PLUM CREEK MITIGATION SITE
Annual Monitoring Report, Year 3 of 5
February 15, 2012

PROJECT OVERVIEW

Impact:	SR 79 Open Creek Bridge; Washington Co., 1.82-acre impact SR 79 Holmes Creek Bridge; Washington Co., 8.27-acre impact
USACE Permit No.:	SAJ-2005-8619 IP-AWP, issued 8/10/06 SAJ-2005-08619 (MOD-AWP), issued 5/11/09 SAJ-2006-4627 IP-AWP, issued 3/12/08 SAJ-2006-4627 MOD-AWP, issued 1/20/09
Mitigation:	Plum Creek, Washington County
Permittee/Consultant:	FDOT
Responsible Party for Monitoring:	Northwest Florida Water Management District (NWFWMD) 81 Water Management Dr. Havana, FL 32333
Date of Inspection:	February 13, 2012
Inspectors:	Graham Lewis, Leigh Brooks

Purpose of the Approved Project
Bridge repair and construction at two sites along SR 79 in Washington County, Florida, have resulted in 10.09 acres of impacts that are being mitigated at this site. Plum Creek is a 130-acre tract located approximately 600 feet north of Holmes Creek in Washington Co., and is contiguous with other NWFWMD lands.

Location and Directions
The mitigation site is located in central Washington County, approximately 4 miles northeast of Vernon (Figures 1 and 2). From Interstate 10, take Exit 112. Head south on SR 79 for about 5.3 miles. Turn left onto Union Hill Road heading east and go 1.4 miles. Turn left onto Johnson Road. In about 0.2 miles you will arrive at the property gate on the south side of the road.

Project Summary
The goal of this mitigation project is the preservation and restoration of approximately 130 acres of wetlands and associated upland buffers near Holmes Creek. Approximately 70 acres of upland pine plantation will be restored to native longleaf pine forest (FLUCCS 411), 30 acres of forested wetlands (FLUCCS 630 with minor inclusions of FLUCCS 625) will be preserved, and another 30 acres of non-forested wetlands (FLUCCS 640) will be restored via hydrologic enhancements and planting of appropriate wetland species including cypress and black gum. Perpetual ecological management strategies will include prescribed fire.

MITIGATION ACTIVITIES
Work Schedule
- Upland tree thinning, Fall 2009 (by previous owner)
- Acquired December, 2009 from the Plum Creek Timber Company.

- Road stabilization and culvert placement, completed April 2010
- Herbicide application for hardwood eradication, completed June 2010
- Beaver removal, completed June 2010
- Beaver dam breaching and low-water crossing installation, completed July 2010
- Prescribed fire in upland sections, completed November 2010
- Planting of longleaf pine in upland (71 acres, 10x10), completed December 2010
- Planting of cypress and black gum in wetland polygon (10 acres, 10x10), completed December 2010
- Annual monitoring, completed fall 2009, fall 2010, winter 2012

Description of management activities

To date, a variety of management activities have been performed as highlighted in the previous section. Prior to acquisition in December 2009 by the NWFWMD, a timber harvest was initiated by the property owners; a clearcut of existing pines was performed throughout the upland areas of the site. Some hardwoods were left as well as a substantial buffer around the cypress/gum wetland (Polygon B, Figure 3). To assist in managing the site and enhance erosion control, the entry road was stabilized with lime rock (#3 grade) and a culvert was installed where water had overtopped the road (Polygon D, Figure 3).

The non-forested wetland area (Polygon B, Figure 3), deemed to have been a closed canopy wetland forest historically, had been inundated for some time by a small population of beavers; they had built an extensive dam system along the southern boundary of the site obstructing flow offsite and pooling water in the wetland. This included blockage of the downstream culvert. The beavers were trapped and removed from the site in June 2010 and their dams were breached in several locations in July 2010. In addition, the downstream culvert was cleaned out and a low-water crossing installed adjacent to it. Beavers have been absent from the property since that time with little standing water observed in the previously ponded area. Water can now flow unhindered from the wetland and leave the site through the culvert.

Several activities were conducted to prepare the upland areas for longleaf restoration. In June 2010 the area (Polygon E, Figure 3) was treated with an herbicide to remove the oaks left from the initial timber harvest. Velpar ULW was applied to the site at a rate of 2.0 lbs per acre. In November a prescribed fire was conducted in preparation for planting. Longleaf pines were planted on the site (71 acres) in December at 436 seedlings per acre. These have survived well as noted in the current survey. In addition to the pines, cypress and black gum were planted (436 trees per acre) in 10 acres of the wetland site; surviving individuals were also observed during the current monitoring.

MONITORING REQUIREMENTS (from Northwest Florida Umbrella, Watershed-based, Regional Mitigation Plan (UWRMP); NWFWMD July 2006, revised March 2009):

- Any project specific requirements per permit.
- Annual or more frequent site inspection
    - Perimeter for signs of trespassing, fencing and signage integrity and infestation by exotic or nuisance vegetation;
    - Internal roads (both public and maintenance) for signs of dumping or trespassing, erosion, road integrity, exotic vegetation and nuisance vegetation and fauna;

    - All construction areas for stabilization and re-vegetation, structure operation and integrity.
- Qualitative monitoring, as appropriate.
    - Pedestrian survey - Notes on general health and reproductive status of vegetation, dominant species, recruitment of new species, the presence or spread of nuisance/exotic species, and the hydrologic condition will be recorded on field data sheets. Potential problems and appropriate solutions will be identified.
    - Permanent photographic stations.
    - Best available digital ortho photography for aerial monitoring.
    - Wildlife utilization - direct sightings, scat, tracks, vocalizations.
- Annual reports posted at www.NWFWMDwetlands.com for duration of monitoring.

SUMMARY OF MONITORING ACTIVITIES

Monitoring Observations

The current monitoring was carried out on February 13, 2012, and consisted of a meandering pedestrian survey throughout the site with photographs taken at a variety of points (Figures 3 and 4). Field sheets are attached documenting site conditions and observed species.

Forested wetlands (Polygon A, Figure 3) appeared in healthy condition with a diverse understory and canopy layer including many large bay, cypress and tupelo trees, typical of a high quality bottomland forest (Photo 1). The disturbed firebreak area at the ecotone edge between the wetland forest and the upland buffer, described in the previous annual monitoring (2010), was still observable but had revegetated well. Uneven grade, disturbed soil had recontoured naturally with only slight irregularities. Seepage was noticeable at the base of the slope with numerous rushes, sedges, sundew and other wetland groundcover colonizing within the old firebreak.

The non-forested wetland area (Polygon B, Figure 3) had only small areas of standing water, indicative of the successful beaver dam removal (see later discussion). Wetland soils were saturated and included some areas of "quaking bottom" where subsurface water was apparent. Wetland vegetation consisted primarily of diverse groundcover species around the periphery (Photos 2-4) with canopy cypress and gum restricted more to the central and eastern portions of the polygon (Photos 5-6). Numerous old stumps and snags of varying sizes were noted (Photo 5), probably dating from when there was standing water over the area (i.e., beaver pond). Isolated clumps of titi (*Cliftonia* and *Cyrilla*) and sweetbay (*Magnolia virginiana*) were scattered throughout especially to the south (Photo 7). Numerous small cypress trees (Photo 8) ranging from 2-3 feet high were found primarily along the western side of the wetland; these individuals appear to be survivors from the Fall 2010/Winter 2011 planting. None were noted on the eastern side.

The current monitoring included an inspection of the beaver dam breaches (Photo 9) and the downstream culvert and low-water crossing (Photo 10) to determine if downstream flow remained unobstructed. Both were found to be in good shape with no signs of beaver activity. No noticeable rebuilding of the dams was observed and flow was noted through the culvert. Since flows were very low, no water was flowing over the low-water crossing.

The upland forest areas (primarily Polygon E, Figure 3) remain in transition between a planted pine silviculture and a native sandhill community (Photos 11-12). Only a single line of large trees (oaks and pines) had been left after clearcutting the site, presumably to act as seed trees for recolonization, and longleaf were planted over most of the uplands. Longleaf seedlings were relatively common and appeared to be doing well particularly in open areas with little groundcover (Photo 13). Wiregrass was also observed but varied in abundance from none on the eastern side of the entry road to sparse on the western side moving upslope (Photo 14). Isolated clumps of yaupon, pineweed, gallberry, blackberry and Carolina jessamine were noted along with sparkleberry, deerberry and persimmon on the eastern side. Shiny and highbush blueberry, yaupon, wild indigo, bluejack and sand live oak, wild olive and American holly were observed on the western side along with broom sedge and witch grass. The site is trending toward a wiregrass-longleaf pine sandhill community but is in the early stage. Continued management with the inclusion of prescribed burns will assist this process. Future wiregrass planting may be necessary to establish adequate groundcover capable of carrying fire.

The main road through the property was in good shape with no signs of erosion or trash. There is a short extension of the entry road to the north and east of the main gate (Photo 15) that may allow entry into the site when the gate is locked. This may require some type of fencing or road blockage.

Success Criteria

The following performance standards, taken from the Northwest Florida Umbrella, Watershed-based, Regional Mitigation Plan (NWFWMD July 2006, revised March 2009), were evaluated during the recent site inspection. Success criteria, while not all met at this time, are trending toward the targeted community type.

- No observable decline in natural community health – no declines observed
- Species diversity is, at a minimum, stable in each wetland polygon – diversity appears stable
- No more than 1% coverage of invasive exotics and 5% coverage of nuisance native and non-invasive exotic species – no exotics were noted during this survey
- No more than 200 pine (longleaf or slash) trees per acre in upland areas – pines are well under the 200-tree threshold. Longleaf were planted in 2010 and seedlings have not left the grass stage. Densities will be monitored in future years.
- Not less than 300 trees per acre in Polygon B (cypress, tupelo or other species) – overall, less than 300 trees per acre (on average) were observed during the current survey; however, high density clumps of cypress and gum were noted in several areas. Since water levels were lowered only recently (i.e., since July 2010), there has not been adequate time for recruitment and recolonization of wetland forest species. Cypress and gum were planted in 2010 with cypress surviving well but it will take several years to develop the targeted closed canopy wetland forest.

CONCLUSIONS

Based on the recent monitoring survey, the mitigation site has a healthy, diverse mix of wetland and upland species with no observed exotics. Both wetland and upland areas are trending towards the desired community types. The forested wetlands have a well-developed canopy with

large mature cypress and bay trees; these areas appear to be stable. The non-forested wetland was recently drained and has developed a diverse groundcover along with several areas of large cypress and gum trees. Small cypress trees, apparently surviving well from the 2010 planting, were noted on the western side of the wetland area and will add to tree density here. Upland polygons have patchy yet relatively diverse groundcover developing; some wiregrass was observed but may need to be supplemented to carry fire in the future. Longleaf seedlings were found throughout the site yet remained in the grass stage. Future monitoring will determine if tree densities in both wetland and upland areas meet success criteria or require further management.

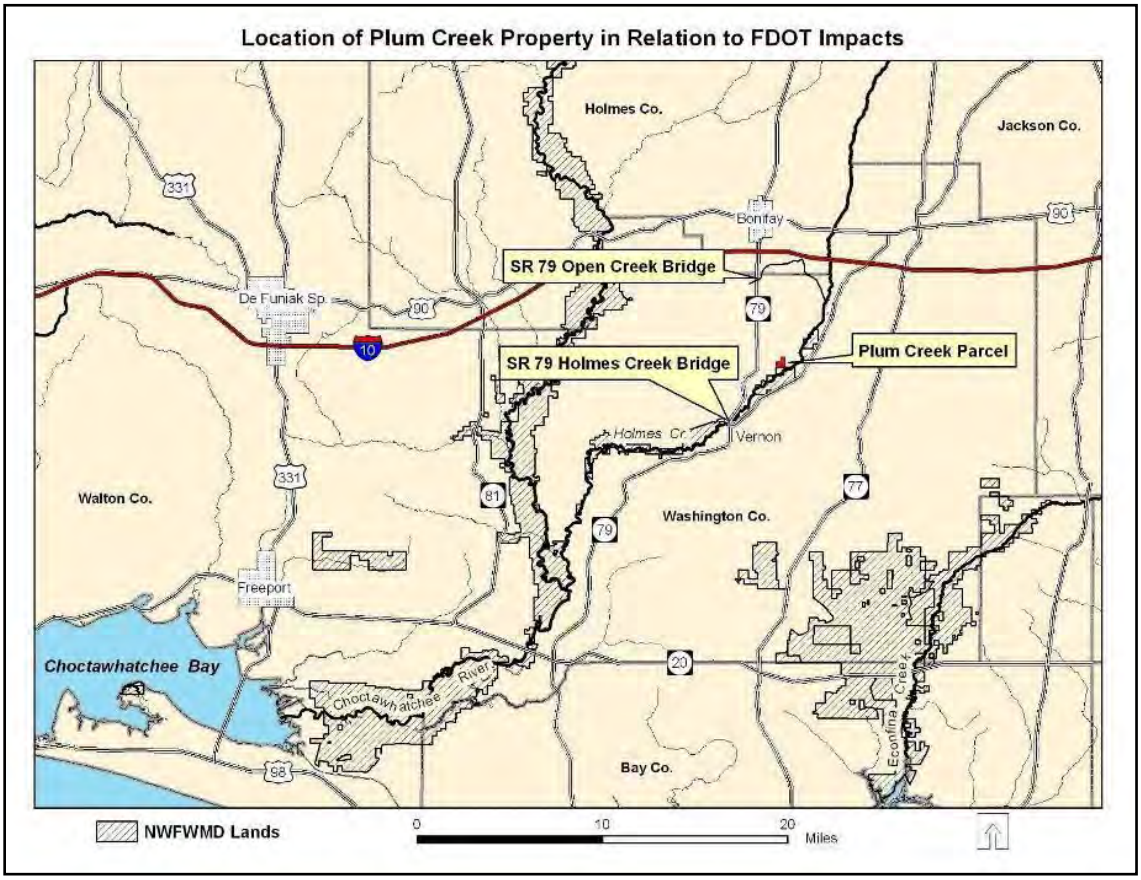

Figure 1. General location for the Plum Creek mitigation site. RTN

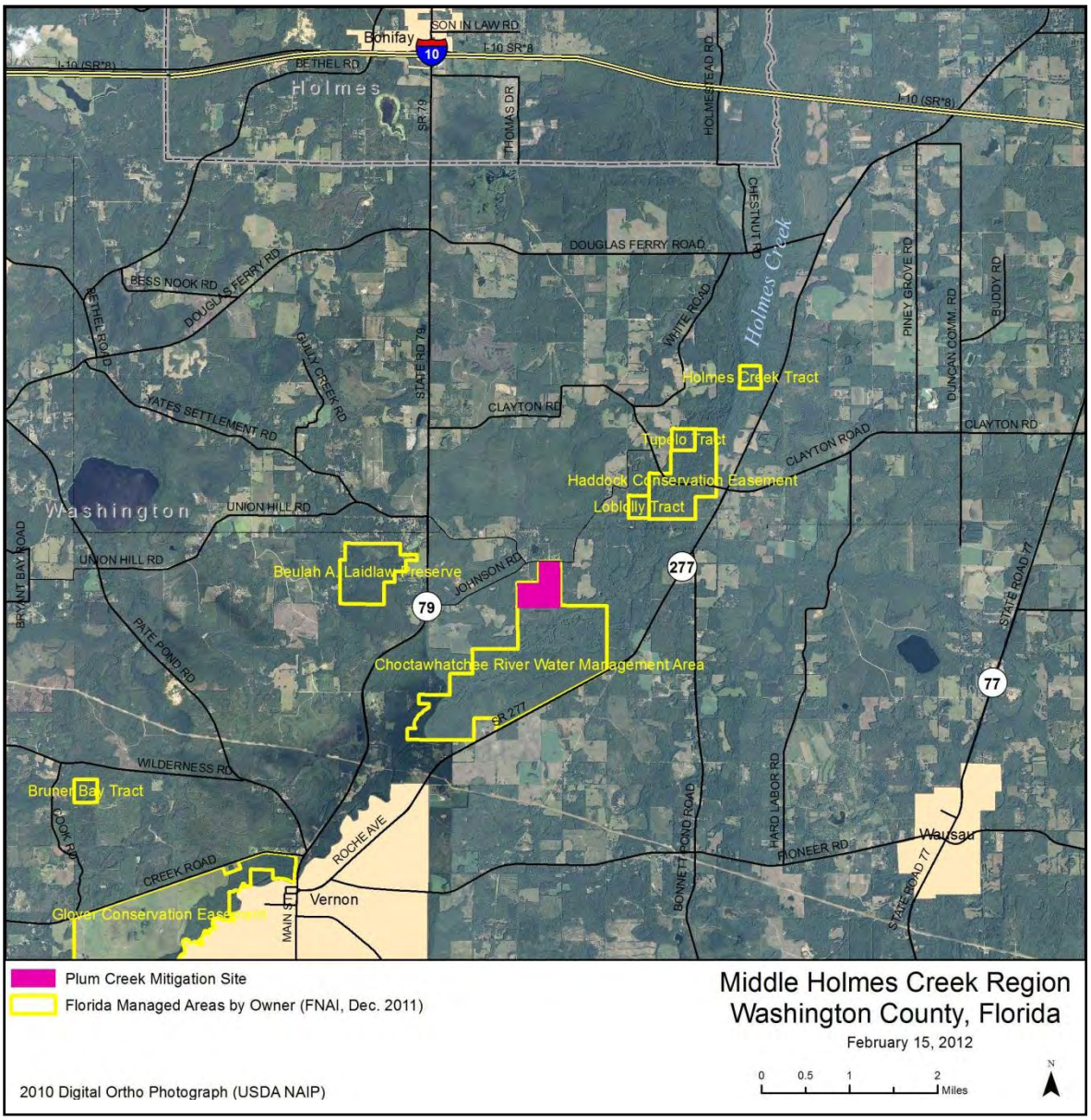

Figure 2. Regional location for the Plum Creek mitigation site. RTN

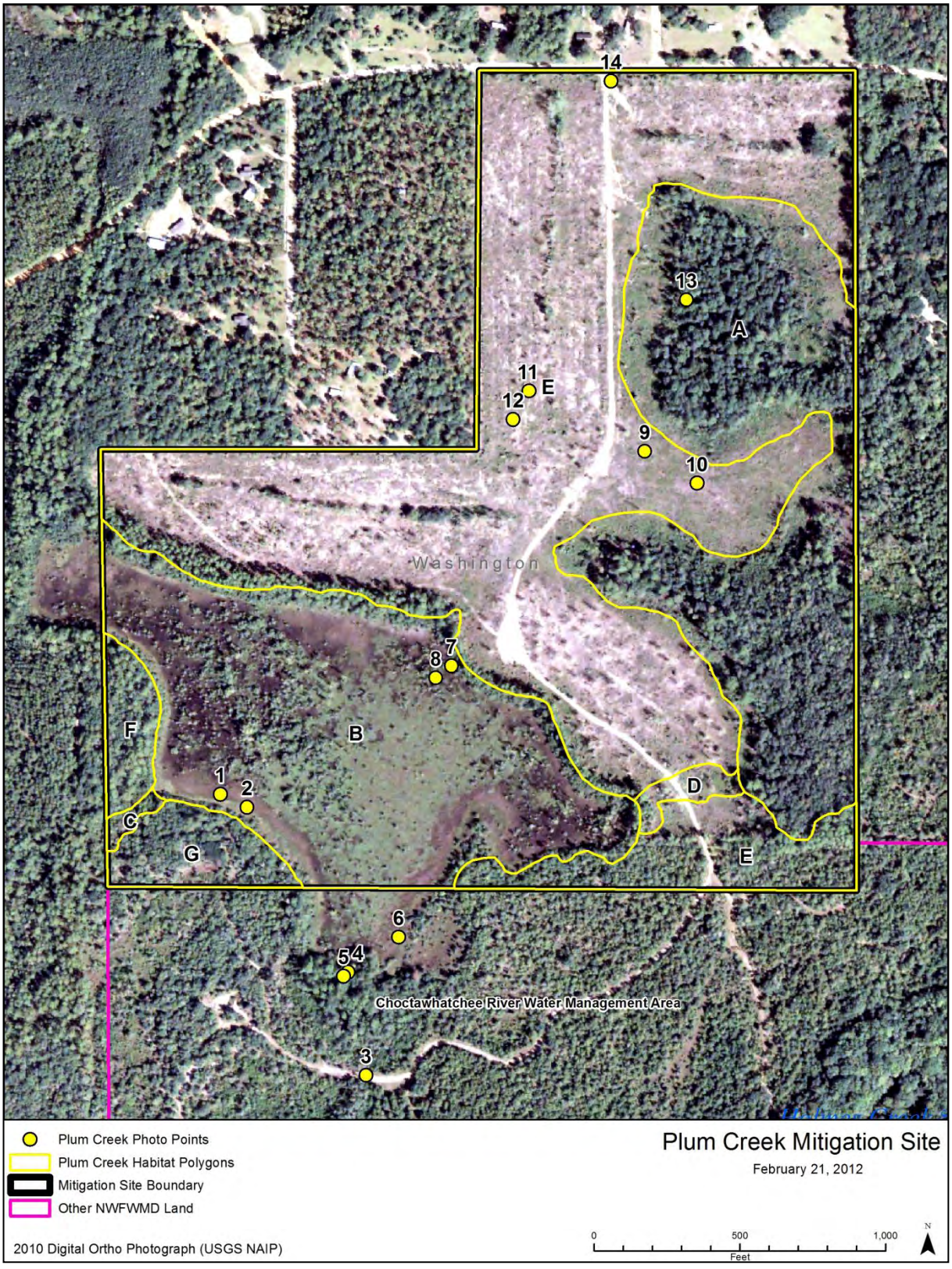

Figure 3. Aerial photograph of mitigation site with location of photographic points indicated. RTN

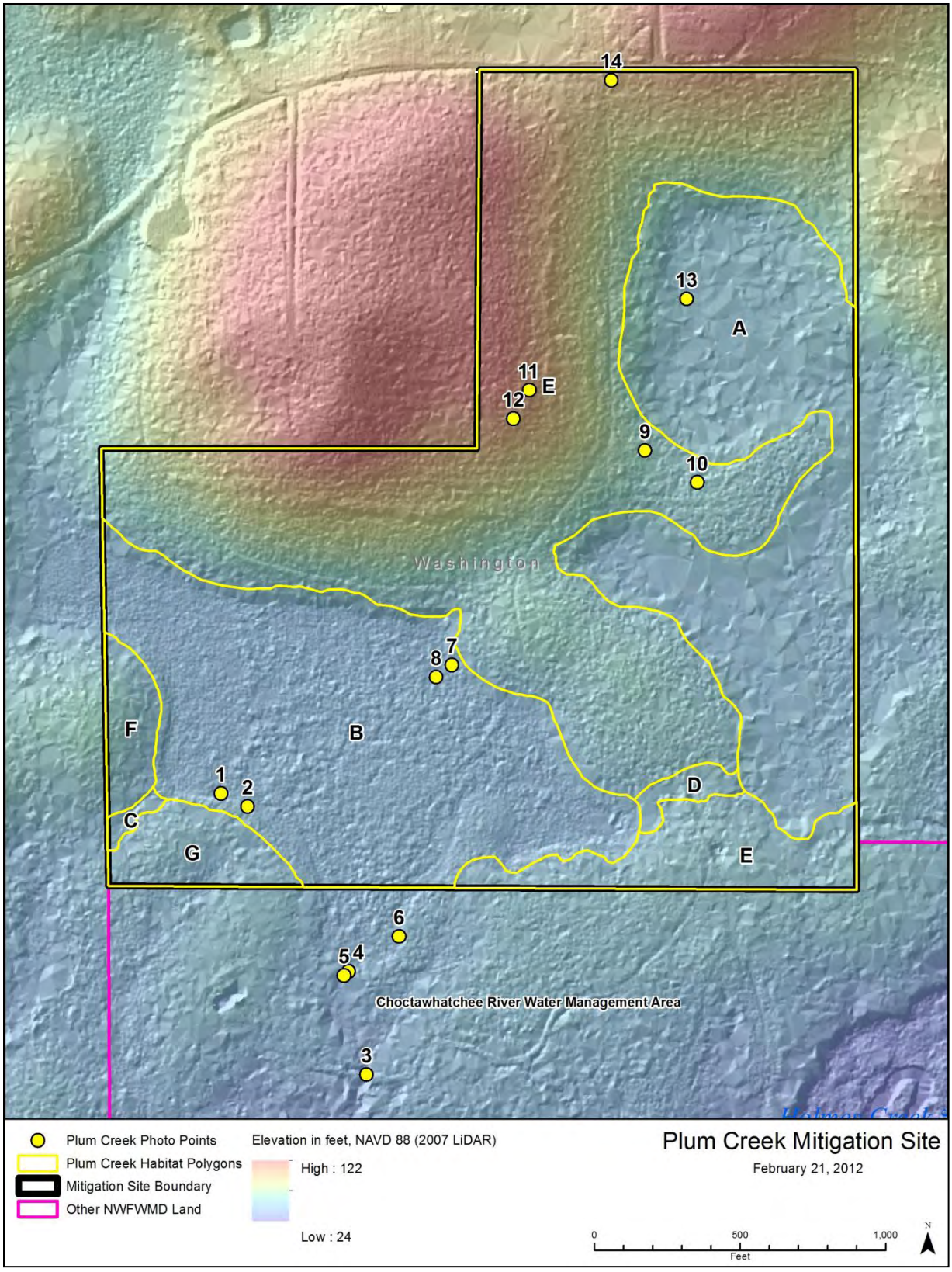

Figure 4. Topography of Plum Creek mitigation site taken from LiDAR imagery (2006). Photo points are indicated as 1-14. RTN

Photo 1. Forested wetland with tall, mature cypress, bay and tupelo. Old stump from historic harvest in foreground. Photo point 13 facing east. 2/13/12. RTN

Photo 2. Non-forested wetland with diverse groundcover. Photo point 2 facing southeast. 2/13/12.

Photo 3. Non-forested wetland with diverse groundcover. Photo point 2 facing northwest. 2/13/12.

Photo 4. Non-forested wetland with close-up of diverse groundcover including *Xyris* sp. in center foreground. Near photo point 2. 2/13/12. RTN

Photo 5. Non-forested wetland with cypress and gum in central portion (bare trees in the background. Note old stumps and snags in foreground. Photo point 1 looking northeast. 2/13/12.

Photo 6. Non-forested wetland with stand of black gum and cypress on eastern side of area. Some small areas of standing water noted along this side of wetland. Photo point 8 facing north. 2/13/12.

RTN

Photo 7. Non-forested wetland, southern end, with isolated sweetbay and titi. Photo point 6 facing north. 2/13/12. RTN

Photo 8. Non-forested wetland, western side, with surviving planted cypress in foreground. Near photo point 2 facing northeast. 2/13/12. RTN

Photo 9. One of several breaches in the beaver dams along the southern portion of the non-forested wetland; all remain open. Photo point 4 facing north. 2/13/12. RTN

Photo 10. Low-water crossing and culvert (not visible in photo) that allow discharge from non-forested wetland. Photo point 3 facing east. 2/13/12. RTN

Photo 11. Upland sandhill community restoration in progress with diverse groundcover; patches of yaupon (dark green shrub) noted throughout. Photo point 9 facing east. 2/13/12.

Photo 12. Upland sandhill community restoration. Photo point 12 facing north. 2/13/12. RTN

Photo 13. Upland restoration area; recently ploanted longleaf seedlings doing well in open areas. Near photo point 10. 2/13/12. RTN

Photo 14. Upland restoration area; note scattered clumps of wiregrass. Photo point 11 facing north. 2/13/12. RTN

Photo 15. Potential gate bypass at main entrance on Johnson Road. Photo point 14 looking south. 2/13/12. RTN

Site Inspection Field Form

Project: Plum Creek Mitigation Site Date: February 13, 2012

Name(s) of Data Collectors: Graham Lewis, Leigh Brooks

Environmental Description: Recovering sandhill and forested wetland, preservation wetland
Weather: Cold, dry, partly cloudy, wind 5 mph, Temp F: Low 30s to mid-50s

Polygon: Plum Creek GPS Location: 30°40'26.348"N 85°39'53.405"W Time: 9:30 a.m. 3:00 p.m.

On at least a yearly basis, the site will be inspected as follows:

A: Perimeter for signs of trespassing, fencing and signage integrity and infestation by exotic or nuisance vegetation;

Fencing needs to be replaced to left of entrance gate on Johnson Road where a road has been created to bypass the gate. There is a hunt blind facing into the property next to the western fence line. No exotic or nuisance vegetation was observed.

B: Internal Roads (Both public and maintenance) for signs of dumping or trespassing, erosion, bridges and road integrity, and exotic or nuisance species infestations;

Internal roads looked good. Stream crossings on adjacent District property looked good, no erosion noted. No exotic or nuisance vegetation was observed.

C: All construction areas for stabilization and re-vegetation, structure, operation, and integrity;

The low water crossing and culvert downstream of the outfall of the old beaver pond looked good. The culvert was intact and appeared very sturdy; water was freely flowing through pipe with no obstructions.

D: Representative polygons for each UMAM community for fuel load, exotic or nuisance species, planted material survival, groundcover, and shrub condition.

Polygon A – Forested preservation wetlands looked good, minimally disturbed from historic logging.

Polygon B – Non-forested wetland recovering from impoundment condition. Open, well vegetated with a variety of groundcover species. Woody plants coming in, most visibly sweetbay (*Magnolia virginiana*) and titi (*Cliftonia* and *Cyrilla*). A few small, planted bald cypress with needles off were observed.

Polygon D – Native pine forest restoration in sandhills looked good for the current phase. Most plantation pines had been removed, area burned and open. Some slash material left on site, showed char from fire. Wiregrass depauperate in some areas, patchy in others. Longleaf pine seedling survival high. A diversity of species is colonizing area, some shrubs robust.

Vegetation Assessment Field Form	**Qualitative Assessment**
Project: Plum Creek Mitigation Site	Date: February 13, 2012
Name(s) of Data Collectors: Graham Lewis, Leigh Brooks	
Environmental Description: Recovering sandhill and forested wetland, preservation wetland Weather: Cold, dry, partly cloudy, wind 5 mph Temp F: Low in the low 30s, high in mid 50s	
Polygon: Plum Creek	GPS Location: 30°40'26.348"N 85°39'53.405"W Time: 9:30 a.m. 3:00 p.m.
Nuisance Species: None	Fuel Load: Low

Wildlife Observations: White-tailed deer, Eastern cottontail, songbirds. Several 1-inch round burrows in uplands various places. Large round burrows south of pond. Woodpecker holes in trees at old beaver dam site. Numerous unidentified tracks in recovering wetland.

Water depth: 1 to 2 inches in stream flowing from restoration wetland

Is the community observed along the walk path representative of the community being measured? Yes

To what degree is the restoration in this area trending towards success?

Positively trending to success in all areas.

Potential Problems and solutions:

- In upland buffers undergoing native pine restoration, shrubs will need to be kept in check with fire. Sparse wiregrass coverage and patchy bare soil may need to be augmented with planted wiregrass to carry fire.

- Restoration wetland area was planted in bald cypress instead of pond cypress. Bald cypress have not been documented to occur naturally on the site. Existing mature trees will serve as seed sources for natural regeneration. Planted off-site trees could be removed.

RTN

Species list from prior year monitoring report.

Scientific Name	**Common Name**	**Polygon A**	**Polygon B**	**Polygon D**	**Polygon E**
Ambrosia artemesifolia	annual ragweed				X
Andropogon virginicus	broom sedge			X	
Aristida stricta var. beyrichiana	wiregrass				
Andropogon virginicus var. *glaucus*	chalky bluestem			X	
Aristida stricta	pineland threeawn				X
Arundinaria gigantea	switchcane	X	X	X	
Asclepias humistrata	pinewoods milkweed				
Asimina angustifolia	slim-leaved paw paw				X
Aster reticulatus	pinewood aster				
Baptisia lanceolata	pineland wild indigo				
Baptisia lecontii	pineland wild indigo				
Bidens mitis	smallfruit beggarticks		X		
Berlandiera pumila	green eyes				
Callicarpa americana	beauty berry			X	X
Carex elliottii	Elliot's sedge	X	X		
Carex sp.	sedge	X			
Centella asiatica	spadeleaf	X			
Cladium jamaicense	Jamaica swamp sawgrass		X		
Cladonia sp.	lichen				X
Clethra alnifolia	sweet pepper bush	X	X	X	
Cliftonia monophylla	black titi	X	X	X	
Cnidoscolus stimulosus	tread softly				X
Conyza canadensis	Canadian horseweed				X
Cornus florida	flowering dogwood				
Croton argyranthemus	healing croton				X
Croton michauxii	Michaux's croton				
Cyrilla racemiflora	red titi				
Dalea pinnata	summer-farewell				
Decodon verticillatus	swamp loosestrife				
Dichanthelium aciculare	needleleaf rosette grass				X
Dicanthelium spp.	panic grass	X	X	X	
Diospyros virginiana	persimmon				X
Dulichium arundinaceum	three-way sedge				
Elephantopus elatus	tall elephantsfoot				X
Elephantopus carolinianus	Carolina elephant's foot				
Erigonum tomentosum	wild buckwheat				X
Eriocaulon decangulare	pipewort		X		
Eupatorium capillifolium	dogfennel	X		X	
Eupatorium compositifolium	yankeeweed	X	X	X	X
Eupatorium mohrii	Mohr's thoroughwort				
Gaylussacia frondosa	blue huckleberry			X	
Gelsemium sempervirens	yellow jessamine			X	X
Gnaphalium pensylvanicum	cudweed				
Hibiscus aculeatus	comfort root				
Hypericum gentianoides	Pineweed	X	X		
Hypericum tetrapetalum	fourpetal St. Johnswort			X	
Ilex coriacea	large gallberry	X	X	X	
Ilex glabra	inkberry			X	X
Ilex opaca	American holly				
Ilex vomitoria	yaupon				X
Itea virginica	Virginia willow	X	X		
Juncus effuses	soft rush	X	X		

Scientific Name	Common Name	Polygon A	Polygon B	Polygon D	Polygon E
Juncus repens	lesser creeping rush				X
Juncus sp.	rush	X	X	X	
Lachnanthes caroliana	red root	X	X	X	
Leucothoe axillaris	coastal dog hobble	X	X		
Leucothoe racemosa	swamp dog hobble	X	X		
Liatris elegans	pinkscale blazing star				X
Liatris graminifolia	shaggy blazing star				X
Liquidambar styraciflua	sweet gum	X	X	X	X
Limnobium caroliniana	spongeplant		X		
Ludwigia sp.	primrose willow	X	X	X	
Lycopus amplectens	clasping waterhorehound				
Lycopus virginicus	Virginia water horehound	X			
Lygodium japonicum	Japanese climbing fern				X
Lyonia lucida	fetterbush	X	X	X	
Magnolia grandiflora	southern magnolia				
Magnolia virginiana	silver bay	X		X	
Myrica cerifera	wax myrtle	X	X	X	
Myrica heterophylla	southern bayberry	X			
Myrica inodorata	odorless wax myrtle	X		X	
Nymphaea odorata	fragrant water lily		X		
Nyssa biflora	swamp tupelo	X	X		
Nyssa sylvatica var. *biflora*	black gum				
Osmanthus americanus	wild olive	X			
Osmunda cinnamomea	cinnamon fern	X			
Osmunda regalis	royal fern				
Panicum verrucosum	warty panicgrass	X		X	
Paspalum notatum	bahiagrass				X
Persea borbonia	red bay	X	X	X	
Persea paulistris	silk bay	X	X	X	
Photinia pyrifolia	red chokeberry				
Pieris phyllyreifolia	climbing fetterbush	X			
Pinus elliottii	slash pine	X	X	X	
Pinus palustris	longleaf pine				X
Pinus taeda	loblolly pine		X		X
Polygala nana	wild bachelor's button		X		
Polypremum procumbens	juniper leaf			X	X
Prunus angustifolia	chickasaw plum				
Prunus serotina	black cherry				
Pteridium aquilinum	bracken fern			X	X
Quercus falcata	red oak				
Quercus geminata	sand live oak				
Quercus hemisphaerica	laurel oak	X	X		
Quercus incana	bluejack oak				X
Quercus laevis	turkey oak				
Quercus margaretta	runner oak				X
Quercus nigra	water oak	X	X		X
Quercus velutina	black oak				X
Rhexia sp.	meadowbeauty			X	
Rhododendron viscosum	swamp azalea	X	X		
Rhus copallinum	winged sumac				X
Rhynchosia reniformis	dollarleaf				X
Rhynchospora chapmanii	Chapman's beaksedge	X		X	
Rhynchospora fascicularis	fascicled beaksedge	X			
Rhynchospora nitens	shortbeak beaksedge		X		
Rhynchospora oligantha	featherbristle beaksedge	X			

Scientific Name	Common Name	Polygon A	Polygon B	Polygon D	Polygon E
Rubus argutus	sawtooth blackberry	X			
Rubus cuneifolius	sand blackberry		X	X	
Salvia azurea	azure blue sage				X
Sassafras albidum	sassafras				X
Schizachyrium sp.	bluestem				X
Schrankia microphylla	sensitive briar				
Scirpus cyperinus	woolgrass	X			
Scleria triglomerata	whip nutrush	X		X	
Serenoa repens	saw palmetto				
Smilax bona-nox	saw greenbrier				X
Smilax glauca	greenbriar				
Smilax laurifolia	laurel greenbrier	X			
Smilax sp.	greenbriar	X	X	X	
Solidago odora	anisescented goldenrod				X
Sphagnum sp.	sphagnum moss	X	X		
Stillingia sylvatica	queen's-delight				X
Symplocos tinctoria	common sweetleaf	X			
Taxodium ascendens	pond cypress	X	X		
Toxicodendron radicans	poison ivy	X		X	
Triadenum virginicum	marsh St. John’s wort				
Trichostema dichotomum	forked bluecurls				
Vaccinium arboreum	sparkleberry				
Vaccinium corymbosum	highbush blueberry	X	X	X	
Vaccinium elliottii	Elliott's blueberry			X	
Vaccinium stamineum	deerberry				
Vitus rotundifolia	muscadine grape	X		X	
Woodwardia areolata	netted chain fern	X	X	X	
Woodwardia virginica	Virginia chain fern	X	X	X	
Xyris ambigua	coastal plain yelloweyed grass	X			
Xyris fimbriata	fringed yelloweyed grass	X	X	X	
Xyris flabelliformis	savannah yelloweyed grass		X		
Yucca filamentosa	Adam's needle				

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