar styraciflua*	0.71	2.25	4.50	1.38	1.92	1.13	1.48
swamp privet	*Forestiera acuminata*	0.13	3.00	6.00	0.26	2.57	1.51	1.44
river birch	*Betula nigra*	0.03	2.00	8.00	0.06	1.71	2.01	1.26
hawthorn	*Crataegus species*	0.11	2.50	5.00	0.21	2.14	1.25	1.20
water hickory	*Carya aquatica*	0.32	2.00	4.00	0.61	1.71	1.00	1.11
Live Total		51.61	116.92	398.50	100.00	100.00	100.00	100.00
Snag:								
bald cypress	*Taxodium distichum*	1.54	16.67	41.33	32.65	25.91	26.61	28.39
planertree	*Planera aquatica*	1.41	12.67	24.00	29.96	19.69	15.45	21.70
water hickory	*Carya aquatica*	1.09	10.00	40.00	23.06	15.54	25.75	21.45
American hornbeam	*Carpinus caroliniana*	0.28	10.00	20.00	5.98	15.54	12.88	11.47
swamp privet	*Forestiera acuminata*	0.06	7.00	14.00	1.22	10.88	9.01	7.04
sweetgum	*Liquidambar styraciflua*	0.27	4.00	8.00	5.66	6.22	5.15	5.68
unknown	unknown	0.05	2.00	4.00	0.99	3.11	2.58	2.23
deciduous holly	*Ilex decidua*	0.02	2.00	4.00	0.49	3.11	2.58	2.06
Snag Total		4.72	64.33	155.33	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.2.1 Big Cypress Bayou: Summary of Tree Layer Field Data, Overcup Oak Swamp, 2013
Site #1: Sanders and DeWare Parcels

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
overcup oak	*Quercus lyrata*	22.80	40.00	100.00	75.96	35.71	37.31	49.66
sweetgum	*Liquidambar styraciflua*	1.26	14.00	28.00	4.21	12.50	10.45	9.05
swamp privet	*Forestiera acuminata*	0.35	14.00	32.00	1.16	12.50	11.94	8.53
planertree	*Planera aquatica*	0.57	10.00	20.00	1.91	8.93	7.46	6.10
bald cypress	*Taxodium distichum*	2.51	6.00	12.00	8.36	5.36	4.48	6.06
willow oak	*Quercus phellos*	0.64	6.00	12.00	2.12	5.36	4.48	3.99
common persimmon	*Diospyros virginiana*	0.15	2.00	16.00	0.49	1.79	5.97	2.75
river birch	*Betula nigra*	0.56	4.00	8.00	1.85	3.57	2.99	2.80
water hickory	*Carya aquatica*	0.30	8.00	20.00	0.99	7.14	7.46	5.20
American hornbeam	*Carpinus caroliniana*	0.54	2.00	8.00	1.81	1.79	2.99	2.19
unknown	*unknown*	0.34	4.00	8.00	1.12	3.57	2.99	2.56
littlehip hawthorn	*Crataegus spathulata*	0.01	2.00	4.00	0.03	1.79	1.49	1.10
Live Total		30.01	112.00	268.00	100.00	100.00	100.00	100.00
Snag:								
river birch	Betula nigra	1.02	4.00	20.00	50.05	15.38	31.25	32.23
swamp privet	Forestiera acuminata	0.18	6.00	12.00	9.00	23.08	18.75	16.94
overcup oak	Quercus lyrata	0.32	4.00	8.00	15.80	15.38	12.50	14.56
unknown	unknown	0.19	4.00	8.00	9.40	15.38	12.50	12.43
unknown	unknown	0.24	2.00	4.00	11.57	7.69	6.25	8.50
American hornbeam	Carpinus caroliniana	0.07	2.00	4.00	3.24	7.69	6.25	5.73
winged elm	Ulmus alata	0.01	2.00	4.00	0.55	7.69	6.25	4.83
water hickory	Carya aquatica	0.01	2.00	4.00	0.38	7.69	6.25	4.78
Snag Total		2.04	26.00	64.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.2.2 Big Cypress Bayou: Summary of Tree Layer Field Data, Overcup Oak Swamp, 2013
Site #2: Locke Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
overcup oak	*Quercus lyrata*	32.04	55.00	170.00	70.32	32.35	33.66	45.45
planertree	*Planera aquatica*	4.67	30.00	75.00	10.26	17.65	14.85	14.25
bald cypress	*Taxodium distichum*	3.37	27.50	95.00	7.41	16.18	18.81	14.13
common persimmon	*Diospyros virginiana*	0.56	15.00	50.00	1.23	8.82	9.90	6.65
deciduous holly	*Ilex decidua*	0.24	12.50	35.00	0.52	7.35	6.93	4.93
sweetgum	*Liquidambar styraciflua*	0.55	10.00	40.00	1.22	5.88	7.92	5.01
willow oak	*Quercus phellos*	3.23	7.50	15.00	7.09	4.41	2.97	4.82
water hickory	*Carya aquatica*	0.57	5.00	10.00	1.24	2.94	1.98	2.06
American hornbeam	*Carpinus caroliniana*	0.29	5.00	10.00	0.63	2.94	1.98	1.85
unknown	unknown	0.04	2.50	5.00	0.09	1.47	0.99	0.85
Live Total		45.57	170.00	505.00	100.00	100.00	100.00	100.00
Snag:								
overcup oak	*Quercus lyrata*	1.76	7.50	15.00	62.06	21.43	19.35	34.28
common persimmon	*Diospyros virginiana*	0.20	12.50	22.50	7.04	35.71	29.03	23.93
planertree	*Planera aquatica*	0.39	10.00	20.00	13.75	28.57	25.81	22.71
sweetgum	*Liquidambar styraciflua*	0.11	2.50	15.00	3.90	7.14	19.35	10.13
water hickory	*Carya aquatica*	0.37	2.50	5.00	13.25	7.14	6.45	8.95
Snag Total		2.83	35.00	77.50	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.2.3 Big Cypress Bayou: Summary of Tree Layer Field Data, Overcup Oak Swamp, 2013
Site #3: Thomas Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
overcup oak	*Quercus lyrata*	20.97	46.00	124.00	64.15	35.94	40.26	46.78
sweetgum	*Liquidambar styraciflua*	3.74	12.00	32.00	11.44	9.38	10.39	10.40
bald cypress	*Taxodium distichum*	2.65	8.00	20.00	8.10	6.25	6.49	6.95
water hickory	*Carya aquatica*	0.62	12.00	24.00	1.89	9.38	7.79	6.35
black tupelo	*Nyssa sylvatica*	1.35	10.00	20.00	4.14	7.81	6.49	6.15
common persimmon	*Diospyros virginiana*	0.68	8.00	20.00	2.07	6.25	6.49	4.94
deciduous holly	*Ilex decidua*	0.10	8.00	16.00	0.32	6.25	5.19	3.92
water oak	*Quercus nigra*	1.64	4.00	8.00	5.01	3.13	2.60	3.58
willow oak	*Quercus phellos*	0.24	6.00	12.00	0.74	4.69	3.90	3.11
planertree	*Planera aquatica*	0.34	4.00	8.00	1.03	3.13	2.60	2.25
American hornbeam	*Carpinus caroliniana*	0.03	4.00	8.00	0.10	3.13	2.60	1.94
rough dogwood	*Cornus drumondii*	0.03	2.00	8.00	0.08	1.56	2.60	1.41
river birch	*Betula nigra*	0.23	2.00	4.00	0.69	1.56	1.30	1.18
red maple	*Acer rubrum*	0.08	2.00	4.00	0.24	1.56	1.30	1.03
Live Total		32.69	128.00	308.00	100.00	100.00	100.00	100.00
Snag:								
unknown	unknown	1.16	10.00	20.00	51.55	35.71	33.33	40.20
water hickory	*Carya aquatica*	0.71	6.00	16.00	31.88	21.43	26.67	26.66
American hornbeam	*Carpinus caroliniana*	0.21	6.00	12.00	9.19	21.43	20.00	16.87
deciduous holly	*Ilex decidua*	0.12	2.00	4.00	5.38	7.14	6.67	6.40
planertree	*Planera aquatica*	0.03	2.00	4.00	1.40	7.14	6.67	5.07
overcup oak	*Quercus lyrata*	0.01	2.00	4.00	0.59	7.14	6.67	4.80
Snag Total		2.24	28.00	60.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.2.4 Big Cypress Bayou: Three-Site Averages for Tree Layer Field Data, Overcup Oak Swamp, 2013 Sites #1-3

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
overcup oak	*Quercus lyrata*	25.27	47.00	131.33	62.86	28.30	31.03	40.73
sweetgum	*Liquidambar styraciflua*	3.23	18.67	45.00	8.02	11.24	10.63	9.97
bald cypress	*Taxodium distichum*	2.84	13.83	42.33	7.07	8.33	10.00	8.47
planertree	*Planera aquatica*	1.35	1.35	1.35	3.37	0.81	0.32	1.50
swamp privet	*Forestiera acuminata*	0.49	8.33	18.00	1.23	5.02	4.25	3.50
common persimmon	*Diospyros virginiana*	0.46	8.33	28.67	1.15	5.02	6.77	4.31
deciduous holly	*Ilex decidua*	0.17	10.25	25.50	0.42	6.17	6.03	4.21
water hickory	*Carya aquatica*	1.64	4.00	8.00	4.07	2.41	1.89	2.79
willow oak	*Quercus phellos*	1.37	6.50	13.00	3.41	3.91	3.07	3.46
water oak	*Quercus nigra*	1.86	14.67	34.33	4.63	8.83	8.11	7.19
Chinese tallow	*Triadica sebifera*	0.29	3.67	8.67	0.71	2.21	2.05	1.66
American hornbeam	*Carpinus caroliniana*	0.03	2.00	8.00	0.06	1.20	1.89	1.05
black tupelo	*Nyssa sylvatica*	0.39	3.00	6.00	0.97	1.81	1.42	1.40
river birch	*Betula nigra*	0.08	2.00	4.00	0.19	1.20	0.95	0.78
rough dogwood	*Cornus drumondii*	0.35	14.00	32.00	0.87	8.43	7.56	5.62
red maple	*Acer rubrum*	0.04	2.50	5.00	0.11	1.51	1.18	0.93
unknown	unknown	0.34	4.00	8.00	0.84	2.41	1.89	1.71
hawthorn	*Crataegus species*	0.01	2.00	4.00	0.02	1.20	0.95	0.72
Live Total		40.20	166.10	423.19	100.00	100.00	100.00	100.00
Snag:								
river birch	*Betula nigra*	0.01	2.00	4.00	0.34	3.70	3.10	2.38
unknown	unknown	0.14	4.00	8.00	3.49	7.41	6.21	5.70
overcup oak	*Quercus lyrata*	0.14	2.17	4.33	3.54	4.01	3.36	3.64
common persimmon	*Diospyros virginiana*	0.93	5.83	13.00	23.89	10.80	10.09	14.93
swamp privet	*Forestiera acuminata*	0.25	6.00	12.00	6.54	11.11	9.31	8.99
planertree	*Planera aquatica*	0.67	7.00	14.00	17.29	12.96	10.87	13.71
American hornbeam	*Carpinus caroliniana*	0.20	12.50	22.50	5.11	23.15	17.46	15.24
sweetgum	*Liquidambar styraciflua*	0.11	2.50	15.00	2.83	4.63	11.64	6.37
Chinese tallow	*Triadica sebifera*	0.24	2.00	4.00	6.05	3.70	3.10	4.29
water hickory	*Carya aquatica*	1.02	4.00	20.00	26.19	7.41	15.52	16.37
deciduous holly	*Ilex decidua*	0.18	6.00	12.00	4.71	11.11	9.31	8.38
Snag Total		3.90	54.00	128.83	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.3.1 Big Cypress Bayou: Summary of Tree Layer Field Data, Willow Oak Bottomland Forest, 2013
Site #1: Sanders and DeWare Parcels

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
willow oak	*Quercus phellos*	9.96	32.00	84.00	50.69	19.51	18.75	29.65
sweetgum	*Liquidambar styraciflua*	4.72	34.00	104.00	24.00	20.73	23.21	22.65
American hornbeam	*Carpinus caroliniana*	0.68	18.00	52.00	3.44	10.98	11.61	8.67
water hickory	*Carya aquatica*	1.05	16.00	44.00	5.35	9.76	9.82	8.31
chinese tallow	*Triadica sebifera*	0.16	12.00	28.00	0.80	7.32	6.25	4.79
deciduous holly	*Ilex decidua*	0.26	10.00	24.00	1.30	6.10	5.36	4.25
black tupelo	*Nyssa sylvatica*	0.72	8.00	20.00	3.65	4.88	4.46	4.33
water oak	*Quercus nigra*	0.86	6.00	20.00	4.38	3.66	4.46	4.17
winged elm	*Ulmus alata*	0.78	6.00	16.00	3.96	3.66	3.57	3.73
red maple	*Acer rubrum*	0.15	6.00	16.00	0.78	3.66	3.57	2.67
common persimmon	*Diospyros virginiana*	0.03	4.00	12.00	0.16	2.44	2.68	1.76
overcup oak	*Quercus lyrata*	0.08	4.00	8.00	0.43	2.44	1.79	1.55
American holly	*Ilex opaca*	0.07	2.00	4.00	0.33	1.22	0.89	0.81
sugarberry	*Celtis laevigata*	0.02	2.00	4.00	0.09	1.22	0.89	0.73
Swamp privet	*Forestiera acuminata*	0.13	4.00	12.00	0.65	2.44	2.68	1.92
Live Total		19.66	164.00	448.00	100.00	100.00	100.00	100.00
Snag:								
American hornbeam	*Carpinus caroliniana*	0.82	18.00	60.00	18.34	47.37	57.69	41.13
unknown	*unknown*	3.32	8.00	20.00	74.36	21.05	19.23	38.21
sweetgum	*Liquidambar styraciflua*	0.21	6.00	12.00	4.67	15.79	11.54	10.67
planertree	*Planera aquatica*	0.10	2.00	4.00	2.25	5.26	3.85	3.79
deciduous holly	*Ilex decidua*	0.01	2.00	4.00	0.19	5.26	3.85	3.10
water hickory	*Carya aquatica*	0.01	2.00	4.00	0.19	5.26	3.85	3.10
Snag Total		4.47	38.00	104.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.3.2 Big Cypress Bayou: Summary of Tree Layer Field Data, Willow Oak Bottomland Forest, 2013
Site #2: Locke Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
willow oak	*Quercus phellos*	19.62	78.00	392.00	70.13	44.83	44.14	53.03
sweetgum	*Liquidambar styraciflua*	6.79	70.00	444.00	24.26	40.23	50.00	38.16
water oak	*Quercus nigra*	0.50	8.00	16.00	1.79	4.60	1.80	2.73
overcup oak	*Quercus lyrata*	0.49	4.00	8.00	1.75	2.30	0.90	1.65
red maple	*Acer rubrum*	0.37	4.00	8.00	1.34	2.30	0.90	1.51
black tupelo	*Nyssa sylvatica*	0.11	4.00	8.00	0.39	2.30	0.90	1.20
winged elm	*Ulmus alata*	0.04	2.00	4.00	0.16	1.15	0.45	0.59
deciduous holly	*Ilex decidua*	0.03	2.00	4.00	0.11	1.15	0.45	0.57
planertree	*Planera aquatica*	0.02	2.00	4.00	0.07	1.15	0.45	0.56
Live Total		27.98	174.00	888.00	100.00	100.00	100.00	100.00
Snag:								
willow oak	*Quercus phellos*	4.86	44.00	120.00	82.12	61.11	68.18	70.47
sweetgum	*Liquidambar styraciflua*	0.56	18.00	32.00	9.54	25.00	18.18	17.57
unknown oak	*Quercus sp.*	0.43	4.00	12.00	7.27	5.56	6.82	6.55
unknown	*unknown*	0.06	6.00	12.00	1.07	8.33	6.82	5.41
Snag Total		5.91	72.00	176.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.3.3 Big Cypress Bayou: Summary of Tree Layer Field Data, Willow Oak Bottomland Forest, 2013
Site #3: Thomas Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
willow oak	*Quercus phellos*	21.88	42.00	96.00	55.04	26.92	25.26	35.74
sweetgum	*Liquidambar styraciflua*	8.11	26.00	72.00	20.39	16.67	18.95	18.67
American hornbeam	*Carpinus caroliniana*	0.91	26.00	72.00	2.29	16.67	18.95	12.63
overcup oak	*Quercus lyrata*	3.99	10.00	28.00	10.03	6.41	7.37	7.94
water oak	*Quercus nigra*	2.48	8.00	16.00	6.24	5.13	4.21	5.19
deciduous holly	*Ilex decidua*	0.22	12.00	24.00	0.55	7.69	6.32	4.85
black tupelo	*Nyssa sylvatica*	0.79	10.00	20.00	1.98	6.41	5.26	4.55
winged elm	*Ulmus alata*	0.30	8.00	16.00	0.77	5.13	4.21	3.37
common persimmon	*Diospyros virginiana*	0.15	6.00	20.00	0.37	3.85	5.26	3.16
red maple	*Acer rubrum*	0.12	4.00	8.00	0.31	2.56	2.11	1.66
water hickory	*Carya aquatica*	0.41	2.00	4.00	1.04	1.28	1.05	1.13
planertree	*Planera aquatica*	0.40	2.00	4.00	1.00	1.28	1.05	1.11
Live Total		39.76	156.00	380.00	100.00	100.00	100.00	100.00
Snag:								
American hornbeam	*Carpinus caroliniana*	0.82	22.00	68.00	11.20	44.00	54.84	36.68
willow oak	*Quercus phellos*	4.24	14.00	28.00	57.94	28.00	22.58	36.17
unknown	*unknown*	1.34	8.00	16.00	18.31	16.00	12.90	15.74
water oak	*Quercus nigra*	0.79	2.00	4.00	10.82	4.00	3.23	6.02
red maple	*Acer rubrum*	0.12	2.00	4.00	1.70	4.00	3.23	2.98
deciduous holly	*Ilex decidua*	0.00	2.00	4.00	0.03	4.00	3.23	2.42
Snag Total		7.32	50.00	124.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.3.4 Big Cypress Bayou: Three-Site Averages for Tree Layer Field Data, Willow Oak Bottomland Forest, 2013 Sites #1-3

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
willow oak	*Quercus phellos*	17.16	50.67	190.67	57.22	26.57	29.82	37.87
sweetgum	*Liquidambar styraciflua*	6.54	43.33	206.67	21.80	22.73	32.33	25.62
American hornbeam	*Carpinus caroliniana*	0.79	22.00	62.00	2.64	11.54	9.70	7.96
water hickory	*Carya aquatica*	0.73	9.00	24.00	2.44	4.72	3.75	3.64
Chinese tallow	*Triadica sebifera*	0.16	12.00	28.00	0.52	6.29	4.38	3.73
deciduous holly	*Ilex decidua*	0.17	8.00	17.33	0.56	4.20	2.71	2.49
black tupelo	*Nyssa sylvatica*	0.54	7.33	16.00	1.80	3.85	2.50	2.72
water oak	*Quercus nigra*	1.28	7.33	17.33	4.27	3.85	2.71	3.61
winged elm	*Ulmus alata*	0.38	5.33	12.00	1.25	2.80	1.88	1.98
red maple	*Acer rubrum*	0.22	4.67	10.67	0.72	2.45	1.67	1.61
common persimmon	*Diospyros virginiana*	0.09	5.00	16.00	0.30	2.62	2.50	1.81
overcup oak	*Quercus lyrata*	1.52	6.00	14.67	5.07	3.15	2.29	3.50
American holly	*Ilex opaca*	0.07	2.00	4.00	0.22	1.05	0.63	0.63
sugarberry	*Celtis laevigata*	0.02	2.00	4.00	0.06	1.05	0.63	0.58
swamp privet	*Forestiera acuminata*	0.13	4.00	12.00	0.42	2.10	1.88	1.47
planertree	*Planera aquatica*	0.21	2.00	4.00	0.70	1.05	0.63	0.79
Live Total		8.79	82.33	208.00	100.00	100.00	100.00	100.00
Snag:								
American hornbeam	*Carpinus caroliniana*	0.82	20.00	64.00	9.32	24.29	30.77	21.46
unknown	unknown	1.58	7.33	16.00	17.93	8.91	7.69	11.51
sweetgum	*Liquidambar styraciflua*	0.39	12.00	22.00	4.40	14.57	10.58	9.85
planertree	*Planera aquatica*	0.10	2.00	4.00	1.15	2.43	1.92	1.83
deciduous holly	*Ilex decidua*	0.01	2.00	4.00	0.06	2.43	1.92	1.47
water hickory	*Carya aquatica*	0.01	2.00	4.00	0.10	2.43	1.92	1.48
willow oak	*Quercus phellos*	4.55	29.00	74.00	51.74	35.22	35.58	40.85
unknown oak	*Quercus sp.*	0.43	4.00	12.00	4.89	4.86	5.77	5.17
water oak	*Quercus nigra*	0.79	2.00	4.00	9.01	2.43	1.92	4.45
red maple	*Acer rubrum*	0.12	2.00	4.00	1.42	2.43	1.92	1.92
Snag Total		8.79	82.33	208.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.4.1 Big Cypress Bayou: Summary of Tree Layer Field Data, Water Oak Bottomland Forest, 2013
Site #1: Sanders and DeWare Parcels

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
water oak	*Quercus nigra*	18.26	62.00	164.00	63.94	36.05	37.96	45.98
American hornbeam	*Carpinus caroliniana*	2.59	38.00	100.00	9.07	22.09	23.15	18.10
sweetgum	*Liquidambar styraciflua*	3.66	18.00	40.00	12.81	10.47	9.26	10.85
winged elm	*Ulmus alata*	2.21	22.00	48.00	7.73	12.79	11.11	10.54
unknown	*unknown*	0.21	4.00	16.00	0.74	2.33	3.70	2.26
willow oak	*Quercus phellos*	0.19	4.00	16.00	0.66	2.33	3.70	2.23
river birch	*Betula nigra*	0.70	2.00	4.00	2.45	1.16	0.93	1.51
unknown hickory	*Carya sp.*	0.06	4.00	8.00	0.21	2.33	1.85	1.46
red maple	*Acer rubrum*	0.05	4.00	8.00	0.17	2.33	1.85	1.45
water hickory	*Carya aquatica*	0.02	4.00	8.00	0.08	2.33	1.85	1.42
sugarberry	*Celtis laevigata*	0.36	2.00	4.00	1.25	1.16	0.93	1.11
overcup oak	*Quercus lyrata*	0.12	2.00	4.00	0.44	1.16	0.93	0.84
deciduous holly	*Ilex decidua*	0.09	2.00	4.00	0.31	1.16	0.93	0.80
gum bumelia	*Sideroxylon lanuginosum*	0.02	2.00	4.00	0.07	1.16	0.93	0.72
black tupelo	*Nyssa sylvatica*	0.02	2.00	4.00	0.06	1.16	0.93	0.72
Live Total		28.55	172.00	432.00	100.00	100.00	100.00	100.00
Snag:								
American hornbeam	*Carpinus caroliniana*	0.86	26.00	80.00	14.65	35.14	44.44	31.41
water oak	*Quercus nigra*	1.88	16.00	36.00	32.13	21.62	20.00	24.59
unknown	*unknown*	1.64	14.00	28.00	28.07	18.92	15.56	20.85
unknown hickory	*Carya sp.*	1.19	4.00	8.00	20.43	5.41	4.44	10.09
river birch	*Betula nigra*	0.11	4.00	8.00	1.91	5.41	4.44	3.92
winged elm	*Ulmus alata*	0.09	4.00	8.00	1.62	5.41	4.44	3.82
honey locust	*Gleditsia triacanthos*	0.05	2.00	4.00	0.85	2.70	2.22	1.93
deciduous holly	*Ilex decidua*	0.01	2.00	4.00	0.19	2.70	2.22	1.70
sweetgum	*Liquidambar styraciflua*	0.01	2.00	4.00	0.15	2.70	2.22	1.69
Snag Total		5.84	74.00	180.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.4.2 Big Cypress Bayou: Summary of Tree Layer Field Data, Water Oak Bottomland Forest, 2013
Site #2: Locke Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
water oak	*Quercus nigra*	23.48	58.00	192.00	66.04	27.62	21.05	38.24
sweetgum	*Liquidambar styraciflua*	5.41	64.00	476.00	15.22	30.48	52.19	32.63
American hornbeam	*Carpinus caroliniana*	1.03	36.00	120.00	2.88	17.14	13.16	11.06
willow oak	*Quercus phellos*	2.87	16.00	40.00	8.06	7.62	4.39	6.69
winged elm	*Ulmus alata*	1.59	14.00	40.00	4.47	6.67	4.39	5.18
red maple	*Acer rubrum*	0.49	12.00	24.00	1.38	5.71	2.63	3.24
overcup oak	*Quercus lyrata*	0.46	4.00	8.00	1.29	1.90	0.88	1.36
black tupelo	*Nyssa sylvatica*	0.19	2.00	4.00	0.53	0.95	0.44	0.64
unknown oak	*Quercus sp.*	0.03	2.00	4.00	0.08	0.95	0.44	0.49
planertree	*Planera aquatica*	0.02	2.00	4.00	0.04	0.95	0.44	0.48
Live Total		35.56	210.00	912.00	100.00	100.00	100.00	100.00
Snag:								
sweetgum	*Liquidambar styraciflua*	0.24	26.00	68.00	5.59	38.24	40.48	28.10
water oak	*Quercus nigra*	1.87	14.00	36.00	43.29	20.59	21.43	28.44
unkown oak	*Quercus sp.*	0.90	14.00	32.00	20.95	20.59	19.05	20.20
willow oak	*Quercus phellos*	0.59	6.00	12.00	13.65	8.82	7.14	9.87
chinese tallow	*Triadica sebifera*	0.60	2.00	4.00	13.91	2.94	2.38	6.41
unknown	*unknown*	0.06	2.00	4.00	1.41	2.94	2.38	2.24
red maple	*Acer rubrum*	0.05	4.00	12.00	1.19	5.88	7.14	4.74
Snag Total		4.31	68.00	168.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.4.3 Big Cypress Bayou: Summary of Tree Layer Field Data, Water Oak Bottomland Forest, 2013
Site #3: Thomas Parcel

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
American hornbeam	*Carpinus caroliniana*	1.67	64.00	200.00	8.46	45.71	54.95	36.37
water oak	*Quercus nigra*	12.80	26.00	56.00	64.73	18.57	15.38	32.90
winged elm	*Ulmus alata*	1.19	16.00	32.00	6.03	11.43	8.79	8.75
sweetgum	*Liquidambar styraciflua*	2.34	10.00	24.00	11.85	7.14	6.59	8.53
black tupelo	*Nyssa sylvatica*	0.70	6.00	16.00	3.52	4.29	4.40	4.07
deciduous holly	*Ilex decidua*	0.07	6.00	12.00	0.33	4.29	3.30	2.64
water hickory	*Carya aquatica*	0.34	4.00	8.00	1.71	2.86	2.20	2.25
willow oak	*Quercus phellos*	0.48	2.00	4.00	2.42	1.43	1.10	1.65
mockernut hickory	*Carya cordiformis*	0.09	2.00	4.00	0.43	1.43	1.10	0.99
overcup oak	*Quercus lyrata*	0.08	2.00	4.00	0.40	1.43	1.10	0.97
red maple	*Acer rubrum*	0.02	2.00	4.00	0.11	1.43	1.10	0.88
Live Total		19.77	140.00	364.00	100.00	100.00	100.00	100.00
Snag:								
American hornbeam	*Carpinus caroliniana*	3.26	40.00	112.00	29.57	51.28	54.90	45.25
unknown	*unknown*	2.32	20.00	48.00	21.06	25.64	23.53	23.41
water oak	*Quercus nigra*	4.61	10.00	28.00	41.75	12.82	13.73	22.77
sweetgum	*Liquidambar styraciflua*	0.63	4.00	8.00	5.67	5.13	3.92	4.91
hawthorn	*Crataegus species*	0.21	2.00	4.00	1.91	2.56	1.96	2.15
deciduous holly	*Ilex decidua*	0.00	2.00	4.00	0.03	2.56	1.96	1.52
Snag Total		11.03	78.00	204.00	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 1.4.4 Big Cypress Bayou: Three-Site Averages for Tree Layer Field Data, Water Oak Bottomland Forest, 2013 Sites #1-3

Common Name	Scientific Name	Basal Area (m^2/ha)	Frequency (%)	Density (trees/ha)	% Relative Values*			
					Basal Area	Frequency	Density	Importance
Live:								
water oak	*Quercus nigra*	18.18	48.67	137.33	62.61	25.61	22.64	36.96
American hornbeam	*Carpinus caroliniana*	1.76	46.00	140.00	6.07	24.21	23.08	17.79
sweetgum	*Liquidambar styraciflua*	3.81	30.67	180.00	13.11	16.14	29.67	19.64
winged elm	*Ulmus alata*	1.66	17.33	40.00	5.73	9.12	6.59	7.15
Chinese tallow	*Triadica sebifera*	0.21	4.00	16.00	0.73	2.11	2.64	1.82
willow oak	*Quercus phellos*	1.18	7.33	20.00	4.06	3.86	3.30	3.74
river birch	*Betula nigra*	0.70	2.00	4.00	2.41	1.05	0.66	1.37
unknown hickory	*Carya sp.*	0.06	4.00	8.00	0.20	2.11	1.32	1.21
red maple	*Acer rubrum*	0.19	6.00	12.00	0.64	3.16	1.98	1.93
water hickory	*Carya aquatica*	0.18	4.00	8.00	0.62	2.11	1.32	1.35
sugarberry	*Celtis laevigata*	0.36	2.00	4.00	1.23	1.05	0.66	0.98
overcup oak	*Quercus lyrata*	0.22	2.67	5.33	0.76	1.40	0.88	1.01
deciduous holly	*Ilex decidua*	0.08	4.00	8.00	0.27	2.11	1.32	1.23
gum bumelia	*Sideroxylon lanuginosum*	0.02	2.00	4.00	0.07	1.05	0.66	0.59
black tupelo	*Nyssa sylvatica*	0.30	3.33	8.00	1.04	1.75	1.32	1.37
unknown oak	*Quercus sp.*	0.03	2.00	4.00	0.10	1.05	0.66	0.60
planertree	*Planera aquatica*	0.02	2.00	4.00	0.05	1.05	0.66	0.59
mockernut hickory	*Carya cordiformis*	0.09	2.00	4.00	0.29	1.05	0.66	0.67
Live Total		29.03	190.00	606.67	100.00	100.00	100.00	100.00
Snag:								
American hornbeam	*Carpinus caroliniana*	2.06	33.00	96.00	20.02	29.20	34.45	27.89
water oak	*Quercus nigra*	2.78	13.33	33.33	27.06	11.80	11.96	16.94
unknown	unknown	1.34	12.00	26.67	13.04	10.62	9.57	11.08
unknown hickory	*Carya sp.*	1.19	4.00	8.00	11.60	3.54	2.87	6.00
river birch	*Betula nigra*	0.11	4.00	8.00	1.09	3.54	2.87	2.50
winged elm	*Ulmus alata*	0.09	4.00	8.00	0.92	3.54	2.87	2.44
honey locust	*Gleditsia triacanthos*	0.05	2.00	4.00	0.48	1.77	1.44	1.23
deciduous holly	*Ilex decidua*	0.01	2.00	4.00	0.07	1.77	1.44	1.09
sweetgum	*Liquidambar styraciflua*	0.29	10.67	26.67	2.84	9.44	9.57	7.28
unkown oak	*Quercus sp.*	0.90	14.00	32.00	8.78	12.39	11.48	10.89
willow oak	*Quercus phellos*	0.59	6.00	12.00	5.72	5.31	4.31	5.11
Chinese tallow	*Triadica sebifera*	0.60	2.00	4.00	5.83	1.77	1.44	3.01
red maple	*Acer rubrum*	0.05	4.00	12.00	0.50	3.54	4.31	2.78
hawthorn	*Crataegus species*	0.21	2.00	4.00	2.05	1.77	1.44	1.75
Snag Total		10.29	113.00	278.67	100.00	100.00	100.00	100.00

* % Rel = (Species total)/All-species total)*100

Table 2 Big Cypress Bayou: Percent Snags Versus Live Trees in Four Forest Guilds
Summary Field Data, 2013, Study Sites 1-3

Common Names:	Scientific Names:	Percent Snags versus Live Trees
Bald Cypress Swamp:		
swamp privet	*Forestiera acuminata*	42.99%
sweetgum	*Liquidambar styraciflua*	37.51%
water hickory	*Carya aquatica*	22.34%
deciduous holly	*Ilex decidua*	7.63%
planertree	*Planera aquatica*	6.87%
bald cypress	*Taxodium distichum*	3.96%
Overcup Oak Swamp:		
river birch	*Betula nigra*	260.91%
Swamp privet	*Forestiera acuminata*	52.65%
American hornbeam	*Carpinus caroliniana*	50.77%
common persimmon	*Diospyros virginiana*	37.59%
water hickory	*Carya aquatica*	24.76%
planertree	*Planera aquatica*	13.93%
deciduous holly	*Ilex decidua*	9.06%
overcup oak	*Quercus lyrata*	3.52%
sweetgum	*Liquidambar styraciflua*	3.03%
Willow Oak Bottomland Forest:		
American hornbeam	*Carpinus caroliniana*	103.47%
water oak	*Quercus nigra*	61.80%
red maple	*Acer rubrum*	57.39%
planertree	*Planera aquatica*	48.09%
willow oak	*Quercus phellos*	26.51%
sweetgum	*Liquidambar styraciflua*	5.91%
deciduous holly	*Ilex decidua*	3.16%
water hickory	*Carya aquatica*	1.16%
Water Oak Bottomland Forest:		
Chinese tallow	*Triadica sebifera*	282.88%
American hornbeam	*Carpinus caroliniana*	116.87%
willow oak	*Quercus phellos*	50.01%
water oak	*Quercus nigra*	43.21%
red maple	*Acer rubrum*	27.56%
river birch	*Betula nigra*	15.95%
deciduous holly	*Ilex decidua*	9.57%
sweetgum	*Liquidambar styraciflua*	7.67%
winged elm	*Ulmus alata*	5.70%

Table 3.1 Big Cypress Bayou: Tree-Layer Mortality
Bald Cypress Swamp, 2013-2016, Sites #1-3

Bald Cypress Swamp: Mortality Summary 2013-2016			
Common Name	**Scientific Name**	**# Stems**	**Basal Area** (m^2/ha)
Site 1			
planertree	*Planera aquatica*	5	4.67
bald cypress	*Taxodium distichum*	3	1.16
swamp privet	*Forestiera acuminata*	1	0.10
	Site Subtotals	**9**	**5.93**
Site 2			
planertree	*Planera aquatica*	2	0.63
deciduous holly	*Ilex decidua*	1	0.12
	Site Subtotals	**3**	**0.75**
Site 3			
sugarberry	*Celtis laevigata*	2	0.11
deciduous holly	*Ilex decidua*	1	0.02
	Site Subtotals	**3**	**0.13**
Three-Site Grand totals		**15**	**6.80**

Table 3.2 Big Cypress Bayou: Tree-Layer Mortality
Overcup Oak Swamp, 2013-2016, Sites #1-3

Overcup Oak Swamp: Mortality Summary 2013-2016			
Site 1:			
Common Name	**Scientific Name**	**# Stems**	**Total Basal Area** (m^2/ha)
Site 1:			
overcup oak	*Quercus lyrata*	1	4.21
swamp privet	*Forestiera acuminata*	9	1.07
planertree	*Planera aquatica*	2	0.93
sweetgum	*Liquidambar styraciflua*	1	0.71
Chinese tallow	*Triadica sebifera*	1	0.14
American hornbeam	*Carpinus caroliniana*	2	0.07
	Site Subtotals	**16**	**7.14**
Site 2:			
overcup oak	*Quercus lyrata*	4	10.97
common persimmon	*Diospyros virginiana*	3	0.44
sweetgum	*Liquidambar styraciflua*	2	0.03
deciduous holly	*Ilex decidua*	2	0.03
planertree	*Planera aquatica*	1	0.01
	Site Subtotals	**12**	**11.49**
Site 3:			
common persimmon	*Diospyros virginiana*	3	2.37
water oak	*Quercus nigra*	1	1.32
bald cypress	*Taxodium distichum*	1	1.23
overcup oak	*Quercus lyrata*	1	0.43
American hornbeam	*Carpinus caroliniana*	1	0.13
	Site Subtotals	**7**	**5.48**
Three-Site Grand totals		**35**	**24.11**

Table 3.3 Big Cypress Bayou: Tree-Layer Mortality
Willow Oak Bottomland Forest, 2013-2016, Sites #1-3

Willow Oak Bottomland Forest: Mortality Summary 2013-2016			
Common Name	**Scientific Name**	**# Stems**	**Total Basal Area** (m^2/ha)
Site 1			
willow oak	*Quercus phellos*	3	1.09
sweetgum	*Liquidambar styraciflua*	1	1.05
American hornbeam	*Carpinus caroliniana*	5	0.88
planertree	*Planera aquatica*	1	0.10
	Site Subtotals	**10**	**3.13**
Site 2			
willow oak	*Quercus phellos*	16	5.05
sweetgum	*Liquidambar styraciflua*	9	2.06
water oak	*Quercus nigra*	1	0.57
	Site Subtotals	**26**	**7.68**
Site 3			
sweetgum	*Liquidambar styraciflua*	2	4.68
willow oak	*Quercus phellos*	2	1.92
American hornbeam	*Carpinus caroliniana*	2	0.46
red maple	*Acer rubrum*	1	0.32
overcup oak	*Quercus lyrata*	1	0.30
planertree	*Planera aquatica*	1	0.29
	Site Subtotals	**9**	**7.96**
Three-Site Grand totals		**45**	**18.76**

Table 3.4 Big Cypress Bayou: Tree-Layer Mortality
Water Oak Bottomland Forest, 2013-2016, Sites #1-3

Water Oak Bottomland Forest: Mortality Summary 2013-2016			
Common Name	**Scientific Name**	**# Stems**	**Total Basal Area** (m^2/ha)
Site 1			
water oak	*Quercus nigra*	2	6.03
sweetgum	*Liquidambar styraciflua*	2	0.94
winged elm	*Ulmus alata*	3	0.77
unknown hickory	*Carya* sp.	1	0.20
willow oak	*Quercus phellos*	1	0.13
American hornbeam	*Carpinus caroliniana*	1	0.07
	Site Subtotals	**10**	**8.13**
Site 2			
water oak	*Quercus nigra*	3	2.11
sweetgum	*Liquidambar styraciflua*	12	1.56
unknown hickory	*Quercus* sp.	1	0.15
red maple	*Acer rubrum*	1	0.11
American hornbeam	*Carpinus caroliniana*	2	0.06
winged elm	*Ulmus alata*	1	0.04
	Site Subtotals	**20**	**4.03**
Site 3			
water oak	*Quercus nigra*	1	3.47
willow oak	*Quercus phellos*	1	2.39
water hickory	*Carya aquatica*	1	1.53
American hornbeam	*Carpinus caroliniana*	12	1.28
mockernut hickory	*Carya tomentosa*	1	0.43
winged elm	*Ulmus alata*	1	0.20
	Site Subtotals	**17**	**9.30**
Three-Site Grand totals		**47**	**21.46**

Table 4.1.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Bald Cypress Swamp, Site #1: Sanders and DeWare Parcels

Neither shrubs nor saplings in 2015 B-1 plots.

Table 4.1.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Bald Cypress Swamp, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common persimmon	*Diospyros virginiana*	17.10%	107.60	20.00	2.00%	60.84%	50.00%	50.0%	53.61%
sweetgum	*Liquidambar styraciflua*	12.60%	69.27	20.00	2.00%	39.17%	50.00%	50.0%	46.39%
Totals		**NA**	**176.87**	**40.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.1.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Bald Cypress Swamp, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
pawpaw	*Asimina triloba*	27.44%	165.56	120.00	12.00%	11.51%	60.00%	60.00%	43.84%
buttonbush	*Cephalanthus occidentalis*	22.80%	1,252.24	40.00	4.00%	87.07%	20.00%	20.00%	42.36%
bald cypress	*Taxodium distichum*	22.80%	19.01	20.00	2.00%	1.32%	10.00%	10.00%	7.11%
sweetgum	*Liquidambar styraciflua*	22.80%	1.41	20.00	2.00%	0.10%	10.00%	10.00%	6.70%
Totals		**NA**	**1,438.22**	**200.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.2.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Overcup Oak Swamp, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
deciduous holly	*Ilex decidua*	50.40%	430.08	40.00	4.00%	43.85%	13.33%	13.33%	23.51%
crossvine	*Bignonia capreolata*	78.40%	22.62	80.00	8.00%	2.31%	26.67%	26.67%	18.55%
hawthorn	*Crataegus species*	30.40%	304.11	20.00	2.00%	31.00%	6.67%	6.67%	14.78%
common greenbrier	*Smilax rotundifolia*	78.40%	79.68	60.00	4.00%	8.12%	20.00%	13.33%	13.82%
snowbell	*Halesia diptera*	45.40%	119.85	20.00	4.00%	12.22%	6.67%	13.33%	10.74%
sweetgum	*Liquidambar styraciflua*	64.40%	16.34	40.00	4.00%	1.67%	13.33%	13.33%	9.44%
cat greenbrier	*Smilax glauca*	78.40%	5.65	20.00	2.00%	0.58%	6.67%	6.67%	4.64%
Chinese tallow	*Triadica sebifera*	30.40%	2.51	20.00	2.00%	0.26%	6.67%	6.67%	4.53%
Totals		**NA**	**980.84**	**300.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.2.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Overcup Oak Swamp, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common greenbrier	*Smilax rotundifolia*	58.80%	60.30	111.11	8.00%	3.73%	31.25%	26.7%	20.55%
snowbell	*Halesia diptera*	58.80%	419.05	22.22	2.00%	25.90%	6.25%	6.7%	12.94%
water elm	*Planera aquatica*	37.80%	419.05	22.22	2.00%	25.90%	6.25%	6.7%	12.94%
American buckwheat vine	*Brunnichia ovata*	58.80%	0.52	66.67	6.00%	0.03%	18.75%	20.0%	12.93%
bald cypress	*Taxodium distichum*	51.30%	337.90	22.22	2.00%	20.89%	6.25%	6.7%	11.27%
deciduous holly	*Ilex decidua*	44.55%	298.97	22.22	2.00%	18.48%	6.25%	6.7%	10.47%
muscadine	*Vitis rotundifolia*	58.80%	70.16	44.44	4.00%	4.34%	12.50%	13.3%	10.06%
rattan-vine	*Berchemia scandens*	58.80%	11.17	22.22	2.00%	0.69%	6.25%	6.7%	4.54%
crossvine	*Bignonia capreolata*	58.80%	0.70	22.22	2.00%	0.04%	6.25%	6.7%	4.32%
Totals		**NA**	**1,617.83**	**355.56**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.2.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Overcup Oak Swamp, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
deciduous holly	*Ilex decidua*	31.20%	2,760.36	50.00	6.00%	82.84%	15.15%	17.65%	38.54%
common greenbrier	*Smilax rotundifolia*	48.68%	28.98	80.00	8.00%	0.87%	24.24%	23.53%	16.21%
crossvine	*Bignonia capreolata*	56.30%	15.43	60.00	6.00%	0.46%	18.18%	17.65%	12.10%
pawpaw	*Asimina triloba*	37.80%	262.95	40.00	4.00%	7.89%	12.12%	11.76%	10.59%
common persimmon	*Diospyros virginiana*	23.55%	63.66	40.00	4.00%	1.91%	12.12%	11.76%	8.60%
bald cypress	*Taxodium distichum*	51.30%	192.42	20.00	2.00%	5.77%	6.06%	5.88%	5.91%
sweetgum	*Liquidambar styraciflua*	58.80%	5.65	20.00	2.00%	0.17%	6.06%	5.88%	4.04%
cat greenbrier	*Smilax glauca*	48.30%	2.87	20.00	2.00%	0.09%	6.06%	5.88%	4.01%
Totals		**NA**	**3,332.33**	**330.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.3.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Willow Oak Bottomland Forest, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common greenbrier	*Smilax rotundifolia*	97.20%	80.39	480.00	46.00%	3.17%	46.15%	46.00%	31.78%
deciduous holly	*Ilex decidua*	55.19%	1,681.38	100.00	10.00%	66.34%	9.62%	10.00%	28.65%
sweetgum	*Liquidambar styraciflua*	95.92%	123.62	80.00	8.00%	4.88%	7.69%	8.00%	6.86%
snowbell	*Halesia diptera*	46.33%	142.51	60.00	6.00%	5.62%	5.77%	6.00%	5.80%
muscadine	*Vitis rotundifolia*	98.00%	116.87	60.00	6.00%	4.61%	5.77%	6.00%	5.46%
Chinese tallow	*Triadica sebifera*	50.25%	142.35	40.00	4.00%	5.62%	3.85%	4.00%	4.49%
saw greenbrier	*Smilax bona-nox*	98.00%	2.51	60.00	6.00%	0.10%	5.77%	6.00%	3.96%
cat greenbrier	*Smilax glauca*	98.00%	3.81	60.00	4.00%	0.15%	5.77%	4.00%	3.31%
crossvine	*Bignonia capreolata*	98.00%	149.07	20.00	2.00%	5.88%	1.92%	2.00%	3.27%
pawpaw	*Asimina triloba*	38.00%	50.89	20.00	2.00%	2.01%	1.92%	2.00%	1.98%
witch hazel	*Hamamelis virginiana*	85.50%	35.34	20.00	2.00%	1.39%	1.92%	2.00%	1.77%
water hickory	*Carya aquatica*	15.50%	5.65	20.00	2.00%	0.22%	1.92%	2.00%	1.38%
American beautyberry	*Callicarpa americana*	98.00%	0.16	20.00	2.00%	0.01%	1.92%	2.00%	1.31%
Totals		**NA**	**2,534.56**	**1,040.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.3.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Willow Oak Bottomland Forest, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
sweetgum	*Liquidambar styraciflua*	45.94%	1,119.19	120.00	12.00%	51.53%	35.29%	37.50%	41.44%
common greenbrier	*Smilax rotundifolia*	98.00%	6.28	80.00	6.00%	0.29%	23.53%	18.75%	14.19%
deciduous holly	*Ilex decidua*	74.25%	346.36	40.00	4.00%	15.95%	11.76%	12.50%	13.40%
blackgum	*Nyssa sylvatica*	85.50%	322.01	40.00	4.00%	14.83%	11.76%	12.50%	13.03%
water oak	*Quercus nigra*	85.50%	377.15	20.00	2.00%	17.37%	5.88%	6.25%	9.83%
common persimmon	*Diospyros virginiana*	85.50%	0.63	20.00	2.00%	0.03%	5.88%	6.25%	4.05%
saw greenbrier	*Smilax bona-nox*	98.00%	0.16	20.00	2.00%	0.01%	5.88%	6.25%	4.05%
Totals		**NA**	**2,171.78**	**340.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.3.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Willow Oak Bottomland Forest, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
sweetgum	*Liquidambar styraciflua*	34.80%	182.25	100.00	10.00%	27.93%	33.33%	33.33%	31.53%
deciduous holly	*Ilex decidua*	22.80%	382.88	20.00	2.00%	58.67%	6.67%	6.67%	24.00%
pawpaw	*Asimina triloba*	23.05%	76.38	60.00	6.00%	11.70%	20.00%	20.00%	17.23%
common greenbrier	*Smilax rotundifolia*	58.80%	8.80	40.00	4.00%	1.35%	13.33%	13.33%	9.34%
saw greenbrier	*Smilax bona-nox*	58.80%	1.26	40.00	4.00%	0.19%	13.33%	13.33%	8.95%
cat greenbrier	*Smilax glauca*	58.80%	0.98	40.00	4.00%	0.15%	13.33%	13.33%	8.94%
Totals		**NA**	**652.55**	**300.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.4.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Water Oak Bottomland Forest, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
deciduous holly	*Ilex decidua*	54.67%	311.84	100.00	6.00%	32.85%	12.17%	10.71%	18.58%
crossvine	*Bignonia capreolata*	98.00%	267.98	60.00	6.00%	28.23%	7.30%	10.71%	15.41%
American beautyberry	*Callicarpa americana*	60.92%	82.31	140.00	6.00%	8.67%	17.03%	10.71%	12.14%
common greenbrier	*Smilax rotundifolia*	98.00%	14.77	120.00	8.00%	1.56%	14.60%	14.29%	10.15%
sweetgum	*Liquidambar styraciflua*	82.17%	102.89	80.00	4.00%	10.84%	9.73%	7.14%	9.24%
Chinaberry	*Melia azedarach*	50.50%	65.03	60.00	4.00%	6.85%	7.30%	7.14%	7.10%
Chinese privet	*Ligustrum sinense*	74.25%	34.71	60.00	4.00%	3.66%	7.30%	7.14%	6.03%
Chinese tallow	*Triadica sebifera*	85.50%	32.20	40.00	4.00%	3.39%	4.87%	7.14%	5.13%
saw greenbrier	*Smilax bona-nox*	98.00%	4.24	62.00	4.00%	0.45%	7.54%	7.14%	5.04%
muscadine	*Vitis rotundifolia*	98.00%	19.01	20.00	2.00%	2.00%	2.43%	3.57%	2.67%
American holly	*Ilex opaca*	98.00%	3.93	20.00	2.00%	0.41%	2.43%	3.57%	2.14%
hawthorn	*Crataegus species*	2.50%	3.93	20.00	2.00%	0.41%	2.43%	3.57%	2.14%
rattan-vine	*Berchemia scandens*	98.00%	3.93	20.00	2.00%	0.41%	2.43%	3.57%	2.14%
pawpaw	*Asimina triloba*	63.00%	2.51	20.00	2.00%	0.26%	2.43%	3.57%	2.09%
Totals		**NA**	**949.27**	**822.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.4.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Water Oak Bottomland Forest, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
sweetgum	*Liquidambar styraciflua*	38.63%	5,234.52	260.00	26.00%	44.82%	17.33%	17.81%	26.65%
American hornbeam	*Carpinus caroliniana*	70.10%	3,308.10	340.00	30.00%	28.33%	22.67%	20.55%	23.85%
common greenbrier	*Smilax rotundifolia*	98.00%	95.50	360.00	36.00%	0.82%	24.00%	24.66%	16.49%
rattan-vine	*Berchemia scandens*	98.00%	295.82	140.00	14.00%	2.53%	9.33%	9.59%	7.15%
muscadine	*Vitis rotundifolia*	98.00%	687.38	100.00	10.00%	5.89%	6.67%	6.85%	6.47%
winged elm	*Ulmus alata*	54.67%	441.86	60.00	6.00%	3.78%	4.00%	4.11%	3.96%
deciduous holly	*Ilex decidua*	59.56%	164.62	60.00	6.00%	1.41%	4.00%	4.11%	3.17%
red maple	*Acer rubrum*	85.50%	611.04	20.00	2.00%	5.23%	1.33%	1.37%	2.65%
willow oak	*Quercus phellos*	85.50%	332.38	20.00	2.00%	2.85%	1.33%	1.37%	1.85%
blackgum	*Nyssa sylvatica*	98.00%	318.09	20.00	2.00%	2.72%	1.33%	1.37%	1.81%
white oak	*Quercus alba*	85.50%	98.17	20.00	2.00%	0.84%	1.33%	1.37%	1.18%
cat greenbrier	*Smilax glauca*	98.00%	58.80	20.00	2.00%	0.50%	1.33%	1.37%	1.07%
huckleberry	*Vaccinium species*	63.00%	30.32	20.00	2.00%	0.26%	1.33%	1.37%	0.99%
greenbrier	*Smilax species*	98.00%	1.26	20.00	2.00%	0.01%	1.33%	1.37%	0.90%
crossvine	*Bignonia capreolata*	98.00%	0.63	20.00	2.00%	0.01%	1.33%	1.37%	0.90%
climbing dogbane	*Trachelospermum difforme*	98.00%	0.16	20.00	2.00%	0.00%	1.33%	1.37%	0.90%
Totals		**NA**	**11,678.65**	**1,500.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 4.4.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2015
Water Oak Bottomland Forest, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
muscadine	*Vitis rotundifolia*	70.86%	981.98	140.00	16.00%	59.14%	25.93%	28.6%	37.88%
deciduous holly	*Ilex decidua*	85.50%	543.02	20.00	4.00%	32.70%	3.70%	7.1%	14.52%
sweetgum	*Liquidambar styraciflua*	82.17%	53.29	60.00	8.00%	3.21%	11.11%	14.3%	9.54%
American beautyberry	*Callicarpa americana*	27.38%	38.13	80.00	6.00%	2.30%	14.81%	10.7%	9.28%
common greenbrier	*Smilax rotundifolia*	64.88%	9.66	80.00	6.00%	0.58%	14.81%	10.7%	8.70%
hophornbeam	*Ostrya virginiana*	73.83%	29.22	40.00	4.00%	1.76%	7.41%	7.1%	5.44%
saw greenbrier	*Smilax bona-nox*	9.00%	0.71	40.00	4.00%	0.04%	7.41%	7.1%	4.86%
mockernut hickory	*Carya tomentosa*	85.50%	1.92	20.00	2.00%	0.12%	3.70%	3.6%	2.46%
cat greenbrier	*Smilax glauca*	98.00%	1.41	20.00	2.00%	0.09%	3.70%	3.6%	2.45%
willow oak	*Quercus phellos*	98.00%	0.98	20.00	2.00%	0.06%	3.70%	3.6%	2.44%
crossvine	*Bignonia capreolata*	38.00%	0.16	20.00	2.00%	0.01%	3.70%	3.6%	2.43%
Totals		**NA**	**1,660.49**	**540.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.1.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Bald Cypress Swamp, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
American buckwheat vine	*Brunnichia ovata*	19.60%	34.87	20.00	2.00%	100.00%	100.00%	100.0%	100.00%
Totals		**NA**	**34.87**	**20.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.1.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Bald Cypress Swamp, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common persimmon	*Diospyros virginiana*	7.60%	138.86	20.00	2.00%	53.00%	50.00%	50.0%	51.00%
sweetgum	*Liquidambar styraciflua*	17.10%	123.15	20.00	2.00%	47.00%	50.00%	50.0%	49.00%
Totals		**NA**	**262.01**	**40.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.1.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Bald Cypress Swamp, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
buttonbush	*Cephalanthus occidentalis*	13.16%	2,597.00	40.00	4.00%	91.37%	22.22%	25.0%	46.20%
common persimmon	*Diospyros virginiana*	15.49%	120.32	80.00	4.00%	4.23%	44.44%	25.0%	24.56%
summer grape	*Vitis aestivalis*	58.80%	76.50	20.00	4.00%	2.69%	11.11%	25.0%	12.93%
American buckwheat vine	*Brunnichia ovata*	58.80%	33.14	20.00	2.00%	1.17%	11.11%	12.5%	8.26%
bald cypress	*Taxodium distichum*	22.80%	15.24	20.00	2.00%	0.54%	11.11%	12.5%	8.05%
Totals		**NA**	**2,842.20**	**180.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.2.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Overcup Oak Swamp, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common greenbrier	*Smilax rotundifolia*	39.20%	46.34	100.00	10.00%	9.36%	50.00%	55.6%	38.30%
hawthorn	*Crataegus species*	15.20%	318.09	20.00	2.00%	64.25%	10.00%	11.1%	28.45%
swamp privet	*Forestiera acuminata*	6.20%	114.51	20.00	2.00%	23.13%	10.00%	11.1%	14.75%
American buckwheat vine	Brunnichia ovata	39.20%	0.47	40.00	2.00%	0.10%	20.00%	11.1%	10.40%
sweetgum	*Liquidambar styraciflua*	15.20%	15.71	20.00	2.00%	3.17%	10.00%	11.1%	8.09%
Totals		**NA**	**495.11**	**200.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.2.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Overcup Oak Swamp, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common greenbrier	*Smilax rotundifolia*	78.40%	73.98	120.00	12.00%	4.35%	35.29%	35.29%	24.98%
water elm	*Planera aquatica*	21.40%	754.30	40.00	4.00%	44.38%	11.76%	11.76%	22.64%
grape	*Vitis species*	78.40%	224.51	40.00	4.00%	13.21%	11.76%	11.76%	12.25%
bald cypress	*Taxodium distichum*	30.40%	171.06	20.00	2.00%	10.07%	5.88%	5.88%	7.28%
trumpet creeper	*Campsis radicans*	78.40%	150.95	20.00	2.00%	8.88%	5.88%	5.88%	6.88%
common persimmon	*Diospyros virginiana*	50.40%	125.98	20.00	2.00%	7.41%	5.88%	5.88%	6.39%
sweetgum	*Liquidambar styraciflua*	50.40%	106.19	20.00	2.00%	6.25%	5.88%	5.88%	6.00%
silverbell	*Halesia diptera*	12.40%	61.58	20.00	2.00%	3.62%	5.88%	5.88%	5.13%
rattan-vine	*Berchemia scandens*	78.40%	30.79	20.00	2.00%	1.81%	5.88%	5.88%	4.53%
American buckwheat vine	*Brunnichia ovata*	78.40%	0.16	20.00	2.00%	0.01%	5.88%	5.88%	3.92%
Totals		**NA**	**1,699.48**	**340.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.2.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Overcup Oak Swamp, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common greenbrier	*Smilax rotundifolia*	58.80%	60.48	100.00	10.00%	7.01%	41.67%	41.7%	30.11%
common persimmon	*Diospyros virginiana*	27.80%	340.39	60.00	6.00%	39.43%	25.00%	25.0%	29.81%
deciduous holly	*Ilex decidua*	19.43%	269.71	40.00	4.00%	31.24%	16.67%	16.7%	21.52%
bald cypress	*Taxodium distichum*	51.30%	192.42	20.00	2.00%	22.29%	8.33%	8.3%	12.99%
crossvine	*Bignonia capreolata*	58.80%	0.31	20.00	2.00%	0.04%	8.33%	8.3%	5.57%
Totals		**NA**	**863.31**	**240.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.3.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Willow Oak Bottomland Forest, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
common greenbrier	*Smilax rotundifolia*	98.00%	152.96	380.00	38.00%	10.09%	57.58%	61.3%	42.98%
rattan-vine	*Berchemia scandens*	98.00%	458.87	40.00	2.00%	30.26%	6.06%	3.2%	13.18%
deciduous holly	*Ilex decidua*	24.50%	366.15	40.00	4.00%	24.15%	6.06%	6.5%	12.22%
sweetgum	*Liquidambar styraciflua*	54.67%	162.15	60.00	6.00%	10.69%	9.09%	9.7%	9.82%
American buckwheat vine	*Brunnichia ovata*	98.00%	185.08	60.00	4.00%	12.21%	9.09%	6.5%	9.25%
snowbell	*Halesia diptera*	34.25%	153.15	40.00	4.00%	10.10%	6.06%	6.5%	7.54%
common persimmon	*Diospyros virginiana*	2.50%	35.34	20.00	2.00%	2.33%	3.03%	3.2%	2.86%
Chinese tallow	*Triadica sebifera*	38.00%	2.51	20.00	2.00%	0.17%	3.03%	3.2%	2.14%
Totals		**NA**	**1,516.21**	**660.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.3.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Willow Oak Bottomland Forest, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
deciduous holly	*Ilex decidua*	53.00%	1,701.33	100.00	10.00%	70.79%	33.33%	33.3%	45.82%
common greenbrier	*Smilax rotundifolia*	78.78%	198.86	120.00	12.00%	8.27%	40.00%	40.0%	29.42%
sweetgum	*Liquidambar styraciflua*	34.50%	496.69	60.00	6.00%	20.67%	20.00%	20.0%	20.22%
common persimmon	*Diospyros virginiana*	38.00%	6.64	20.00	2.00%	0.28%	6.67%	6.7%	4.54%
Totals		**NA**	**2,403.51**	**300.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.3.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Willow Oak Bottomland Forest, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
American hornbeam	*Carpinus caroliniana*	59.40%	351.23	0.04	4.00%	79.46%	0.03%	28.6%	36.02%
common persimmon	*Diospyros virginiana*	30.73%	80.90	40.00	4.00%	18.30%	33.32%	28.6%	26.73%
common greenbrier	*Smilax rotundifolia*	78.40%	7.07	60.00	4.00%	1.60%	49.98%	28.6%	26.72%
sweetgum	*Liquidambar styraciflua*	68.40%	2.83	20.00	2.00%	0.64%	16.66%	14.3%	10.53%
Totals		**NA**	**442.02**	**120.04**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.4.1 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Water Oak Bottomland Forest, Site #1: Sanders and DeWare Parcels

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
American beautyberry	*Callicarpa americana*	38.63%	180.92	120.00	12.00%	9.88%	12.24%	12.500%	11.54%
common greenbrier	*Smilax rotundifolia*	98.00%	21.05	160.00	16.00%	1.15%	16.33%	16.667%	11.38%
Chinese privet	*Ligustrum sinense*	91.54%	331.24	80.00	6.00%	18.09%	8.16%	6.250%	10.83%
deciduous holly	*Ilex decidua*	38.00%	490.25	20.00	2.00%	26.77%	2.04%	2.083%	10.30%
rattan-vine	*Berchemia scandens*	98.00%	136.35	80.00	8.00%	7.45%	8.16%	8.333%	7.98%
sweetgum	*Liquidambar styraciflua*	85.50%	188.97	60.00	6.00%	10.32%	6.12%	6.250%	7.56%
chinaberry	*Melia azedarach*	46.33%	131.16	60.00	6.00%	7.16%	6.12%	6.250%	6.51%
American holly	*Ilex opaca*	74.25%	141.06	40.00	4.00%	7.70%	4.08%	4.167%	5.32%
saw greenbrier	*Smilax bona-nox*	98.00%	5.18	60.00	6.00%	0.28%	6.12%	6.250%	4.22%
crossvine	*Bignonia capreolata*	98.00%	4.40	60.00	6.00%	0.24%	6.12%	6.250%	4.20%
Chinese tallow	*Triadica sebifera*	63.00%	79.48	40.00	4.00%	4.34%	4.08%	4.167%	4.20%
Japanese honeysuckle	*Lonicera japonica*	98.00%	2.91	40.00	4.00%	0.16%	4.08%	4.167%	2.80%
hophornbeam	*Ostrya virginiana*	85.50%	39.27	20.00	2.00%	2.14%	2.04%	2.083%	2.09%
yaupon	*Ilex vomitoria*	85.50%	38.33	20.00	2.00%	2.09%	2.04%	2.083%	2.07%
laurel greenbrier	*Smilax laurifolia*	98.00%	26.55	20.00	2.00%	1.45%	2.04%	2.083%	1.86%
gum bumelia	*Sideroxylon lanuginosum*	63.00%	7.70	20.00	2.00%	0.42%	2.04%	2.083%	1.51%
water oak	*Quercus nigra*	38.00%	2.87	20.00	2.00%	0.16%	2.04%	2.083%	1.43%
sugarberry	*Celtis laevigata*	63.00%	1.57	20.00	2.00%	0.09%	2.04%	2.083%	1.40%
muscadine	*Vitis rotundifolia*	98.00%	1.41	20.00	2.00%	0.08%	2.04%	2.083%	1.40%
American hornbeam	*Carpinus caroliniana*	63.00%	0.35	20.00	2.00%	0.02%	2.04%	2.083%	1.38%
Totals		**NA**	**1,831.00**	**980.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.4.2 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Water Oak Bottomland Forest, Site #2: Locke Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
American hornbeam	*Carpinus caroliniana*	40.49%	7,123.76	340.00	34.00%	43.12%	23.94%	24.64%	30.57%
sweetgum	*Liquidambar styraciflua*	32.33%	4,464.32	300.00	28.00%	27.02%	21.13%	20.29%	22.81%
common greenbrier	*Smilax rotundifolia*	98.00%	569.10	300.00	30.00%	3.45%	21.13%	21.74%	15.44%
muscadine	*Vitis rotundifolia*	98.00%	686.60	140.00	14.00%	4.16%	9.86%	10.14%	8.05%
deciduous holly	*Ilex decidua*	45.81%	996.55	100.00	10.00%	6.03%	7.04%	7.25%	6.77%
red maple	*Acer rubrum*	53.67%	1,024.47	60.00	4.00%	6.20%	4.23%	2.90%	4.44%
winged elm	*Ulmus alata*	70.33%	457.30	60.00	6.00%	2.77%	4.23%	4.35%	3.78%
rattan-vine	*Berchemia scandens*	98.00%	418.34	40.00	4.00%	2.53%	2.82%	2.90%	2.75%
willow oak	*Quercus phellos*	63.00%	318.09	20.00	2.00%	1.93%	1.41%	1.45%	1.59%
blackgum	*Nyssa sylvatica*	85.50%	311.06	20.00	2.00%	1.88%	1.41%	1.45%	1.58%
overcup oak	*Quercus lyrata*	85.50%	114.51	20.00	2.00%	0.69%	1.41%	1.45%	1.18%
huckleberry	*Vaccinium species*	63.00%	35.34	20.00	2.00%	0.21%	1.41%	1.45%	1.02%
Totals		**NA**	**16,519.44**	**1,420.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 5.4.3 Big Cypress Bayou: Summary of Shrub-Sapling Layer Field Data, 2016
Water Oak Bottomland Forest, Site #3: Thomas Parcel

Species Name		Mean	Mean BA	Mean	Mean	% Relative	% Relative	% Relative	% Relative
Common	**Scientific**	**Vigor (%)**	**cm^2/ha**	**Density/ha**	**Frequency**	**Basal Area**	**Density**	**Frequency**	**Importance**
deciduous holly	*Ilex decidua*	14.33%	614.81	60.00	4.00%	49.00%	10.71%	6.90%	22.21%
common greenbrier	*Smilax rotundifolia*	98.00%	13.35	100.00	12.00%	1.06%	17.86%	20.69%	13.20%
muscadine	*Vitis rotundifolia*	98.00%	116.40	60.00	8.00%	9.28%	10.71%	13.79%	11.26%
American hornbeam	*Carpinus caroliniana*	44.25%	28.27	80.00	10.00%	2.25%	14.29%	17.24%	11.26%
American beautyberry	*Callicarpa americana*	30.50%	108.54	60.00	6.00%	8.65%	10.71%	10.34%	9.90%
summer grape	*Vitis aestivalis*	98.00%	277.09	20.00	2.00%	22.09%	3.57%	3.45%	9.70%
sweetgum	*Liquidambar styraciflua*	59.25%	23.09	40.00	4.00%	1.84%	7.14%	6.90%	5.29%
crossvine	*Bignonia capreolata*	98.00%	1.26	40.00	2.00%	0.10%	7.14%	3.45%	3.56%
American holly	*Ilex opaca*	15.50%	30.79	20.00	2.00%	2.45%	3.57%	3.45%	3.16%
common persimmon	*Diospyros virginiana*	63.00%	30.79	20.00	2.00%	2.45%	3.57%	3.45%	3.16%
bitternut hickory	*Carya cordiformis*	38.00%	5.65	20.00	2.00%	0.45%	3.57%	3.45%	2.49%
dewberry	*Rubus trivialis*	98.00%	3.93	20.00	2.00%	0.31%	3.57%	3.45%	2.44%
rattan-vine	*Berchemia scandens*	98.00%	0.63	20.00	2.00%	0.05%	3.57%	3.45%	2.36%
Totals		**NA**	**1,254.60**	**560.00**	**NA**	**NA**	**NA**	**NA**	**NA**

Table 6.1.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Bald Cypress Swamp, Woody Seedlings, Site #1: Sanders and DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	2.31%	34.00%	1,400	9,361	10,761	54.58%	34.00%	48.12%	45.57%
water elm	*Planera aquatica*	1.31%	42.00%	4,733	3,600	8,333	30.97%	42.00%	37.27%	36.75%
common persimmon	*Diospyros virginiana*	0.15%	6.00%	400	200	600	3.55%	6.00%	2.68%	4.08%
bald cypress	*Taxodium distichum*	0.10%	4.00%	600	0	600	2.36%	4.00%	2.68%	3.02%
common greenbrier	*Smilax rotundifolia*	0.06%	2.00%	0	444	444	1.31%	2.00%	1.99%	1.77%
American hornbeam	*Carpinus caroliniana*	0.05%	2.00%	0	400	400	1.18%	2.00%	1.79%	1.66%
summer grape	*Vitis aestivalis*	0.05%	2.00%	0	400	400	1.18%	2.00%	1.79%	1.66%
rattan-vine	*Berchemia scandens*	0.06%	2.00%	0	222	222	1.31%	2.00%	0.99%	1.44%
deciduous holly	*Ilex decidua*	0.05%	2.00%	0	200	200	1.18%	2.00%	0.89%	1.36%
overcup oak	*Quercus lyrata*	0.05%	2.00%	0	200	200	1.18%	2.00%	0.89%	1.36%
peppervine	*Nekemias arborea*	0.05%	2.00%	0	200	200	1.18%	2.00%	0.89%	1.36%
All woody species - Total		**4.23%**	**NA**	**7,133**	**15,228**	**22,361**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.1.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Bald Cypress Swamp, Herb Species and Ground Cover, Site #1: Sanders and DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
smallspike false nettle	*Boehmeria cylindrica*	1.46%	20.00%	54.00%	40.00%	47.00%
catchfly grass	*Leersia lenticularis*	0.59%	16.00%	21.77%	32.00%	26.88%
dicot herb seedlings	*NA*	0.25%	4.00%	9.24%	8.00%	8.62%
Virginia dayflower	*Commelina species*	0.10%	4.00%	3.70%	8.00%	5.85%
caric sedge	*Carex species*	0.20%	2.00%	7.39%	4.00%	5.70%
southern waxy sedge	*Carex glaucescens*	0.06%	2.00%	2.05%	4.00%	3.03%
Canada wild rye	*Elymus canadensis*	0.05%	2.00%	1.85%	4.00%	2.92%
All herb species - Total		**2.71%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	9.02%	NA
Live Tree (>3 cm basal dia)	4.35%	40.00%
Snags&Stumps (>3 cm basal dia)	0.31%	4.00%
Bare soil	14.35%	26.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	6.56%	60.00%
Forest Floor (organic)	73.99%	92.00%

Table 6.1.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Bald Cypress Swamp, Woody Seedlings, Site #2: Locke Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
water elm	*Planera aquatica*	5.19%	60.00%	4,500	29,500	34,000	51.88%	36.92%	61.82%	50.21%
American buckwheat vine	*Mikania scandens*	2.44%	37.50%	1,000	8,750	9,750	24.38%	23.08%	17.73%	21.73%
common persimmon	*Diospyros virginiana*	0.56%	15.00%	1,250	3,500	4,750	5.63%	9.23%	8.64%	7.83%
climbing hempvine	*Mikania scandens*	0.75%	15.00%	0	2,750	2,750	7.50%	9.23%	5.00%	7.24%
summer grape	*Vitis aestivalis*	0.56%	15.00%	750	750	1,500	5.63%	9.23%	2.73%	5.86%
overcup oak	*Quercus lyrata*	0.19%	7.50%	250	500	750	1.88%	4.62%	1.36%	2.62%
bald cypress	*Taxodium distichum*	0.13%	5.00%	750	0	750	1.25%	3.08%	1.36%	1.90%
saw greenbrier	*Smilax bona-nox*	0.13%	5.00%	0	500	500	1.25%	3.08%	0.91%	1.75%
cat greenbrier	*Smilax glauca*	0.06%	2.50%	0	250	250	0.63%	1.54%	0.45%	0.87%
All woody species - Total		**10.00%**	**NA**	**8,500**	**46,500**	**55,000**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.1.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Bald Cypress Swamp, Herbs and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
dicot herb seedlings	*NA*	3.81%	30.00%	54.46%	31.58%	43.02%
catchfly grass	*Leersia lenticularis*	1.56%	32.50%	22.32%	34.21%	28.27%
smallspike false nettle	*Boehmeria cylindrica*	1.25%	17.50%	17.86%	18.42%	18.14%
Canada wild rye	*Elymus canadensis*	0.19%	7.50%	2.68%	7.89%	5.29%
Virginia dayflower	*Commelina species*	0.19%	7.50%	2.68%	7.89%	5.29%
All herb species - Total		**7.00%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	25.25%	NA
Live Tree (>3 cm basal dia)	3.44%	37.50%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	33.75%	57.50%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	6.63%	72.50%
Forest Floor (organic)	53.31%	100.00%

Table 6.1.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Bald Cypress Swamp, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	2.91%	44.00%	1,000	9,911	10,911	41.64%	34.38%	52.85%	42.96%
water elm	*Planera aquatica*	1.00%	16.00%	0	2,000	2,000	14.33%	12.50%	9.69%	12.17%
buttonbush	*Cephalanthus occidentalis*	0.47%	18.00%	400	2,489	2,889	6.69%	14.06%	13.99%	11.58%
overcup oak	*Quercus lyrata*	0.36%	14.00%	200	1,444	1,644	5.10%	10.94%	7.97%	8.00%
peppervine	*Nekemias arborea*	0.95%	4.00%	0	200	200	13.61%	3.13%	0.97%	5.90%
common persimmon	*Diospyros virginiana*	0.55%	8.00%	0	600	600	7.88%	6.25%	2.91%	5.68%
deciduous holly	*Ilex decidua*	0.10%	4.00%	400	200	600	1.43%	3.13%	2.91%	2.49%
water hickory	*Carya aquatica*	0.10%	4.00%	200	400	600	1.43%	3.13%	2.91%	2.49%
common greenbrier	*Smilax rotundifolia*	0.10%	4.00%	0	200	200	1.43%	3.13%	0.97%	1.84%
American hornbeam	*Carpinus caroliniana*	0.20%	2.00%	0	200	200	2.87%	1.56%	0.97%	1.80%
bald cypress	*Taxodium distichum*	0.05%	2.00%	200	0	200	0.72%	1.56%	0.97%	1.08%
climbing dogbane	*Trachelospermum difforme*	0.05%	2.00%	0	200	200	0.72%	1.56%	0.97%	1.08%
poison ivy	*Toxicodendron radicans*	0.05%	2.00%	200	0	200	0.72%	1.56%	0.97%	1.08%
water oak	*Quercus nigra*	0.05%	2.00%	0	200	200	0.72%	1.56%	0.97%	1.08%
muscadine	*Vitis rotundifolia*	0.05%	2.00%	0	0	0	0.72%	1.56%	0.00%	0.76%
All woody species - Total		**6.98%**	**NA**	**2,600**	**18,044**	**20,644**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.1.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Bald Cypress Swamp, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
dicot herb seedlings	*NA*	3.76%	58.00%	29.24%	35.37%	32.30%
smallspike false nettle	*Boehmeria cylindrica*	4.00%	30.00%	31.10%	18.29%	24.70%
Lizard's tail	*Saururus cernuus*	3.35%	34.00%	26.05%	20.73%	23.39%
unknown grass	*NA*	1.40%	28.00%	10.89%	17.07%	13.98%
southern waxy sedge	*Carex glaucescens*	0.25%	10.00%	1.94%	6.10%	4.02%
mud plantain	*Heteranthera species*	0.05%	2.00%	0.39%	1.22%	0.80%
Virginia dayflower	*Commelina species*	0.05%	2.00%	0.39%	1.22%	0.80%
All herb species - Total		**12.86%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	27.24%	NA
Live Tree (>3 cm basal dia)	4.99%	68.00%
Snags&Stumps (>3 cm basal dia)	0.40%	2.00%
Bare soil	0.21%	8.00%
Rock	0.22%	2.00%
Lg Woody Debris (> 3 cm dia)	5.56%	40.00%
Forest Floor (organic)	82.98%	98.00%

Table 6.2.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Overcup Oak Swamp, Woody Seedlings, Site #1: Sanders-DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	2.50%	28.00%	0	14,400	14,400	35.71%	29.79%	56.25%	40.58%
common greenbrier	*Smilax rotundifolia*	1.85%	20.00%	0	5,000	5,000	26.43%	21.28%	19.53%	22.41%
saw greenbrier	*Smilax bona-nox*	1.55%	8.00%	0	2,000	2,000	22.14%	8.51%	7.81%	12.82%
climbing dogbane	*Trachelospermum difforme*	0.60%	18.00%	0	2,000	2,000	8.57%	19.15%	7.81%	11.84%
overcup oak	*Quercus lyrata*	0.10%	4.00%	0	400	400	1.43%	4.26%	1.56%	2.42%
snowbell	*Halesia diptera*	0.10%	4.00%	0	400	400	1.43%	4.26%	1.56%	2.42%
willow oak	*Quercus phellos*	0.10%	4.00%	0	400	400	1.43%	4.26%	1.56%	2.42%
common persimmon	*Diospyros virginiana*	0.05%	2.00%	0	600	600	0.71%	2.13%	2.34%	1.73%
river birch	*Betula nigra*	0.05%	2.00%	0	200	200	0.71%	2.13%	0.78%	1.21%
water elm	*Planera aquatica*	0.05%	2.00%	0	200	200	0.71%	2.13%	0.78%	1.21%
crossvine	*Bignonia capreolata*	0.05%	2.00%	0	0	0	0.71%	2.13%	0.00%	0.95%
All woody species - Total		**7.00%**	**NA**	**0**	**25,600**	**25,600**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.2.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Overcup Oak Swamp, Herb Species and Ground Cover, Site #1: Sanders-DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
catchfly grass	*Leersia lenticularis*	1.75%	20.00%	41.67%	34.48%	38.07%
southern waxy sedge	*Carex glaucescens*	1.55%	22.00%	36.90%	37.93%	37.42%
beaked panicgrass	*Panicum anceps*	0.35%	8.00%	8.33%	13.79%	11.06%
plumegrass	*Saccharum species*	0.45%	4.00%	10.71%	6.90%	8.81%
Carolina snailseed	*Cocculus carolinus*	0.05%	2.00%	1.19%	3.45%	2.32%
common wood sedge	*Carex blanda*	0.05%	2.00%	1.19%	3.45%	2.32%
All herb species - Total		**4.20%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	14.65%	NA
Live Tree (>3 cm basal dia)	1.10%	12.00%
Snags&Stumps (>3 cm basal dia)	0.05%	2.00%
Bare soil	22.80%	56.00%
Rock	0.00%	2.00%
Lg Woody Debris (> 3 cm dia)	4.25%	50.00%
Forest Floor (organic)	69.50%	100.00%

Table 6.2.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Overcup Oak Swamp, Woody Seedlings, Site #2: Locke Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	1.38%	32.50%	0	8,250	8,250	25.88%	24.07%	39.29%	29.75%
water elm	*Planera aquatica*	0.44%	17.50%	500	2,750	3,250	8.24%	12.96%	15.48%	12.22%
common greenbrier	*Smilax rotundifolia*	1.00%	15.00%	0	750	750	18.82%	11.11%	3.57%	11.17%
willow oak	*Quercus phellos*	0.44%	10.00%	250	1,250	1,500	8.24%	7.41%	7.14%	7.60%
common persimmon	*Diospyros virginiana*	0.31%	12.50%	250	1,250	1,500	5.88%	9.26%	7.14%	7.43%
snowbell	*Halesia diptera*	0.50%	5.00%	0	1,000	1,000	9.41%	3.70%	4.76%	5.96%
climbing dogbane	*Trachelospermum difforme*	0.19%	7.50%	0	750	750	3.53%	5.56%	3.57%	4.22%
red maple	*Acer rubrum*	0.19%	7.50%	500	250	750	3.53%	5.56%	3.57%	4.22%
peppervine	*Nekemias arborea*	0.25%	2.50%	0	1,250	1,250	4.71%	1.85%	5.95%	4.17%
saw greenbrier	*Smilax bona-nox*	0.19%	7.50%	0	500	500	3.53%	5.56%	2.38%	3.82%
bald cypress	*Taxodium distichum*	0.13%	5.00%	500	0	500	2.35%	3.70%	2.38%	2.81%
overcup oak	*Quercus lyrata*	0.13%	5.00%	0	500	500	2.35%	3.70%	2.38%	2.81%
deciduous holly	*Ilex decidua*	0.06%	2.50%	0	250	250	1.18%	1.85%	1.19%	1.41%
trumpet creeper	*Campsis radicans*	0.06%	2.50%	0	250	250	1.18%	1.85%	1.19%	1.41%
rattan-vine	*Berchemia scandens*	0.06%	2.50%	0	0	0	1.18%	1.85%	0.00%	1.01%
All woody species - Total		**5.31%**	**NA**	**2,000**	**19,000**	**21,000**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.2.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Overcup Oak Swamp, Herb Species and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
southern waxy sedge	*Carex glaucescens*	1.38%	15.00%	48.89%	23.08%	35.98%
catchfly grass	*Leersia lenticularis*	0.81%	25.00%	28.89%	38.46%	33.68%
dicot herb seedlings	*NA*	0.38%	15.00%	13.33%	23.08%	18.21%
Virginia dayflower	*Commelina species*	0.13%	5.00%	4.44%	7.69%	6.07%
caric sedge	*Carex species*	0.06%	2.50%	2.22%	3.85%	3.03%
smallspike false nettle	*Boehmeria cylindrica*	0.06%	2.50%	2.22%	3.85%	3.03%
All herb species - Total		**2.81%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	9.88%	NA
Live Tree (>3 cm basal dia)	0.69%	12.50%
Snags&Stumps (>3 cm basal dia)	0.06%	2.50%
Bare soil	21.13%	35.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	4.81%	52.50%
Forest Floor (organic)	68.38%	97.50%

Table 6.2.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Overcup Oak Swamp, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	2.45%	44.00%	0	8,600	8,600	22.07%	20.56%	23.50%	22.04%
overcup oak	*Quercus lyrata*	0.85%	34.00%	600	4,600	5,200	7.66%	15.89%	14.21%	12.58%
common persimmon	*Diospyros virginiana*	1.15%	20.00%	0	3,400	3,400	10.36%	9.35%	9.29%	9.67%
common greenbrier	*Smilax rotundifolia*	1.70%	14.00%	0	2,400	2,400	15.32%	6.54%	6.56%	9.47%
saw greenbrier	*Smilax bona-nox*	0.60%	10.00%	0	5,000	5,000	5.41%	4.67%	13.66%	7.91%
climbing dogbane	*Trachelospermum difforme*	0.65%	20.00%	0	2,200	2,200	5.86%	9.35%	6.01%	7.07%
peppervine	*Nekemias arborea*	0.95%	12.00%	0	1,600	1,600	8.56%	5.61%	4.37%	6.18%
crossvine	*Bignonia capreolata*	0.65%	14.00%	0	1,800	1,800	5.86%	6.54%	4.92%	5.77%
snowbell	*Halesia diptera*	0.80%	6.00%	0	2,600	2,600	7.21%	2.80%	7.10%	5.70%
summer grape	*Vitis aestivalis*	0.35%	8.00%	0	800	800	3.15%	3.74%	2.19%	3.03%
rattan-vine	*Berchemia scandens*	0.15%	6.00%	0	800	800	1.35%	2.80%	2.19%	2.11%
muscadine	*Vitis rotundifolia*	0.20%	8.00%	0	200	200	1.80%	3.74%	0.55%	2.03%
willow oak	*Quercus phellos*	0.25%	4.00%	0	600	600	2.25%	1.87%	1.64%	1.92%
bald cypress	*Taxodium distichum*	0.10%	4.00%	400	0	400	0.90%	1.87%	1.09%	1.29%
water elm	*Planera aquatica*	0.10%	4.00%	0	400	400	0.90%	1.87%	1.09%	1.29%
American hornbeam	*Carpinus caroliniana*	0.05%	2.00%	0	200	200	0.45%	0.93%	0.55%	0.64%
blackgum	Nyssa sylvatica	0.05%	2.00%	0	200	200	0.45%	0.93%	0.55%	0.64%
water hickory	*Carya aquatica*	0.05%	2.00%	0	200	200	0.45%	0.93%	0.55%	0.64%
All woody species - Total		**11.10%**	**NA**	**1,000**	**35,600**	**36,600**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.2.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Overcup Oak Swamp, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
unknown grass	*NA*	5.30%	58.00%	66.25%	49.15%	57.70%
dicot herb seedlings	*NA*	2.00%	38.00%	25.00%	32.20%	28.60%
southern waxy sedge	*Carex glaucescens*	0.30%	6.00%	3.75%	5.08%	4.42%
rough panicgrass	*Dichanthelium leucothrix*	0.15%	6.00%	1.88%	5.08%	3.48%
Carolina snailseed	*Cocculus carolinus*	0.05%	2.00%	0.63%	1.69%	1.16%
Lizard's tail	*Saururus cernuus*	0.05%	2.00%	0.63%	1.69%	1.16%
mud plantain	*Heteranthera species*	0.05%	2.00%	0.63%	1.69%	1.16%
smallspike false nettle	*Boehmeria cylindrica*	0.05%	2.00%	0.63%	1.69%	1.16%
yellow wood-sorrel	*Oxalis stricta*	0.05%	2.00%	0.63%	1.69%	1.16%
All herb species - Total		**8.00%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	28.30%	NA
Live Tree (>3 cm basal dia)	0.55%	10.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	16.30%	66.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	2.90%	46.00%
Forest Floor (organic)	75.35%	98.00%

Table 6.3.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Willow Oak Bottomland Forest, Woody Seedlings, Site #1: Sanders-DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	4.45%	52.00%	200	17400	17,600	21.71%	17.93%	35.48%	25.04%
saw greenbrier	*Smilax bona-nox*	4.40%	38.00%	0	6200	6,200	21.46%	13.10%	12.50%	15.69%
climbing dogbane	*Trachelospermum difforme*	1.35%	48.00%	0	5000	5,000	6.59%	16.55%	10.08%	11.07%
common greenbrier	*Smilax rotundifolia*	2.45%	24.00%	0	5200	5,200	11.95%	8.28%	10.48%	10.24%
crossvine	*Bignonia capreolata*	0.95%	20.00%	0	2600	2,600	4.63%	6.90%	5.24%	5.59%
American hornbeam	*Carpinus caroliniana*	1.80%	10.00%	0	1800	1,800	8.78%	3.45%	3.63%	5.29%
sweetgum	*Liquidambar styraciflua*	1.40%	14.00%	200	1200	1,400	6.83%	4.83%	2.82%	4.83%
dewberry	*Rubus trivialis*	0.70%	10.00%	0	1600	1,600	3.41%	3.45%	3.23%	3.36%
cat greenbrier	*Smilax glauca*	0.30%	12.00%	200	1800	2,000	1.46%	4.14%	4.03%	3.21%
willow oak	*Quercus phellos*	0.25%	10.00%	0	1200	1,200	1.22%	3.45%	2.42%	2.36%
snowbell	*Halesia diptera*	0.75%	2.00%	0	200	200	3.66%	0.69%	0.40%	1.58%
Chinese tallow	*Triadica sebifera*	0.30%	6.00%	0	600	600	1.46%	2.07%	1.21%	1.58%
rattan-vine	*Berchemia scandens*	0.15%	6.00%	0	800	800	0.73%	2.07%	1.61%	1.47%
water oak	*Quercus nigra*	0.25%	4.00%	0	800	800	1.22%	1.38%	1.61%	1.40%
muscadine	*Vitis rotundifolia*	0.25%	4.00%	0	400	400	1.22%	1.38%	0.81%	1.14%
peppervine	*Nekemias arborea*	0.15%	6.00%	0	200	200	0.73%	2.07%	0.40%	1.07%
sugarberry	Celtis laevigata	0.10%	4.00%	0	400	400	0.49%	1.38%	0.81%	0.89%
water hickory	*Carya aquatica*	0.10%	4.00%	0	400	400	0.49%	1.38%	0.81%	0.89%
winged elm	*Ulmus alata*	0.10%	4.00%	0	400	400	0.49%	1.38%	0.81%	0.89%
deciduous holly	*Ilex decidua*	0.10%	4.00%	0	200	200	0.49%	1.38%	0.40%	0.76%
bitternut hickory	*Carya cordiformis*	0.05%	2.00%	0	200	200	0.24%	0.69%	0.40%	0.45%
trumpet creeper	*Campsis radicans*	0.05%	2.00%	0	200	200	0.24%	0.69%	0.40%	0.45%
witch hazel	*Hamamelis virginiana*	0.05%	2.00%	0	200	200	0.24%	0.69%	0.40%	0.45%
summer grape	*Vitis aestivalis*	0.05%	2.00%	0	0	0	0.24%	0.69%	0.00%	0.31%
All woody species - Total		**20.50%**	**NA**	**600**	**49000**	**49,600**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.3.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Willow Oak Bottomland Forest, Herb Species and Ground Cover, Site #1: Sanders-DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
southern waxy sedge	*Carex glaucescens*	5.50%	44.00%	48.46%	37.29%	42.87%
catchfly grass	*Leersia lenticularis*	1.15%	18.00%	10.13%	15.25%	12.69%
Virginia dayflower	*Commelina species*	2.00%	4.00%	17.62%	3.39%	10.51%
variable rosette grass	*Dichanthelium commutatum*	0.80%	12.00%	7.05%	10.17%	8.61%
caric sedge	*Carex species*	0.70%	10.00%	6.17%	8.47%	7.32%
lespedeza	*Lespedeza species*	0.45%	12.00%	3.96%	10.17%	7.07%
smartweed	*Polygonum species*	0.15%	6.00%	1.32%	5.08%	3.20%
Canada goldenrod	*Solidago canadensis*	0.25%	4.00%	2.20%	3.39%	2.80%
inland sea oats	*Chasmanthium latifolium*	0.10%	4.00%	0.88%	3.39%	2.14%
longleaf woodoats	*Chasmanthium sessiliflorum*	0.20%	2.00%	1.76%	1.69%	1.73%
dicot herb seedlings	*NA*	0.05%	2.00%	0.44%	1.69%	1.07%
All herb species - Total		**11.35%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	45.20%	NA
Live Tree (>3 cm basal dia)	0.45%	12.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	3.90%	28.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	4.35%	54.00%
Forest Floor (organic)	84.35%	96.00%

Table 6.3.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Willow Oak Bottomland Forest, Woody Seedlings, Site #2: Locke Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
mimosa-tree	*Albizia julibrissin*	0.10%	4.00%	400	0	400	4.35%	6.67%	66.67%	25.89%
willow oak	*Quercus phellos*	0.50%	14.00%	0	2,600	2,600	21.74%	23.33%	0.00%	15.02%
saw greenbrier	*Smilax bona-nox*	0.10%	4.00%	200	400	600	4.35%	6.67%	33.33%	14.78%
common greenbrier	*Smilax rotundifolia*	0.50%	6.00%	0	800	800	21.74%	10.00%	0.00%	10.58%
crossvine	*Bignonia capreolata*	0.20%	8.00%	0	800	800	8.70%	13.33%	0.00%	7.34%
sweetgum	*Liquidambar styraciflua*	0.25%	4.00%	0	400	400	10.87%	6.67%	0.00%	5.85%
common persimmon	*Diospyros virginiana*	0.15%	6.00%	0	800	800	6.52%	10.00%	0.00%	5.51%
American buckwheat vine	*Mikania scandens*	0.15%	6.00%	0	600	600	6.52%	10.00%	0.00%	5.51%
deciduous holly	*Ilex decidua*	0.20%	2.00%	0	200	200	8.70%	3.33%	0.00%	4.01%
climbing dogbane	*Trachelospermum difforme*	0.05%	2.00%	0	200	200	2.17%	3.33%	0.00%	1.84%
rattan-vine	*Berchemia scandens*	0.05%	2.00%	0	200	200	2.17%	3.33%	0.00%	1.84%
water hickory	*Carya aquatica*	0.05%	2.00%	0	0	0	2.17%	3.33%	0.00%	1.84%
All woody species - Total		**2.30%**	**NA**	**600**	**7,000**	**7,600**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.3.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Willow Oak Bottomland Forest, Herb Species and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
southern waxy sedge	*Carex glaucescens*	0.40%	10.00%	61.54%	71.43%	66.48%
caric sedge	*Carex species*	0.20%	2.00%	30.77%	14.29%	22.53%
longleaf woodoats	*Chasmanthium sessiliflorum*	0.05%	2.00%	7.69%	14.29%	10.99%
All herb species - Total		**0.65%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	3.10%	NA
Live Tree (>3 cm basal dia)	0.70%	10.00%
Snags&Stumps (>3 cm basal dia)	0.05%	2.00%
Bare soil	0.25%	4.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	13.00%	78.00%
Forest Floor (organic)	84.75%	100.00%

Table 6.3.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Willow Oak Bottomland Forest, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
willow oak	*Quercus phellos*	4.85%	56.00%	2,400	32,000	34,400	41.99%	25.45%	62.09%	43.18%
crossvine	*Bignonia capreolata*	0.70%	28.00%	0	2,800	2,800	6.06%	12.73%	5.05%	7.95%
American buckwheat vine	*Mikania scandens*	0.85%	22.00%	0	3,200	3,200	7.36%	10.00%	5.78%	7.71%
common greenbrier	*Smilax rotundifolia*	0.75%	10.00%	200	1,200	1,400	6.49%	4.55%	2.53%	4.52%
sweetgum	*Liquidambar styraciflua*	0.75%	10.00%	0	1,200	1,200	6.49%	4.55%	2.17%	4.40%
muscadine	*Vitis rotundifolia*	0.95%	10.00%	0	200	200	8.23%	4.55%	0.36%	4.38%
saw greenbrier	*Smilax bona-nox*	0.50%	14.00%	0	1,200	1,200	4.33%	6.36%	2.17%	4.29%
common persimmon	*Diospyros virginiana*	0.30%	12.00%	0	1,600	1,600	2.60%	5.45%	2.89%	3.65%
overcup oak	*Quercus lyrata*	0.30%	12.00%	0	1,400	1,400	2.60%	5.45%	2.53%	3.53%
cat greenbrier	*Smilax glauca*	0.35%	8.00%	400	600	1,000	3.03%	3.64%	1.81%	2.82%
deciduous holly	*Ilex decidua*	0.20%	8.00%	0	1,000	1,000	1.73%	3.64%	1.81%	2.39%
climbing dogbane	*Trachelospermum difforme*	0.30%	6.00%	0	800	800	2.60%	2.73%	1.44%	2.26%
water hickory	*Carya aquatica*	0.15%	6.00%	0	800	800	1.30%	2.73%	1.44%	1.82%
water oak	*Quercus nigra*	0.05%	2.00%	0	2,200	2,200	0.43%	0.91%	3.97%	1.77%
American hornbeam	*Carpinus caroliniana*	0.10%	4.00%	0	600	600	0.87%	1.82%	1.08%	1.26%
snowbell	*Halesia diptera*	0.20%	2.00%	0	200	200	1.73%	0.91%	0.36%	1.00%
peppervine	Nekemias arborea	0.05%	2.00%	0	400	400	0.43%	0.91%	0.72%	0.69%
water elm	*Planera aquatica*	0.05%	2.00%	0	400	400	0.43%	0.91%	0.72%	0.69%
elm	*Ulmus species*	0.05%	2.00%	0	200	200	0.43%	0.91%	0.36%	0.57%
hawthorn	*Crataegus species*	0.05%	2.00%	0	200	200	0.43%	0.91%	0.36%	0.57%
red maple	*Acer rubrum*	0.05%	2.00%	0	200	200	0.43%	0.91%	0.36%	0.57%
All woody species - Total		**11.55%**	**NA**	**3,000**	**52,400**	**55,400**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.3.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Willow Oak Bottomland Forest, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
dicot herb seedlings	*NA*	0.50%	20.00%	26.32%	35.71%	31.02%
Lizard's tail	*Saururus cernuus*	0.65%	6.00%	34.21%	10.71%	22.46%
unknown grass	*NA*	0.25%	10.00%	13.16%	17.86%	15.51%
southern waxy sedge	*Carex glaucescens*	0.15%	6.00%	7.89%	10.71%	9.30%
longleaf woodoats	*Chasmanthium sessiliflorum*	0.10%	4.00%	5.26%	7.14%	6.20%
rough panicgrass	*Dichanthelium leucothrix*	0.10%	4.00%	5.26%	7.14%	6.20%
rattlesnake fern	*Botrychium virginianum*	0.05%	2.00%	2.63%	3.57%	3.10%
smartweed	*Polygonum species*	0.05%	2.00%	2.63%	3.57%	3.10%
violet	*Viola species*	0.05%	2.00%	2.63%	3.57%	3.10%
All herb species - Total		**1.90%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	18.80%	NA
Live Tree (>3 cm basal dia)	0.55%	10.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	13.35%	50.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	6.20%	56.00%
Forest Floor (organic)	65.65%	88.00%

Table 6.4.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Woody Seedlings, Site #1: Sanders-DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
crossvine	*Bignonia capreolata*	2.80%	74.00%	0	8,800	8,800	12.44%	19.89%	19.05%	17.13%
saw greenbrier	*Smilax bona-nox*	3.50%	48.00%	0	5,400	5,400	15.56%	12.90%	11.69%	13.38%
dewberry	*Rubus trivialis*	1.65%	28.00%	0	4,000	4,000	7.33%	7.53%	8.66%	7.84%
muscadine	*Vitis rotundifolia*	2.25%	16.00%	0	1,800	1,800	10.00%	4.30%	3.90%	6.07%
rattan-vine	*Berchemia scandens*	1.20%	20.00%	0	3,400	3,400	5.33%	5.38%	7.36%	6.02%
common greenbrier	*Smilax rotundifolia*	2.00%	10.00%	200	1,400	1,600	8.89%	2.69%	3.46%	5.01%
American hornbeam	*Carpinus caroliniana*	0.85%	16.00%	0	2,000	2,000	3.78%	4.30%	4.33%	4.14%
poison ivy	*Toxicodendron radicans*	0.45%	12.00%	0	3,200	3,200	2.00%	3.23%	6.93%	4.05%
climbing dogbane	*Trachelospermum difforme*	0.40%	16.00%	0	1,600	1,600	1.78%	4.30%	3.46%	3.18%
Japanese honeysuckle	*Lonicera japonica*	0.60%	12.00%	0	1,600	1,600	2.67%	3.23%	3.46%	3.12%
deciduous holly	*Ilex decidua*	0.55%	10.00%	0	1,200	1,200	2.44%	2.69%	2.60%	2.58%
cat greenbrier	*Smilax glauca*	1.30%	4.00%	0	400	400	5.78%	1.08%	0.87%	2.57%
water oak	*Quercus nigra*	0.60%	10.00%	0	800	800	2.67%	2.69%	1.73%	2.36%
winged elm	*Ulmus alata*	0.40%	10.00%	0	1,000	1,000	1.78%	2.69%	2.16%	2.21%
willow oak	*Quercus phellos*	0.25%	10.00%	0	1,000	1,000	1.11%	2.69%	2.16%	1.99%
sugarberry	*Celtis laevigata*	0.50%	8.00%	0	600	600	2.22%	2.15%	1.30%	1.89%
common persimmon	Diospyros virginiana	0.30%	6.00%	0	1,000	1,000	1.33%	1.61%	2.16%	1.70%
loblolly pine	*Pinus taeda*	0.30%	6.00%	400	600	1,000	1.33%	1.61%	2.16%	1.70%
honey locust	*Gleditsia triacanthos*	0.20%	8.00%	0	800	800	0.89%	2.15%	1.73%	1.59%
sweetgum	*Liquidambar styraciflua*	0.20%	8.00%	200	600	800	0.89%	2.15%	1.73%	1.59%
Chinese tallow	*Triadica sebifera*	0.15%	6.00%	0	800	800	0.67%	1.61%	1.73%	1.34%
Chinese privet	*Ligustrum sinense*	0.45%	4.00%	0	400	400	2.00%	1.08%	0.87%	1.31%
red bay	*Asimina triloba*	0.75%	2.00%	0	0	0	3.33%	0.54%	0.00%	1.29%
Virginia creeper	*Parthenocissus quinquefolia*	0.15%	6.00%	0	600	600	0.67%	1.61%	1.30%	1.19%
American buckwheat vine	*Mikania scandens*	0.25%	4.00%	0	600	600	1.11%	1.08%	1.30%	1.16%
bitternut hickory	*Carya cordiformis*	0.10%	4.00%	0	400	400	0.44%	1.08%	0.87%	0.80%
American beautyberry	*Callicarpa americana*	0.05%	2.00%	0	200	200	0.22%	0.54%	0.43%	0.40%
Chinaberry	*Melia azedarach*	0.05%	2.00%	0	200	200	0.22%	0.54%	0.43%	0.40%
eastern red cedar	*Juniperus virginiana*	0.05%	2.00%	0	200	200	0.22%	0.54%	0.43%	0.40%
overcup oak	*Quercus lyrata*	0.05%	2.00%	0	200	200	0.22%	0.54%	0.43%	0.40%
red maple	*Acer rubrum*	0.05%	2.00%	0	200	200	0.22%	0.54%	0.43%	0.40%
sassafras	*Sassafras albidum*	0.05%	2.00%	200	0	200	0.22%	0.54%	0.43%	0.40%
trumpet creeper	*Campsis radicans*	0.05%	2.00%	0	200	200	0.22%	0.54%	0.43%	0.40%
All woody species - Total		**22.50%**	**NA**	**1,000**	**45,200**	**46,200**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.4.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Herb Species, Site #1: Sanders-DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
caric sedge	*Carex species*	5.45%	42.00%	29.46%	26.25%	27.85%
variable rosette grass	*Dichanthelium commutatum*	3.75%	30.00%	20.27%	18.75%	19.51%
longleaf woodoats	*Chasmanthium sessiliflorum*	3.55%	20.00%	19.19%	12.50%	15.84%
inland sea oats	*Chasmanthium latifolium*	1.05%	8.00%	5.68%	5.00%	5.34%
Canada wild rye	*Elymus canadensis*	1.20%	6.00%	6.49%	3.75%	5.12%
rush	*Juncus species*	1.30%	4.00%	7.03%	2.50%	4.76%
roundhead sedge	*Kyllinga pumila*	0.50%	8.00%	2.70%	5.00%	3.85%
yellow wood-sorrel	*Oxalis stricta*	0.20%	8.00%	1.08%	5.00%	3.04%
beaked panicgrass	*Panicum anceps*	0.40%	2.00%	2.16%	1.25%	1.71%
creeping lespedeza	*Lespedeza repens*	0.10%	4.00%	0.54%	2.50%	1.52%
late-flowering boneset	*Eupatorium serotinum*	0.10%	4.00%	0.54%	2.50%	1.52%
smooth ticktrefoil	*Desmodium laevigatum*	0.10%	4.00%	0.54%	2.50%	1.52%
southern waxy sedge	*Carex glaucescens*	0.10%	4.00%	0.54%	2.50%	1.52%
trailing lespedeza	*Lespedeza procumbens*	0.10%	4.00%	0.54%	2.50%	1.52%
Carolina elephantsfoot	*Elephantopus carolinianus*	0.20%	2.00%	1.08%	1.25%	1.17%
yellow nutsedge	*Cyperus esculentus*	0.20%	2.00%	1.08%	1.25%	1.17%
Carolina horse-nettle	*Solanum carolinense*	0.05%	2.00%	0.27%	1.25%	0.76%
catchfly grass	*Leersia lenticularis*	0.05%	2.00%	0.27%	1.25%	0.76%
dicot herb seedlings	*NA*	0.05%	2.00%	0.27%	1.25%	0.76%
woolly croton	*Croton capitatus var. lindheimeri*	0.05%	2.00%	0.27%	1.25%	0.76%
All herb species - Total		**18.50%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Table 6.4.1.3 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Ground Cover, Site #1: Sanders-DeWare Parcels

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	58.30%	NA
Live Tree (>3 cm basal dia)	0.05%	2.00%
Snags&Stumps (>3 cm basal dia)	1.15%	4.00%
Bare soil	0.45%	18.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	12.15%	74.00%
Forest Floor (organic)	84.00%	100.00%

Table 6.4.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Woody Seedlings, Site #2: Locke Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
crossvine	*Bignonia capreolata*	2.60%	86.00%	0	9,200	9,200	26.94%	28.67%	24.34%	26.65%
rattan-vine	*Berchemia scandens*	0.65%	26.00%	200	3,200	3,400	6.74%	8.67%	8.99%	8.13%
poison ivy	*Toxicodendron radicans*	0.55%	22.00%	400	3,600	4,000	5.70%	7.33%	10.58%	7.87%
American hornbeam	*Carpinus caroliniana*	0.80%	20.00%	0	2,400	2,400	8.29%	6.67%	6.35%	7.10%
common greenbrier	*Smilax rotundifolia*	1.00%	16.00%	0	1,600	1,600	10.36%	5.33%	4.23%	6.64%
water oak	*Quercus nigra*	0.50%	20.00%	0	2,400	2,400	5.18%	6.67%	6.35%	6.07%
cat greenbrier	*Smilax glauca*	0.40%	16.00%	400	2,200	2,600	4.15%	5.33%	6.88%	5.45%
saw greenbrier	*Smilax bona-nox*	0.60%	10.00%	600	800	1,400	6.22%	3.33%	3.70%	4.42%
muscadine	*Vitis rotundifolia*	0.45%	12.00%	0	1,600	1,600	4.66%	4.00%	4.23%	4.30%
dewberry	*Rubus trivialis*	0.40%	10.00%	0	1,200	1,200	4.15%	3.33%	3.17%	3.55%
peppervine	*Nekemias arborea*	0.35%	8.00%	0	1,400	1,400	3.63%	2.67%	3.70%	3.33%
willow oak	*Quercus phellos*	0.20%	8.00%	0	1,200	1,200	2.07%	2.67%	3.17%	2.64%
red maple	*Acer rubrum*	0.20%	8.00%	0	1,000	1,000	2.07%	2.67%	2.65%	2.46%
sweetgum	*Liquidambar styraciflua*	0.20%	8.00%	0	800	800	2.07%	2.67%	2.12%	2.29%
deciduous holly	*Ilex decidua*	0.15%	6.00%	0	1,000	1,000	1.55%	2.00%	2.65%	2.07%
American buckwheat vine	*Mikania scandens*	0.10%	4.00%	0	400	400	1.04%	1.33%	1.06%	1.14%
climbing dogbane	Trachelospermum difforme	0.10%	4.00%	0	400	400	1.04%	1.33%	1.06%	1.14%
common persimmon	*Diospyros virginiana*	0.10%	4.00%	0	400	400	1.04%	1.33%	1.06%	1.14%
blueberry	*Vaccinium species*	0.05%	2.00%	0	600	600	0.52%	0.67%	1.59%	0.92%
bitternut hickory	*Carya cordiformis*	0.05%	2.00%	0	200	200	0.52%	0.67%	0.53%	0.57%
loblolly pine	*Pinus taeda*	0.05%	2.00%	200	0	200	0.52%	0.67%	0.53%	0.57%
Virginia creeper	*Parthenocissus quinquefolia*	0.05%	2.00%	200	0	200	0.52%	0.67%	0.53%	0.57%
winged elm	*Ulmus alata*	0.05%	2.00%	0	200	200	0.52%	0.67%	0.53%	0.57%
snowbell	*Halesia diptera*	0.05%	2.00%	0	0	0	0.52%	0.67%	0.00%	0.39%
All woody species - Total		**9.65%**	**NA**	**2,000**	**35,800**	**37,800**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.4.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Herb Species and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
longleaf woodoats	*Chasmanthium sessiliflorum*	3.30%	36.00%	49.62%	31.03%	40.33%
caric sedge	*Carex species*	2.05%	40.00%	30.83%	34.48%	32.65%
inland sea oats	*Chasmanthium latifolium*	0.35%	8.00%	5.26%	6.90%	6.08%
rattlesnake fern	*Botrychium virginianum*	0.20%	8.00%	3.01%	6.90%	4.95%
catchfly grass	*Leersia lenticularis*	0.15%	6.00%	2.26%	5.17%	3.71%
rough panicgrass	*Dichanthelium leucothrix*	0.10%	4.00%	1.50%	3.45%	2.48%
yellow wood-sorrel	*Oxalis stricta*	0.10%	4.00%	1.50%	3.45%	2.48%
bracken fern	*Pteridium aquilinum*	0.20%	2.00%	3.01%	1.72%	2.37%
dicot herb seedlings	*NA*	0.05%	2.00%	0.75%	1.72%	1.24%
late-flowering boneset	*Eupatorium serotinum*	0.05%	2.00%	0.75%	1.72%	1.24%
smooth ticktrefoil	*Desmodium laevigatum*	0.05%	2.00%	0.75%	1.72%	1.24%
St. Andrew's-cross	*Hypericum hypericoides ssp. hypericoides*	0.05%	2.00%	0.75%	1.72%	1.24%
All herb species - Total		**6.65%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	24.00%	NA
Live Tree (>3 cm basal dia)	0.45%	10.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	1.10%	26.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	5.60%	68.00%
Forest Floor (organic)	91.05%	98.00%

Table 6.4.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
crossvine	*Bignonia capreolata*	3.10%	60.00%	0	8,600	8,600	14.73%	18.75%	16.67%	16.71%
muscadine	*Vitis rotundifolia*	5.35%	48.00%	0	4,600	4,600	25.42%	15.00%	8.91%	16.44%
water oak	*Quercus nigra*	1.70%	38.00%	0	12,000	12,000	8.08%	11.88%	23.26%	14.40%
saw greenbrier	*Smilax bona-nox*	2.55%	30.00%	200	4,600	4,800	12.11%	9.38%	9.30%	10.26%
American hornbeam	*Carpinus caroliniana*	3.00%	22.00%	0	2,800	2,800	14.25%	6.88%	5.43%	8.85%
willow oak	*Quercus phellos*	1.10%	16.00%	400	3,000	3,400	5.23%	5.00%	6.59%	5.60%
dewberry	*Rubus trivialis*	1.05%	8.00%	0	1,800	1,800	4.99%	2.50%	3.49%	3.66%
cat greenbrier	*Smilax glauca*	0.65%	14.00%	200	1,400	1,600	3.09%	4.38%	3.10%	3.52%
poison ivy	*Toxicodendron radicans*	0.35%	8.00%	0	2,600	2,600	1.66%	2.50%	5.04%	3.07%
red maple	*Acer rubrum*	0.15%	6.00%	0	2,600	2,600	0.71%	1.88%	5.04%	2.54%
deciduous holly	*Ilex decidua*	0.20%	8.00%	200	1,000	1,200	0.95%	2.50%	2.33%	1.93%
sweetgum	*Liquidambar styraciflua*	0.20%	8.00%	0	600	600	0.95%	2.50%	1.16%	1.54%
American buckwheat vine	*Mikania scandens*	0.25%	4.00%	0	1,000	1,000	1.19%	1.25%	1.94%	1.46%
common greenbrier	*Smilax rotundifolia*	0.15%	6.00%	0	600	600	0.71%	1.88%	1.16%	1.25%
Virginia creeper	*Parthenocissus quinquefolia*	0.15%	6.00%	0	600	600	0.71%	1.88%	1.16%	1.25%
common persimmon	*Diospyros virginiana*	0.15%	6.00%	0	400	400	0.71%	1.88%	0.78%	1.12%
rattan-vine	Berchemia scandens	0.20%	2.00%	0	400	400	0.95%	0.63%	0.78%	0.78%
loblolly pine	*Pinus taeda*	0.10%	4.00%	200	0	200	0.48%	1.25%	0.39%	0.70%
water hickory	*Carya aquatica*	0.10%	4.00%	0	200	200	0.48%	1.25%	0.39%	0.70%
rusty blackhaw	*Viburnum rufidulum*	0.10%	4.00%	0	0	0	0.48%	1.25%	0.00%	0.58%
bitternut hickory	*Carya cordiformis*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
blackgum	*Nyssa sylvatica*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
Carolina Jessamine	*Gelsemium sempervirens*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
Chinese privet	*Ligustrum sinense*	0.05%	2.00%	200	0	200	0.24%	0.63%	0.39%	0.42%
climbing dogbane	*Trachelospermum difforme*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
climbing hempvine	*Mikania scandens*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
overcup oak	*Quercus lyrata*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
sassafras	*Sassafras albidum*	0.05%	2.00%	0	200	200	0.24%	0.63%	0.39%	0.42%
White fringetree	*Chionanthus virginicus*	0.05%	2.00%	0	0	0	0.24%	0.63%	0.00%	0.29%
All woody species - Total		**21.05%**	**NA**	**1,400**	**50,200**	**51,600**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 6.4.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2015
Water Oak Bottomland Forest, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
caric sedge	*Carex* species	1.55%	26.00%	67.39%	59.09%	63.24%
dicot herb seedlings	*NA*	0.15%	6.00%	6.52%	13.64%	10.08%
unknown grass	*NA*	0.25%	4.00%	10.87%	9.09%	9.98%
rough panicgrass	*Dichanthelium leucothrix*	0.10%	4.00%	4.35%	9.09%	6.72%
southern waxy sedge	*Carex glaucescens*	0.20%	2.00%	8.70%	4.55%	6.62%
yellow wood-sorrel	*Oxalis stricta*	0.05%	2.00%	2.17%	4.55%	3.36%
All herb species - Total		**2.30%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground Cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	37.50%	NA
Live Tree (>3 cm basal dia)	0.85%	8.00%
Snags&Stumps (>3 cm basal dia)	0.05%	2.00%
Bare soil	1.55%	30.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	9.85%	68.00%
Forest Floor (organic)	85.50%	98.00%

Table 7.1.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Overcup Oak Swamp, Woody Seedlings, Site #1: Sanders-DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
Chinese tallow	*Triadica sebifera*	1.41%	32.00%	46,400	3,756	50,156	22.13%	18.18%	42.56%	27.62%
climbing dogbane	*Trachelospermum difforme*	1.46%	40.00%	29,400	1,822	31,222	22.82%	22.73%	26.49%	24.01%
snowbell	*Halesia diptera*	1.35%	20.00%	1,200	11,000	12,200	21.17%	11.36%	10.35%	14.29%
water elm	*Planera aquatica*	0.59%	22.00%	5,756	1,244	7,000	9.32%	12.50%	5.94%	9.25%
roundleaf greenbrier	*Smilax rotundifolia*	0.45%	18.00%	6,800	400	7,200	7.06%	10.23%	6.11%	7.80%
common persimmon	*Diospyros virginiana*	0.35%	14.00%	5,800	600	6,400	5.49%	7.95%	5.43%	6.29%
American buckwheat vine	*Mikania scandens*	0.25%	10.00%	600	800	1,400	3.92%	5.68%	1.19%	3.60%
overcup oak	*Quercus lyrata*	0.21%	8.00%	400	422	822	3.22%	4.55%	0.70%	2.82%
water hickory	*Carya aquatica*	0.15%	6.00%	800	0	800	2.35%	3.41%	0.68%	2.15%
blackgum	*Nyssa aquatica*	0.06%	2.00%	0	222	222	0.87%	1.14%	0.19%	0.73%
willow oak	*Quercus phellos*	0.06%	2.00%	222	0	222	0.87%	1.14%	0.19%	0.73%
summer grape	*Vitis aestivalis*	0.05%	2.00%	200	0	200	0.78%	1.14%	0.17%	0.70%
All woody species - Total		**6.38%**	**NA**	**97,578**	**20,267**	**117,844**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.1.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Overcup Oak Swamp, Herb Species and Ground Cover, Site #1: Sanders-DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
Caric sedge	*Carex species*	0.50%	14.00%	70.87%	63.64%	67.25%
inland sea oats	*Chasmanthium latifolium*	0.16%	6.00%	22.05%	27.27%	24.66%
plumegrass	*Saccharum species*	0.05%	2.00%	7.09%	9.09%	8.09%
All herb species - Total		**0.71%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	7.60%	NA
Live Tree (>3 cm basal dia)	0.87%	20.00%
Snags&Stumps (>3 cm basal dia)	0.06%	2.00%
Bare soil	7.49%	30.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	2.02%	44.00%
Forest Floor (organic)	60.80%	92.00%

Table 7.1.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Overcup Oak Swamp, Woody Seedlings, Site #2: Locke Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
overcup oak	*Quercus lyrata*	0.94%	30.00%	15,250	0	15,250	20.27%	25.00%	29.05%	24.77%
willow oak	*Quercus phellos*	0.69%	20.00%	18,250	0	18,250	14.86%	16.67%	34.76%	22.10%
American buckwheat vine	*Mikania scandens*	0.94%	20.00%	1,000	5,500	6,500	20.27%	16.67%	12.38%	16.44%
roundleaf greenbrier	*Smilax rotundifolia*	0.63%	7.50%	0	4,000	4,000	13.51%	6.25%	7.62%	9.13%
common persimmon	*Diospyros virginiana*	0.31%	12.50%	250	1,250	1,500	6.76%	10.42%	2.86%	6.68%
climbing dogbane	*Trachelospermum difforme*	0.19%	7.50%	1,000	3,000	4,000	4.05%	6.25%	7.62%	5.97%
summer grape	*Vitis aestivalis*	0.31%	5.00%	0	0	0	6.76%	4.17%	0.00%	3.64%
water elm	*Planera aquatica*	0.13%	5.00%	250	750	1,000	2.70%	4.17%	1.90%	2.92%
peppervine	*Nekemias arborea*	0.25%	2.50%	0	0	0	5.41%	2.08%	0.00%	2.50%
snowbell	*Halesia diptera*	0.06%	2.50%	0	750	750	1.35%	2.08%	1.43%	1.62%
deciduous holly	*Ilex decidua*	0.06%	2.50%	0	500	500	1.35%	2.08%	0.95%	1.46%
trumpet creeper	*Campsis radicans*	0.06%	2.50%	500	0	500	1.35%	2.08%	0.95%	1.46%
water hickory	*Carya aquatica*	0.06%	2.50%	250	0	250	1.35%	2.08%	0.48%	1.30%
All woody species - Total		**4.63%**	**NA**	**36,750**	**15,750**	**52,500**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.1.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Overcup Oak Swamp, Herb Species and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
inland sea oats	*Chasmanthium latifolium*	0.44%	10.00%	100.00%	100.00%	100.00%
All herb species - Total		**0.44%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	4.15%	NA
Live Tree (>3 cm basal dia)	1.00%	20.00%
Snags&Stumps (>3 cm basal dia)	0.25%	4.00%
Bare soil	8.50%	44.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	1.70%	30.00%
Forest Floor (organic)	24.20%	76.00%

Table 7.1.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 20161
Overcup Oak Swamp, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
American buckwheat vine	*Mikania scandens*	2.15%	38.00%	600	12,400	13,000	25.29%	21.59%	21.59%	22.83%
willow oak	*Quercus phellos*	1.40%	16.00%	19,200	400	19,600	16.47%	9.09%	32.56%	19.37%
overcup oak	*Quercus lyrata*	0.95%	32.00%	5,200	600	5,800	11.18%	18.18%	9.63%	13.00%
roundleaf greenbrier	*Smilax rotundifolia*	1.40%	16.00%	0	7,800	7,800	16.47%	9.09%	12.96%	12.84%
common persimmon	*Diospyros virginiana*	0.65%	20.00%	1,600	1,400	3,000	7.65%	11.36%	4.98%	8.00%
summer grape	*Vitis aestivalis*	0.45%	12.00%	200	1,000	1,200	5.29%	6.82%	1.99%	4.70%
crossvine	*Bignonia capreolata*	0.30%	6.00%	1,200	2,600	3,800	3.53%	3.41%	6.31%	4.42%
snowbell	*Halesia diptera*	0.50%	8.00%	600	600	1,200	5.88%	4.55%	1.99%	4.14%
peppervine	*Nekemias arborea*	0.20%	8.00%	0	1,800	1,800	2.35%	4.55%	2.99%	3.30%
water elm	*Planera aquatica*	0.20%	8.00%	1,000	400	1,400	2.35%	4.55%	2.33%	3.07%
rattan-vine	*Berchemia scandens*	0.10%	4.00%	600	0	600	1.18%	2.27%	1.00%	1.48%
buttonbush	*Cephalanthus occidentalis*	0.10%	4.00%	0	200	200	1.18%	2.27%	0.33%	1.26%
saw greenbrier	*Smilax bona-nox*	0.05%	2.00%	600	0	600	0.59%	1.14%	1.00%	0.91%
bald cypress	*Taxodium distichum*	0.05%	2.00%	200	0	200	0.59%	1.14%	0.33%	0.69%
All woody species - Total		**8.50%**	**NA**	**31,000**	**29,200**	**60,200**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.1.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Overcup Oak Swamp, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
dicot herb seedlings	*NA*	2.35%	56.00%	81.03%	77.78%	79.41%
Virginia dayflower	*Commelina virginica*	0.25%	10.00%	8.62%	13.89%	11.25%
Lizard's tail	*Saururus cernuus*	0.25%	4.00%	8.62%	5.56%	7.09%
Carolina snailseed	*Cocculus carolinus*	0.05%	2.00%	1.72%	2.78%	2.25%
All herb species - Total		**2.90%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	22.45%	NA
Live Tree (>3 cm basal dia)	0.85%	16.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	10.75%	70.00%
Rock	1.95%	2.00%
Lg Woody Debris (> 3 cm dia)	4.50%	46.00%
Forest Floor (organic)	11.90%	92.00%

Table 7.2.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Willow Oak Bottomland Forest, Woody Seedlings, Site #1: Sanders-DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
willow oak	*Quercus phellos*	2.75%	60.00%	43,400	1,800	45,200	27.50%	21.43%	37.23%	28.72%
roundleaf greenbrier	*Smilax rotundifolia*	2.00%	54.00%	400	16,600	17,000	20.00%	19.29%	14.00%	17.76%
American buckwheat vine	*Mikania scandens*	1.85%	48.00%	1,600	13,200	14,800	18.50%	17.14%	12.19%	15.94%
water oak	*Quercus nigra*	0.55%	16.00%	17,200	1,800	19,000	5.50%	5.71%	15.65%	8.96%
climbing dogbane	*Trachelospermum difforme*	0.70%	28.00%	4,200	5,800	10,000	7.00%	10.00%	8.24%	8.41%
sweetgum	*Liquidambar styraciflua*	0.30%	6.00%	3,800	200	4,000	3.00%	2.14%	3.29%	2.81%
crossvine	*Bignonia capreolata*	0.20%	8.00%	400	2,400	2,800	2.00%	2.86%	2.31%	2.39%
Chinese tallow	*Triadica sebifera*	0.25%	10.00%	1,200	0	1,200	2.50%	3.57%	0.99%	2.35%
American hornbeam	*Carpinus caroliniana*	0.20%	8.00%	0	800	800	2.00%	2.86%	0.66%	1.84%
water hickory	*Carya aquatica*	0.20%	8.00%	200	400	600	2.00%	2.86%	0.49%	1.78%
dewberry	*Rubus trivialis*	0.10%	4.00%	2,000	400	2,400	1.00%	1.43%	1.98%	1.47%
peppervine	*Nekemias arborea*	0.15%	6.00%	0	800	800	1.50%	2.14%	0.66%	1.43%
snowbell	*Halesia diptera*	0.25%	4.00%	0	400	400	2.50%	1.43%	0.33%	1.42%
sugarberry	*Celtis laevigata*	0.10%	4.00%	200	600	800	1.00%	1.43%	0.66%	1.03%
muscadine	*Vitis rotundifolia*	0.10%	4.00%	200	0	200	1.00%	1.43%	0.16%	0.86%
rattan-vine	*Berchemia scandens*	0.05%	2.00%	400	200	600	0.50%	0.71%	0.49%	0.57%
chickasaw plum	Prunus angustifolia	0.05%	2.00%	0	200	200	0.50%	0.71%	0.16%	0.46%
deciduous holly	*Ilex decidua*	0.05%	2.00%	0	200	200	0.50%	0.71%	0.16%	0.46%
summer grape	*Vitis aestivalis*	0.05%	2.00%	0	200	200	0.50%	0.71%	0.16%	0.46%
trumpet creeper	*Campsis radicans*	0.05%	2.00%	0	200	200	0.50%	0.71%	0.16%	0.46%
overcup oak	*Quercus lyrata*	0.05%	2.00%	0	0	0	0.50%	0.71%	0.00%	0.40%
All woody species - Total		**10.00%**	**NA**	**75,200**	**46,200**	**121,400**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.2.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Willow Oak Bottomland Forest, Herb Species and Ground Cover, Site #1: Sanders-DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
Caric sedge	*Carex species*	1.30%	28.00%	56.52%	50.00%	53.26%
inland sea oats	*Chasmanthium latifolium*	0.55%	16.00%	23.91%	28.57%	26.24%
Virginia dayflower	*Commelina virginica*	0.25%	4.00%	10.87%	7.14%	9.01%
smallspike false nettle	*Boehmeria cylindrica*	0.15%	6.00%	6.52%	10.71%	8.62%
late-flowering boneset	*Eupatorium serotinum*	0.05%	2.00%	2.17%	3.57%	2.87%
All herb species - Total		**2.30%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	26.09%	NA
Live Tree (>3 cm basal dia)	0.75%	18.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	0.30%	6.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	2.15%	50.00%
Forest Floor (organic)	25.00%	92.00%

Table 7.2.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Willow Oak Bottomland Forest, Woody Seedlings, Site #2: Locke Parcel

Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
	%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
Quercus phellos	16.20%	16.00%	375,600	400	376,000	95.01%	27.59%	97.77%	73.46%
Bignonia capreolata	0.05%	16.00%	400	0	400	0.29%	27.59%	0.10%	9.33%
Quercus alba	0.15%	6.00%	800	0	800	0.88%	10.34%	0.21%	3.81%
Smilax rotundifolia	0.30%	4.00%	0	2,167	2,167	1.76%	6.90%	0.56%	3.07%
Mikania scandens	0.10%	4.00%	400	200	600	0.59%	6.90%	0.16%	2.55%
Quercus nigra	0.05%	4.00%	600	0	600	0.29%	6.90%	0.16%	2.45%
Diospyros virginiana	0.05%	4.00%	500	0	500	0.29%	6.90%	0.13%	2.44%
Carpinus caroliniana	0.10%	2.00%	3,100	0	3,100	0.59%	3.45%	0.81%	1.61%
Halesia diptera	0.05%	2.00%	0	400	400	0.29%	3.45%	0.10%	1.28%
	17.05%	**NA**	**381,400**	**3,167**	**384,567**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.2.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Willow Oak Bottomland Forest, Herb Species and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
Caric sedge	*Carex species*	0.05%	2.00%	100.00%	100.00%	100.00%
All herb species - Total		**0.05%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	17.80%	NA
Live Tree (>3 cm basal dia)	0.75%	12.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	0.25%	4.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	4.70%	54.00%
Forest Floor (organic)	33.45%	96.00%

Table 7.2.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Willow Oak Bottomland Forest, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
willow oak	*Quercus phellos*	2.85%	70.00%	35,000	12,400	47,400	42.22%	38.04%	62.37%	47.54%
roundleaf greenbrier	*Smilax rotundifolia*	1.10%	26.00%	400	4,400	4,800	16.30%	14.13%	6.32%	12.25%
crossvine	*Bignonia capreolata*	0.55%	22.00%	3,000	8,000	11,000	8.15%	11.96%	14.47%	11.53%
overcup oak	*Quercus lyrata*	0.35%	14.00%	2,000	1,000	3,000	5.19%	7.61%	3.95%	5.58%
common persimmon	*Diospyros virginiana*	0.45%	12.00%	1,400	1,200	2,600	6.67%	6.52%	3.42%	5.54%
American buckwheat vine	*Mikania scandens*	0.35%	8.00%	0	2,000	2,000	5.19%	4.35%	2.63%	4.05%
deciduous holly	*Ilex decidua*	0.30%	6.00%	0	800	800	4.44%	3.26%	1.05%	2.92%
summer grape	*Vitis aestivalis*	0.15%	6.00%	600	1,000	1,600	2.22%	3.26%	2.11%	2.53%
water elm	*Planera aquatica*	0.15%	6.00%	600	0	600	2.22%	3.26%	0.79%	2.09%
rattan-vine	*Berchemia scandens*	0.10%	4.00%	200	200	400	1.48%	2.17%	0.53%	1.39%
water hickory	*Carya aquatica*	0.10%	4.00%	0	400	400	1.48%	2.17%	0.53%	1.39%
muscadine	*Vitis rotundifolia*	0.20%	2.00%	0	0	0	2.96%	1.09%	0.00%	1.35%
peppervine	*Nekemias arborea*	0.05%	2.00%	0	1,200	1,200	0.74%	1.09%	1.58%	1.14%
American hornbeam	*Carpinus caroliniana*	0.05%	2.00%	0	200	200	0.74%	1.09%	0.26%	0.70%
All woody species - Total		**6.75%**	**NA**	**43,200**	**32,800**	**76,000**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.2.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Willow Oak Bottomland Forest, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
Caric sedge	*Carex species*	0.25%	10.00%	50.00%	50.00%	50.00%
dicot herb seedlings	*NA*	0.15%	6.00%	30.00%	30.00%	30.00%
Lizard's tail	*Saururus cernuus*	0.05%	2.00%	10.00%	10.00%	10.00%
longleaf woodoats	*Chasmanthium sessiliflorum*	0.05%	2.00%	10.00%	10.00%	10.00%
All herb species - Total		**0.50%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	10.00%	NA
Live Tree (>3 cm basal dia)	2.00%	12.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	10.85%	56.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	4.90%	52.00%
Forest Floor (organic)	15.05%	84.00%

Table 7.3.1.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Water Oak Bottomland Forest, Woody Seedlings, Site #1: Sanders-DeWare Parcels

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
water oak	*Quercus nigra*	2.10%	64.00%	49,200	1,000	50,200	18.26%	19.75%	37.08%	25.03%
crossvine	*Bignonia capreolata*	1.10%	44.00%	5,200	27,000	32,200	9.57%	13.58%	23.78%	15.64%
roundleaf greenbrier	*Smilax rotundifolia*	1.90%	52.00%	200	12,000	12,200	16.52%	16.05%	9.01%	13.86%
dewberry	*Rubus trivialis*	2.05%	36.00%	1,000	13,000	14,000	17.83%	11.11%	10.34%	13.09%
muscadine	*Vitis rotundifolia*	0.55%	16.00%	1,200	2,600	3,800	4.78%	4.94%	2.81%	4.18%
Japanese honeysuckle	*Lonicera japonica*	0.40%	16.00%	200	4,400	4,600	3.48%	4.94%	3.40%	3.94%
American hornbeam	*Carpinus caroliniana*	0.40%	10.00%	200	1,600	1,800	3.48%	3.09%	1.33%	2.63%
climbing dogbane	*Trachelospermum difforme*	0.20%	8.00%	200	3,000	3,200	1.74%	2.47%	2.36%	2.19%
Chinese tallow	*Triadica sebifera*	0.25%	10.00%	1,000	200	1,200	2.17%	3.09%	0.89%	2.05%
Chinese privet	*Ligustrum sinense*	0.45%	4.00%	200	200	400	3.91%	1.23%	0.30%	1.81%
rattan-vine	*Berchemia scandens*	0.20%	8.00%	200	1,000	1,200	1.74%	2.47%	0.89%	1.70%
wild yam	*Dioscorea villosa*	0.20%	8.00%	200	800	1,000	1.74%	2.47%	0.74%	1.65%
sugarberry	*Celtis laevigata*	0.20%	8.00%	0	600	600	1.74%	2.47%	0.44%	1.55%
American beautyberry	*Callicarpa americana*	0.25%	4.00%	0	1,400	1,400	2.17%	1.23%	1.03%	1.48%
sweetleaf	*Symplocos tinctoria*	0.40%	2.00%	0	400	400	3.48%	0.62%	0.30%	1.46%
poison ivy	*Toxicodendron radicans*	0.15%	6.00%	400	400	800	1.30%	1.85%	0.59%	1.25%
Virginia creeper	Parthenocissus quinquefolia	0.15%	6.00%	0	600	600	1.30%	1.85%	0.44%	1.20%
willow oak	*Quercus phellos*	0.10%	4.00%	1,400	0	1,400	0.87%	1.23%	1.03%	1.05%
bitternut hickory	*Carya cordiformis*	0.05%	2.00%	200	2,000	2,200	0.43%	0.62%	1.62%	0.89%
deciduous holly	*Ilex decidua*	0.10%	4.00%	0	400	400	0.87%	1.23%	0.30%	0.80%
blackgum	*Nyssa aquatica*	0.05%	2.00%	200	200	400	0.43%	0.62%	0.30%	0.45%
honey locust	*Gleditsia triacanthos*	0.05%	2.00%	0	400	400	0.43%	0.62%	0.30%	0.45%
sweetgum	*Liquidambar styraciflua*	0.05%	2.00%	0	400	400	0.43%	0.62%	0.30%	0.45%
mimosa-tree	*Albizia julibrissin*	0.05%	2.00%	200	0	200	0.43%	0.62%	0.15%	0.40%
red mulberry	*Morus rubra*	0.05%	2.00%	0	200	200	0.43%	0.62%	0.15%	0.40%
summer grape	*Vitis aestivalis*	0.05%	2.00%	0	200	200	0.43%	0.62%	0.15%	0.40%
All woody species - Total		**11.50%**	**NA**	**61,400**	**74,000**	**135,400**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.3.1.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Water Oak Bottomland Forest, Herb Species, Site #1: Sanders-DeWare Parcels

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
rough panicgrass	*Dichanthelium leucothrix*	1.20%	42.00%	26.67%	41.18%	33.92%
longleaf woodoats	*Chasmanthium sessiliflorum*	1.15%	16.00%	25.56%	15.69%	20.62%
Caric sedge	*Carex species*	0.40%	4.00%	8.89%	3.92%	6.41%
inland sea oats	*Chasmanthium latifolium*	0.20%	8.00%	4.44%	7.84%	6.14%
switchgrass	*Panicum virgatum*	0.40%	2.00%	8.89%	1.96%	5.42%
unknown grass	*NA*	0.40%	2.00%	8.89%	1.96%	5.42%
Carolina elephantsfoot	*Elephantopus carolinianus*	0.15%	6.00%	3.33%	5.88%	4.61%
wood violet	*Viola sororia*	0.15%	6.00%	3.33%	5.88%	4.61%
common threeseed mercury	*Acalypha rhomboidea*	0.15%	4.00%	3.33%	3.92%	3.63%
yellow wood-sorrel	*Oxalis stricta*	0.10%	4.00%	2.22%	3.92%	3.07%
late-flowering boneset	*Eupatorium serotinum*	0.05%	2.00%	1.11%	1.96%	1.54%
Spanish needles	*Bidens frondosa*	0.05%	2.00%	1.11%	1.96%	1.54%
strawberry bush	*Euonymus americanus*	0.05%	2.00%	1.11%	1.96%	1.54%
Virginia wildrye	*Elymus virginicus*	0.05%	2.00%	1.11%	1.96%	1.54%
All herb species - Total		**4.50%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	34.85%	NA
Live Tree (>3 cm basal dia)	0.35%	8.00%
Snags&Stumps (>3 cm basal dia)	0.20%	2.00%
Bare soil	0.65%	14.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	3.55%	46.00%
Forest Floor (organic)	12.50%	78.00%

Table 7.3.2.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Water Oak Bottomland Forest, Woody Seedlings, Site #2: Locke Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
water oak	*Quercus nigra*	4.15%	86.00%	125,400	1,800	127,200	37.39%	33.33%	73.95%	48.22%
roundleaf greenbrier	*Smilax rotundifolia*	1.95%	38.00%	600	11,400	12,000	17.57%	14.73%	6.98%	13.09%
crossvine	*Bignonia capreolata*	1.10%	42.00%	5,400	13,000	18,400	9.91%	16.28%	10.70%	12.30%
poison ivy	*Toxicodendron radicans*	0.45%	16.00%	200	4,200	4,400	4.05%	6.20%	2.56%	4.27%
summer grape	*Vitis aestivalis*	0.70%	8.00%	200	400	600	6.31%	3.10%	0.35%	3.25%
muscadine	*Vitis rotundifolia*	0.30%	12.00%	0	1,200	1,200	2.70%	4.65%	0.70%	2.68%
sweetgum	*Liquidambar styraciflua*	0.60%	4.00%	0	400	400	5.41%	1.55%	0.23%	2.40%
rattan-vine	*Berchemia scandens*	0.30%	8.00%	0	2,000	2,000	2.70%	3.10%	1.16%	2.32%
American hornbeam	*Carpinus caroliniana*	0.45%	6.00%	0	400	400	4.05%	2.33%	0.23%	2.20%
red maple	*Acer rubrum*	0.20%	8.00%	200	400	600	1.80%	3.10%	0.35%	1.75%
winged elm	*Ulmus alata*	0.15%	6.00%	200	600	800	1.35%	2.33%	0.47%	1.38%
peppervine	*Nekemias arborea*	0.15%	4.00%	0	600	600	1.35%	1.55%	0.35%	1.08%
common persimmon	*Diospyros virginiana*	0.10%	4.00%	800	0	800	0.90%	1.55%	0.47%	0.97%
dewberry	*Rubus trivialis*	0.10%	2.00%	400	400	800	0.90%	0.78%	0.47%	0.71%
wild yam	*Dioscorea villosa*	0.05%	2.00%	0	400	400	0.45%	0.78%	0.23%	0.49%
black elderberry	*Sambucus nigra ssp. canadensis*	0.05%	2.00%	0	200	200	0.45%	0.78%	0.12%	0.45%
blueberry	Vaccinium species	0.05%	2.00%	200	0	200	0.45%	0.78%	0.12%	0.45%
deciduous holly	*Ilex decidua*	0.05%	2.00%	0	200	200	0.45%	0.78%	0.12%	0.45%
red mulberry	*Morus rubra*	0.05%	2.00%	0	200	200	0.45%	0.78%	0.12%	0.45%
sugarberry	*Celtis laevigata*	0.05%	2.00%	0	200	200	0.45%	0.78%	0.12%	0.45%
Virginia creeper	*Virginia creeper*	0.05%	2.00%	0	200	200	0.45%	0.78%	0.12%	0.45%
trumpet creeper	*Campsis radicans*	0.05%	0.00%	200	0	200	0.45%	0.00%	0.12%	0.19%
All woody species - Total		**11.10%**	**NA**	**133,800**	**38,200**	**172,000**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.3.2.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Water Oak Bottomland Forest, Herb Species and Ground Cover, Site #2: Locke Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
longleaf woodoats	*Chasmanthium sessiliflorum*	1.40%	6.00%	56.00%	15.00%	35.50%
rattlesnake fern	*Botrychium virginianum*	0.15%	14.00%	6.00%	35.00%	20.50%
wood violet	*Viola sororia*	0.15%	12.00%	6.00%	30.00%	18.00%
Caric sedge	*Carex species*	0.55%	2.00%	22.00%	5.00%	13.50%
green dragon	*Arisaema dracontium*	0.20%	4.00%	8.00%	10.00%	9.00%
late-flowering boneset	*Eupatorium serotinum*	0.05%	2.00%	2.00%	5.00%	3.50%
All herb species - Total		**2.50%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	58.30%	NA
Live Tree (>3 cm basal dia)	0.05%	2.00%
Snags&Stumps (>3 cm basal dia)	1.15%	4.00%
Bare soil	0.45%	18.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	12.15%	74.00%
Forest Floor (organic)	84.00%	100.00%

Table 7.3.3.1 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Water Oak Bottomland Forest, Woody Seedlings, Site #3: Thomas Parcel

Common Name	Scientific Name	Cover	Frequency	Density (#stems/ha)			% Relative Values*			
		%	%	y1	y2+	Total	Cover	Frequency	Density	Importance
crossvine	*Bignonia capreolata*	2.25%	54.00%	4,600	40,000	44,600	18.75%	18.88%	54.79%	30.81%
muscadine	*Vitis rotundifolia*	2.55%	38.00%	1,800	3,400	5,200	21.25%	13.29%	6.39%	13.64%
roundleaf greenbrier	*Smilax rotundifolia*	1.75%	46.00%	800	7,200	8,000	14.58%	16.08%	9.83%	13.50%
water oak	*Quercus nigra*	0.95%	32.00%	2,200	4,000	6,200	7.92%	11.19%	7.62%	8.91%
American hornbeam	*Carpinus caroliniana*	1.00%	20.00%	200	2,200	2,400	8.33%	6.99%	2.95%	6.09%
poison ivy	*Toxicodendron radicans*	0.40%	10.00%	600	3,400	4,000	3.33%	3.50%	4.91%	3.91%
sweetgum	*Liquidambar styraciflua*	0.55%	8.00%	1,400	800	2,200	4.58%	2.80%	2.70%	3.36%
willow oak	*Quercus phellos*	0.35%	14.00%	600	800	1,400	2.92%	4.90%	1.72%	3.18%
rattan-vine	*Berchemia scandens*	0.30%	12.00%	400	1,200	1,600	2.50%	4.20%	1.97%	2.89%
dewberry	*Rubus trivialis*	0.35%	8.00%	400	400	800	2.92%	2.80%	0.98%	2.23%
summer grape	*Vitis aestivalis*	0.35%	8.00%	0	800	800	2.92%	2.80%	0.98%	2.23%
American buckwheat vine	*Mikania scandens*	0.20%	8.00%	200	1,000	1,200	1.67%	2.80%	1.47%	1.98%
common persimmon	*Diospyros virginiana*	0.25%	4.00%	0	600	600	2.08%	1.40%	0.74%	1.41%
rusty blackhaw	*Viburnum rufidulum*	0.15%	6.00%	0	600	600	1.25%	2.10%	0.74%	1.36%
Virginia creeper	*Parthenocissus quinquefolia*	0.15%	6.00%	0	600	600	1.25%	2.10%	0.74%	1.36%
deciduous holly	*Ilex decidua*	0.10%	4.00%	0	200	200	0.83%	1.40%	0.25%	0.83%
American beautyberry	Callicarpa americana	0.20%	2.00%	0	0	0	1.67%	0.70%	0.00%	0.79%
water hickory	*Carya aquatica*	0.05%	2.00%	200	200	400	0.42%	0.70%	0.49%	0.54%
winged elm	*Ulmus alata*	0.05%	2.00%	200	200	400	0.42%	0.70%	0.49%	0.54%
sassafras	*Sassafras albidum*	0.05%	2.00%	0	200	200	0.42%	0.70%	0.25%	0.45%
All woody species - Total		**12.00%**	**NA**	**13,600**	**67,800**	**81,400**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7.3.3.2 Big Cypress Bayou: Summary of Herb-Seedling Layer Field Data, 2016
Water Oak Bottomland Forest, Herb Species and Ground Cover, Site #3: Thomas Parcel

Herbs:

Common Name	Scientific Name	Cover	Freq	% Relative Values*		
		%	%	Cover	Frequency	Importance
Caric sedge	*Carex species*	0.80%	18.00%	88.89%	81.82%	85.35%
inland sea oats	*Chasmanthium latifolium*	0.05%	2.00%	5.56%	9.09%	7.32%
Virginia dayflower	*Commelina virginica*	0.05%	2.00%	5.56%	9.09%	7.32%
All herb species - Total		**0.90%**	**NA**	**100.00%**	**100.00%**	**100.00%**

Ground Cover:

Ground cover	Cover	Freq
	%	%
All-Veg (herb+woody) Total	26.60%	NA
Live Tree (>3 cm basal dia)	1.00%	8.00%
Snags&Stumps (>3 cm basal dia)	0.00%	0.00%
Bare soil	1.20%	26.00%
Rock	0.00%	0.00%
Lg Woody Debris (> 3 cm dia)	8.20%	54.50%
Forest Floor (organic)	18.65%	93.00%

APPENDIX C:

FIELD PROTOCOL: Forest Macroplots and Nested Quadrats

Movement within 50mX10m Macroplots: Please be conscientious at all times to minimize experimental disturbance within macroplots. Be more careful than when hiking in wilderness, i.e., leave no footprints to the maximum extent possible. Do not step on live plants and decomposed fallen wood that is not sound, do not break either live or dead branches, etc.

TREE LAYER

SUPPLIES: each team

clipboard
pencils (3), magic markers
forms, species list
50+-m tapes (2)
DBH tapes, metric (2)
aluminum tags & nails, with hammer
camera
labeled wire flags
personal gear (water, lunch, repellent, etc.)
ziplocks, label paper
tree-identification guides
aluminum tags & nails
hand compass, GPS unit

FORM DATA ENTRY:
Throughout 50mX10m macroplot, record the following measurements for all snags (standing dead trees with an angle greater than 45° to the horizontal) and live trees ≥ 5.0 cm DBH. In the USA, diameter at breast height (DBH) is defined as the average stem diameter, outside bark, at 1.37 m (4.5') above the ground on the uphill side of the tree, disregarding any bark-litter mound at the base of tree. For consistent measurement, the steel diameter tape must be level and pulled taut, while avoiding bumps, stubs, and other outer bark and bole irregularities.

Tag # - For each woody stem ≥5 cm DBH (see "DBH" below), including each stem of a multiple-stem tree, nail a round numbered aluminum tag into the stem, on the side facing the "zero" end of the 50-m transect. At precisely 145 cm above the ground on the high-ground side of the tree, tap the 7.5-cm nail in approximately 1/3 way (2.5 cm or 1.0 inch), to allow for future diameter growth. Be certain to measure from true ground level, by avoiding soil-surface mounds, including those caused by root, bark, rock, debris, and heaved soil. Record the tag number on the datasheet. The nail will serve as a reference, so that each individual stem can be re-measured at an identical location (see "DBH" below).

L/S – Note if the stem is live or a snag. A snag is defined as a standing dead tree with an angle equal to or greater than 45° to the horizontal. Dead trees with an angle less than 45° are downed woody debris, which are not included in this method and therefore not recorded.

Sp. - Record 4-letter code for scientific name of tree species.

DBH – On the high ground side (no mounds) of every stem ≥5 cm DBH (see "Tag #" above and "irregular trees" below), measure the diameter of the stem with the DBH tape centered at exactly 8 cm below the tag nail, so that the tape is centered at precisely DBH (137 cm or 4.5"). Avoid

any bark obstructions and pull tape level and taut, then record to a precision of 0.1 cm.

DBH for irregular trees (modified from Avery and Burkhart, 2001): When swellings, deformities, or branches occur at 137 cm above ground, take DBH above irregularity where normal stem form ceases to be affected. If trunk forks immediately above DBH height, measure DBH immediately below swelling caused by fork. For forks below true DBH, each stem is normally measured at normal DBH above fork. The exception is when normal DBH height is too close to fork so that it is influenced by swelling associated with the fork, in which case the DBH is measured immediately above such swelling. In this manner, more than one DBH may be recorded for each stem/tag number, including multiple trunks. For swell-butted stems, DBH is measured above swell if swell is at normal DBH height. When you encounter a trunk that forks below DBH, apply a metal tag on each of the forks of the stem.

V Class – Record the Vigor Class for live trees.

Vigor Class:
Record the Vigor Class as % live canopy volume. Modified from the Braun-Blanquet cover-abundance scale (Mueller-Dombois and Ellenberg, 1974), record six class codes based on % live-crown volume relative to potential crown volume (including any broken top). As defined below, the lower the vigor class the fuller and healthier the live tree crown:

Code:	% Live Canopy Volume:	Code:	% Live Canopy Volume:
1	96-100	**4**	26-50
2	76-95	**5**	6-25
3	51-75	**6**	0-5

When entering vigor-class codes in spreadsheet, please convert to % live canopy volume as follows:

Vigor-Class Code:	**% Live Canopy Volume:**	**Enter As:**
1	96-100	98.0%
2	76-95	85.5%
3	51-75	63.0%
4	26-50	38.0%
5	6-25	15.5%
6	0-5	2.5%

Crown Class –

S: Suppressed (crown completely over topped with none exposed to direct sunlight).
I: Intermediate (less than half of the top of the crown exposed to direct sunlight).
C: Co-dominant (more than half of the crown top exposed to direct sunlight, but none of the sides of the crown).
D: Dominant (the top and much of the sides of the crown fully exposed to direct sunlight).

Location –

Position: Record location (nearest meter) of stem along the center 50-m transect.

L/R: Indicate if the stem is left or right of the center transect, when facing the 50m end of the transect.

<u>SHRUB LAYER</u> – Woody Species

Tree saplings and shrub species are quantified within a 2mX50m plot along the central 50-m transect within the 50-mX10-m macroplots.

SUPPLIES: each team

forms, species list
pencils (3), magic markers
personal gear (water, lunch, repellent, etc.)
camera
measuring tapes & ruler (metric)
ziplocks, label paper
plant-identification guides
hand compass, GPS unit

FORM DATA ENTRY:
Tree and shrub species (live and dead) greater than 1.37 cm (DBH) in height and with a DBH of less than 5 cm are recorded as described in the Tree Layer method, including species, live/snag (L/S), DBH, vigor/decomposition class (V/D), and location. DBHs for multiple stems connected above ground are recorded separately. Measured stems are located in the field as practical, by recorded location and shrub #. Each shrub, including specimens with multiple stems connected above ground, have a unique shrub #. Each stem of a multiple-stemmed shrub has the same shrub #. Please refer to the attached field sheet.

Record the following measurements for all dead shrubs and tree saplings (standing dead with an angle greater than 45° to the horizontal) and live shrubs and tree saplings < 5.0 cm DBH (no stem greater than 4.9 cm DBH). In the USA, diameter at breast height (DBH) is defined as the average stem diameter, outside bark, at 1.37 m (4.5') above the ground on the uphill side of the tree, disregarding any bark-litter mound at the base of tree. For consistent measurement, the steel diameter tape must be level and pulled taut, while avoiding bumps, stubs, and other outer bark and bole irregularities.

L/S – Note if the stem is live or a snag. A snag is defined as a standing dead tree with an angle equal to or greater than 45° to the horizontal. Dead trees with an angle less than 45° are downed woody debris, which are not included in this method and therefore not recorded.

Sp. - Record 4-letter code for scientific name of tree species.

DBH – On the high ground side (no mounds) of every stem <5 cm DBH, measure the diameter of the stem with the DBH tape, so that the tape is centered at precisely DBH (137 cm or 4.5”). Avoid any bark obstructions and pull tape level and taut, then record to a precision of 0.1 cm.

<u>DBH for irregular shrubs (modified from Avery and Burkhart, 2001)</u>: When swellings, deformities, or branches occur at 137 cm above ground, take DBH above irregularity where normal stem form ceases to be affected. If trunk forks immediately above DBH height, measure

DBH immediately below swelling caused by fork. For forks below true DBH, each stem is normally measured at normal DBH above fork. The exception is when normal DBH height is too close to fork so that it is influenced by swelling associated with the fork, in which case the DBH is measured immediately above such swelling. In this manner, more than one DBH may be recorded for each stem/tag number, including multiple trunks. For swell-butted stems, DBH is measured above swell if swell is at normal DBH height. When you encounter a trunk that forks below DBH, apply a metal tag on each of the forks of the stem.

V Class – Record the Vigor Class for live shrubs.

Vigor Class:
Record the Vigor Class as % live canopy volume. Modified from the Braun-Blanquet cover-abundance scale (Mueller-Dombois and Ellenberg, 1974), record six class codes based on % dead-crown volume relative to potential crown volume (including any broken top). As defined below, the lower the vigor class the fuller and healthier the live tree crown:

Code:	% Live Canopy Volume:	Code:	% Live Canopy Volume:
1	96-100	**4**	26-50
2	76-95	**5**	6-25
3	51-75	**6**	0-5

When entering vigor-class codes for the shrub-layer in spreadsheet, please convert to % live canopy volume as follows:

Vigor-Class Code:	**% Live Canopy Volume:**	**Enter As:**
1	96-100	98.0%
2	76-95	85.5%
3	51-75	63.0%
4	26-50	38.0%
5	6-25	15.5%
6	0-5	2.5%

Location –

Position: Record perpendicular location (nearest 0.1 meter) of shrub along the center 50-m transect.
L/R: Indicate if the stem is left or right of the center transect, when facing the 50m end of the transect.
Distance: Perpendicular distance from shrub base to center transect.

HERB LAYER - Woody Seedlings and Herbs

The herb layer (woody seedlings and herbs) is quantified using a total of ten 1-m^2 quadrats located along the central 50-m transect in each 50-mX10-m macroplot. These quadrats are centered at 5m intervals from the 5m through 50m positions, in order to extend the prior 2014 sampling of five quadrats.

SUPPLIES: each team
clipboard
pencils (3), magic markers
forms, species list
1mX1m PVC quadrat frame
personal gear (water, lunch, repellent, etc.)
camera
measuring tape & ruler (metric)
ziplocks, label paper
plant-identification guides
aluminum tags & nails
hand compass, GPS unit
cardboard placard (37.5 cm X 40.0 cm) marked to estimate 15 and 5 % cover

FORM DATA ENTRY:
The following percent cover classes (1-7) estimate the canopy cover of woody and herbaceous species within each quadrat: **1** < 4.99%, **2**=5-14.99%, **3**=15-24.99%, **4**=25-49.99%, **5**=50-74.99%, **6**=75-94.99%, **7**=95-100%. A cardboard placard (37.5 cm X 40.0 cm) marked to estimate 15 and 5 percent cover, may increase both accuracy and decrease time in the field. Specific methods for each of the 3 main data categories included in the field sheet are:

Woody Species – For woody species less than 1.37 cm in height, record grand total cover (cover class: 1-7) for all woody species combined ("All woody spp - Total"). Since woody regeneration is of particular importance, record each woody species along with its cover class, average height (nearest 1.0 cm), and number of stems. The number of woody stems is tallied according to whether the stem is first-year (y1: no leaf scar) or older (y2+: at least one leaf scar).

Herbaceous species - Record grand total cover (cover class: 1-7) for all herbaceous species combined ("All herb spp – Total") no matter their height. For individual herb species with a cover class of 3 or greater, record species, cover class, and average height (nearest 1.0 cm).

Other- The combined total cover (cover class: 1-7) for all woody species less than 1.37 cm in height and all herbaceous species (again, herbs regardless of height). The cover class (1-7) for each of the other listed categories is also recorded. Before proceeding to next quadrat, be sure to check that total cover for bare soil + woody debris + floor + boles + snags equals 100%. If not, adjust cover estimates for each of these 5 categories to achieve a total cover of 100%.