

**LAFAYETTE CREEK PROPERTY—PHASES I AND II  
UMBRELLA REGIONAL MITIGATION PLANS FOR  
FLORIDA DEPARTMENT OF TRANSPORTATION PROJECTS  
CONCEPTUAL MITIGATION PLAN  
WALTON COUNTY, FLORIDA**

June 20, 2011

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## 1.0 PROJECT OVERVIEW AND GOALS

Cardno ENTRIX has prepared this restoration plan for Phases I (509.09 Acres) and II (397.86 Acres) within the Lafayette Creek Property (Lafayette Creek) for the Northwest Florida Water Management District (NFWFMD). Historically, the site experienced habitat degradation from less than optimal land management practices, primarily silviculture and fire exclusion/suppression, that is still evident in the community structure of the wetlands and some adjacent uplands. The intent of this plan is to provide a framework for the restoration of wetlands and uplands at Lafayette Creek. This restoration plan was developed in concert with NFWFMD.

NFWFMD acquired the 3,160-acre Lafayette Creek tract from M. C. Davis in late 2004 as part of its continuing commitment to protect and preserve NFWFMD water resources. This tract is also a key component of the proposed “Northwest Florida Greenway,” which is intended to provide a natural ecological corridor extending from the Apalachicola National Forest (ANF) westward to Eglin Air Force Base (EAFB). Purchase of this land by NFWFMD eliminated the high probability of future residential and commercial development along this tract given the well drained nature of the on-site uplands.

The well drained uplands are the ecological cornerstone of the water resources present on site as all the wetlands and other surface waters originating on Phases I and II are the result of seepage of ground water from the underlying surficial aquifer.

Approximately 490 acres of the western portion of the Lafayette Creek tract were purchased explicitly as mitigation for wetland and other surface waters impacts associated with the U. S. Highway 331 (US331) Freeport Realignment and are currently being managed according to the *Lafayette Creek Mitigation Parcel Management Plan* submitted to the U. S. Army Corps of Engineers (COE) in August 2005. The management approach and methods proposed for the wetlands and upland buffers on the 906.95-acre Phases I and II will be similar to those used on the western 490-acre parcel. Phases I and II occur immediately adjacent and east of the original 490-acre mitigation tract. The proposed restoration activities for Phases I and II described in this report are intended to provide wetland mitigation credits for the Florida Department of Transportation (FDOT) to offset wetland impacts within FDOT District 3 and during the US331 realignment in Walton County. The wetland mitigation potential of Phase III will be assessed at a later date with results and recommendations submitted under separate cover. Ultimately, long-term ecological management will be implemented seamlessly across the entire Lafayette Creek tract.

The wetland mitigation and community boundary limits were established by Cardno ENTRIX and NFWFMD. This report provides an overview of current and historic site conditions as well as a conceptual mitigation plan for lands currently slated for mitigation. This review utilized interpretation of 2010 and historic aerial photography (primarily 1956), Natural Resources Conservation Service (NRCS) soil survey maps, Florida Land Use Cover Classification System maps (FLUCCS), Florida Native Areas Inventory (FNAI) vegetative community concepts, National Wetlands Inventory (NWI) data and Florida Department of Environmental Protection (FDEP) rule 62-340 *Florida Administrative Code* (FAC). Field work was conducted to ground-truth aerial interpretations, provide community structure and composition data, and to assess each community’s restoration potential. Restoration assessment areas were aerially delineated based on these data using ArcView GIS 9.0. The prescribed restoration plan is based on the evaluation of these data.

Both common and scientific botanical names follow Wunderlin and Hansen (2003); see references in **Section 11.0**. The authorities of scientific names can be obtained in this reference, and therefore, are not

included in this report. Plant community concepts follow the FLUCCS classification system with further refinement using FNAI concepts.

## 2.0 LOCATION AND LANDSCAPE

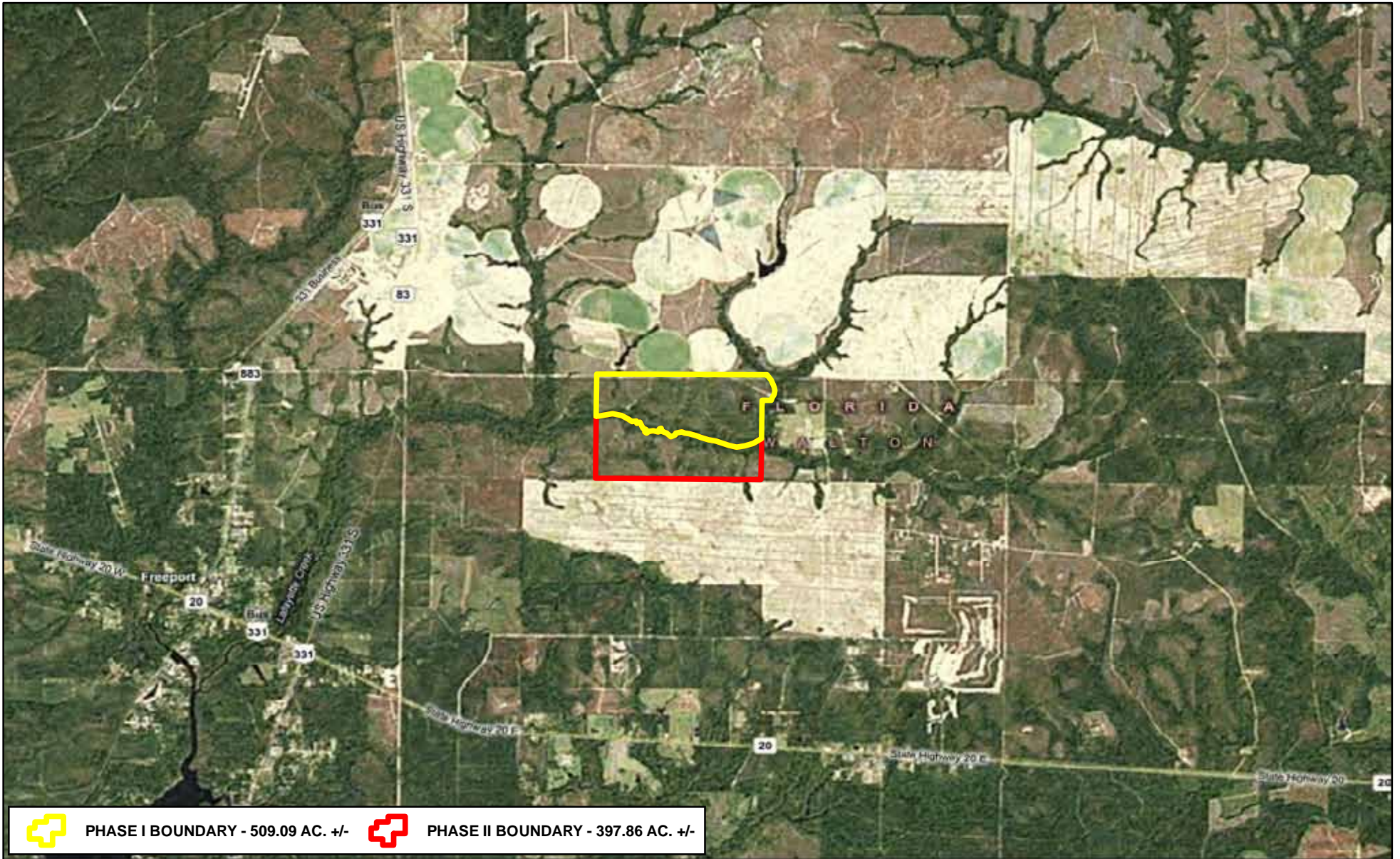
Lafayette Creek (Sections 4, 5, and 6; Township 01S, Range 18W; 30° 31' 23.67'' North and 86° 04' 00.00'' West) is located between US331 and Highway 81, north of Highway 20, in Walton County, Florida; see **Figure 1**. It is within 1.5 miles of the City of Freeport, and approximately 1.4 miles from the 4-lane US331 realignment.

This watershed lies within the Southern Pine Hills District in the Western Highlands physiographic province and near the upper limit of the Gulf Coastal Lowlands physiographic province. The Western Highlands are a series of rolling, stream-dissected hills formed primarily on the Citronelle Formation siliciclastic sediments. The rolling topography of the highlands is the result of stream erosion of an extensive Pliocene river delta thought to have extended over much of the Florida panhandle. The transition from the higher elevation Western Highlands to the lowlands is commonly marked by an indistinct marine escarpment with a base at approximately 25 feet above mean sea level (MSL). The Gulf Coastal Lowlands fringe the Gulf of Mexico shoreline from the Alabama-Florida state line eastward into Bay County forming a flat-to-gently-rolling band between the coastline and the Western Highlands to the north. Undifferentiated Pleistocene and Holocene siliciclastic sediments and alluvium, possibly including reworked Citronelle Formation, underlie the Gulf Coastal Lowlands. The site ranges from 16 to 158 feet in elevation. These topographic characteristics are detailed on a United States Geological Survey (USGS) Quadrangle map attached as **Figure 2**.

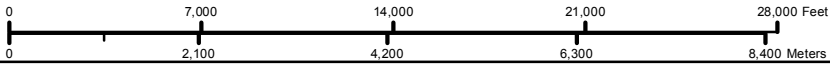
Phases I and II property lie within the Choctawhatchee River watershed, north of Choctawhatchee Bay (a Class III waterbody). The site is dominated by erosional remnant hills, small deeply cut tributaries, steepheads, and creek floodplains. The phases are approximately bisected by Lafayette Creek (class III), a perennial stream flowing from east to west across the center of the area, with Phase I to the north and Phase II to the south. The headwaters of this roughly third order stream lie partially within the NFWFMD Lafayette Creek property and partly just outside of the boundary. Lafayette Creek is a tributary to Fourmile Creek joining just north of that stream discharging to LaGrange Bayou. Two other major perennial streams, Magnolia Creek to the west of Phase I and Wolf Creek forming the eastern boundary of Phase I, are tributaries of Lafayette Creek from the north. Numerous small seepage streams, including several steephead ravines, discharge into these larger streams within the boundaries of Phases I and II. Although the Lafayette Creek property itself is primarily undeveloped, it is bordered by Bahia grass (*Paspalum notatum*) pasture and the City of Freeport's spray fields to the north and south respectively; this adds to the value of the property as a buffer for the water quality of the streams. A maintained power-line right-of-way (ROW; in Phase I) and unpaved roads are present within the property.

## 3.0 EXISTING CONDITIONS

Historically, the Lafayette Creek property was subjected to timber harvesting followed by commercial silvicultural activities and fire suppression. Removal of the natural, old growth forest was evident by the lack of a longleaf pine (*Pinus palustris*) canopy and the presence of extensive areas of both large and dense, young slash pine (*P. elliottii*) in the uplands, the presence of remnant cypress stumps, and a general lack of large canopy trees in the major creek floodplain wetlands. While silvicultural conversion of the property seems to have been accomplished with a minimal amount of mechanical soil disturbance, some areas near and within wetlands were bedded to support the growth of slash pine.



 PHASE I BOUNDARY - 509.09 AC. +/-
  PHASE II BOUNDARY - 397.86 AC. +/-



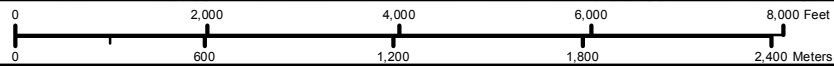
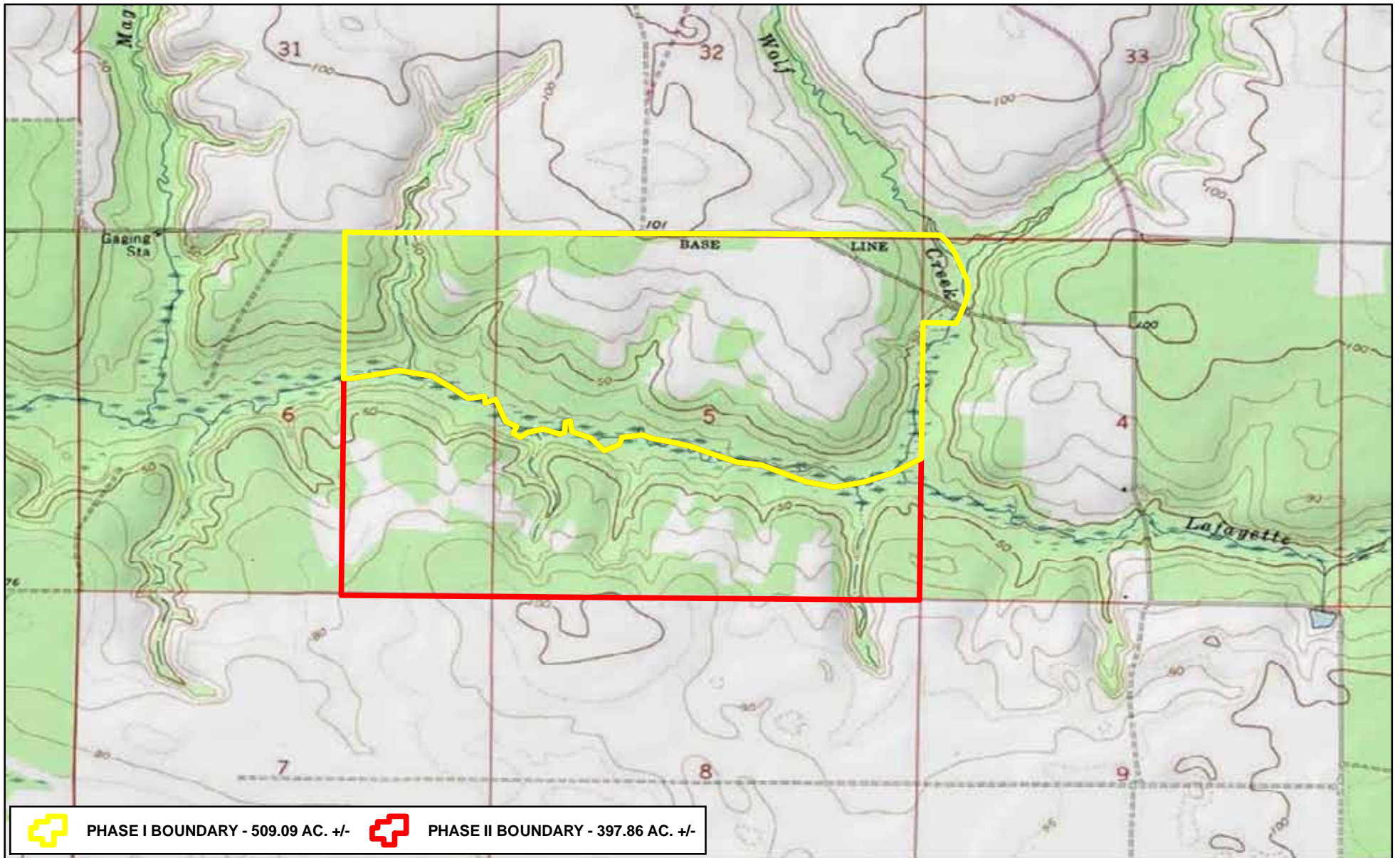
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**Figure 1 - Location Map**  
**Lafayette Creek**  
**Walton County, Florida**



Image: BING MAPS  
 Sec 4, 5 and 6  
 Twp 01 S  
 Rng 18 W

	
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## Figure 2 - USGS Quadrangle Map

Lafayette Creek  
Walton County, Florida



Image: BING MAPS  
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Twp 01 S  
Rng 18 W



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Although aerial signatures on historic photographs show some evidence of fire suppression as early as 1956, open-canopy, upland forests are still dominant at this period. Fire was effectively excluded from wetlands and non-sandhill uplands following more recent installation of firebreaks. Fire suppression and augmentation with slash pine appears to be the primary cause of shifts in plant community structure and boundaries. However, a recent winter burn from the upland into the periphery of the wetlands has reduced shrub cover in some areas.

FLUCCS was primarily used to define and map the site’s ecological communities. The FLUCCS method was designed by FDOT as a way to develop a unified land use classification system for all land cover and plant communities found throughout Florida. Cardno ENTRIX conducted field surveys of the Phases I and II portions of the mitigation area in order to aerially delineate the current limits of the wetland and upland vegetative communities and land uses. These communities are delineated in **Figures 3A** and **3B**.

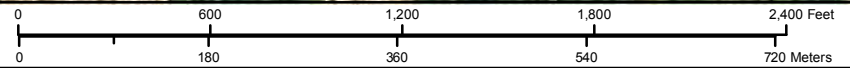
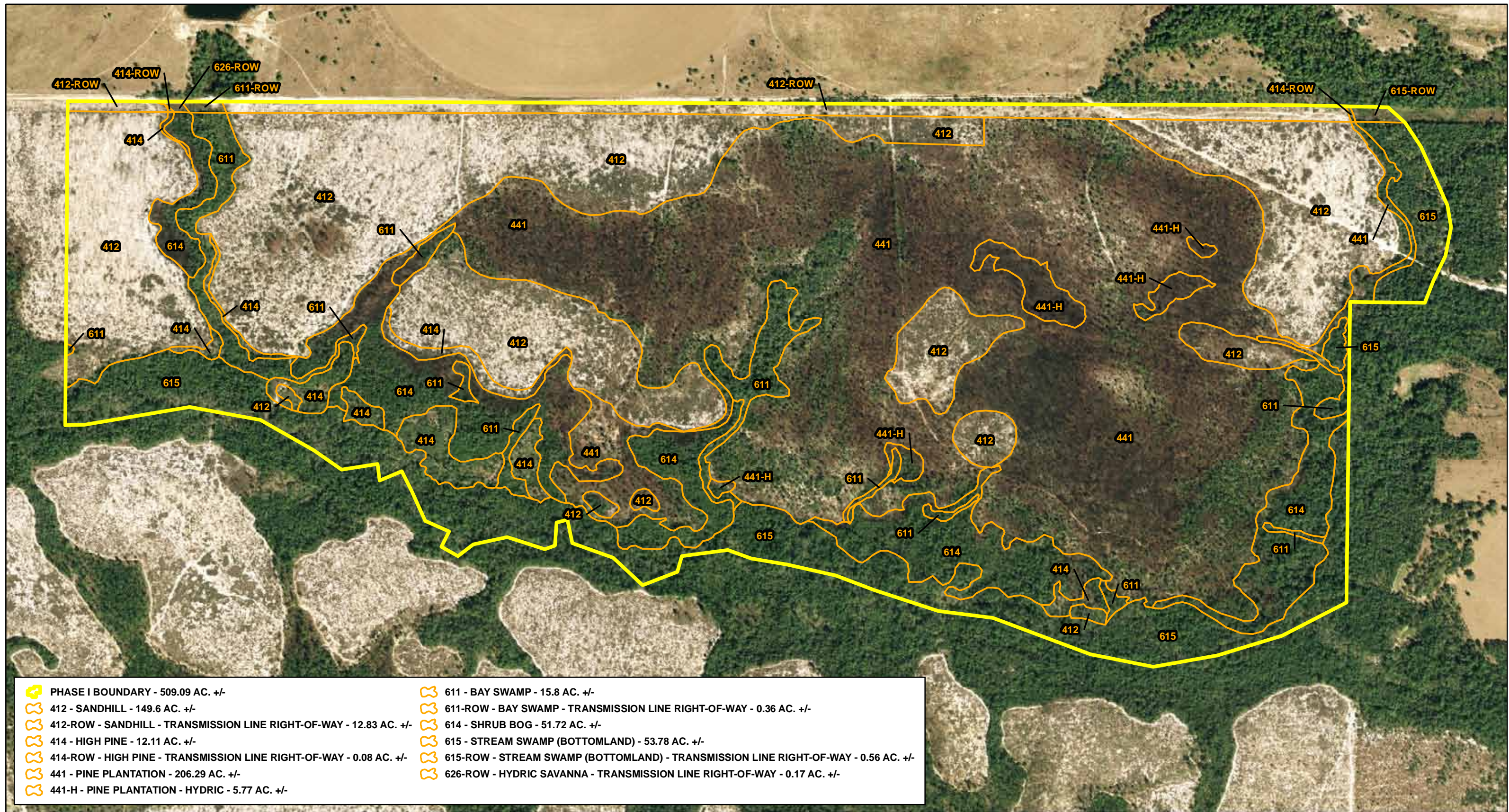
Cardno ENTRIX used high-resolution infrared photography, 1956 and 2010 aerial photography, NRCS soil survey maps, and field ground-truthing to determine the current and historic plant community limits, structure, and composition. A summary of observed vegetative communities is included in **Table 1**. A brief description of the species composition and structure found within each community is also provided in this plan. A complete list of observed plant and wildlife species is provided in **Appendices A** and **B**. A series of site photographs is provided as **Appendix C**.

**Table 1.** Summary of Current Phases I and II Community Acreages on the Lafayette Creek Property.

FLUCCS Code	FLUCCS Community	Wetland	Acreage
<b>Phase I (509.09 Acres)</b>			
412	Sandhill	No	149.6
412 ROW	Sandhill Transmission Line Right-of-Way	No	12.83
414	High Pine	No	12.11
414 ROW	High Pine Transmission Line Right-of-Way	No	0.08
441	Pine Plantation	No	206.29
441H	Pine Plantation - Hydric	Yes	5.77
611	Bay Swamp	Yes	15.8
611 ROW	Bay Swamp Transmission Line Right-of-Way	Yes	0.36
614	Shrub Bog	Yes	51.72
615	Bottomland/Floodplain Swamp/ Stream Swamp	Yes	53.78
615 ROW	Bottomland/Floodplain Swamp Transmission Line Right-of-Way	Yes	0.56
626 ROW	Hydric Savanna Transmission Line Right-of-Way	Yes	0.17
<b>Phase II (397.86 Acres)</b>			
412	Sandhill	No	225.63
414	High Pine	No	13.21
441	Pine Plantation	No	68.39
441H	Pine Plantation - Hydric	Yes	13.43
611	Bay Swamp	Yes	25.02
614	Shrub Bog	Yes	24.55
615	Bottomland/Floodplain Swamp/ Stream Swamp	Yes	27.62
<b>TOTAL WETLAND ACREAGE</b>			<b>218.78</b>
<b>TOTAL UPLAND ACREAGE</b>			<b>688.14</b>

**Sandhill (FLUCCS 412)/FNAI Sandhill, 375.23 Acres**

This upland plant community is found on the highest and most well drained ridges and knolls throughout the mitigation area. The fine and medium fuel load is low to moderate. The canopy is sparse when present and can consist of longleaf pine, which would have been the historic canopy species, slash pine, or sand pine (*P. clausa*). Grass and intermediate stage longleaf pine seedlings are present throughout this plant community. Sapling sand pine is also found in this community, although they are uncommon. Tall



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**Figure 3A - Current FLUCCS Map Phase I**

Lafayette Creek  
Walton County, Florida



Image: 2007  
Sec 4, 5 and 6  
Twp 01 S  
Rng 18 W

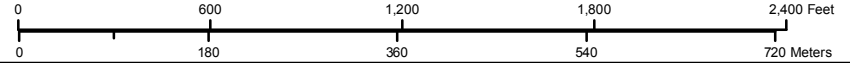
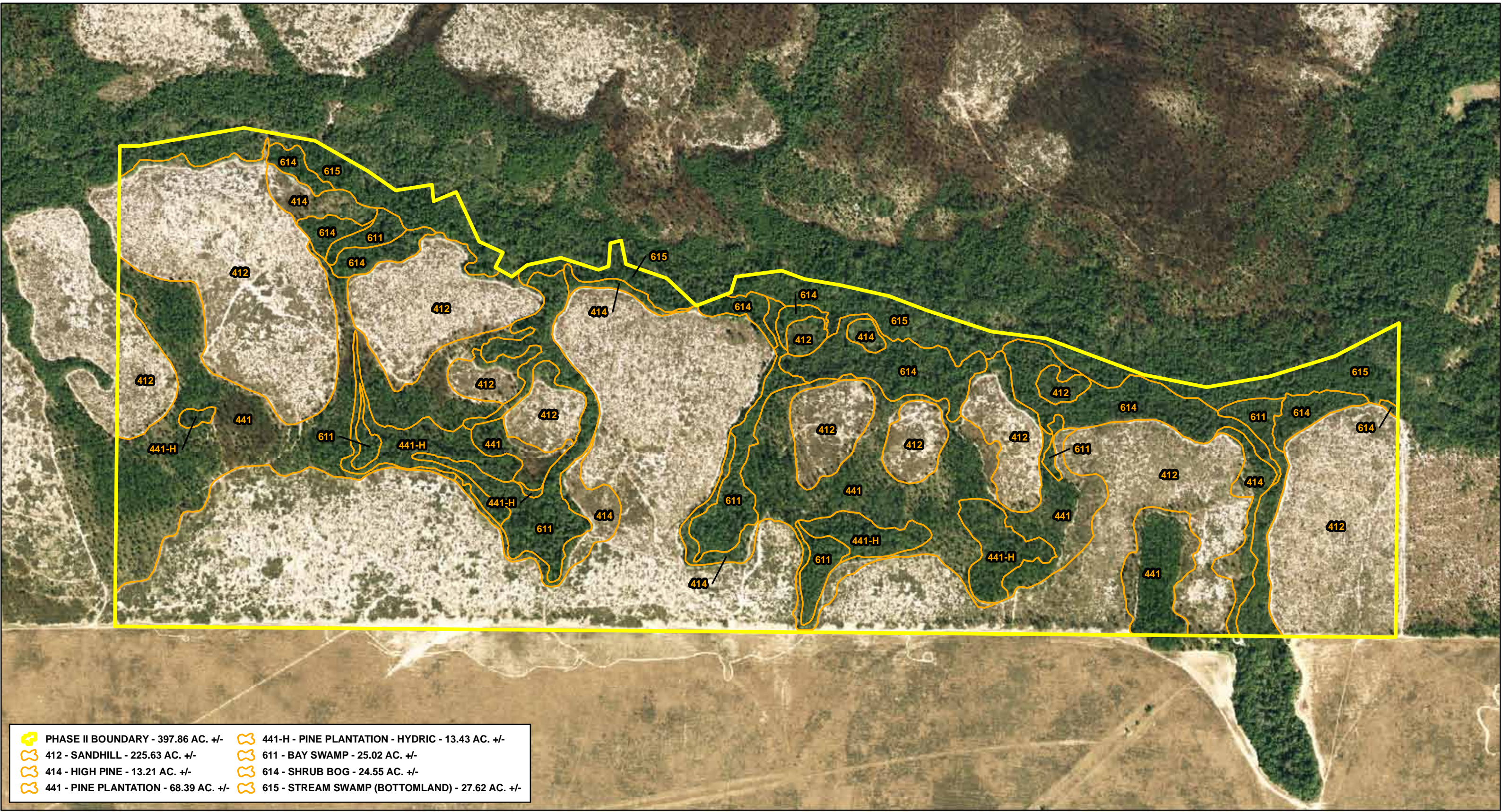
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**Figure 3B - Current FLUCCS Map Phase II**  
 Lafayette Creek  
 Walton County, Florida

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(4-6 foot) shrubs are sparse and may include typical sandhill oak species such as sand live oak (*Quercus geminata*), turkey oak (*Q. laevis*), and bluejack oak (*Q. incana*), as well as yaupon (*Ilex vomitoria*) and (*Diospyros virginiana*). Short shrub cover ranges from moderate to dense and consists of scattered saw palmetto (*Serenoa repens*), Adam's needle (*Yucca filamentosa*), gopher apple (*Licania michauxii*), sand live oak, and eastern prickly pear (*Opuntia humifusa*). The herbaceous layer is sparse to moderately dense. Wiregrass (*Aristida stricta*) can comprise from 5-60 % of an area. Other common herbaceous species encountered include buckwheat (*Eriogonum tomentosum*), cottony goldenaster (*Chrysopsis gossypina*), woody goldenrod (*Chrysoma pauciflorescens*), spurge nettle (*Cnidioscolus stimulosus*), sandyfield beaksedge (*Rhynchospora megalocarpa*), pine barren stitchwort (*Minuartia caroliniana*), aniscented goldenrod (*Solidago odora*), baptisia (*Baptisia lancifolia*), broomsedge bluestem (*Andropogon virginicus*), Elliott's bluestem (*A. gyrans*), lady lupine (*Lupinus villosus*), capillary hairsedge (*Bulbostylis ciliatifolia*), hairyflower spiderwort (*Tradescantia hirsutiflora*), fringed bluestar (*Amsonia ciliata*), narrowleaf silkgrass (*Pityopsis graminifolia*), Greater Florida spurge (*Euphorbia floridana*), wire sedge (*Carex tenax*), and coastalplain honeycombhead (*Balduina angustifolia*). Patches of exposed sand are common and can comprise up to 60% of an area.

#### Sandhill Transmission Line Right-of-Way (FLUCCS 412ROW)/FNAI Sandhill, 12.83 Acres

This upland plant community occurs along the northern boundary of Phase I and is located on the highest and most well drained ridges and knolls within ROW. ROW appears to be routinely maintained through mowing and is absent of tall vegetation. Aside from the absence of a pine canopy this community is similar in structure and composition to the adjacent FLUCCS 412 plant community designations.

#### High Pine (FLUCCS 414)/FNAI Upland Pine, 25.32 Acres

This upland plant community is found in large gently sloping upland areas and within broad wedges at the heads of drainage channels. This community can intergrade with the FLUCCS 412 units. The majority of this community was burned the previous winter and fuel load is currently low to moderate. This community contains a sparse to dense canopy dominated by slash pine, with occasional mature and sapling longleaf pine and very rare Pond pine (*P. serotina*) near some wetlands. Pockets of fire suppression mediated, dense, slash pine regeneration are also present. This community supports a dense herbaceous layer dominated by bracken fern (*Pteridium aquilinum*) with sparse wire grass in some areas and sparse to moderate wiregrass without bracken fern in others. Tall shrubs are uncommon but can be present in dense patches and include yaupon and, along the wetland edge, encroaching titi (*Cliftonia monophylla* and *Cyrilla racemiflora*). The short shrub stratum is sparse to moderate and typically includes yaupon, dwarf live oak (*Q. minima*), running oak (*Q. pumila*), wax myrtle (*Myrica cerifera*), saw palmetto (*Serenoa repens*), dwarf huckleberry (*Gaylussacia dumosa*), blue huckleberry (*Gaylussacia frondosa*), ink gallberry (*Ilex glabra*), and shiny blueberry (*Vaccinium myrsinites*). Aside from wiregrass and bracken fern common herbaceous species include dense-spike blackroot (*Pterocaulon pycnostachyum*), Carolina yelloweyed grass (*Xyris caroliniana*), tall jointweed (*Polygonella gracilis*), October flower (*Polygonella polygama*), vanillaleaf (*Carphephorus odoratissimus*), broomsedge bluestem, cypress panicgrass (*Dichanthelium ensifolium*), rayless sunflower (*Helianthus radula*), comfortroot (*Hibiscus aculeatus*), and queendevil (*Hieracium gronovii*).

#### High Pine Transmission Line Right-of-Way (FLUCCS 414ROW)/FNAI Upland Pine, 0.08 Acre

This upland plant community is found on the highest and most well drained ridges and knolls within the ROW. ROW appears to be routinely maintained through mowing and is absent of tall vegetation. Aside from the absence of a pine canopy this community is similar in structure and composition to the adjacent FLUCCS 414 plant community designations.

Pine Plantation (FLUCCS 441)/FNAI Pine Plantation, 274.68 Acres

This upland plant community is found in large gently sloping upland areas, within broad wedges at the heads of drainage channels, and on the highest knolls within the mitigation area. The species may include high pine FLUCCS 414 dominants or, in fewer cases, longleaf/xeric Oak dominants. The majority of this community was burned the previous winter and fuel load is currently low to moderate. This community contains a moderate to dense canopy dominated by slash pine, which was extensively aerially seeded or planted for silviculture, with occasional mature and sapling longleaf pine. Pockets of fire suppression mediated, dense slash pine regeneration are also present. This community supports a dense herbaceous layer dominated by bracken fern with sparse wire grass in some areas and sparse to moderate wiregrass without bracken fern in others. Tall shrubs can be present in dense patches and include sandhill oak species such as sand live oak, turkey oak, and bluejack oak, yaupon and American persimmon (*Diospyros virginiana*), and, along the wetland edge, encroaching titi. The short shrub stratum is sparse to moderate and typically includes yaupon holly, dwarf live oak, running oak, wax myrtle, saw palmetto, dwarf huckleberry, blue huckleberry, ink gallberry, and shiny blueberry. Wiregrass or bracken fern can comprise from 5-80 % of an area. Aside from wiregrass and bracken fern common herbaceous species include dense-spike blackroot, Carolina yelloweyed grass, tall jointweed, October flower, vanillaleaf, broomsedge bluestem, cypress panicgrass, rayless sunflower, comfortroot, and queendevil.

Pine Plantation-Hydric (FLUCCS 441H)/FNAI Pine Plantation, 19.20 Acres

This wetland plant community can be found along the boundary of uplands and floodplain wetlands as well as in depressions within FLUCCS 414 units. The substrate ranges from sandy surface texture to having a substantial thickness of muck/mucky mineral soil. In fire suppressed portions a thick duff/root layer is present above the mineral surface. This community was historically hydric pine savannah/seepage slopes (FLUCCS 626) and much of the natural vegetation remains intact, except in areas that have been subjected to long fire exclusion. Fine and medium fuel load is moderate to high and areas that are not significantly invaded by titi were recently burned the previous winter. Three variants of this community designation are present at the site and the foundation for the ecological distinction between the first two lies in the edaphic and hydrologic characteristics. The third is distinguished by physiognomic structure.

The first variant is found on sandy substrate and generally within uplands (FLUCCS 414). These areas are shallow, sometimes sloping (FNAI seepage slopes), depressions that support an open herbaceous stratum dominated by wiregrass. The canopy, when present, is sparse and is composed of 5-60-foot slash pine, pond pine, and occasionally longleaf pine. The shrub layer is sparse to moderate and consists of scattered titi. In the lowest areas, 4-7-foot tall isolated titi dominated bogs are present but uncommon. Short shrub cover is also sparse to moderate and includes tall shrub species as well as large gallberry (*Ilex coriacea*), hairy huckleberry (*Gaylussacia mosieri*), ink gallberry, wax myrtle (*Myrica heterophylla*), and red chokeberry (*Photinia pyrifolia*). The herbaceous layer is moderate to dense and wiregrass is the dominant species. Other characteristic herbaceous species include white-top pitcher plant (*Sarracenia leucophylla*; state-listed Endangered), purple pitcher plant (*S. purpurea*; state-listed Threatened), parrot pitcher plant (*S. psittacina*; state-listed Threatened), coastal false asphodel (*Tofieldia racemosa*), flypoison (*Amianthium muscaetoxicum*), dwarf sundew (*Drosera brevifolia*), thread-leaved sundew (*Drosera filiformis*), hatpins (*Eriocaulon compressum*), and tenangle pipewort (*E. decangulare*), early whitetop fleabane (*Erigeron vernus*), variable leaved sunflower (*Helianthus heterophyllus*), goldencrest (*Lophiola aurea*), foxtail clubmoss (*Lycopodiella alopecuroides*), whitehead bogbutton (*Lachnocaulon anceps*), Small's bogbutton (*L. minus*), redroot (*Lachnanthes caroliniana*), woolly witchgrass (*Dichanthelium scabriusculum*), loosehead beaksedge (*Rhync*

*hospora chalarocephala*), woolly sunbonnets (*Chaptalia tomentosa*), one-flower honeycombhead (*Balduina uniflora*), pale meadowbeauty (*Rhexia mariana*), savanna meadowbeauty (*R. alifanus*), maid marian (*R. nashii*), Nuttall's meadowbeauty (*R. nuttallii*), cypress panicgrass, pineland yelloweyed grass (*Xyris stricta*), bog white violet (*Viola lanceolata*), tuberous grasspink (*Calopogon tuberosus*), and fringed beaksedge (*Rhynchospora ciliaris*).

The second variant is found on muck or mucky mineral substrate and is generally located on the upper edges of stream floodplains. It can comprise large areas on the upper edge of the Lafayette and Wolf Creek floodplains or can be associated with the smaller seepage stream floodplains. Along the small seepage streams it may intergrade with bay swamp (FLUCCS 611). This second type constitutes the majority of the FLUCCS 626 designation at the site. The hydrology of this community is driven by seepage from the surrounding uplands. The canopy is sparse and typically includes pond pine, slash pine, or sweetbay. The shrub layer is dominated by moderate to dense black titi and gallberry that ranges from 4-20 feet tall as a result of fire exclusion. The herbaceous stratum is very sparse where these shrub species are dense and patches of remnant vegetation can still be found in open areas. Throughout these areas the state endangered species whitetop pitcher plant and the state threatened species Gulf purple pitcher plant (*Sarracenia rosea*) are common although generally vegetative and frail due to limited light availability. Patches of wiregrass can also be found in gaps within this community type. In areas that exhibit the longest hydroperiods the state-threatened species coastalplain beaksedge (*Rhynchospora stenophylla*) becomes dominant. Other species that are commonly associated with the coastalplain beaksedge dominated areas are hatpins, beaksedge (*Rhynchospora chalarocephala* and *R. fascicularis*), dwarf sundew, Georgia Indian plantain (*Arnoglossum sulcatum*), and sphagnum moss (*Sphagnum* spp.). The state threatened species water sundew (*Drosera intermedia*) is also found in this variant of the FLUCCS 626 type.

The third and least common variant of this community designation is dominated by hydrophytic shrub species other than black titi and titi and is also found along upland and wetland ecotones. It may result from fire exclusion in hydric pine savanna and is most likely of natural origin. Medium fuel load is moderate to high and generally a thick duff layer is present. The canopy is sparse and is comprised of 5-60-foot slash pine and, occasionally, longleaf pine or pond pine. The tall shrub layer is sparse to moderate and consists of titi, sweetbay (*Magnolia virginiana*), and yaupon. The short shrub layer is moderate to dense and is dominated by large gallberry, red bay (*Persea palustris*), Elliott's blueberry (*V. elliotii*), highbush blueberry (*V. corymbosum*), gallberry (*Ilex glabra*), sweet pepper bush (*Clethra alnifolia*), and fetterbush (*Lyonia lucida*). Herbaceous species are sparse and may include wiregrass, whitehead bogbutton, cypress panicgrass, and redroot.

#### Bay Swamp (FLUCCS 611)/FNAI Bay Swamp, 40.82 Acres

This community designation includes forested slopes and bottomlands within depressions and along small deeply cut tributaries to Lafayette creek where sweetbay is dominant in the canopy. This community type may also include historically open savanna areas that have been subjected to fire exclusion but are not dominated by titi, but it is often present. The sparse to dense canopy consists of sweetbay, pond pine, slash pine, tulip poplar (*Liriodendron tulipifera*), and water oak (*Q. nigra*). The steep topography along small drains within this community create hydrologic variability within this concept; mesophytic species may be prevalent on slopes while hydrophytic species will be predominate along the creek channels. The tall shrub layer is sparse to dense, consists of titi, and can range from 3-15 feet in height. The short shrub layer is 1-6 feet tall and is composed of a mixture of large gallberry, fetterbush, doghobble (*Leucothoe axillaris*), and sweet pepper bush. The herbaceous stratum is sparse to moderate and typically includes giant cane (*Arundinaria gigantea*), royal fern (*Osmunda regalis* var. *spectabilis*), Virginia chain fern

(*Woodwardia virginica*), cinnamon fern (*Osmunda cinnamomea*), clustered sedge (*Carex glaucescens*), and beaksedge. In some areas, species typical of open hydric habitats such as Coastalplain beaksedge, hatpins, beaksedge, dwarf sundew, Georgia Indian plantain, and sphagnum moss are present. This species assemblage can intergrade with hydric pine savanna (FLUCCS 626).

Within this community type are small inclusions of upland hardwood forests on the slopes. These areas have a similar canopy species composition along with slippery elm (*Ulmus rubra*), American snowbell (*Styrax americana*), and American hornbeam (*Carpinus caroliniana*) with a dense tall shrub stratum dominated by the state threatened species mountain laurel (*Kalmia latifolia*) and Florida anise (*Illicium floridanum*) in and near wetter areas. These areas are too small in size to delineate as unique polygons.

This community also encompasses many seepage streams. Although these streams are much smaller than Lafayette and Wolf Creeks and are driven by seepage from surrounding well drained uplands, some of the larger ones may be perennial. A few steephead perennial streams are also present. These small tributaries are also characterized by a narrow channel and occur in predominately wetland portions, but at least a few have some upland eroded channels. The small tributaries support higher species richness than the larger blackwater streams within the channels. Some examples of herbaceous species commonly found in these streams include primrose butterwort (*Pinguicula primuliflora*), green arrow arum (*Peltandra virginica*), Georgia Indian plantain, and lillies (*Hymenocallis* sp.) as well as other wetland herbs common throughout the site such as royal fern, Virginia chain fern, cinnamon fern, clustered sedge (*Carex glaucescens*), hatpins, primrose-leaf violet (*Viola primuliflora*), and sphagnum moss.

#### Bay Swamp Transmission Line Right-of-way (FLUCCS 611ROW)/FNAI Utility Corridor 0.36 Acre

This community designation is a small open herbaceous wetland border within the maintained ROW. It is adjacent to forested bay swamp (FLUCCS 611). A small tributary to Lafayette Creek runs through the center of it. No canopy is present and the shrub strata is 1-5 feet tall and includes hazel alder (*Alnus serrulata*), sweetbay, large gallberry, buttonbush, wax myrtle (*Myrica cerifera*), bedstraw St. Johnswort (*Hypericum galioides*), fetterbush, possumhaw (*Viburnum nudum*), myrtleleaf St. Johnswort (*Hypericum fascicularis*), sawtooth blackberry (*Rubus argutus*), and titi. The herbaceous stratum is dense and common species include coastalplain beaksedge, beaksedge, fascicled beaksedge, manyhead rush (*Juncus polycephalus*), needlepod rush (*J. scirpoides*), poverty rush (*J. tenuis*), Canadian rush (*J. canadensis*), roundhead rush (*J. validus*), Mohr's thoroughwort (*Eupatorium mohrii*), taperleaf water horehound (*Lycopus rubellus*), Virginia chainfern, bullrush (*Typha latifolia*), bushy bluestem (*Andropogon glomeratus*), shortleaf yelloweyed grass (*Xyris brevifolia*), dwarf sundew, pale meadowbeauty, hatpins, woolly witchgrass, foxtail clubmoss, southern waxy sedge (*Carex glaucescens*), prickly bog sedge (*C. atlantica*), stinking camphorweed (*Pluchea foetida*), cinnamon fern, royal fern, sugarcane plumegrass (*Saccharum giganteum*), and sphagnum moss.

#### Shrub Bog (FLUCCS 614)/FNAI Shrub Bog, 76.27 Acres

This vegetative assemblage occupies historic hydric pine savanna along the transitions between uplands and floodplain wetlands and along small Lafayette Creek tributaries as well as large portions of the Lafayette and Wolf Creeks floodplains that are influenced by both seepage and overbank flow. In areas that historically supported a hydric pine savanna (FLUCCS 626) the current structure has developed as a result of a reduction in the historic fire return interval. In areas within the floodplain it is most likely of natural origin. The canopy is generally sparse and typically includes scattered sweetbay, tulip popular, slash pine, pond pine, and red maple (*Acer rubrum*). The dense tall shrub layer can range from 4-30 feet and is primarily comprised of black titi with occasional red titi. Light availability is very limited and subsequently short shrub and herbaceous species cover is generally sparse. Short shrub cover may

include sweet pepper bush, wax myrtle, swamp bayberry, large gallberry, ink gallberry, hairy huckleberry, and fetterbush. Herbaceous cover includes scattered wiregrass, *Sarracenia* species, and hatpins in shrub-invaded hydric pine savanna and where titi was the historic canopy/tall shrub species the herbaceous stratum is dominated by darkgreen sedge (*Carex venusta*), pine barren sedge (*Carex turgescens*), virginia chain fern, and cinnamon fern in areas that were naturally dominated by black titi adjacent to the FLUCCS 615 community designation

#### Stream Swamp (Bottomland; FLUCCS 615)/FNAI Bottomland Hardwood Forest, 81.4 Acres

This wetland plant community occurs along the floodplain of Lafayette and Wolf Creeks on mucky and mucky mineral soils. This community is typified by a 40-60-foot moderate to dense canopy of tulip poplar, sweetbay, pond cypress (*Taxodium ascendens*), swamp cypress (*T. distichum*), water oak, swamp laurel oak (*Q. laurifolia*), swamp tupelo (*Nyssa biflora*), and red maple. Portions of the floodplain dominated by tulip poplar and sweetbay that show evidence of overbank flow typically display very short-term inundation while those dominated by cypress and swamp tupelo exhibit longer periods of standing water, often even after the creek flow has returned to the channel. The swamps back from the immediate stream bank probably are more driven hydrologically by water from the upland seepage—long-term saturation—than overbank flow. Trees are young and few old specimens were seen. Slash pine is a component of the canopy in some areas but it is found on hummocks. Recruitment of cypress and other canopy species is low. Tall shrubs are generally sparse and this strata is dominated by black and red titi. In some areas tall shrubs, primarily black titi, become dominant with heights ranging from 20-30 feet creating a low, closed canopy. These titi-dominated areas are also underlain by muck and mucky mineral soil. Short shrub cover is sparse to moderate and ranges from 1-4 feet tall. Characteristic short shrub species include doghobble, fetterbush, highbush blueberry, Virginia willow (*Itea virginica*), wax myrtle, swamp azalea (*Rhododendron viscosum*), large gallberry, myrtleleaf St. Johnswort, and sweet pepper bush. Although herbaceous cover is generally sparse, it can be found in dense in patches throughout. Characteristic herbaceous species include royal fern, Virginia chain fern, cinnamon fern, clustered sedge, green arrow arum, and primrose leaved violet.

This community designation encompasses the two largest streams within the assessment area, Wolf Creek and Lafayette Creek. In some areas a small levee is present between the floodplain and the creek. These features are low, narrow and were not mapped separately from the floodplain swamp. The sandy levee soils support a mixture of upland and wetland plant species. Water oak and sweetbay are the dominant canopy species and the 1-6-foot tall shrub layer consists of red titi, silk bay (*Persea palustris*), large gallberry, sparkleberry (*Vaccinium arboreum*), wild olive (*Osmanthus americanus*), holly (*Ilex opaca*), shiny blueberry (*Vaccinium myrsinites*), deer berry (*V. stamineum*), and St. Andrews cross (*Hypericum hypericoides*). The Florida endangered shrub species stewartia (*Stewartia malcodendron*) was also present in this community type. The herbaceous layer is dominated by slender woodoats (*Chasmanthium laxum*), sandyfield beaksedge, twinberry (*Mitchella repens*), broomsedge bluestem, and bracken fern.

#### Stream Swamp (Bottomland) Transmission Line ROW (FLUCCS 615ROW)/FNAI Utility Corridor, 0.56 Acre

This wetland plant community occurs along the floodplain of Wolf Creek within the maintained transmission line ROW on mucky and mucky mineral soils. Tall shrubs are sparse and this strata is dominated by black titi and red titi. Short shrub cover is sparse to moderate and ranges from 1-4 feet tall. Characteristic short shrub species include doghobble, fetterbush, highbush blueberry, Virginia willow, wax myrtle, swamp azalea, large gallberry, myrtleleaf St. Johnswort, and sweet pepper bush. Herbaceous cover is dense and coastalplain beaksedge is the dominant species. Other characteristic herbaceous

species include hatpins, royal fern, Virginia chain fern, cinnamon fern, clustered sedge (*Carex glaucescens*), green arrow arum, and primrose leaved violet.

#### Hydric Pine Savanna Transmission Line ROW (FLUCCS 626ROW)/FNAI Utility Corridor, 0.17 Acre

This wetland plant community occurs within the maintained ROW along the northern limits of Phase I. ROW appears to be routinely maintained through mowing and is absent of tall vegetation. Aside from the absence of canopy species this community is similar in structure and composition to the adjacent FLUCCS 614 plant community designation to the immediate south.

#### Streams

Although not broken out as specific polygons, the streams on site form a remarkable community that represents the epitome of northwest Florida water resources. All streams were low in turbidity, some slightly colored (drought), and others crystal clear. The largest stream on site is Lafayette Creek, which is perennial and predominately blackwater, although substantial ground water seepage supporting stream flow is produced from adjacent clear water tributaries that feed it. As noted above, the deep muck soils along the flood plain of much of Lafayette Creek is supported by ground water seepage from surrounding well drained soils that in places come right to the edge of the floodplains. Over-bank flow, while evident, is of short duration except in the limited areas dominated by cypress. Lafayette Creek arises east of the Phases I and II site and flows to the west along and forming the southern boundary of the Phase I area and the northern boundary of phase II. Wolf Creek, a tributary stream to Lafayette Creek, is also perennial but less blackwater than Lafayette Creek because of extensive contribution from direct seepage and from seepage tributaries off site to the north. Wolf Creek arises north of the site and flows to the south along and forming the eastern boundary of the Phase I area. Aquatic plant species seen within the perennial streams include creeping rush (*Juncus repens*), wild celery (*Vallisneria americana*), and waterhead pondweed (*Potamogeton diversifolius*).

Numerous small seepage streams are present and, based upon the extent of water present during the inspections, most flow year round except during droughts. Higher rain fall periods are likely to induce flow in areas that are now only saturated, thus during these periods many small intermittent stream are likely to occur within the wetlands near the larger streams. Of specific note is the presence of several steephead ravines on site. The largest, which arises off site to the south and flows northward to Lafayette Creek, includes a substantial (for Florida) water fall (Riclan Falls) just prior to entering the larger creek floodplain. The actual spring head is on off-site lands. Steepheads are Florida's unique spring fed streams that result from deep drainage from the surficial aquifer by a spring vent at the bottom of the upper end of the ravine. Unlike typical ravines, they are not induced by surficial erosion but rather through the action of the spring head slowly removing sand from below the wall of the ravine. Water in steephead ravine streams is perennial, clear, and cool resulting in an aquatic habitat that supports aquatic life forms that are often more associated with southern Appalachian streams than typical Florida swamp fed systems. At least three smaller steephead streams were noted actually arising on the Phase I and Phase II site.

#### **4.0 LISTED SPECIES**

All incidental listed wildlife and botanical observations were recorded. These surveys were conducted concurrently with habitat mapping and overall site assessments. Prior to initiating field work, Cardno ENTRIX obtained information from the FNAI and Florida Fish and Wildlife Conservation Commission (FFWCC) databases of known listed and rare species occurrences within the project vicinity. Focus was given on identification of these species as well as other species known to occur locally. Seven rare plant species were found during this survey and no rare animal species were encountered. Hairy Florida wild

indigo (*Baptisia calycosa* var. *villosa*; state-listed Threatened) and yellowroot (*Xanthorhiza simplicissima*; state-listed Endangered) were reported by NFWFMD staff to occur within the site but were not seen during this survey.

White-top pitcher plant (*Sarracenia leucophylla*; state-listed Endangered); OBL (FDEP); OBL (NWI)

This herbaceous species is a southeastern coastal plain endemic. Its range extends from North Carolina south to the Florida Panhandle and west to the Gulf Coast of Mississippi. Within Florida it is known from ten counties west of the Big Bend region. This species is distinguished by its 1-3-foot tall, erect, “pitcher-like” modified leaves that are distinctively white infused with red toward the apex/hood. The modified leaf shape is utilized in acidic, nutrient-poor environments to acquire energy for growth through the capture of insects that fall in and are digested by enzymes in the base of the tube. The flowers are deep maroon and may be present throughout the spring and summer.

At Lafayette Creek this species is the most common of the listed species encountered. It is found in open sandy or mucky substrate throughout the FLUCCS 626 and 611 community designations. Generally it was seen in large colonies of up to 100 plants where light availability was high and groundcover was species rich; however, in areas where titi invasion has significantly shaded the understory these plants were present in groups of 1-3 individuals that often were not producing “pitchers” most likely due to light deficiency. The restoration of these community types will increase light availability for and encourage pollinator visitation to this species.

Parrot pitcher plant (*S. psittacina*; state-listed Threatened); OBL (FDEP); OBL (NWI)

This herbaceous species is a southeaster coastal plain endemic. Its range extends from southern Georgia south to the North Florida and west to the Gulf Coast of Louisiana with one disjunct population in central Louisiana. Within Florida it is known from 17 counties, two of which are on the Atlantic Coast (Nassau and Baker) and the other 15 are west of Tallahassee within the Florida Panhandle. This species is distinguished by its small green with red venation to red “pitcher-like” modified leaves that are distinguished by a red and white infused globose, or balloon shaped, hood resulting from the fusion of the hood margins. The modified leaf shape is utilized in acidic, nutrient poor environments to acquire energy for growth through the capture of insects that fall in and are digested by enzymes in the base of the tube. The flowers are light green to deep maroon and may be present throughout the spring and summer.

At Lafayette Creek this species is not common. It is found in sandy substrate and was seen in the two isolated FLUCCS 626 units within the Phase I portion of the property. These areas support high species richness and cover and are still open. Wiregrass cover is also moderate to high in these areas. Two to three reproductive individuals were seen within this area. With continued fire management and minimal mechanical clearing this species will persist and may eventually re-colonize or rebound from dormant rootstock in other sandy variant FLUCCS 626 restoration areas.

Gulf purple pitcher plant (*S. rosea*; state-listed Threatened); OBL (FDEP); OBL (NWI)

This herbaceous species is a southeastern coastal plain endemic. Its range extends from southern Georgia south to the Florida Panhandle and west to the Gulf Coast of Mississippi. Within Florida it is know from 10 counties west of the Big Bend region. This species is distinguished by its purple to green with purple venation “pitcher-like” modified leaves that are decumbent, or lay horizontally on the ground gently rising toward the apex/hood. The modified leaf shape is utilized in acidic, nutrient poor environments to acquire energy for growth through the capture of insects that fall in and are digested by enzymes in the base of the tube. The flowers are can range from light green with reddish bracts to lavender purple with maroon bracts and may be present throughout the spring and summer.



At Lafayette Creek this species was uncommon, often seen alone or in groups of two or three. It is found in the mucky variant of the FLUCCS 626 plant community designation. Shading and decreased species richness due to black titi encroachment was the most prevalent habitat impact and was a factor in every population that was located during the survey. The restoration of this community type will increase light availability for and encourage pollinator visitation to this species.

Coastalplain beaksedge (*Rhynchospora stenophylla*; state-listed Threatened); OBL (FDEP); FACW (NWI)

This herbaceous species is a southeastern endemic. Its range extends from North Carolina, with a disjunct population in southeastern Virginia, south to the Florida Panhandle and Big Bend region and west to eastern Texas. Within Florida this species is found in 12 counties within the Panhandle and Big Bend regions. This member of the sedge family is distinguished by long wiry leaves and a lax inflorescence supporting 2-7 solitary achenes. Each 1.5-3 mm long transversely roughened (rugose) achene is subtended by numerous upwardly barbed bristles that extend beyond the tubercle, or triangular shaped structure at the apex of the achene.

At Lafayette Creek it was common in deep organic, permanently saturated soils generally associated with seepage systems. In open areas it was the dominant herbaceous species and was always found in association with *Sphagnum* spp. Often this species was found in association with other listed species such as white-top pitcher plant, Gulf purple pitcher plant, and spoonleaf sundew. This species also serves the same ecological function as wiregrass, in areas that are too wet for wiregrass survival, by providing a dense source of fine fuel for fire. Areas that exhibit titi encroachment along seepage streams that have this species in the herb stratum were historically open, as this species requires high light availability and is an indicator of frequent fire, or, in the case of the Transmission ROW, mechanical clearing. By mechanically removing shrubs and instituting prescribed fire in the muck variant of FLUCCS 626 and allowing fire to burn through the FLUCCS 611 community designation the habitat for this species will be expanded.

Water Sundew (*Drosera intermedia*; state-listed Threatened); OBL (FDEP); OBL (NWI)

This herbaceous species is found throughout the eastern United States and Canada and a disjunct occurrence is known from one county in Idaho. Within Florida this species is found in 21 counties scattered throughout North Florida, Central Florida, and the Florida Panhandle. It is distinguished by reddish, spoon-shaped leaves that are present all the way up the stem (cauline) as opposed to being restricted to the base (scapose) as is seen in other members of this genus. These leaves have a glabrous (hairless) petiole and the blade is covered with gland tipped hairs. These hairs are used to catch insects that are then digested with enzymes in the glands to provide a source of energy in acidic/nutrient poor environments.

At Lafayette Creek this species was found in one location within the bay swamp (FLUCCS 611) community designation in deep organic, permanently saturated muck associated with a seepage system.

Stewartia (*Stewartia malcodendron*; state-listed Endangered)

This small shrub species is found throughout the southeastern United States. Its range extends from Virginia south to the Florida Panhandle and west to Texas. Within Florida this species is found in 10 counties in the Panhandle. It is distinguished vegetatively by elliptic, deciduous leaves that are slightly lighter green on the underside. The leaves are minutely serrate along the upper three-quarters of the margin. The lower surface and leaf margins are covered with sparse soft white hairs. The buds are protected by two scales that are covered with the same soft white pubescence. The twigs are a light to

dark reddish brown and new growth is covered with hairs. The flowers are solitary, arising from the leaf axils, with five white petals subtending numerous stamens with purple anthers and a pubescent ovary in the center. The fruits are a 1-2 cm wide woody capsule containing 2-4 purplish to reddish brown seeds. The flowers appear from April to June and fruits can be seen July through October. Most commonly this species is associated with rich slope forests; however, it has also been reported from the open edges between sandhills and creek swamps.

At Lafayette Creek one individual was seen on the Lafayette Creek levee adjacent to the Stream Swamp (Bottomland; FLUCCS 615) community.

Mountain Laurel (*Kalmia latifolia*; state-listed Threatened); FACW (FDEP); FACU (NWI)

This shrub species is found throughout the northeastern and southeastern United States. Its range extends from Maine south to Florida and west to the Mississippi River. Within Florida it is found on rich mesic slopes in 11 counties in the Panhandle with a disjunct population in Suwannee County. It is distinguished by its elliptic waxy dark green evergreen leaves. The midvein on the upper surface is slightly raised. They are alternate and range from 5-13 cm in length. From April through June showy clusters of flowers are prominent. These have fused corollas, making them cup-shaped, and are white infused with pink. The fruits appear July through August and are round, brown dehiscent capsules, quarter-inch long, splitting into five valves when dry and release numerous small seeds.

At Lafayette Creek this species was common when found, occurring in groups of 5-20 individuals, but its habitat was uncommon throughout the mitigation area. It can be found within the Bay Swamp (FLUCCS 611) community designation on steep slopes most commonly associated with large populations of Florida anise and on higher areas of the Lafayette Creek bank levee. The observation date and location of all incidental listed species observations is provided in **Table 2**.

**Table 2.** Listed Species Locations and Observation Date

Species	GPS Date	Latitude	Longitude
<i>Drosera intermedia</i> , 11-30 vegetative	4/26/2011	30.519441897	-86.059478126
<i>Kalmia latifolia</i>	4/4/2011	30.523680094	-86.075379314
<i>Kalmia latifolia</i> , 10-15	4/26/2011	30.520151	-86.056967
<i>Kalmia latifolia</i> , 10-15 pl, flowering	4/26/2011	30.520150949	-86.056967215
<i>Kalmia latifolia</i> , 1-5 flowering	4/5/2011	30.527494001	-86.077546792
<i>Kalmia latifolia</i> , flowering 1-5	4/5/2011	30.520981656	-86.060811986
<i>Sarracenia leucophylla</i>	4/26/2011	30.521265274	-86.068389682
<i>Sarracenia leucophylla</i>	4/4/2011	30.526128364	-86.075114563
<i>Sarracenia leucophylla</i>	4/6/2011	30.524241038	-86.071256122
<i>Sarracenia leucophylla</i> -numerous	4/27/2011	30.517594560	-86.064642721
<i>Sarracenia leucophylla</i>	5/17/2011	30.519239273	-86.059333448
<i>Sarracenia leucophylla</i>	4/4/2011	30.521867163	-86.062256320
<i>Sarracenia leucophylla</i>	4/4/2011	30.521672305	-86.062039912
<i>Sarracenia leucophylla</i>	4/6/2011	30.526278238	-86.060931680
<i>Sarracenia leucophylla</i>	4/6/2011	30.522961359	-86.058325235
<i>Sarracenia leucophylla</i>	4/6/2011	30.521779673	-86.058668759
<i>Sarracenia leucophylla</i>	4/5/2011	30.522366906	-86.063373877
<i>Sarracenia leucophylla</i>	4/5/2011	30.521317381	-86.062156732
<i>Sarracenia leucophylla</i>	4/27/2011	30.516701641	-86.064251736
<i>Sarracenia leucophylla</i>	4/26/2011	30.521033161	-86.066541864
<i>Sarracenia leucophylla</i>	4/26/2011	30.516702	-86.064252
<i>Sarracenia leucophylla</i>	4/26/2011	30.521265	-86.06839
<i>Sarracenia leucophylla</i>	4/26/2011	30.521033	-86.066542
<i>Sarracenia leucophylla</i> -numerous	4/26/2011	30.517595	-86.064643

Species	GPS Date	Latitude	Longitude
<i>Sarracenia leucophylla</i> , 10-20 pl.	4/6/2011	30.525241164	-86.057404377
<i>Sarracenia psittacina</i>	4/6/2011	30.526278238	-86.060931680
<i>Sarracenia rosea</i>	4/4/2011	30.526128364	-86.075114563
<i>Sarracenia rosea</i>	4/26/2011	30.518660308	-86.059222897
<i>Sarracenia rosea</i>	4/26/2011	30.519369457	-86.059485026
<i>Sarracenia rosea</i>	4/26/2011	30.521033161	-86.066541864
<i>Sarracenia rosea</i>	4/26/2011	30.51866	-86.059223
<i>Sarracenia rosea</i>	4/26/2011	30.519369	-86.059485
<i>Sarracenia rosea</i>	4/26/2011	30.521033	-86.066542
<i>Stewartia malacodendron</i>	4/4/2011	30.523680094	-86.075379314

## 5.0 EXOTIC SPECIES

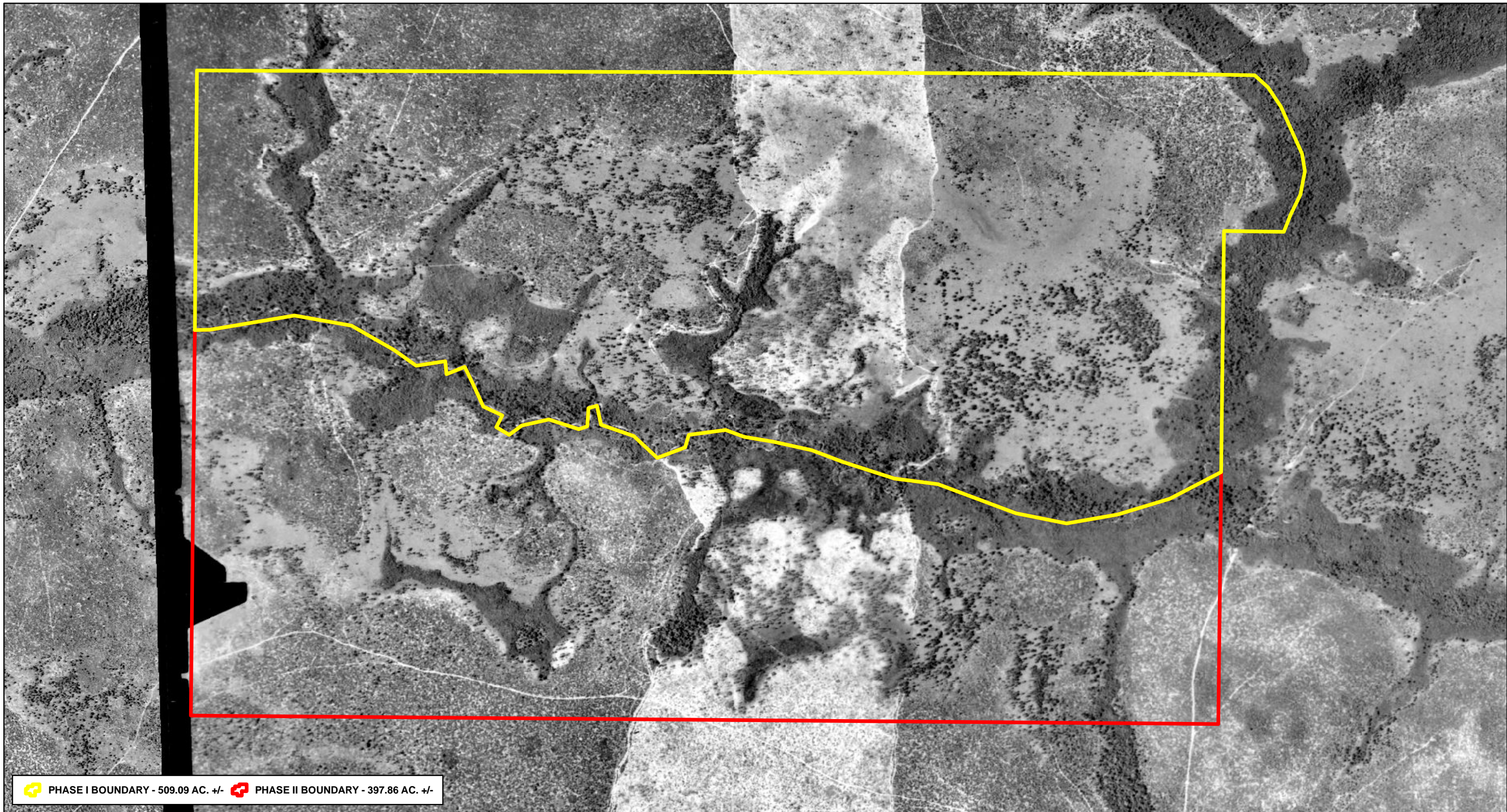
Invasive plants affect forest health, productivity, and limit species diversity of native forests. These plants replace native plant species and often form exotic monocultures. In many cases these stands of exotic plants are not beneficial to native wildlife which has evolved to depend on native plants for food and shelter, and who in turn distribute native plants by seed dispersal. When exotic plants replace too much of our native plants, those wildlife dependent on native plants will move away or become extirpated. Exotic invasive plant species also reduce or eliminate resources, *i. e.*, food, cover, nesting sites, used by native wildlife and can promote populations of invasive non-native wildlife by providing them with resources otherwise unavailable in the area. No Florida Exotic Pest Plant Council (FLEPPC) listed species were observed during field surveys.

## 6.0 HISTORIC CONDITIONS

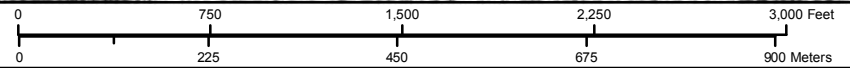
Black-and-white 1956 historical aerial photographs were determined to provide the most complete illustration and highest resolution images available. Therefore, these were selected as the best representation of historic vegetative communities and distribution patterns, although aeriels from as early as 1942 were reviewed. These photographs were geo-referenced and tiled to create an image depicting the historic site conditions of the Lafayette Creek property. Although historic aeriels detailing community coverage prior to timber harvest activities are not available, the plant community boundaries would not have been altered by these practices and aerial delineation using these photographs was deemed accurate. Historic aeriels suggest that the pre-European plant communities within the Phases I and II were longleaf pine/xeric oak, upland/high pine, hydric savannas/seepage slopes, bottomland/floodplain swamp, and bay swamp. A historic aerial is provided as **Figure 4**.

## 7.0 SOILS

The digitized NRCS soil survey was utilized to determine the approximate extent of the soils map units known to exist within the project site. Additionally, the *Hydric Soils of Florida Handbook*, Fourth Edition, was utilized to evaluate the potential presence of hydric soils. The locations and limit of individual soil units within the each phase are depicted in **Figure 5**.



 PHASE I BOUNDARY - 509.09 AC. +/-
  PHASE II BOUNDARY - 397.86 AC. +/-



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

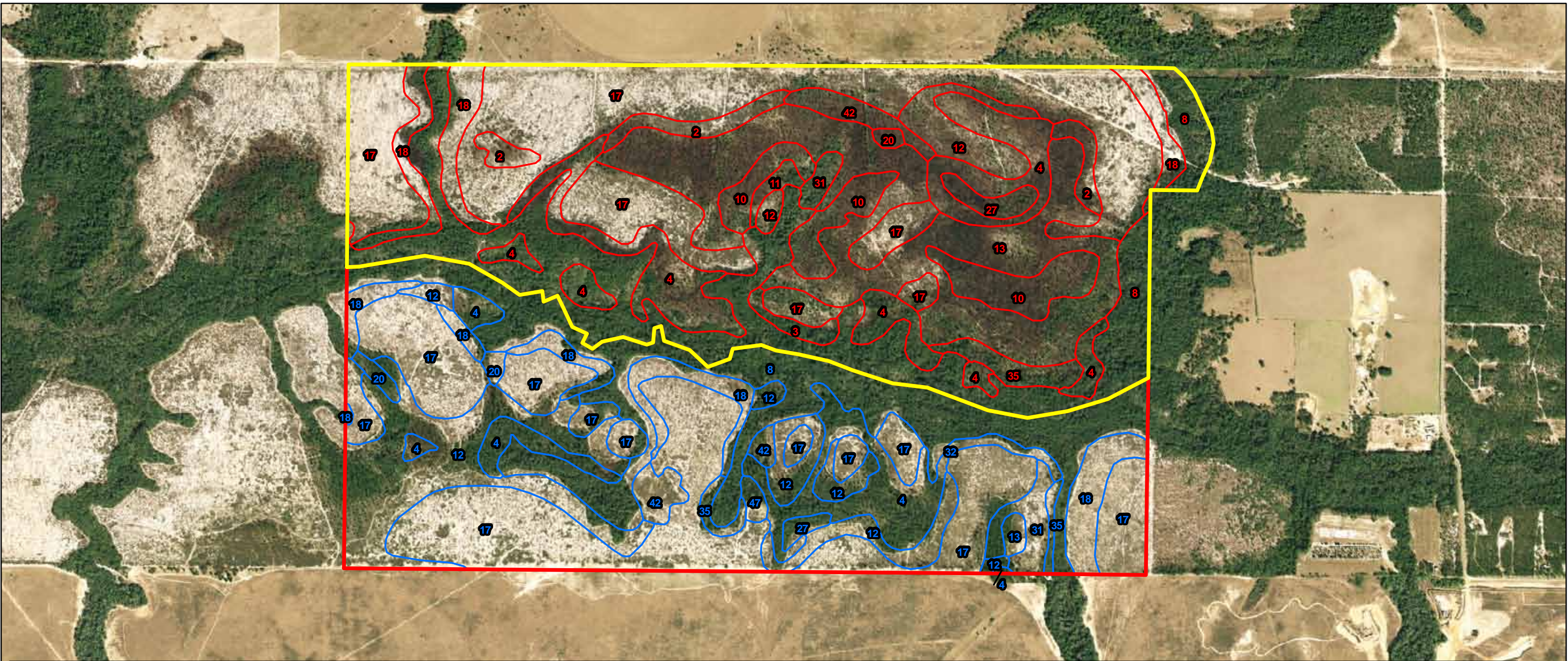
**Figure 4 - Historical Aerial 1956**  
**Lafayette Creek**  
**Walton County, Florida**



Image: 1956  
 Sec 4, 5 and 6  
 Twp 01 S  
 Rng 18 W

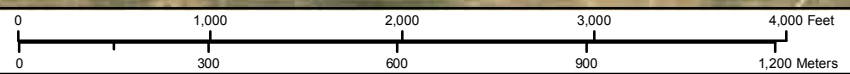
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 Coordinate System: NAD 1983 SP2NF



PHASE I BOUNDARY - 509.09 AC. +/-	13 - FUQUAY LOAMY SAND, 0 TO 5 PERCENT SLOPES - 95.66 AC. +/-	PHASE II BOUNDARY - 397.85 AC. +/-	20 - LEEFIELD-STILSON LOAMY SANDS, 0 TO 5 PERCENT SLOPES - 3.16 AC. +/-
<b>PHASE I SOILS</b>	17 - LAKELAND SAND, 0 TO 5 PERCENT SLOPES - 151.10 AC. +/-	<b>PHASE II SOILS</b>	27 - RUTLEGE FINE SAND - 2.02 AC. +/-
2 - BONIFAY LOAMY SAND, 0 TO 5 PERCENT SLOPES - 13.37 AC. +/-	18 - LAKELAND SAND, 5 TO 12 PERCENT SLOPES - 21.90 AC. +/-	4 - CHIPLEY SAND, 0 TO 5 PERCENT SLOPES - 34.93 AC. +/-	31 - TROUP SAND, 0 TO 5 PERCENT SLOPES - 7.79 AC. +/-
3 - BONIFAY LOAMY SAND, 5 TO 8 PERCENT SLOPES - 3.36 AC. +/-	20 - LEEFIELD-STILSON LOAMY SANDS, 0 TO 5 PERCENT SLOPES - 1.16 AC. +/-	8 - DOROVAN-PAMLICO ASSOCIATION, FREQUENTLY FLOODED - 85.4 AC. +/-	32 - TROUP SAND, 5 TO 8 PERCENT SLOPES - 2.87 AC. +/-
4 - CHIPLEY SAND, 0 TO 5 PERCENT SLOPES - 56.27 AC. +/-	27 - RUTLEGE FINE SAND - 4.48 AC. +/-	12 - FOXWORTH SAND, 0 TO 5 PERCENT SLOPES - 74.07 AC. +/-	35 - TROUP-ORANGEBURG-COWARTS LOAMY SANDS, 5 TO 12 PERCENT SLOPES - 4.02 AC. +/-
8 - DOROVAN-PAMLICO ASSOCIATION, FREQUENTLY FLOODED - 99.52 AC. +/-	31 - TROUP SAND, 0 TO 5 PERCENT SLOPES - 2.96 AC. +/-	13 - FUQUAY LOAMY SAND, 0 TO 5 PERCENT SLOPES - 1.89 AC. +/-	42 - BLANTON SAND, 0 TO 5 PERCENT SLOPES - 6.57 AC. +/-
10 - DOTHAN LOAMY SAND, 2 TO 5 PERCENT SLOPES - 29.5 AC. +/-	35 - TROUP-ORANGEBURG-COWARTS LOAMY SANDS, 5 TO 12 PERCENT SLOPES - 6.7 AC. +/-	17 - LAKELAND SAND, 0 TO 5 PERCENT SLOPES - 144.12 AC. +/-	47 - BONNEAU LOAMY SAND, 0 TO 5 PERCENT SLOPES - 1.94 AC. +/-
11 - DOTHAN LOAMY SAND, 5 TO 8 PERCENT SLOPES - 2.47 AC. +/-	42 - BLANTON SAND, 0 TO 5 PERCENT SLOPES - 6.27 AC. +/-	18 - LAKELAND SAND, 5 TO 12 PERCENT SLOPES - 29.11 AC. +/-	
12 - FOXWORTH SAND, 0 TO 5 PERCENT SLOPES - 14.37 AC. +/-			

\*\*Note: NRCS Soils data may not register accurately with other mapping products.



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**Figure 5 - NRCS Soils Map**  
Lafayette Creek  
Walton County, Florida

Image: 2007  
Sec 4, 5 and 6  
Twp 01 S  
Rng 18 W

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According to the NRCS soil survey for Walton County, Florida (USDA, 2011 and 1989) sixteen soils mapping units are present within the subject area. Two mapping units are listed as hydric: Dorovan-Pamlico Association, frequently flooded; and Rutlege fine sand. The Dorovan-Pamlico mapping unit is dominantly Dorovan muck (Dysic, thermic Typic Medisaprists) in the areas with the longest hydroperiod, and Pamlico muck (Sandy or sandy-skeletal, siliceous, dysic, thermic Terric Haplosaprists) along the outer edges of the mapping unit where the hydroperiod is slightly shorter. Both soil series have a water table near or above the surface for most of the year and fall into the Histosol soil order because both series have greater than 16 inches of muck at the surface. The Rutlege mapping unit is dominantly Rutlege fine sand, sandy, siliceous, thermic Typic Humaquepts, and is very poorly drained. This soil series has a sandy surface texture, a high water table at or near the surface for long periods of the year, and shallow ponding is common.

The dominant upland soil mapping units are Lakeland sand, 0 to 5 percent slopes; Foxworth sand, 0 to 5 percent slopes; Fuquay loamy sand, 0 to 5 percent slopes; and Chipley sand, 0 to 5 percent slopes. The Lakeland and Foxworth series are moderately well to excessively drained Quartzip sammments. Foxworth has an apparent high water table at 3.5 to 6 feet June through October, and Lakeland has an apparent high water table at greater than 6 feet. Fuquay loamy sands are loamy, kaolinitic, thermic Arenic Plinthic Kandiudults that exhibit a perched water table at 4 to 6 feet below the surface January through March due to high kaolin content and low hydraulic conductivity in the B horizon. Chipley sand is somewhat poorly drained with an apparent high water table at 2 to 3 feet December through April. It is primarily found between the hydric mapping units and soils with higher drainage classes or as isolated islands within the Dorovan-Pamlico mapping units. **Table 3** lists the soils map units and the native plant community/landform associated with each unit within the mitigation area.

**Table 3.** USDA NRCS Soil Types, Phases I and II, Lafayette Creek Property.

Soil Unit	Soil Mapping Unit	Acreage	Associated Plant Community
10	Dothan Loamy Sand, 2 to 5 Percent Slopes	29.50	High Pine, Sandhill
11	Dothan Loamy Sand, 5 to 8 Percent Slopes	2.47	High Pine, Sandhill
12	Foxworth Sand, 0 to 5 Percent Slopes	14.37	High Pine, Sandhill
13	Fuquay Loamy Sand, 0 to 5 Percent Slopes	95.66	High Pine, Sandhill
17	Lakeland Sand, 0 to 5 Percent Slopes	151.10	Sandhill
18	Lakeland Sand, 5 to 12 Percent Slopes	21.92	Sandhill
2	Bonifay Loamy Sand, 0 to 5 Percent Slopes	13.37	High Pine
20	Leefield-Stilson Loamy Sands, 0 to 5 Percent Slopes	1.16	High Pine
27	Rutlege Fine Sand	4.48	Hydric Pine Savanna
3	Bonifay Loamy Sand, 5 to 8 Percent Slopes	3.36	High Pine
31	Troup Sand, 0 to 5 Percent Slopes	2.96	High Pine
35	Troup-Orangeburg-Cowarts Loamy Sands, 5 to 12 Percent Slopes	6.70	High Pine
4	Chipley Sand, 0 to 5 Percent Slopes	56.27	High Pine
42	Blanton Sand, 0 to 5 Percent Slopes	6.27	High Pine
8	Dorovan-Pamlico Association, Frequently Flooded	99.52	Bottomland/Floodplain Swamp, Titi Swamp, Hydric Pine Savanna
10	Dothan Loamy Sand, 2 to 5 Percent Slopes	29.50	High Pine, Sandhill

## 8.0 PROPOSED CONDITIONS

Aerial photographs of historic and current plant community boundaries were compared to identify changes in community structure and/or community limits. The majority of changes within the wetland plant communities at Lafayette Creek appear to be the result of fire exclusion. The most prevalent change is the succession of historically open hydric savannas to densely forested wetland systems containing a dense understory of black titi. Silvicultural operations such as logging, aerial seeding, bedding, and planting of pine have had the greatest impact on the upland areas. The mitigation goals are to re-establish historic plant species assemblages and community limits within to the greatest extent possible. This will

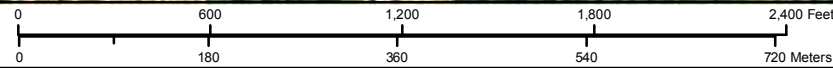
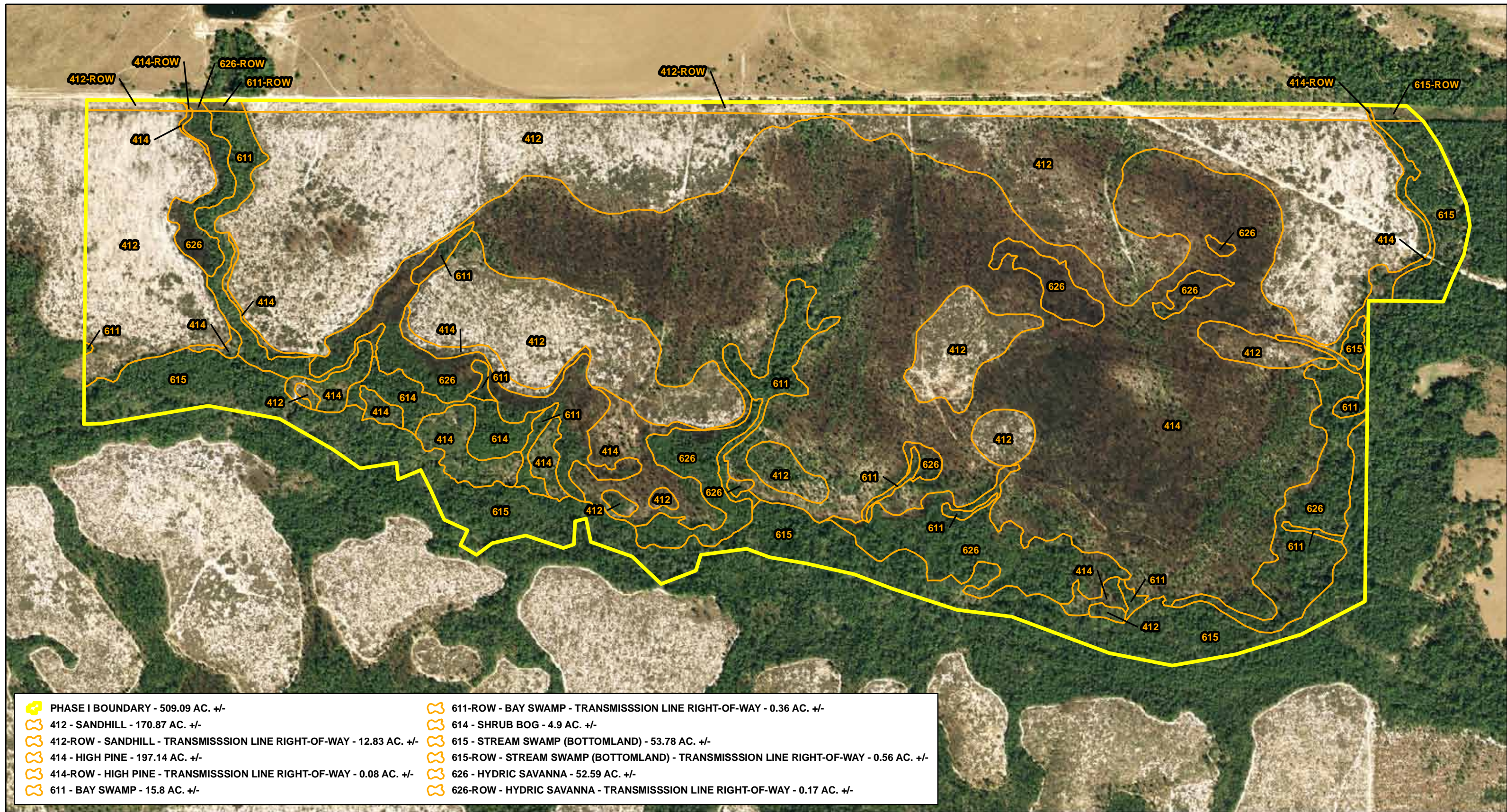
be achieved through focusing on improving wetland habitat by clearing dense titi using a Gyro-Trac, the thinning of pine, and regular prescribed fire.

A total of six community types, excluding ROW community variants, have been identified as historically occurring throughout the Lafayette Creek property. These are the chosen target communities. The primary restoration target is to restore titi swamp to hydric savanna/seepage slope. Other target conditions include using fire to increase light availability in bay swamps along small seepage streams, reducing pine canopy cover in uplands to reduce overall evapotranspiration, and the ongoing protection of stream buffers and headwaters. Target conditions, with appropriate continued management, will be similar to historical native structure and vegetation assemblages as shown in **Figures 6A** and **6B** and as below described. Target community types and acreages are approximated based on aerial interpretation of 1956 historic aerial photography. A summary of the target plant communities/land uses following restoration and/or enhancement activities are detailed in **Table 4**. Descriptions typifying the historic/target communities are also provided.

**Table 4.** Summary of Historic/Target Vegetative Communities within Phases I and II on the Lafayette Creek Property.

FLUCCS Code	FLUCCS Community	Wetland	Acreage
<b>Phase I</b>			
412	Sandhill	No	170.87
412ROW	Sandhill Transmission Line Right-of-Way	No	12.83
414	High Pine	No	197.14
414ROW	High Pine Transmission Line Right-of-Way	No	0.08
611	Bay Swamp	Yes	15.8
611ROW	Bay Swamp Transmission Line Right-of-Way	Yes	0.36
614	Shrub Bog	Yes	4.9
615	Stream Swamp (Bottomland)	Yes	53.78
615ROW	Stream Swamp (Bottomland) Transmission Line Right-of-Way	Yes	0.56
626	Hydric Savanna/seepage slope	Yes	52.59
626ROW	Hydric Pine Savanna Transmission Line Right-of-Way	Yes	0.17
<b>Phase II</b>			
412	Sandhill	No	225.63
414	High Pine	No	81.6
611	Bay Swamp	Yes	25.02
614	Shrub Bog	Yes	0.66
615	Stream Swamp (Bottomland)	Yes	27.62
626	Hydric Savanna/seepage slope	Yes	37.33
<b>TOTAL WETLAND ACREAGE</b>			<b>218.79</b>
<b>TOTAL UPLAND ACREAGE</b>			<b>688.15</b>

A transmission line ROW occurs along the northernmost limits of Phase I. The ROW appears to be routinely maintained through mowing. The ROW spans the length of the Phase I and includes several wetland and upland habitats. No mitigation activities are scheduled or wetland credit anticipated from any of the ROW communities.



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**Figure 6A - Proposed FLUCCS Map Phase I**

Lafayette Creek  
Walton County, Florida



Image: 2007  
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Rng 18 W

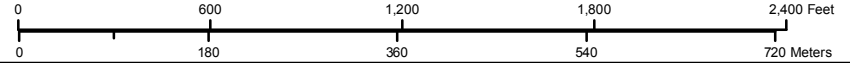
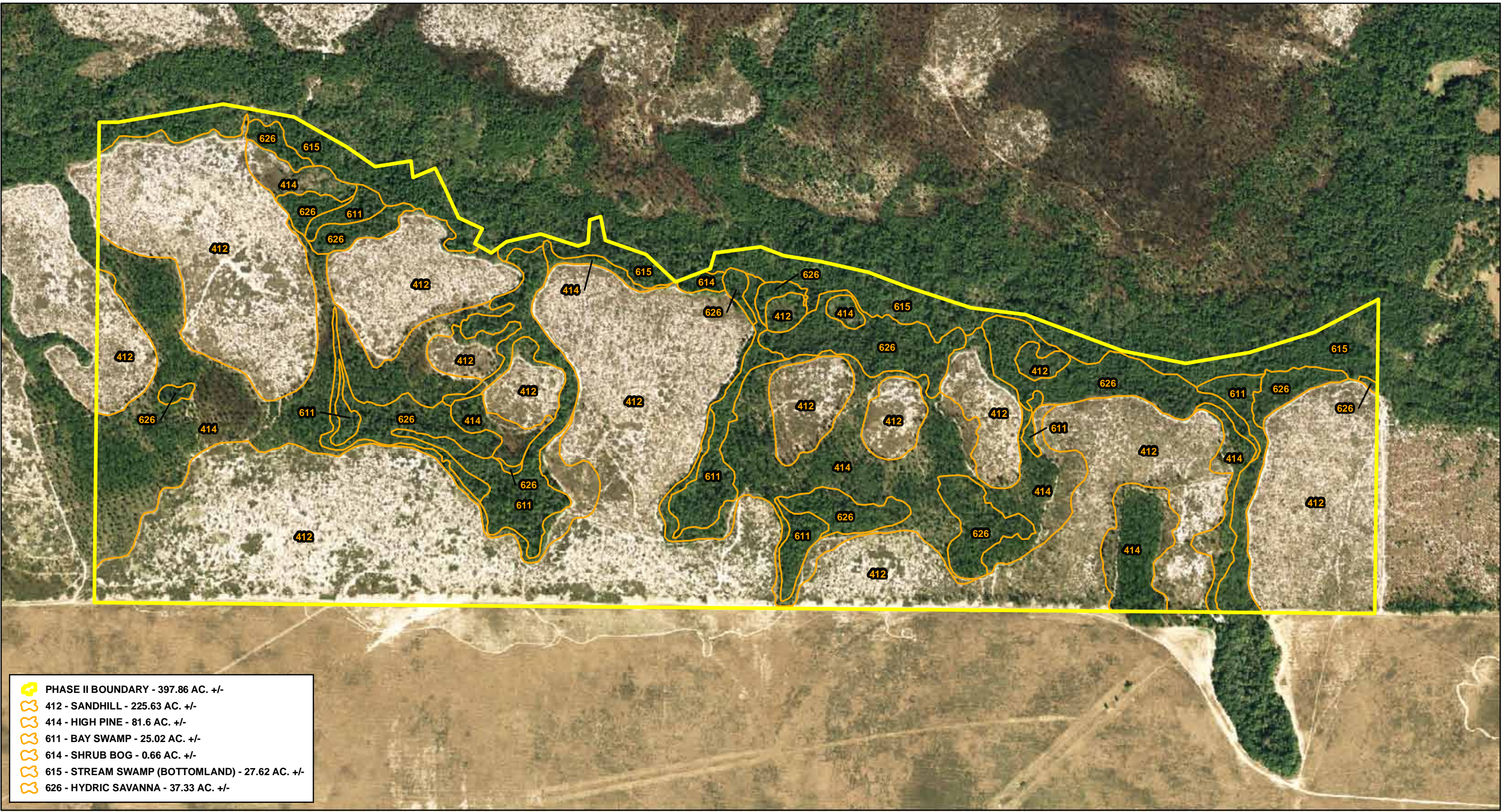
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**Figure 6B - Proposed FLUCCS Map Phase II**  
**Lafayette Creek**  
**Walton County, Florida**

Image: 2007  
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Sandhill (FLUCCS 412)/FNAI Sandhill, 396.5 Acres

This plant community designation currently supports a species rich groundcover that is appropriate for this community type. Currently, the canopy is non-existent, although planted grass-stage longleaf pine is common throughout. A small portion of this community is currently planted pine (FLUCCS 441) and in these areas the slash pine canopy will be thinned to eventually allow for the colonization of longleaf pine. Wiregrass is sparse to dense and tall shrubs are limited to scattered patches. With the introduction of 2-3 year fire intervals and continued longleaf pine survival, this community will continue to thrive eventually supporting a canopy of longleaf pine and increasing wiregrass cover. If the current conditions remain constant, the prevalence of wiregrass in some areas and needle fall from the projected longleaf pine canopy will carry fire supporting and encouraging reproduction of the species that are currently present culminating in a community structure and composition that mimics natural undisturbed Longleaf/Xeric Oak forest.

Longleaf/Xeric Oak Transmission Line ROW (FLUCCS 412ROW)/FNAI Utility Corridor, 12.83 Acres

No significant changes in community composition or structure are anticipated to occur within this community. It is adjacent to Longleaf/Xeric Oak (FLUCCS 412). This community will be maintained by ongoing maintenance of ROW and fire intrusion from adjacent management.

High Pine (FLUCCS 414)/FNAI Upland Pine, 278.74 acres

This plant community designation is currently dominated by planted slash pine with occasional longleaf pine. Originally longleaf pines were common on drier sites while slash pines, which are less fire-resistant, were confined to moister sites; wildfire was the contributing factor in this distribution. However, fire control and silviculture have extended the range of slash pine into former longleaf pine sites. The understory is currently variable. In areas where the natural and undisturbed groundcover is intact, it consists of moderate to dense wiregrass and species such as yaupon, dwarf live oak, runner oak, wax myrtle, saw palmetto, dwarf huckleberry, blue huckleberry, ink gallberry, and shiny blueberry, dense-spike blackroot, Carolina yelloweyed grass, tall jointweed, October flower, vanillaleaf, broomsedge bluestem, cypress panic grass, rayless sunflower, comfortroot, and queendevil. In other areas bracken fern is the dominant groundcover species; this is possibly a result of soil disturbance. The most disturbed areas within this community designation are dominated by cat greenbriar (*Smilax glauca*) with few to no desired herbs and shrubs.

Regular 2-3 year prescribed fire would reduce cover of undesired species such as cat greenbriar and encourage recruitment of fire dependant species such as wiregrass and low growing shrubs from the surrounding uplands. Thinning, resulting in the reduction of the slash pine canopy, will increase light availability to the understory and reduce overall evapotranspiration at the site. The remaining slash pine will provide fine fuel for prescribed fire until a longleaf pine canopy is restored. Pine or wiregrass planting may be necessary in some areas in the future, but the proper management regime would allow these species the opportunity to recruit naturally.

High Pine Transmission Line ROW (FLUCCS 414ROW)/FNAI Upland Pine, 0.08 acre

No significant changes in community composition or structure are anticipated to occur within this community. It is adjacent to high pine (FLUCCS 414) and Longleaf/Xeric Oak (FLUCCS 412). This community will be maintained by ongoing maintenance of ROW and fire intrusion from adjacent management.

Hydric Savanna (FLUCCS 626)/FNAI Seepage Slope, Wet Prairie and Wet Flatwoods, 89.92 Acres

Currently this target community type is either planted pine (FLUCCS 441) or titi swamp (FLUCCS 614). This community will become an open pine forest with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. Where there is a sloping aspect to the wetland depression (seepage

slope), the nearly total absence of a pine canopy is desirable. The pine canopy currently consists of slash and longleaf pine, and, in the areas underlain by muck substrate, pond pine. The subcanopy, where present, may consist of scattered sweetbay, swamp bay, loblolly bay (*Gordonia lasianthus*), pond cypress, black titi, and/or wax myrtle. Shrubs include large gallberry, fetterbush, black titi, sweet pepper bush, red chokeberry, and azaleas (*Rhododendron canescens* and *R. viscosum*).

The sandy variant of this community is currently mapped as planted pine. Target herbaceous species that may already be present in this community include wiregrass, toothache grass (*Ctenium aromaticum*), white-top pitcher plant, purple pitcher plant, parrot pitcher plant, coastal false asphodel, flypoison (*Amianthium muscaetoxicum*), dwarf sundew, thread-leaved sundew, hatpins, tenangle pipewort, early whitetop fleabane, variable leaved sunflower, goldencrest, foxtail club moss, whitehead bogbutton, Small's bogbutton, redroot, woolly witchgrass, loosehead beaksedge, woolly sunbonnets, one-flower honeycombhead, pale meadowbeauty, savanna meadowbeauty, maid marian, Nuttall's meadowbeauty, cypress panicgrass, pineland yelloweyed grass, bog white violet, tuberous grasspink, and fringed beaksedge. The muck variant of this community is currently mapped as titi swamp in some areas and planted pine in others. In this variant, coastalplain beaksedge will be dominant as it is currently the dominant graminoid in open areas that fall under this classification. Other species that are commonly associated with the coastalplain beaksedge dominated areas and can be expected to thrive are tenangle pipewort, loosehead beaksedge, fascicled beaksedge, dwarf sundew, water sundew, Georgia Indian plantain, and sphagnum moss.

After shrubs are cleared using a Gyro-Trac and prescribed fire is implemented on regular intervals, recruitment of typical hydric savanna species will follow from seed bank as well as remnant and adjacent populations. Fire dependant species such as wiregrass, in the areas underlain by sandy substrate, and coastal plain beaksedge, in the areas underlain by muck, will re-colonize these restored areas and provide necessary fine fuel for regular prescribed fire on 2 to 3 year intervals. Many of the state-listed plant species on site are found in this community type. Shrub reduction followed by fire will create a suitable environment for these species. Following mitigation activities, lands slated for conversion to hydric pine flatwoods are anticipated to revert to a historic structure and composition. Ideal conditions include 10-20 percent canopy cover, or less as noted above, either by pine species or sweetbay and a litter/heavy fuel free understory dominated by herbaceous graminoids. Shrubs, such as black titi, should be a minor component of this plant community type.

#### Shrub Bog (FLUCCS 614)/FNAI Shrub Bog, 5.56 Acres

No significant changes in vegetative assemblages or structure are anticipated to occur within existing titi swamps. A reduction in shrub and vine cover along ecotones should be encouraged through prescribed fire intrusion where a firebreak is not present. Following mitigation activities, lands slated for conversion to titi swamp are anticipated to succeed back to a historic community structure and composition.

#### Stream Swamp (Bottomland; FLUCCS 615)/FNAI Bottomland Hardwood Forest, 81.4 Acres

No significant changes in community composition or structure are anticipated to occur within this community.

#### Stream Swamp (Bottomland) Transmission Line ROW (FLUCCS 615 ROW)/FNAI Utility Corridor, 0.56 Acre

No significant changes in community composition or structure are anticipated to occur within this community. It is adjacent to forested bay swamp (FLUCCS 611). This community will be maintained by ongoing maintenance of ROW and fire intrusion from adjacent management. Fire from adjacent uplands should be encouraged to enter this forest system especially when the soil is damp to wet.

Bay Swamp (FLUCCS 611)/FNAI Baygall, 40.82 Acres

This community designation includes forested slopes and bottomlands along small deeply cut tributaries to Lafayette creek where sweetbay and often tulip poplar are dominant in the canopy. This community type may also include historically open savanna areas that have been subjected to fire exclusion, but are not dominated by titi, although it is often present. This community type will be subjected to frequent fire, which will be allowed to burn through the plant community when possible. This will reduce cover of black titi, and allow for a more open understory, allowing light to reach the herbaceous stratum. The portions of this community type that still support species such as coastalplain beaksedge, white-topped pitcher plant, Gulf purple pitcher plant, and tenangle pipewort remain as evidence of a historically open plant community that has been impacted by shrub encroachment resulting from fire exclusion. With fire intrusion these areas are expected to revert back to a historic plant community structure and composition. Other small areas within this unit, often associated with steepheads, that are dominated by mountain laurel and Florida anise would not have burned often and fire should not be forced through these areas.

Bay Swamp Transmission Line ROW (FLUCCS 611ROW)/FNAI Utility Corridor, 0.36 Acre

No significant changes in community composition or structure are anticipated to occur within this community. It is adjacent to forested bay swamp (FLUCCS 611). This community will be maintained by ongoing maintenance of ROW and fire intrusion from adjacent management.

## **9.0 RESTORATION PLAN**

The following restoration recommendations are proposed to aid in the development of the management plans and land management activities implemented by NFWFMD. To the greatest extent possible, this plan will attempt to re-establish pre-silvicultural vegetation assemblages and distribution patterns on the Lafayette Creek property.

The mitigation restoration scenario was developed to provide a framework to facilitate a mitigation cost/ecological lift analysis. Cardno ENTRIX completed a Unified Mitigation Assessment Methodology (UMAM) analysis. The mitigation plan was developed in coordination with NFWFMD utilizing site-specific field surveys and target field conditions. The mitigation plan and associated UMAM analysis are described further in this section. This report does not provide specific mitigation cost analysis.

Native upland pine forest buffers (FLUCCS 414 and 412) will be restored from existing planted slash and sand pine plantation using restoration techniques that may include extensive thinning of bedded slash pine, eradication of sand pine, prescribed fire, and perpetual ecological management. Actual restoration techniques implemented will be dependent upon site-specific conditions and adaptive management. In both upland and wetland polygons management strategies of nuisance and exotic species will be implemented as necessary.

Of the approximately 218.78 acres of wetlands that remain available within Phase I and II for FDOT mitigation, approximately 81.40 acres, exclusive of non-ROW lands, that border major stream channels will be preserved as stream swamp (bottomland; FLUCCS 615). These areas will generate ecological lift from buffer improvements and implementation of perpetual management for ecological integrity thereby protecting the associated streams. Approximately 89.91 wetland acres within the upland communities, along minor stream tributaries, and adjacent to the creek floodplains will be restored from Titi Swamp (FLUCCS 614) and Pine Plantation-Hydric (FLUCCS 441H) to Hydric Pine Savanna/Seepage Slope (FLUCCS 626). Restoration activities may include prescribed fire, shrub layer reduction, nuisance species control, and restoration of upland buffers. Approximately 40.82 wetland acres will be maintained

as bay swamp (FLUCCS 611) with prescribed fire to encourage titi reduction and subsequently increase species richness.

The conversion of specific types of current communities to their target community types, and potential acreages, is described in **Table 5**. Proposed activities include pine thinning, prescribed fire, as well as mechanical (Gyro-Trac) treatments to control woody vegetation. Specific details are described in **Sections 9.1** and **9.2**.

**Table 5.** Matrix of Current to Target Vegetative Communities and Land Uses with Acreages

FLUCCS Code	Description	412	412 ROW	414	414 ROW	611	611 ROW	614	615	615 ROW	626	626 ROW
<b>Current</b>		<b>Target</b>										
<b>Phase I (509.09 Acres)</b>												
412	Sandhill	149.6										
412 ROW	Sandhill ROW		12.83									
414	High Pine			12.11								
414 ROW	High Pine ROW				0.08							
441	Pine Plantation	21.27		185.03								
441H	Pine Plantation Hydric										5.77	
611	Bay Swamp					15.80						
611 ROW	Bay Swamp ROW						0.36					
614	Shrub Bog							4.90			46.82	
615	Stream Swamp								53.78			
615 ROW	Stream Swamp ROW									0.56		
626 ROW	Hydric Savanna ROW											0.17
<b>Phase II (397.86 Acres)</b>												
412	Sandhill	225.63										
414	High Pine			13.21								
441	Pine Plantation											
441H	Pine Plantation Hydric			68.39							13.43	
611	Bay Swamp					25.02						
614	Shrub Bog							0.66			23.89	
615	Stream Swamp								27.62			
<b>TOTAL</b>		<b>396.50</b>	<b>12.83</b>	<b>278.74</b>	<b>0.08</b>	<b>40.82</b>	<b>0.36</b>	<b>5.56</b>	<b>81.40</b>	<b>0.56</b>	<b>89.91</b>	<b>0.17</b>

## 9.1 MITIGATION EFFORT

**Figures 7A** and **7B** depict the proposed mitigation plan for Phases I and II respectively. **Table 6** provides a summary of the proposed mitigation activities for Phases I and II.

**Table 6.** Phases I and II Proposed Restoration Technique per Community Conversion Type

Current Community	Target Community	UMAM Polygon	Restoration Technique				
			Thinning	Gyrotrac	Fire	Preserve/Fire Intrusion	Mow (by others)/Fire Intrusion
<b>Phase I (509.09 Acres)</b>							
412	412	1-1			X		
614	614	2-1			X		
412	412	3-2		X	X		
614	614	4-3	X		X		
441	412	5-3	X		X		
441	414	6-3	X		X		
441	626	7-4		X	X		
611	611	8-5				X	
615	615	9-5				X	
412 ROW	412 ROW	10-6					X
414 ROW	414 ROW	11-6					X
611 ROW	611 ROW	12-6					X
615 ROW	615 ROW	13-6					X
626 ROW	626 ROW	14-6					X

Current Community	Target Community	UMAM Polygon	Restoration Technique				
			Thinning	Gyrotrac	Fire	Preserve/Fire Intrusion	Mow (by others)/Fire Intrusion
<b>Phase II (397.86 Acres)</b>							
412	412	1-1			X		
614	614	2-1			X		
412	412	3-2		X	X		
614	614	4-3	X		X		
441	414	6-3	X		X		
441	626	7-4	X	X	X		
611	611	8-5				X	
615	615	9-5				X	

## 9.2 RESTORATION TECHNIQUES

Low impact machinery should be utilized where possible. Vehicles should be equipped with tracks to avoid rutting in both uplands and wetlands. Tracked vehicles are in contact with a larger surface area than would generally be the case with a wheeled vehicle, and as a result exert a much lower force per unit area on the ground being traversed than a conventional wheeled vehicle of the same weight. This makes them suitable for use on soft, low friction, and uneven ground. Existing access roads, where available, should be used to enter and exit mitigation areas. Further, restoration activities should not occur following periods of extended rainfall.

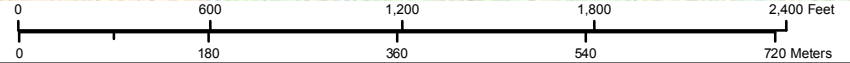
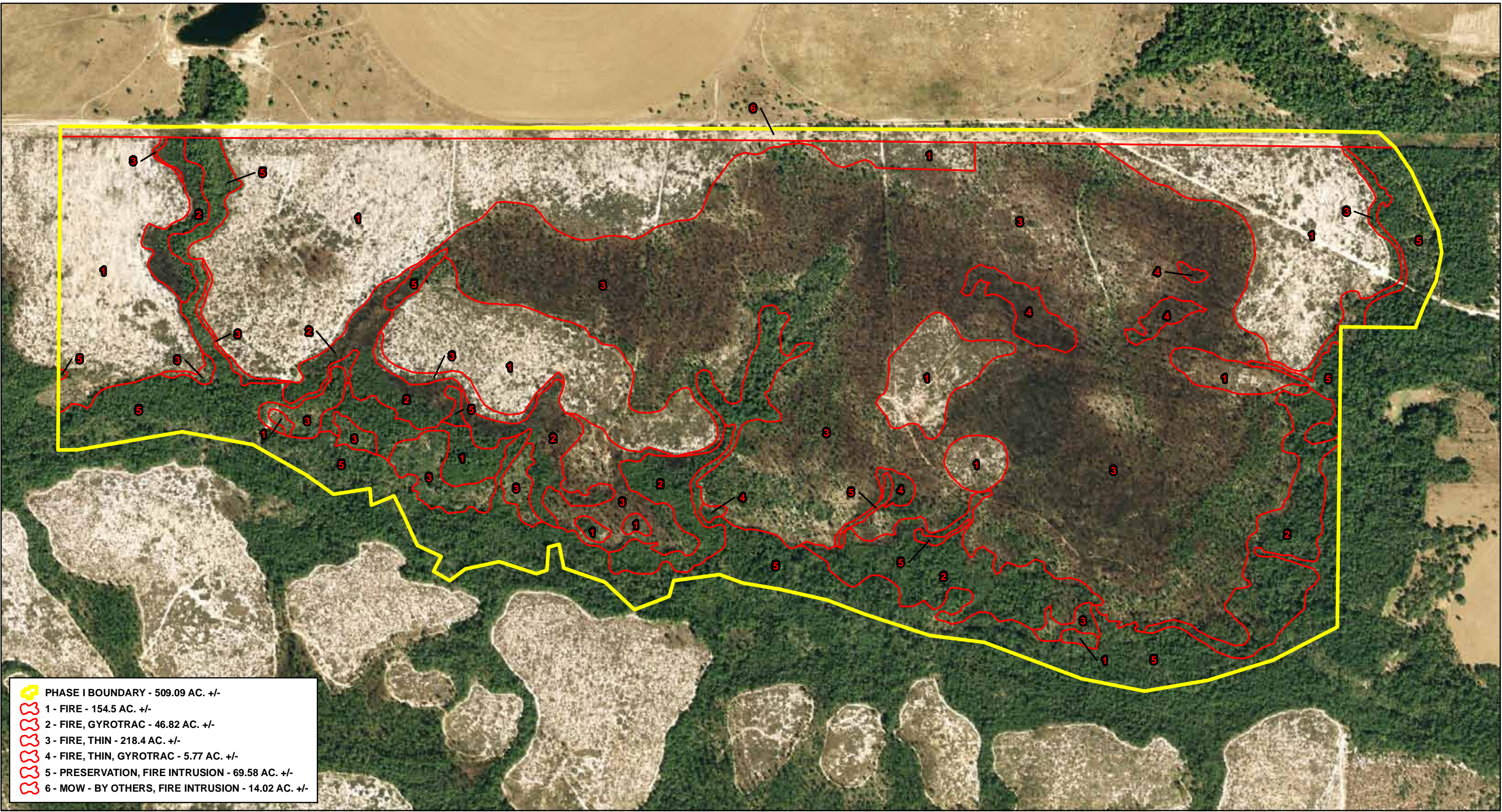
### Prescribed Fire, Fire Intrusion

Frequent fire is necessary to re-establish and maintain the historic limits and plant assemblages of grasslands and herbaceous pinelands. A great deal of the existing dense woody vegetation is likely attributable to fire suppression, especially within the mesic and hydric flatwoods as well as savanna lands. The longer the period of time since the last fire, the more developed the understory shrubs will be. If the understory is allowed to grow for too long, the accumulation of needle drape and the height of flammable understory shrubs will increase the probability of a catastrophic canopy fire. Due to the long absence of fire throughout many of wetland communities within Phases I and II of the Lafayette Creek property, cool season or dormant season burns may be required to reduce the fuel load prior to warm season burns.

Falling dense titi stands should also be implemented to reduce the vertical fuel load reducing the likelihood of a canopy fire. Fires should be allowed to burn into deeper wetland systems. Existing firebreaks should be used where present. No firelines will be used to prevent fire from intruding into forested or shrub dominated wetlands unless experiencing drought conditions or there is concern with smoke management. When a fireline is necessary, heavy equipment can be used only to mow or “lay down” vegetation by driving equipment over the area of concern with attention to avoiding wet, mucky areas. If the previous two methods are unsatisfactory, and the situation is considered a serious threat, careful planning and consideration for a lightly harrowed line as determined by NFWFMD staff is acceptable.

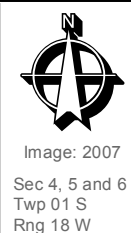
Growing season burning will be used whenever possible to mimic natural fires. Firelines will avoid ecotones and prescribed fires will be encouraged to burn into wetland ecotones when sufficient hydration exists. The protocol for fire in wetlands is to allow fires to reduce woody plants on the wetland edges and within the ecotone.

The reduction of shrub density through repeated prescribed burns will allow relict graminoid and herbaceous groundcover species, currently present at reduced numbers, the opportunity to colonize areas previously occupied by woody vegetation. The woody species will persist, but will remain as part of the ground cover stratum as the herbaceous component recovers. Plants currently identified as absent within unburned lands should emerge, as many herbaceous species are known to become dormant with increasing competition from shrubs, surviving as rootstocks until released by fire and increased exposure to light and air. A summary of the target fire return interval for each target community is provided as **Table 7**.

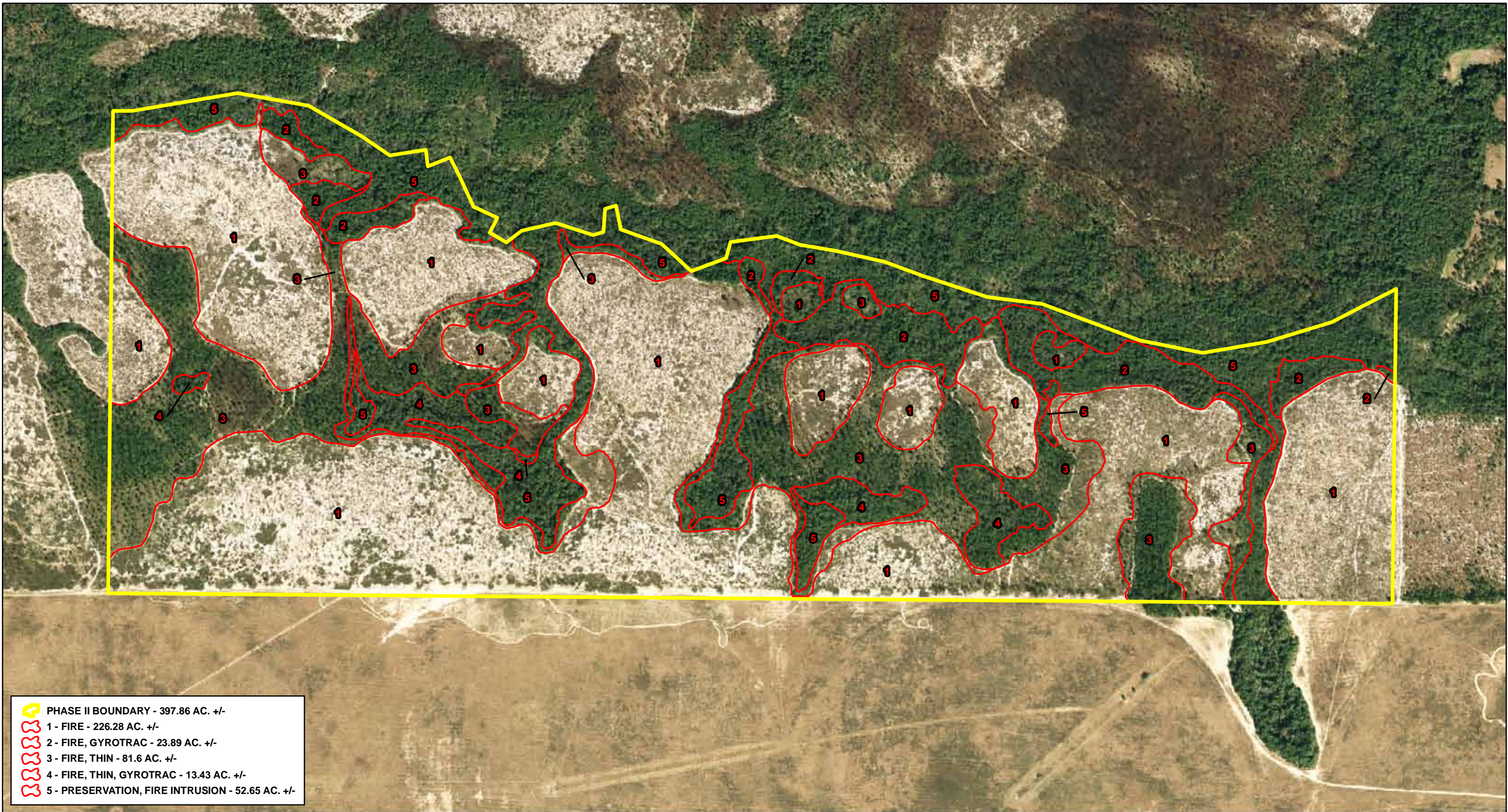








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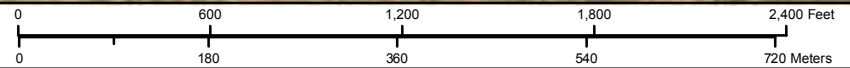
**Figure 7A - Mitigation Activity Phase I**  
**Lafayette Creek**  
**Walton County, Florida**



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Image: 2007 Sec 4, 5 and 6 Twp 01 S Rng 18 W		Coordinate System: NAD 1983 SPFNF	



-  PHASE II BOUNDARY - 397.86 AC. +/-
-  1 - FIRE - 226.28 AC. +/-
-  2 - FIRE, GYROTRAC - 23.89 AC. +/-
-  3 - FIRE, THIN - 81.6 AC. +/-
-  4 - FIRE, THIN, GYROTRAC - 13.43 AC. +/-
-  5 - PRESERVATION, FIRE INTRUSION - 52.65 AC. +/-



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**Figure 7B - Mitigation Activity Phase II**  
**Lafayette Creek**  
**Walton County, Florida**

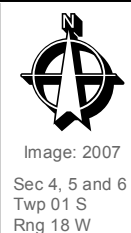


	
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**Table 7.** Summary of Fire Return Interval within Phases I and II, Lafayette Creek.

FLUCCS Code	FLUCCS Community	Fire Return Interval
<b>Phase I (509.09 Acres)</b>		
412	Sandhill	2-4 yrs.
412 ROW	Sandhill ROW	NA
414	High Pine	2-4 yrs.
414 ROW	High Pine ROW	NA
611	Bay Swamp	occasional, rare
611 ROW	Bay Swamp ROW	NA
614	Shrub Bog	variable, periodic
615	Stream Swamp (Bottomland)	occasional, rare
626	Hydric Savanna	2-4 yrs.
626 ROW	Hydric Savanna ROW	NA
<b>Phase II (397.86 Acres)</b>		
412	Sandhill	2-4 yrs.
414	High Pine	2-4 yrs.
611	Bay Swamp	occasional, rare
614	Shrub Bog	variable, periodic
615	Stream Swamp (Bottomland)	occasional, rare
626	Hydric Savanna	2-4 yrs.

Silvicultural Activities (Gyrotrac, Thinning, Drop/Fall)

Where possible, slash pine should be thinned and converted to uneven-aged management. Preferably, thinning will result in a random spatial pattern of trees. In all cases enough canopy trees should be left to provide sufficient needle cast to carry fires. When groundcover fuels have recovered enough to carry fire on their own, canopy trees should be further harvested, felled, or girdled to restore historic densities. If harvested, specialized equipment, including chainsaws, may be required to prevent rutting in some areas. Of note is the occurrence in places of large slash pine within the Lafayette Creek floodplain very near the boundary of the uplands. Removal of some of these timber sized trees could assist in the re-establishment of more typical wetland tree species within the light gaps.

Locations of these activities are shown on **Figures 7A** and **7B**.

A Gyro-Track, set off-grade, should be used to “rough cut” areas containing dense, mature brush and small trees. Gyro-Tracking should be conducted in manner that does not disturb the soil. A summary of the longterm target tree density by proposed vegetative community is provided in **Table 8**. Actual tree densities during implementation phase of mitigation activities are likely to be higher than the longterm target densities.

**Table 8.** Summary of Target Trees per Acre.

FLUCCS Code	FLUCCS Community	Target Trees/Acre	Forest Age Structure
412	Sandhill	25-40	Uneven
412 ROW	Sandhill ROW	NA	NA
414	High Pine	25-40	Uneven
414 ROW	High Pine ROW	NA	NA
611	Bay Swamp	200-400	Uneven
611 ROW	Bay Swamp ROW	NA	NA
614	Shrub Bog	NA	NA
615	Stream Swamp (Bottomland)	200-400	Uneven
615 ROW	Stream Swamp (Bottomland) ROW	NA	NA
626	Hydric Savanna	0-15	Uneven
626 ROW	Hydric Savanna ROW	NA	NA

An initial pine thinning of 100-200 trees per acre should be implemented in the uplands where understory and shrub layers are reduced. This initial target density should provide sufficient needle cast to sufficiently carry fire across the landscape as the understory is developing. After the understory can carry a fire, tree densities can be further reduced toward target levels.

The successful restoration of historic vegetative distribution patterns should be measured against the best available pre-silvicultural aerial photography. While near-total hydrologic restoration within the study areas is potentially possible, complete re-establishment of historic hydropatterns and historic vegetative limits may not be realized due to permanent hydrologic alterations within the study sites and on adjacent lands. Hydrological restoration of off-site lands is outside the scope of this report. Though comparison of restored target vegetative communities with those historically present is not possible due to the lack of pre-silvicultural vegetative data within the study areas, similar relatively unaltered plant assemblages present locally and should be used as reference sites. Reference sites for this project have not yet been identified.

#### Exotic/Nuisance Vegetation Treatment

Although FLEPPC-listed species were observed during field surveys, future treatment of unwanted plant species may be required. If nuisance/exotic species are observed on site, chemical treatment should be utilized to remove and retard growth. Herbicide applications should be applied by a Florida-licensed Restricted Use Pesticide (RUP) applicator that is familiar with the indigenous plant populations.

Herbicides are often the most effective and efficient means of controlling woody plants or plants with running rhizomes. There are several application techniques that can be used to control trees and other woody plants, and not all woody plant species are equally susceptible to herbicides. Therefore, relative to size and species, results may vary for any of these application methods.

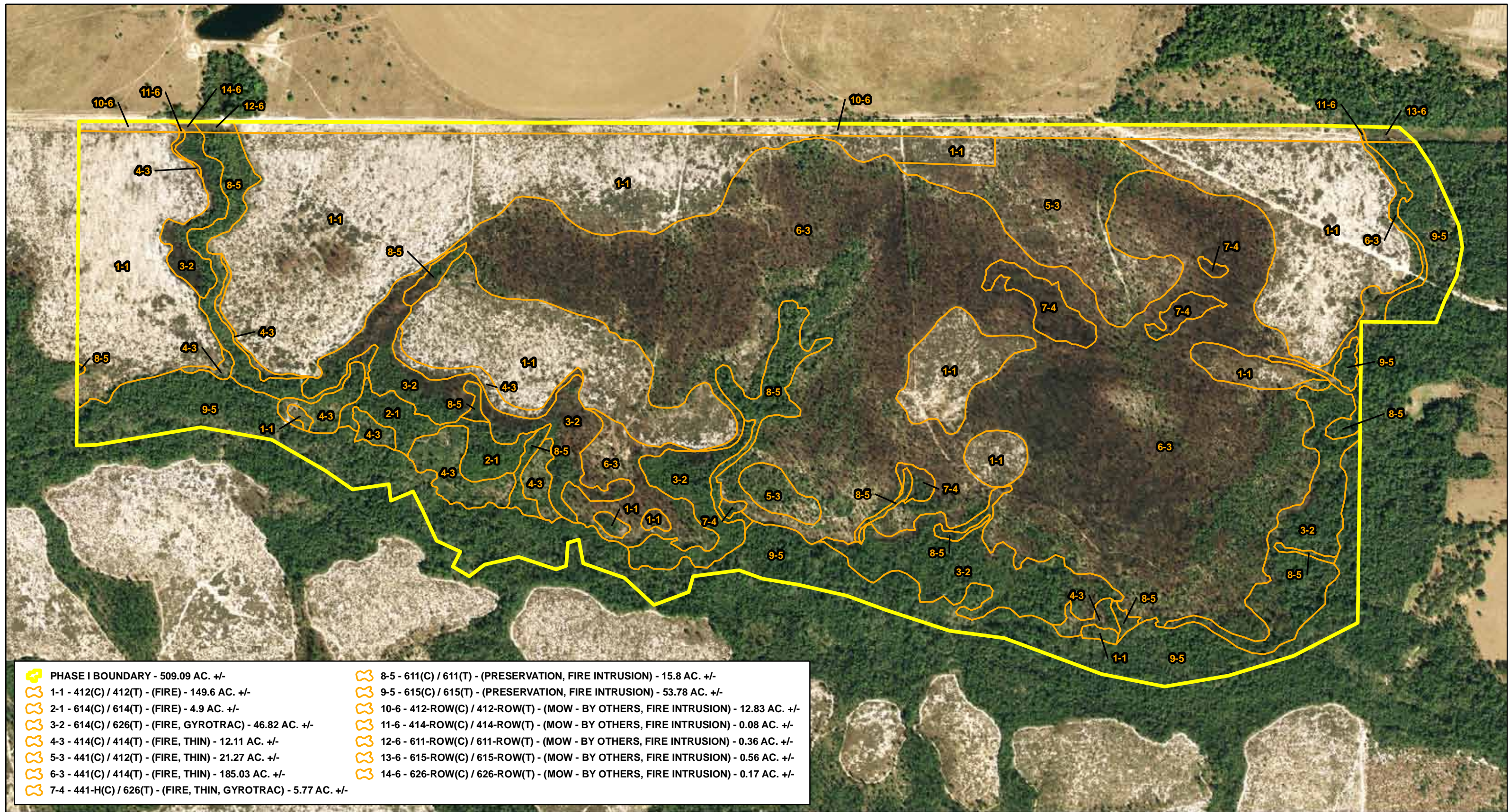
Hand-applied foliar spray will be utilized where risk to non-target species is minimal. Treatments using this method will be conducted such that over-application, spray run-off, and spray drift are minimized. Additionally, a tracer dye will be used with the spray solution to avoid over-application or omitting some plants entirely. This treatment technique is most effective during the growing season. All treatments will be conducted during appropriate vegetative growing stage, weather conditions, and season to increase effectiveness.

#### Erosion Stabilization

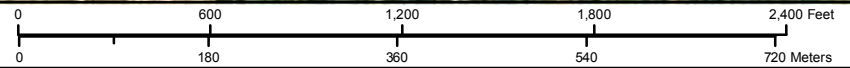
Along the eastern border of Phase I, a significant erosion gully has formed above a natural ravine that is a tributary to Wolf Creek. This feature is associated with a historical, primitive road crossing of Wolf Creek. Surficial drainage from heavy rains has become focused on this feature resulting in active erosion that is having a negative impact on the natural ravine stream and also transmitting increased sedimentation into Wolf Creek because of the close proximity. Efforts should be made to trap the sedimentation through impoundment of the gully and diversion surficial flows currently entering the gully head.

## **10.0 UMAM ANALYSIS**

UMAM analysis was conducted for the mitigation plan. The results of UMAM analysis identify a potential overall functional lift of **83.77 credits** following implementation of the proposed mitigation activities. Credits generated from upland assessment areas were divided into Forested and Shrub categories based on the proportional credits generated by the two categories and the functional benefits provided to these wetland communities. A UMAM assessment area polygon map is provided as **Figures 8A** and **8B** for Phases I and II.



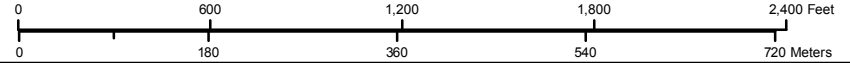
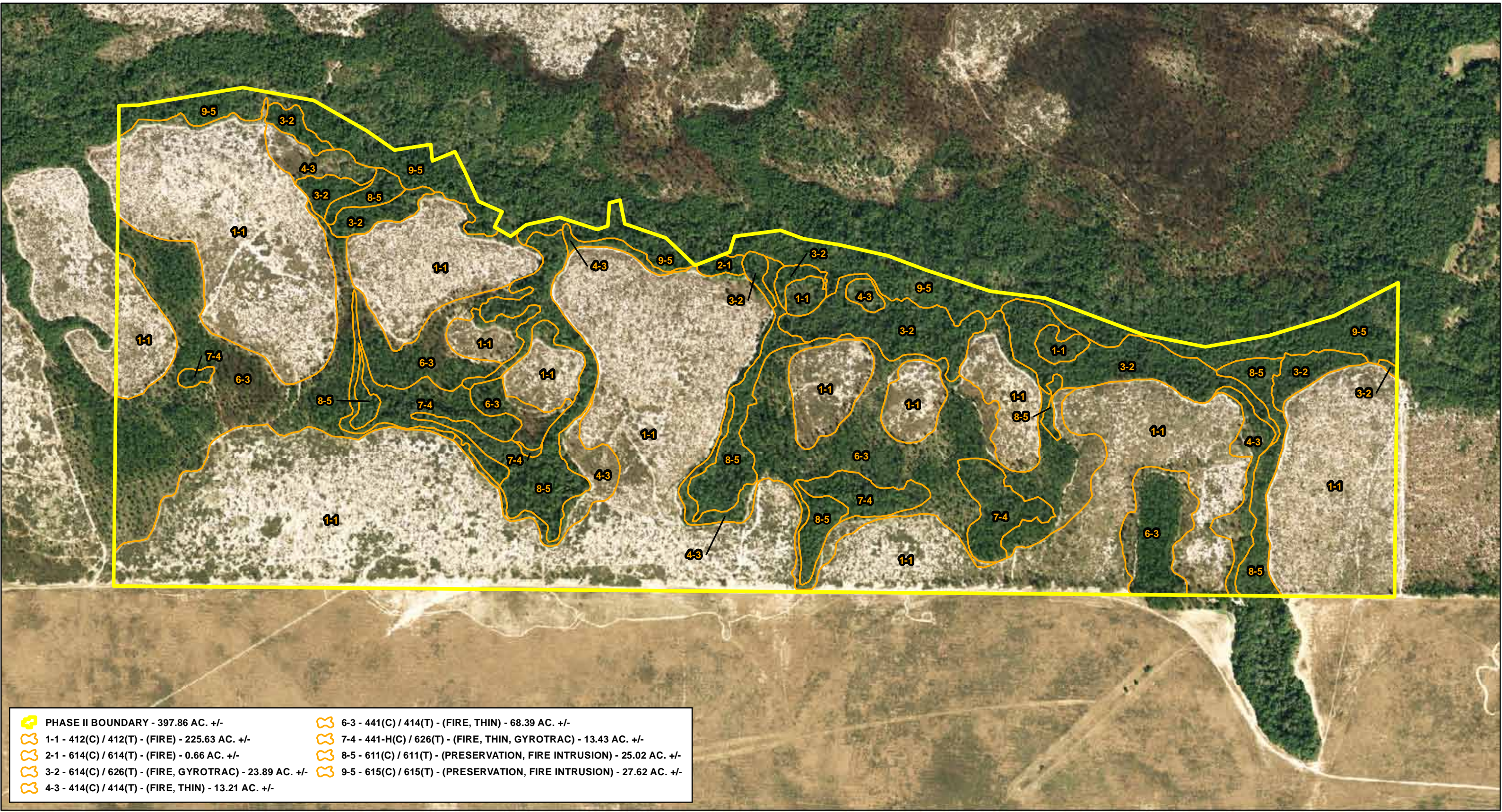
- PHASE I BOUNDARY - 509.09 AC. +/-
- 1-1 - 412(C) / 412(T) - (FIRE) - 149.6 AC. +/-
- 2-1 - 614(C) / 614(T) - (FIRE) - 4.9 AC. +/-
- 3-2 - 614(C) / 626(T) - (FIRE, GYROTRAC) - 46.82 AC. +/-
- 4-3 - 414(C) / 414(T) - (FIRE, THIN) - 12.11 AC. +/-
- 5-3 - 441(C) / 412(T) - (FIRE, THIN) - 21.27 AC. +/-
- 6-3 - 441(C) / 414(T) - (FIRE, THIN) - 185.03 AC. +/-
- 7-4 - 441-H(C) / 626(T) - (FIRE, THIN, GYROTRAC) - 5.77 AC. +/-
- 8-5 - 611(C) / 611(T) - (PRESERVATION, FIRE INTRUSION) - 15.8 AC. +/-
- 9-5 - 615(C) / 615(T) - (PRESERVATION, FIRE INTRUSION) - 53.78 AC. +/-
- 10-6 - 412-ROW(C) / 412-ROW(T) - (MOW - BY OTHERS, FIRE INTRUSION) - 12.83 AC. +/-
- 11-6 - 414-ROW(C) / 414-ROW(T) - (MOW - BY OTHERS, FIRE INTRUSION) - 0.08 AC. +/-
- 12-6 - 611-ROW(C) / 611-ROW(T) - (MOW - BY OTHERS, FIRE INTRUSION) - 0.36 AC. +/-
- 13-6 - 615-ROW(C) / 615-ROW(T) - (MOW - BY OTHERS, FIRE INTRUSION) - 0.56 AC. +/-
- 14-6 - 626-ROW(C) / 626-ROW(T) - (MOW - BY OTHERS, FIRE INTRUSION) - 0.17 AC. +/-



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**Figure 8A - UMAM Assessment Area Phase I**  
 Lafayette Creek  
 Walton County, Florida

	Image: 2007 Sec 4, 5 and 6 Twp 01 S Rng 18 W	2420 W. Lakeshore Drive, Suite 100 Tallahassee, FL 32312 <a href="http://www.cardnoentrix.com">www.cardnoentrix.com</a>
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**Figure 8B - UMAM Assessment Area Phase II**  
 Lafayette Creek  
 Walton County, Florida

 Image: 2007 Sec 4, 5 and 6 Twp 01 S Rng 18 W	 2420 W. Lakeshore Drive, Suite 100 Tallahassee, FL 32312	ph. (850) 681-9700 fx (850) 681-9741
	<a href="http://www.cardnoentrix.com">www.cardnoentrix.com</a> Coordinate System: NAD 1983 SPFNF	

UMAM polygons were delineated based on both current and historic/target vegetative community structure and function as well as the proposed mitigation schedule. A summary of the mitigation effort UMAM scoring is provided in **Appendix D**.

### 10.1 IMPLEMENTATION ISSUES

- Initial dormant-season fuel reduction fires should be followed by implementation of growing-season burns, subject to on-the-ground conditions, and on 2-5-year cycles.
- Mechanical clearing should minimize impacts to wetlands by avoiding operation during very wet seasons and avoiding streams whenever possible. Where clearing does involve opening the stream, great care should be taken to not disturb the stream bank. Heavy and medium fuel resulting from mechanical operations should be burned shortly thereafter to avoid impacts on desired and remnant herbaceous species.

### 10.2 PERFORMANCE CRITERIA

The plant community structure targeted in the post-enhancement condition is intended to be that which existed prior to silviculture, fire exclusion, and subsequent increase in woody vegetation as listed in **Table 5** and illustrated on **Figures 6A** and **6B**.

### 10.3 LONG-TERM MANAGEMENT

NFWFMD will be responsible for ensuring the perpetual management of mitigation lands. NFWFMD will manage the property for restoration and mitigation purposes, as necessary, and in accordance with the conservation easement. Long-term management is described in *Umbrella, Watershed-Based, Regional Mitigation Plan* (UWRMP) Section 11.7.

### 11.0 REFERENCES

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## APPENDIX

### A



Appendix A—2011 Observed Plant Species and Habitat Preference

Scientific Name	Common Name	412	414	626	614	615	611
<i>Acer rubrum</i>	Red maple			X			X
<i>Agalinis purpurea</i>	Purple false foxgloves			X		X	X
<i>Aletris lutea</i>	Yellow colic root			X			X
<i>Alnus serrulata</i>	Hazel alder					X	X
<i>Ambrosia artemisiifolia</i>	Common ragweed			X			X
<i>Amsonia ciliata</i>	Bluestar	X	X				
<i>Andropogon glomeratus</i>	Broom sedge		X	X	X		X
<i>Andropogon virginicus</i>	Broom sedge	X	X	X			
<i>Aristida stricta</i> var. <i>beyrichiana</i>	Wiregrass	X	X	X	X		
<i>Aristida spiciformis</i>	bottlebrush threeawn			X			
<i>Arundinaria gigantea</i>	Giant cane					X	
<i>Asclepias humistrata</i>	Milkweed	X	X				
<i>Asimina parviflora</i>	Paw paw		X			X	
<i>Astragalus villosus</i>	Hairy milk vetch	X	X				
<i>Baccharis glomeruliflora</i>	Groundsel tree			X			
<i>Balduina angustifolia</i>	Coastal plain honeycomb head			X			
<i>Baptisia lanceolata</i>	Pineland wild indigo	X	X				
<i>Bignonia capreolata</i>	Crossvine					X	X
<i>Bulbostylis ciliatifolia</i>	Capillary hairsedge	X	X				
<i>Callicarpa americana</i>	Beauty berry		X				
<i>Carphephorus odoratissimus</i>	Vanillaleaf		X	X			
<i>Carpinus caroliniana</i>	Ironwood		X			X	
<i>Carex glaucescens</i>	Clustered sedge			X		X	X
<i>Carex venusta</i>	Darkgreen sedge					X	X
<i>Carex tenax</i>	Caric sedge	X	X				
<i>Carex turgescens</i>	Pinebarren sedge					X	X
<i>Castanea pumila</i>	Chinkapin		X				
<i>Cephalanthus occidentalis</i>	Buttonbush					X	X
<i>Chasmanthium laxum</i>	Slender woodoats		X			X	
<i>Chrysoma paucifloculosa</i>	Woody goldenrod	X					
<i>Chrysopsis</i> sp.	Woolygoldenrod	X	X				
<i>Clethra alnifolia</i>	Sweet pepper bush			X	X	X	X
<i>Cliftonia monophylla</i>	Black titi			X	X	X	X
<i>Cnidioscolus stimulosus</i>	Tread softly	X	X				
<i>Croton argyranthemus</i>	Silver croton	X					
<i>Ctenium aromaticum</i>	Toothache grass			X			
<i>Cuscuta</i> sp.	Dodder		X				
<i>Cyrilla racemiflora</i>	Red titi			X	X	X	X
<i>Dalea pinnata</i>	Summer-farewell	X	X				
<i>Dichanthelium ensifolium</i>	Panic grass		X	X			
<i>Dicanthelium scabulosum</i>	Panic grass			X			X
<i>Dicanthelium</i> spp.	Panic grass						
<i>Diospyros virginiana</i>	Persimmon	X	X				
<i>Drosera brevifolia</i>	Dwarf sundew			X	X	X	X
<i>Drosera intermedia</i> *	Spoonleaf sundew						X
<i>Drosera trayci</i>	Tracy's sundew			X			
<i>Eleocharis</i> sp.	Spikerush						X
<i>Elephantopus elatus</i>	Elephant's foot		X				X
<i>Eragrostis elliottii</i>	Lovegrass		X	X		X	
<i>Eriocaulon compressum</i>	Hatpins			X			
<i>Eriocaulon decangulare</i>	Hatpins			X	X		X
<i>Eriogonum tomentosum</i>	Buckwheat	X	X				
<i>Eupatorium compositifolium</i>	Dog fennel	X	X				
<i>Euphorbia floridana</i>	Greater Florida spruce	X					
<i>Eurybia eryngiifolia</i>	Thistle leaf aster			X			
<i>Euthamia caroliniana</i>	Flattop goldenrod			X			

**Lafayette Creek Property—Phases I and II  
Umbrella Regional Mitigation Plans for  
Florida Department of Transportation Projects  
June 20, 2011**



Scientific Name	Common Name	412	414	626	614	615	611
<i>Euthamia graminifolia</i>	Flattop goldenrod		X	X			
<i>Fuirena breviseta</i>	Umbrella sedge			X			X
<i>Gaylussacia dumosa</i>	Huckleberry	X	X	X			
<i>Gaylussacia frondosa</i>	Huckleberry		X	X			
<i>Gaylussacia moserii</i>	Hairy huckleberry			X			
<i>Gelsemium sempervirens</i>	Yellow jessamine		X	X			
<i>Gnaphalium pennsylvanicum</i>	Cudweed	X	X				
<i>Hamamelis virginiana</i>	Witchhazel		X			X	X
<i>Helianthemum carolinianum</i>	Rock-rose	X	X				
<i>Helianthus angustifolius</i>	Narrow leaved sunflower			X			X
<i>Helianthus heterophylla</i>	Variable leaved sunflower			X			
<i>Helianthus radula</i>	Stiff sunflower		X				
<i>Hypericum fasciculatum</i>	Peelbark St. John's wort			X	X		X
<i>Hypericum galioides</i>	Bedstraw St. John's wort			X	X	X	X
<i>Hypericum gentinoides</i>	Pineweed	X	X				
<i>Hypericum hypericoides</i>	St. andrews cross		X			X	
<i>Heterotheca subaxillaris</i>	Camphorweed	X	X				
<i>Hypoxis juncea</i>	Fringed yellow star grass		X				
<i>Ilex glabra</i>	Ink gallberry		X	X			
<i>Ilex coriacea</i>	Large gallberry			X	X	X	X
<i>Ilex opaca</i>	Holly	X	X				X
<i>Ilex vomitoria</i>	Yaupon		X			X	X
<i>Illicium floridanum</i>	Florida Anise						
<i>Itea virginica</i>	Sweetspire					X	X
<i>Juncus canadensis</i>	Canada rush			X			X
<i>Juncus effusus</i>	Woolly rush			X			X
<i>Juncus polycephalus</i>	Rush			X			X
<i>Juncus scirpoides</i>	Rush			X			X
<i>Juncus tenuis</i>	Rush			X			X
<i>Juncus validus</i>	Rush			X			X
<i>Kalmia hirsuta</i>	Hairy Wicky		X				
<i>Kalmia latifolia*</i>	Mountain laurel					X	X
<i>Lachnocaulon anceps</i>	Bogbutton		X	X			X
<i>Lachnocaulon minus</i>	Small's bogbutton			X			X
<i>Leucothoe axillaris</i>	Doghobble					X	X
<i>Liatris sp.</i>	Blazing star	X	X				
<i>Licania michauxii</i>	Gopher apple		X				
<i>Liriodendron tulipifera</i>	Tulip poplar					X	X
<i>Lithospermum caroliniense</i>	Pucoon	X					
<i>Ludwigia leptocarpa</i>	Anglestem primrose willow			X			X
<i>Ludwigia pilosa</i>	Hairy primrosewillow			X			X
<i>Lupinus diffusus</i>	Sky-blue lupine	X					
<i>Lupinus perennis</i>	Sundial lupine	X					
<i>Lupinus villosus</i>	Lady lupine	X					
<i>Lycopodiella alopecuroides</i>	Foxtail clubmoss			X			X
<i>Lycopus rubellus</i>	Water horehound			X			X
<i>Lyonia lucida</i>	Fetterbush		X	X	X		X
<i>Magnolia grandiflora</i>	Southern magnolia		X			X	X
<i>Magnolia virginiana</i>	Sweetbay				X	X	X
<i>Melanthium virginicum</i>	Crow poison			X			
<i>Minuartia caroliniana</i>	Pinebarren stitchwort	X					
<i>Mitchella repens</i>	Twinberry		X				
<i>Myrica heterophylla</i>	Wax myrtle		X	X			
<i>Myrica cerifera</i>	Wax myrtle		X	X	X	X	X
<i>Myrica inodorata</i>	Odorless wax myrtle			X	X		X
<i>Nyssa biflora</i>	Black gum				X	X	X
<i>Opuntia humifusa</i>	Prickly-pear cactus						
<i>Osmanthus americanus</i>	Wild olive		X				X
<i>Osmunda cinnamomea</i>	Cinnamon fern			X	X	X	X

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Scientific Name	Common Name	412	414	626	614	615	611
<i>Osmunda regalis</i>	Royal fern			X	X	X	X
<i>Oxydendron arboreum</i>	Sourwood						X
<i>Panicum verrucosum</i>	Warty panic grass			X			X
<i>Paspalum notatum</i>	Bahia grass	X	X				
<i>Peltandra virginica</i>	Green arrow arum					X	X
<i>Persea borbonia</i>	Red bay				X	X	X
<i>Persea palustris</i>	Silk bay				X	X	X
<i>Photinia pyrifolia</i>	Red chokeberry			X	X		X
<i>Phytolacca americana</i>	Pokeweed		X			X	
<i>Pinguicula primuliflora</i>	Primrose flowered butterwort			X			X
<i>Pinus clausa</i>	Sand pine	X					
<i>Pinus elliotii</i>	Slash pine	X	X	X	X	X	X
<i>Pinus palustris</i>	Longleaf pine	X	X	X	X	X	
<i>Pityopsis aspera</i>	Pineland silkgrass	X	X				
<i>Pityopsis graminifolia</i>	Grass-leaved silkgrass	X	X				
<i>Pleea tenuifolia</i>	Rush featherling			X			
<i>Pluchea foetida</i>	Camphor			X			X
<i>Polygala lutea</i>	Orange milkwort		X	X			X
<i>Polygala nana</i>	Candyroot		X	X			X
<i>Polygonella gracillis</i>	Jointweed	X	X				
<i>Potamogeton diversifolius</i>	Waterthread pondweed						X
<i>Pteridium aquilinum</i>	Bracken fern		X				
<i>Pterocaulon pycnostachyum</i>	Blackroot		X				
<i>Quercus geminata</i>	Sand live oak	X	X				
<i>Quercus falcata</i>	Southern red oak		X				
<i>Quercus hemisphaerica</i>	Diamond oak	X	X				
<i>Quercus incana</i>	Blue jack oak	X	X				
<i>Quercus laevis</i>	Turkey oak	X					
<i>Quercus laurifolia</i>	Laurel oak					X	X
<i>Quercus margaretta</i>	Sand post oak	X	X				
<i>Quercus minima</i>	Dwarf live oak		X				
<i>Quercus nigra</i>	Water oak		X			X	X
<i>Quercus pumila</i>	Runner oak		X				
<i>Rhexia alifanus</i>	Savanna meadowbeauty			X			
<i>Rhexia mariana</i>	Pale meadowbeauty		X	X			X
<i>Rhexia nashii</i>	Meadowbeauty		X	X	X		
<i>Rhododendron viscosum</i>	Swamp azalea			X	X	X	X
<i>Rhus coppalinum</i>	Winged sumac		X				
<i>Rhynchospora chalarocephala</i>	Beak sedge			X	X	X	X
<i>Rhynchospora fascicularis</i>	Beak sedge			X	X	X	X
<i>Rhynchospora intermedia</i>	Beak sedge		X				
<i>Rhynchospora megalocarpa</i>	Beak sedge	X	X			X	
<i>Rhynchospora stenophylla*</i>	Coastal plain beak sedge						X
<i>Rubus argutus</i>	Blackberry					X	X
<i>Rubus cuneifolius</i>	Sand blackberry	X	X				
<i>Saccharum baldwinii</i>	Narrow plumegrass			X			X
<i>Sagittaria latifolia</i>	Broadleaf arrowhead					X	X
<i>Salix caroliniana</i>	Willow			X		X	
<i>Sarracenia leucophylla*</i>	White top pitcher plant						
<i>Sarracenia psittacina*</i>	Parrot pitcher						
<i>Sarracenia rosea*</i>	Gulf purple pitcher plant						
<i>Schrankia microphylla</i>	Sensitive briar	X	X				
<i>Sericocarpus tortifolius</i>	White top aster	X	X				
<i>Serenoa repens</i>	Saw palmetto	X	X				
<i>Smilax auriculata</i>	Ear-leaf greenbriar		X				
<i>Smilax bona-nox</i>	Greenbriar		X	X	X	X	X
<i>Smilax glauca</i>	Cat greenbriar			X	X	X	X
<i>Smilax laurifolia</i>	Bamboo vine			X	X	X	X
<i>Smilax pumila</i>	Sarsparilla vine		X				

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Scientific Name	Common Name	412	414	626	614	615	611
<i>Smilax smallii</i>	Greenbriar					X	
<i>Smilax tamnoides</i>	Greenbriar					X	X
<i>Solidago fistulosa</i>	Goldenrod			X			X
<i>Solidago odora</i>	Goldenrod	X	X				
<i>Sphagnum sp.</i>	Sphagnum moss			X	X	X	X
<i>Stewartia malacodendron*</i>	Stewartia					X	
<i>Stillingia sylvatica</i>	Queen's delight	X	X				
<i>Styrax americana</i>	Styrax			X		X	X
<i>Symphotrichum dumosum</i>	Rice button aster		X				
<i>Taxodium ascendens</i>	Pond cypress				X		X
<i>Taxodium distichum</i>	Bald cypress					X	
<i>Tephrosia spicata</i>	Spiked hoary pea	X	X				
<i>Tephrosia virginiana</i>	Devil's Shoestring	X	X				
<i>Tofieldia racemosa</i>	Coastal false asphodel			X			
<i>Toxicodendron radicans</i>	Poison ivy					X	X
<i>Tragia urens</i>	Wavyleaf noseburn	X	X				
<i>Tragia urticifolia</i>	Nettle leaf noseburn	X	X				
<i>Tradescantia hirsutiflora</i>	Hairy spiderwort	X	X				
<i>Triadenum virginicum</i>	Virginia marsh St. John's wort					X	X
<i>Typha latifolia</i>	Cattail						X
<i>Ulmus americana</i>	American elm					X	
<i>Utricularia subulata</i>	Bladderwort			X			X
<i>Vaccinium arboreum</i>	Sparkleberry	X	X				
<i>Vaccinium corymbosum</i>	High-bush blueberry			X	X	X	X
<i>Vaccinium elliotii</i>	Elliott's blueberry					X	X
<i>Vaccinium myrsinites</i>	Shiny blueberry		X	X			
<i>Vaccinium staminium</i>	Deerberry		X	X			
<i>Viburnum nudum</i>	Possumhaw					X	X
<i>Viola lanceolata</i>	Lance leaved violet			X			X
<i>Viola primulifolia</i>	Primrose leaved violet			X	X		X
<i>Vitis rotundifolia</i>	Muscadine grape	X	X	X	X		
<i>Wisteria frutescens</i>	Swamp wisteria					X	X
<i>Woodwardia areolata</i>	Netted chain fern					X	X
<i>Woodwardia virginica</i>	Virginia chain fern					X	X
<i>Xyris brevifolia</i>	Yellow eyed grass			X	X		
<i>Xyris stricta</i>	Yellow eyed grass			X			
<i>Xyris caroliniana</i>	Yellow eyed grass		X				
<i>Yucca filamentosa</i>	Adam's needle	X	X				

## APPENDIX

### B

**Appendix B—Observed and Target Wildlife Species, Phases I and II Lafayette Creek**

<i>Scientific Name</i>	<i>Common Name</i>
<b>Amphibians</b>	
<i>Acris gryllus</i>	cricket frog
<i>Acris gryllus</i>	southern cricket frog
<i>Agkistrodon piscivorus</i>	cottonmouth
<i>Alligator mississippiensis</i>	alligator
<i>Ambystoma cingulatum</i>	flatwoods salamander
<i>Ambystoma talpoideum</i>	mole salamander
<i>Ambystoma tigrinum</i>	tiger salamander
<i>Amphiuma means</i>	two-toed amphiuma
<i>Anolis carolinensis</i>	green anole
<i>Bufo quercicus</i>	oak toad
<i>Chelydra serpentina</i>	snapping turtle
<i>Cnemidophorus sexlineatus</i>	six-lined racerunner
<i>Coluber constrictor</i>	black racer
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake
<i>Crotalus spp.</i>	diamondback rattlesnake
<i>Deirochelys reticularia</i>	chicken turtle
<i>Desmognathus auriculatus</i>	southern dusky salamander
<i>Diadophis punctatus</i>	ringneck snake
<i>Elaphe guttata</i>	red rat snake
<i>Elaphe obsoleta quadrivittata</i>	yellow rat snake
<i>Elaphe obsoleta spiloides</i>	gray rat snake
<i>Eumeces laticeps</i>	broadhead skink
<i>Eurycea quadradigitata</i>	dwarf salamander
<i>Farancia abacura</i>	eastern mud snake
<i>Gastrophryne carolinensis</i>	narrowmouth toad
<i>Gopherus polyphemus</i>	gopher tortoise
<i>Heterodon simus</i>	southern hognose snake
<i>Farancia erytrogramma</i>	rainbow snake
<i>Hyla chrysoscelis</i>	Cope's gray treefrog
<i>Hyla cinerea</i>	green treefrog
<i>Hyla femoralis</i>	pinewoods treefrog
<i>Nerodia erythrogaster erythrogaster</i>	redbellied water snake
<i>Hyla gratiosa</i>	barking treefrog
<i>Hyla squirella</i>	squirrel treefrog
<i>Kinosternon baurii</i>	striped mud turtle
<i>Kinosternon subrubrum steindachneri</i>	mud turtle
<i>Lampropeltis elapsoides</i>	scarlet kingsnake
<i>Masticophis flagellum</i>	coachwhip snake
<i>Micrurus fulvius</i>	coral snake
<i>Nerodia fasciata</i>	banded water snake
<i>Nerodia floridana</i>	green water snake
<i>Notophthalmus perstriatus</i>	striped newt
<i>Opheodrys aestivus</i>	rough green snake
<i>Ophisaurus ventralis</i>	eastern glass lizard
<i>Plethodon glutinosus</i>	slimy salamander
<i>Pseudacris nigrita</i>	southern chorus frog
<i>Pseudacris ocularis</i>	little grass frog
<i>Pseudacris ornata</i>	ornate chorus frog
<i>Pseudacris spp.</i>	Chorus frog
<i>Rana capito</i>	gopher frog
<i>Rana catesbeiana</i>	bull frog
<i>Rana clamitans clamitans</i>	bronze frog

Scientific Name	Common Name
<i>Rana grylio</i>	pig frog
<i>Rana sphenoccephala</i>	leopard frog
<i>Regina alleni</i>	striped swamp snake
<i>Regina rigida</i>	crayfish snake
<i>Scaphiopus holbrookii</i>	eastern spadefoot toad
<i>Sceloporus undulatus</i>	eastern fence lizard
<i>Scincella lateralis</i>	ground skink
<i>Seminatrix pygaea</i>	black swamp snake
<i>Siren intermedia</i>	lesser siren
<i>Siren lacertina</i>	greater siren
<i>Sistrurus miliarius</i>	pygmy rattlesnake
<i>Storeria occipitomaculata</i>	red-bellied snake
<i>Terrapene carolina</i>	box turtle
<b>Reptiles</b>	
<i>Gopherus polyphemus</i>	gopher tortoise
<i>Terrapene carolina</i>	box turtle
<i>Chelydra serpentina</i>	common snapping turtle
<i>Pseudemys concinna concinna</i>	river cooter
<i>Sternotherus odoratus</i>	stinkpot
<i>Chelydra serpentina</i>	snapping turtle
<b>Birds</b>	
<i>Accipitriformes spp.</i>	hawks
<i>Aix sponsa</i>	wood duck
<i>Ardea alba</i>	great egret
<i>Ardea herodias</i>	great blue heron
<i>Baeolophus bicolor</i>	tufted titmouse
<i>Bubo virginianus</i>	great horned owl
<i>Buteo lineatus</i>	red-shouldered hawk
<i>Circus cyaneus</i>	northern harrier
<i>Coccyzus americanus</i>	yellowbellied cuckoo
<i>Colinus virginianus</i>	bobwhite
<i>Compsothlypis americana</i>	parula warbler
<i>Corvus brachyrhynchos</i>	common crow
<i>Cyanocitta cristata</i>	blue jay
<i>Dendroica pinus</i>	pine warbler
<i>Dryocopus pileatus</i>	pileated woodpecker
<i>Dumetella carolinensis</i>	catbird
<i>Egretta caerulea</i>	little blue heron
<i>Egretta thula</i>	snowy egret
<i>Egretta tricolor</i>	tricolored heron
<i>Elanoides forficatus</i>	swallow-tailed kite
<i>Euphagus carolinus</i>	rusty blackbird
<i>Falco sparverius</i>	southeastern kestrel
<i>Grus canadensis</i>	sandhill crane
<i>Melanerpes carolinus</i>	red-bellied woodpecker
<i>Picoides villosus</i>	hairy woodpecker
<i>Meleagris spp.</i>	turkey
<i>Mimus polyglottos</i>	mocking bird
<i>Myiarchus crinitus</i>	great-crested flycatcher
<i>Pandion haliaetus</i>	osprey
<i>Passeriformes spp.</i>	songbirds
<i>Poliophtila caerulea</i>	blue gray gnatcatcher
<i>Protonotaria citrea</i>	prothonotary warbler
<i>Scolopax minor</i>	woodcock
<i>Sitta pusilla</i>	brown-headed nuthatch
<i>Strix varia</i>	barred owl

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<i>Scientific Name</i>	<b>Common Name</b>
<i>Thryothorus ludovicianus</i>	Carolina wren
<i>Vireo griseus</i>	white-eyed vireo
<i>Vireo olivaceus</i>	red-eyed vireo
<i>Lanius ludovicianus</i>	loggerhead shrike
<i>Pipilo erythrophthalmus</i>	rufous-sided towhee
<i>Dendroica coronata</i>	yellow-rumped warbler
<i>Dendroica dominica</i>	yellow-throated warbler
<i>Archilochus colubris</i>	ruby-throated hummingbird
<i>Megascops kennicottii</i>	screech owl
<i>Colinus virginianus</i>	bobwhite
<i>Zenaida macroura</i>	mourning dove
<b>Mammals</b>	
<i>Didelphis virginiana</i>	opossum
<i>Felis rufus</i>	bobcat
<i>Lontra canadensis</i>	river otter
<i>Mephitis mephitis</i>	striped skunk
<i>Neotoma floridana</i>	wood rat
<i>Neovison vison</i>	southern mink
<i>Sorex longirostris</i>	southeastern shrew
<i>Odocoileus virginianus</i>	white-tailed deer
<i>Sylvilagus palustris</i>	marsh rabbit
<i>Peromyscus gossypinus</i>	cotton mouse
<i>Procyon lotor</i>	raccoon
<i>Blarina brevicauda</i>	short-tailed shrew
<i>Scalopus aquaticus</i>	eastern mole
<i>Sciurus carolinensis</i>	gray squirrel
<i>Sciurus niger</i>	fox squirrel
<i>Sigmodon hispidus</i>	cotton rat
<i>Soricidae spp.</i>	shrews
<i>Sylvilagus floridanus</i>	cottontail rabbit
<i>Urocyon cinereoargenteus</i>	gray fox
<i>Ursus americanus</i>	black bear



## APPENDIX

### C



1. Upland Hardwood Forest (included in FLUCCS 611)



2. Sandhill (FLUCCS 412)



3. Pine Plantation (FLUCCS 441)



4. High Pine (FLUCCS 414)



5. High Pine (FLUCCS 414)



6. Bay Swamp (FLUCCS 611)



7. Bay Swamp (FLUCCS 611)



8. Bay Swamp Right-of-Way (FLUCCS 611)



9. Pine Plantation - Hydric (FLUCCS 441H)



10. Remnant Hydric Savanna Wiregrass in Shrub Bog (FLUCCS 614)



11. Seepage Stream Discharge into Lafayette Creek



12. Seepage Stream Falls in Bay Swamp (FLUCCS 611)



13. Seepage Stream



14. Stream Swamp (Bottomland; FLUCCS 615)



15. Stream Swamp (Bottomland; FLUCCS 615)



16. Stream Swamp (Bottomland; FLUCCS 615)



17. Shrub Bog (FLUCCS 614)



18. Spring Vent in Steephead System



19. Lafayette Creek

## APPENDIX

### D

LAFAYETTE CREEK PHASES I and II																					
UMAM ASSESSMENT AREAS (AA)					SCORE						UMAM W/OUT MIT.	UMAM WITH MIT.	DELTA	TIME LAG	P FACTOR	RISK	RFG	LIFT/LOSS	AVAILABLE CREDIT		
AA	FLUCCS DESIGNATION		MITIGATION ACTION	AREA (acres)	LOCATION AND LANDSCAPE		WATER ENVIRONMENT		COMMUNITY STRUCTURE										SHRUB	FORESTED	UPLAND FORESTED
	CURRENT	TARGET			W/OUT or CUR.	WITH MIT.	W/OUT or CUR.	WITH MIT.	W/OUT or CUR.	WITH MIT.											
Phase I																					
1-1	Sandhill (FLUCCS 412)	Sandhill (FLUCCS 412)	Fire	149.6	6	8	NA	NA	8	9	0.47	0.57	0.10	1.92	NA	1.00	0.05	7.79	NA	NA	7.79
2-1	Shrub Bog (FLUCCS 614)	Shrub Bog (FLUCCS 614)	Fire	4.9	6	8	8	9	6	7	0.67	0.80	0.13	1.00	NA	1.00	0.13	0.65	0.65	NA	NA
3-2	Shrub Bog (FLUCCS 614)	Hydric Savanna (FLUCCS 626)	Fire, Gyrotrac	46.82	6	8	8	9	3	9	0.57	0.87	0.30	1.14	NA	1.50	0.18	8.21	NA	8.21	NA
4-3	High Pine (FLUCCS 414)	High Pine (FLUCCS 414)	Fire, Thin	12.11	6	8	NA	NA	7	9	0.43	0.57	0.13	1.07	NA	1.00	0.12	1.51	NA	NA	1.51
5-3	Pine Plantation (FLUCCS 441)	Sandhill (FLUCCS 412)	Fire, Thin	21.27	6	8	NA	NA	7	9	0.43	0.57	0.13	1.07	NA	1.25	0.10	2.12	NA	NA	2.12
6-3	Pine Plantation (FLUCCS 441)	High Pine (FLUCCS 414)	Fire, Thin	185.03	6	8	NA	NA	7	9	0.43	0.57	0.13	1.07	NA	1.25	0.10	18.45	NA	NA	18.45
8-4	Pine Plantation Hydric (FLUCCS 441H)	Hydric Savanna (FLUCCS 626)	Fire, Thin, Gyrotrac	5.77	6	8	8	9	3	9	0.57	0.87	0.30	1.14	NA	1.50	0.18	1.01	NA	1.01	NA
9-5	Bay Swamp (FLUCCS 611)	Bay Swamp (FLUCCS 611)	Preservation, Fire Intrusion	15.80	6	8	8	9	7	9	0.70	0.87	0.17	NA	1	NA	0.17	2.63	NA	2.63	NA
10-5	Stream Swamp (FLUCCS 615)	Stream Swamp (FLUCCS 615)	Preservation, Fire Intrusion	53.78	6	8	8	9	8	9	0.73	0.87	0.13	NA	1	NA	0.13	7.17	NA	7.17	NA
11-6	Sandhill ROW (FLUCCS 412ROW)	Sandhill ROW (FLUCCS 412ROW)	Mow, Fire Intrusion	12.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12-6	Shrub Bog ROW (FLUCCS 614ROW)	Shrub Bog ROW (FLUCCS 614ROW)	Mow, Fire Intrusion	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13-6	Bay Swamp ROW (FLUCCS 611ROW)	Bay Swamp ROW (FLUCCS 611ROW)	Mow, Fire Intrusion	0.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14-6	Stream Swamp ROW (FLUCCS 615ROW)	Stream Swamp ROW (FLUCCS 615ROW)	Mow, Fire Intrusion	0.56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



UMAM ASSESSMENT AREAS (AA)				SCORE							UMAM W/OUT MIT.	UMAM WITH MIT.	DELTA	TIME LAG	P FACTOR	RISK	RFG	LIFT/LOSS	AVAILABLE CREDIT			
AA	FLUCCS DESIGNATION		MITIGATION ACTION	AREA (acres)	LOCATION AND LANDSCAPE		WATER ENVIRONMENT		COMMUNITY STRUCTURE										WETLAND		UPLAND	
	CURRENT	TARGET			W/OUT or CUR.	WITH MIT.	W/OUT or CUR.	WITH MIT.	W/OUT or CUR.	WITH MIT.									SHRUB	FORESTED	FORESTED	
15-6	Hydric Savanna ROW (FLUCCS 626ROW)	Hydric Savanna ROW (FLUCCS 626ROW)	Mow, Fire Intrusion	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
<b>Phase II</b>																						
1-1	Sandhill (FLUCCS 412)	Sandhill (FLUCCS 412)	Fire	225.63	6	8	NA	NA	8	9	0.47	0.57	0.10	1.92	NA	1.00	0.05	11.75	NA	NA	11.75	
2-1	Shrub Bog (FLUCCS 614)	Shrub Bog (FLUCCS 614)	Fire	0.66	6	8	8	9	6	7	0.40	0.50	0.10	1.00	NA	1.00	0.10	0.07	0.07	NA	NA	
3-2	Shrub Bog (FLUCCS 614)	Hydric Savanna (FLUCCS 626)	Fire, Gyrotrac	23.89	6	8	8	9	3	9	0.30	0.57	0.27	1.14	NA	1.50	0.16	3.73	NA	3.73	NA	
4-3	High Pine (FLUCCS 414)	High Pine (FLUCCS 414)	Fire, Thin	13.21	6	8	NA	NA	7	9	0.43	0.57	0.13	1.07	NA	1.00	0.12	1.65	NA	NA	1.65	
6-3	Pine Plantation (FLUCCS 441)	High Pine (FLUCCS 414)	Fire, Thin	68.39	6	8	NA	NA	7	9	0.43	0.57	0.13	1.07	NA	1.25	0.10	6.82	NA	NA	6.82	
7-4	Pine Plantation Hydric (FLUCCS 441H)	Hydric Savanna (FLUCCS 626)	Fire, Thin, Gyrotrac	13.43	6	8	8	9	3	9	0.57	0.87	0.30	1.14	NA	1.50	0.18	2.36	NA	2.36	NA	
8-5	Bay Swamp (FLUCCS 611)	Bay Swamp (FLUCCS 611)	Preservation, Fire Intrusion	25.02	6	8	8	9	7	9	0.70	0.87	0.17	NA	1	NA	0.17	4.17	NA	4.17	NA	
9-5	Stream Swamp (FLUCCS 615)	Stream Swamp (FLUCCS 615)	Preservation, Fire Intrusion	27.62	6	8	8	9	8	9	0.73	0.87	0.13	NA	1	NA	0.13	3.68	NA	3.68	NA	
<b>TOTAL</b>				<b>869.80</b>														<b>TOTAL</b>	<b>83.77</b>	<b>0.72</b>	<b>32.96</b>	<b>50.08</b>
																		<b>TOTAL</b>	<b>Shrub</b>	<b>1.79</b>		
																		<b>TOTAL</b>	<b>Forested</b>	<b>81.98</b>		
																		<b>GRAND TOTAL</b>		<b>83.77</b>		