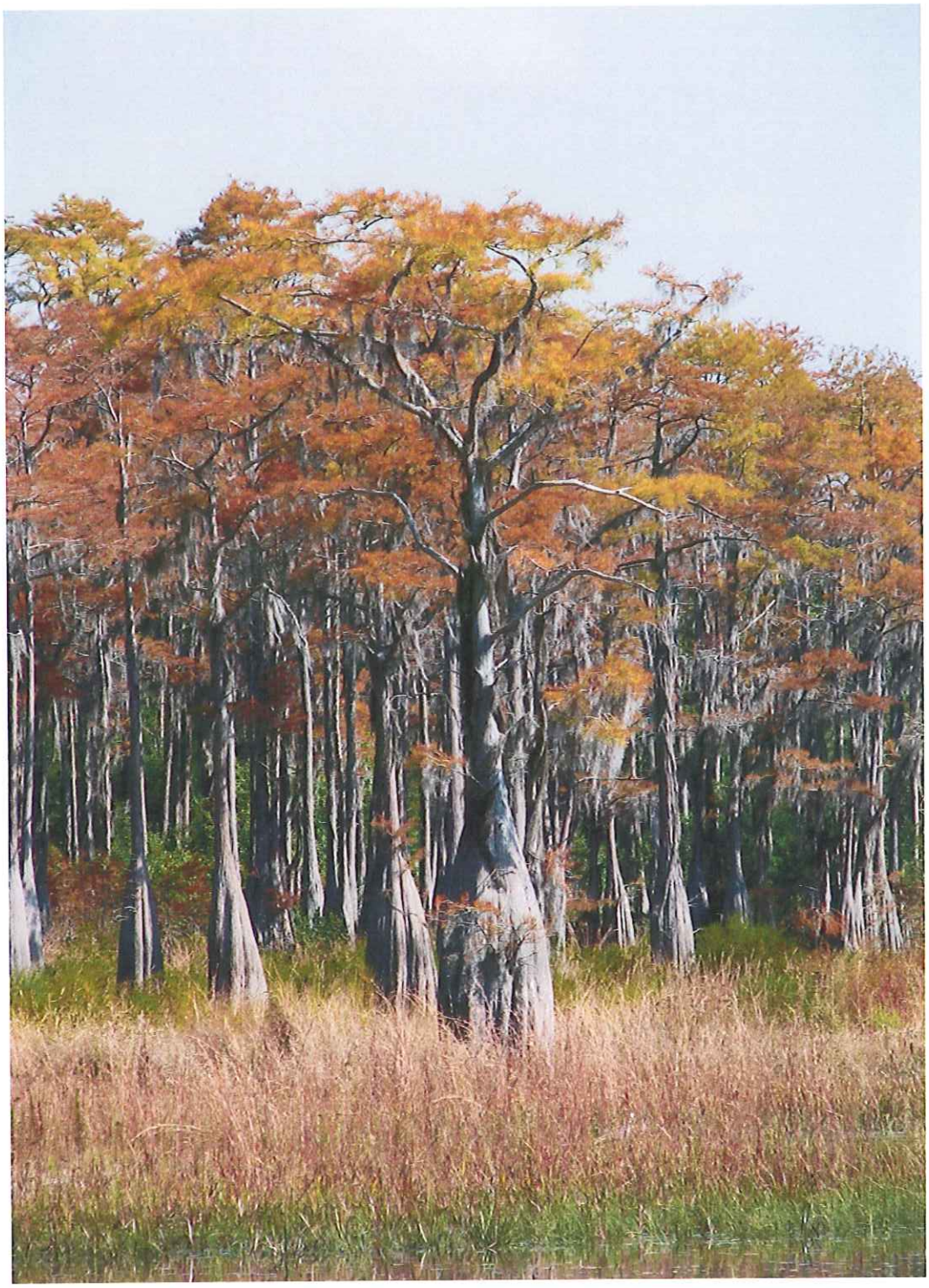
Sand Hill Lakes Mitigation Bank
Fourth Annual Report
December 2009



Executive Summary

The Sand Hill Lakes Mitigation Bank (SLMB) consists of approximately 2,155 acres in southern Washington Co. in the Sand Hill Lakes region of the Florida Panhandle (Figure 1). It is located just west of the intersection of SR77 and SR 279 within Township 1 North, Range 14 & 15 West. It contains approximately 850 acres of wetlands, 155 acres of natural lakes and ponds, and 1,150 acres of upland buffer communities. The FDEP permit for the SHLMB was issued September 5, 2005. This is the fourth annual report for the SHLMB. A synoptic listing of notable activities conducted prior to this report and those anticipated in the coming year are presented below.

Interim Success Criteria

All interim success criteria have been met since January 2010. A sufficient number of both natural cypress regeneration and black gum seedlings (300 t/ac) planted along the shoreline of the slough area (Dykes Mill Pond shoreline) and have survived at least one year (January 2010). A sufficient number of planted long leaf pine (436/acre) have survived at least one year for the sand hill restoration (formally pine plantation 319 acres) (January 2009). The following interim success criteria have been met since 2007: All hydrologic and erosion restoration activities have been completed, the Dykes Mill pond dam has been removed in slough area; prescribed burns have occurred in accordance with the burn plans; and all erosion areas, road removal, dam replacement at Black pond and culvert replacement has been completed. All natural and planted areas have increasing vegetation, less than 2% exotic vegetation; preservation areas are maintaining or improving function; upland and wet pine flatwoods have measurably increased in herbaceous ground cover and decreasing in woody vegetative cover; adequate numbers of pine exist within the polygons to meet permit requirements. The targeted oaks (Management Unit 12 and portion of Management Unit 10 were reduced in number in 2006/2007. In 2008, the re-sprouting of oaks was steadily increasing. In 2009, it was determined that the oak densities had increased to greater than 300 trees per acre and should be further reduced to maintain an oak density of less than 150/trees per acre. In June of 2009, ULW was applied at a rate of 1.67 lbs per acre to further reduce the oak re-sprouts in Management Unit 12 and portions of Management Unit 10. Oak re-sprouts were significantly reduced by the ULW to significantly fewer than 150 trees per acre. A total of 640 acres were burned in Management Unit 2, 3, 10, 11, 12, was burned during the winter of 2009 and 2010.

Restoration Activities Completed

Perimeter fencing, gates and signage were installed by February 2005. Ongoing law enforcement has been conducted at the site since 2003 with the purchase of the bank property with no violations to date. A conservation easement was recorded for the SHLMB in February of 2006, preserving the wetland, aquatic and upland communities in perpetuity. Duncan Cairns, Tyler Macmillan and David Clayton were approved as QMS officers for the SHLMB. In accordance with permit requirements a mitigation fund was established for the bank. An archeological/historic survey was conducted at the SHLMB and approved by the Florida Division of Historical Resources (DHR). The majority of the restoration activities were to be initiated during 2005/2006. However, due in part to the delayed permit approvals and a lengthy archeological review by DHR, the initiation of many mitigation activities were initiated approximately a year from the proposed timeline. The initial replanting long leaf pine in the uplands surrounding Black Pond, Cat Pond, and Greenhead branch occurred in December 2004. Oak reduction in the uplands was initiated in June 2005 and completed in August 2006. Construction activities were initiated in July of 2006, in accordance with all permit requirements. All stabilization of erosion areas and re-vegetation, road fill removal, bridge and culvert replacement, Dykes Mill Pond dam removal were completed by March, 2007. The replacement of the dam at Black pond was initiated in October 2007 and was completed by January 2008. Removal of off- site sand pine and slash pine plantation was initiated in July 2007 and completed by October 2007. Gyro-Trac work was initiated in March of 2007 and completed by September of 2007. An additional 38 acres Gyro-Trac work was conducted in June and August 2008 in areas that were historically wet pine flatwoods bringing the total acreage of wet pine flatwood

restoration to 165 acres, an increase from the original 147 acres. Long leaf pine planting occurred in the uplands during the winters of 2005 and 2007. Additional long leaf pine planting occurred in November 2008 in Management Unit 11 where the offsite sand pine or slash pine had been harvested (319 acres). Pond cypress was planted at Dykes Mill Pond in January 2008 and during the drought a significant number of natural cypress seedlings were observed. In addition, a supplemental planting of black gum occurred in May of 2009. Initial wire grass plantings occurred in the wet pine flatwoods in 2006. Wire grass planting is ongoing as allowed in the permit due to the large acreage to restore and limited seed source. To date a total of 165 acres of wet pine flatwoods/wet prairie habitat has been replanted in wet wire grass tublings on 3' centers for a total of 798,600 plugs. Similarly, a total of 110 acres of upland wire grass tublings have been planted for a total of 532,400 tublings. An additional 30 acres of upland and wetland wire grass tublings will be planted in winter 2010/2011.

Controlled Burns

Fire was re-introduced to the SHLMB in the fall of 2004. All initial burns for the wetlands and uplands were completed in December 2006. A total of 2 burn cycles have been completed for the entire SHLMB to date although areas requiring more frequent fires such as sand hills and wet flatwoods have had as many as 4 burn cycles since the bank was established. In 2007, summer burns were re-introduced to portions of the bank. Warm season burns will be conducted in 2008 for 368 acres. A total of 640 acres were burned in Management Unit 2, 3, 10, 11, 12, during the winter of 2009 and 2010. Winter burns were needed due to the higher fuel loads generated from herbiciding the oaks.

Nuisance and Exotic Species

Surveys of nuisance species (flora and fauna) have been conducted throughout the past 5 years. In addition a yearly fall site inspection for nuisance species occurs in conjunction with the annual monitoring as well as day to day monitoring by District and FWC staff. Several small patches of torpedo grass (*Panicum repens*) were treated with Habitat at historic boat launch areas during August and September 2005 and 2007. No live plants were observed during the fall monitoring in 2009. Minor feral hog damage was observed at Dry and Dykes Mill Pond in 2007. Very limited signs of hogs were observed in 2008 and 2009. Water level gages were installed and surveyed in on December of 2005 for 10 locations throughout the bank, and have been read by the FWC for the last three years and data supplied to the District.

Annual Sampling

The annual sampling for this report was conducted in October 30- November 5, 2009.
Pedestrian surveys were conducted for both wetland and uplands. The pedestrian surveys were very useful in providing detailed species lists and a greater understanding of species diversity for each community. In addition the pedestrian surveys cover far more area of the polygon that may reveal late successional and threatened or endangered species. In Pedestrian surveys are also useful in identifying pockets of nuisance species and determine fuel loads. Overall, species diversity was excellent throughout the SHLMB and plants were healthy. The number of species observed continues to increase as habitats improve.

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Introduction

The Sand Hill Lakes Mitigation Bank (SLMB) consists of 2,155 acres in the southern portion of Washington Co. in the Sand Hill Lakes region of the Florida Panhandle (Figure 1). It is located just west of the intersection

of SR77 and SR 279, and is within Township 1 North, Range 14 & 15 West. It contains approximately 850 acres of wetlands including high quality cypress sloughs and strands, degraded hydric pine flatwoods, bayheads, seepage slopes, and approximately155 acres of natural solution ponds and shallow, gently-sloped lakes connected by streams and ditches. The remaining 1,150 acres of consist of secondary growth upland buffer communities (including high quality and degraded sand hill communities as well as sand pine plantation, slash pine plantation, and mixed hardwoods) (Figure 1a).

The SHLMB occurs on the divide between the Choctawhatchee and St. Andrew Bay watersheds. The majority of the proposed Bank is in the surface headwaters of Pine Log Creek, which flows westerly and southwesterly to Pine Log State Forest and ultimately to the Choctawhatchee River and Bay. However, because of the karst nature of the Sand Hill Lakes the SHLMB is also a recharge area for Econfina Creek, which, via Deer Point Lake, is the water supply for Panama City.

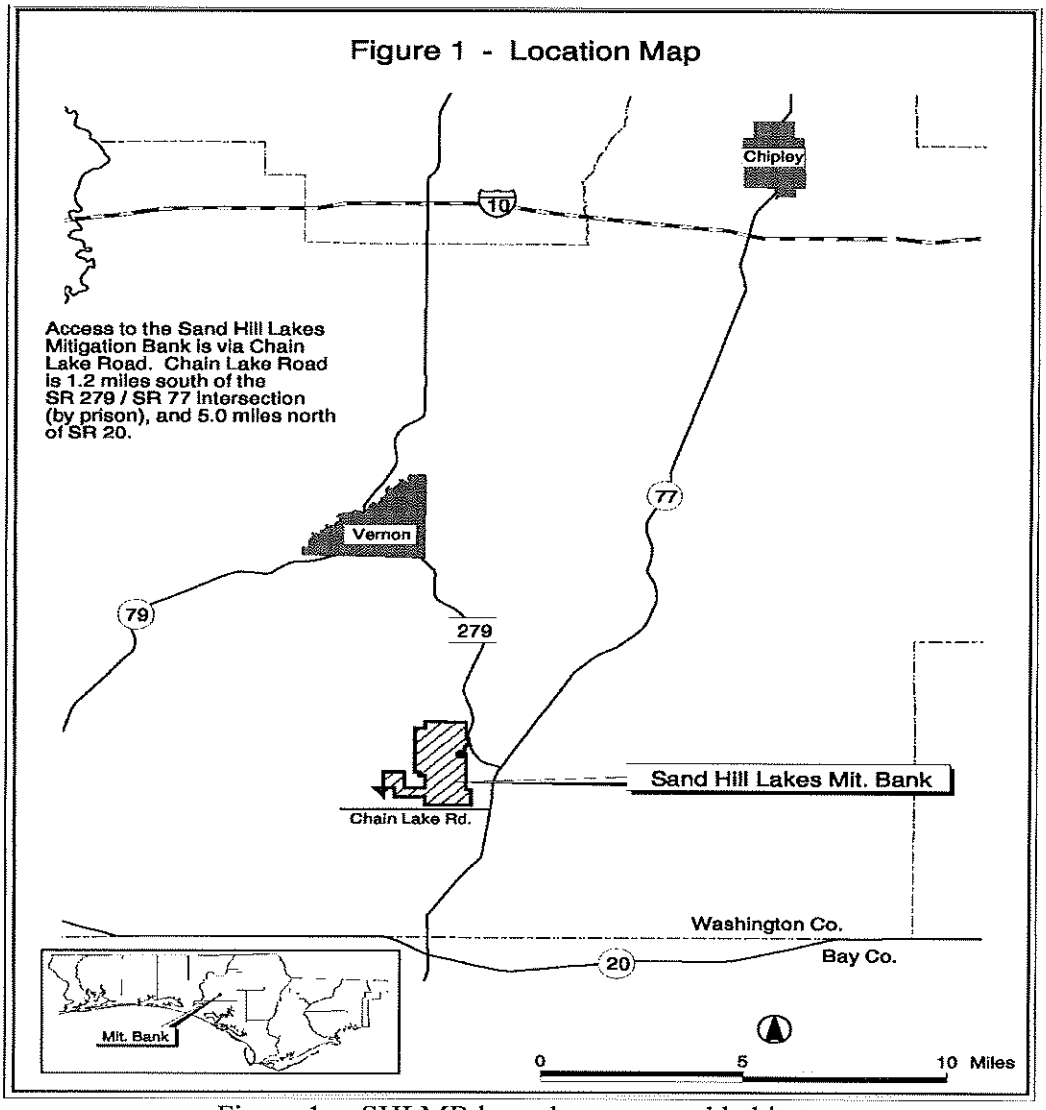
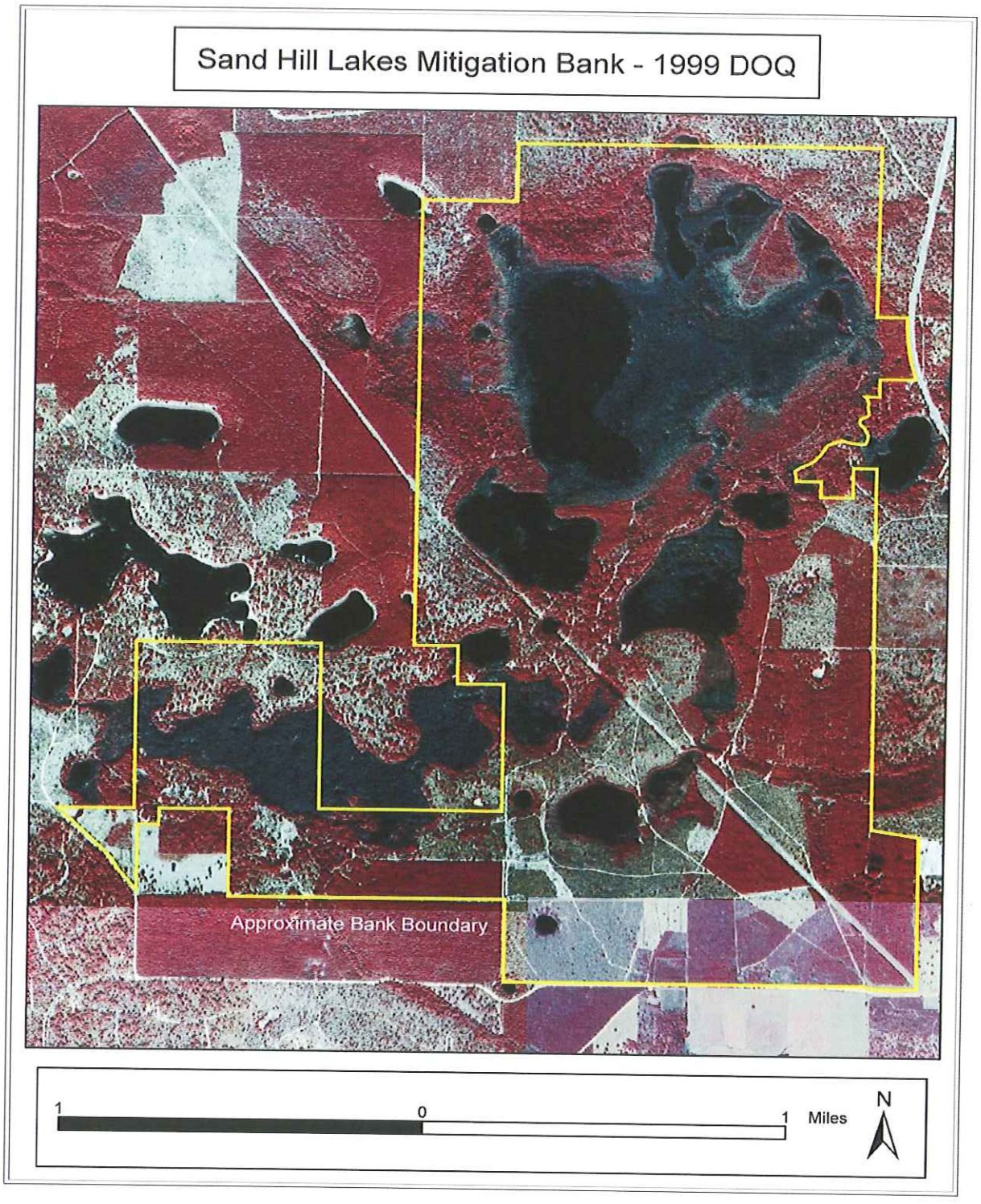


Figure 1a. SHLMB boundary map and habitats



Bank Establishment and Implementation of Permit Requirements

The permit for the Sand Hill Lakes Mitigation Bank (SHLMB) was issued by the DEP on September 5, 2005. This document represents the fourth annual report for the SHLMB. Perimeter fencing with gates and signs were installed prior to March of 2005. Law enforcement has been conducted at the site since the property was purchased and is ongoing at the SHLMB. A conservation easement was recorded for the SHLMB on 2/28/06, preserving the wetland, aquatic and upland communities in perpetuity. QMS officers Duncan Cairns, Tyler Macmillan and David Clayton were selected by the NWFWMD and approved by the DEP. In accordance with permit requirements a mitigation fund was established for the bank. An archeological and historic survey was conducted for the SHLMB and approved by the Division of Historical Resources. Construction activities were initiated in July of 2006, in accordance with permit requirements.

Mitigation Activities

Work Schedule

According to the proposed work schedule for the SHLMB found on page12 of the SHLMB permit, the majority of the restoration activities were to be initiated during 2005-2006. However, the restoration activities were postponed due to delays in permit issuance, recording of conservation, and additional time needed to complete and approve the archeological study. Consequently, many of the restoration activities were delayed by approximately 1 year. A revised schedule was included in the first monitoring report. In 2008, the majority of the construction and restoration activities were completed and an updated work schedule has been provided (Table 1).

Table 1. Restoration work schedule

Activity	Estimated Completion Date
Conservation easement, QMS	**Completed 3/06**
Fencing and signage	**Completed 3/05**
Site security / law enforcement / internal gaiting / road closures	**Ongoing**
Stabilization of 10 erosion sites	**Completed 3/2007**
Hydrologic enhancements - Replacement of Black Pond dam - Removal of Dykes Mill Pond dam - Removal of road fill at (3) sites - Construction of 2 bridges and replacement of 3 culverts	**Initiated 10/07** **Completed 1/08** **Initiated 7/06** **Completed 8/06** **Initiated 7/06** **Completed 3/07** **Initiated 7/06** **Completed 3/07**
Removal of pine plantation and thinning of slash pine	**Initiated 7/07** **Competed 10/2007**
Removal of oak overgrowth and replanting with longleaf pine	**Competed: Oak removed 2005/2006, additional oak removal (ULW, 6/2008)** **Pine planted 2005 and 12/2007**
80% completion of initial growing season and fuel reduction fires in areas to be maintained as oak / pine community	**Completed 12/2005**
Initial thinning, roller chopping, and fuel reduction fires in hydric pine	**Completed Initial burns 8/05** **Completed required shrub reduction 6/07 (Gyrotrack)** **Completed Pine thinning 10/07** **Completed site prep burns following harvest 12/2008**
Supplemental wiregrass seeding if necessitated by onsite conditions	**2008/2012 Ongoing** **Initial wet flatwoods wire grass planting (165 acres) completed 12/09**
Installation of water level gages	**Completed 12/05**
Baseline assessments of vegetation	**Completed 2004/2005**
Fire Management / Monitoring Year 1 / Annual Report	**Completed 2005/2006 report**

Fire Management / Monitoring Year 2/ Annual Report	**Completed 2007/2008 report,**
Fire Management / Monitoring Year3 / Annual Report	**Completed 2009/2010 report**
Fire Management / Monitoring Year 4 / Annual Report	2010/2011 report
Fire Management / Monitoring Year 5 / Annual Report	2012/2013 report
Perpetual Ecological Management	2013 +

Hydrologic Enhancements

Hydrologic enhancements include the complete removal of 2 fill-road crossings, installation of bridges at 3 crossings and 2 culverts and the removal or replacement of 2 failing water control structures, the remediation of 10 erosion areas, the stabilization of 1 boat launching site, and construction of one rain shelter (Figures 3 and 4).

The removal of the failing water control structure at Dykes Mill Pond and construction of three bridges (#1, #3, #7), and two culverts (#9, #10-A-B) was initiated in July 2006 and completed in April of 2007 in accordance with permit conditions (Figure 3). The graded areas were stabilized and seeded in early 2007 with season-appropriate, non-invasive annual grass to reduce potentially turbid runoff. On June 30th, the graded areas were seeded with brown-top millet. Currently all water control structures are functioning properly and water levels have risen to post drought levels.

The removal and re-vegetation of two fill-road crossing was initiated in January of 2007 and completed in March of 2007 (Figure 3). Erosion area #6 was restored in July of 2006 as part of road enhancement project while remediation of the remaining 9 erosion sites was initiated in January and completed in April 2007. Hay bales and silt fences were installed in accordance with the permit requirements (Figure 3 and 4). The areas were planted as each site was completed. Sites were planted in accordance with the approved planting plan. Graded areas were stabilized with annual rye grass and seeded with brown-top millet on June 30, 2007. Sites were monitored during the summer and fall monitoring. Inadvertently, the contractor used Bahia grass hay to stabilize soils at the two erosion areas 1-3 (Cat Pond and the road removal at Deep Edge). The contractor was required to treat each area with herbicide until the Bahia grass was eliminated. Initial treatments occurred in May with subsequent treatments in September. Supplemental wire grass and long leaf pine seedlings will be planted at these sites in 2008. In 2008 seed from the eradicated Bahia grass and or mulch germinated as was again reated with to remove the grass. In addition, poor survival was observed at the erosion sites 1, 2, 4, 5, and 10. Supplemental planting occurred in February 2008 in accordance with the permit requirements. Shrubs were planted at the road fill removal sites in March 2009 in accordance with the planting plan. This action completes the planting requirements for these areas.

The replacement of the water control structure at Black Pond (#2) was initiated in October 31, 2007 and completed by the end of January 2008.

Finally, the stabilization of one boat launch area on Dry Pond was completed in September 2007. Photographic documentation for all these activities was included in the 2007 report.

Figure 3 - Structures

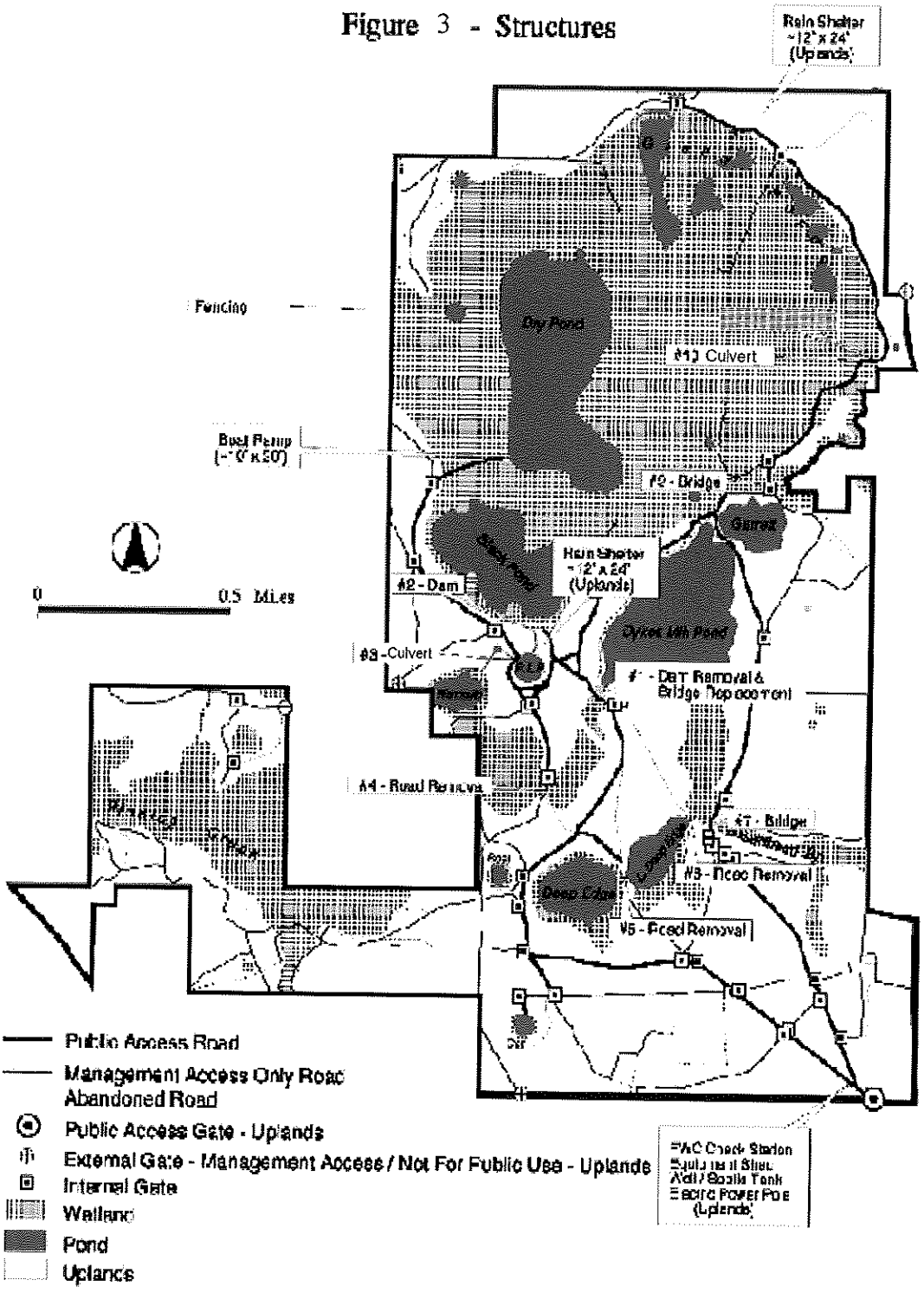
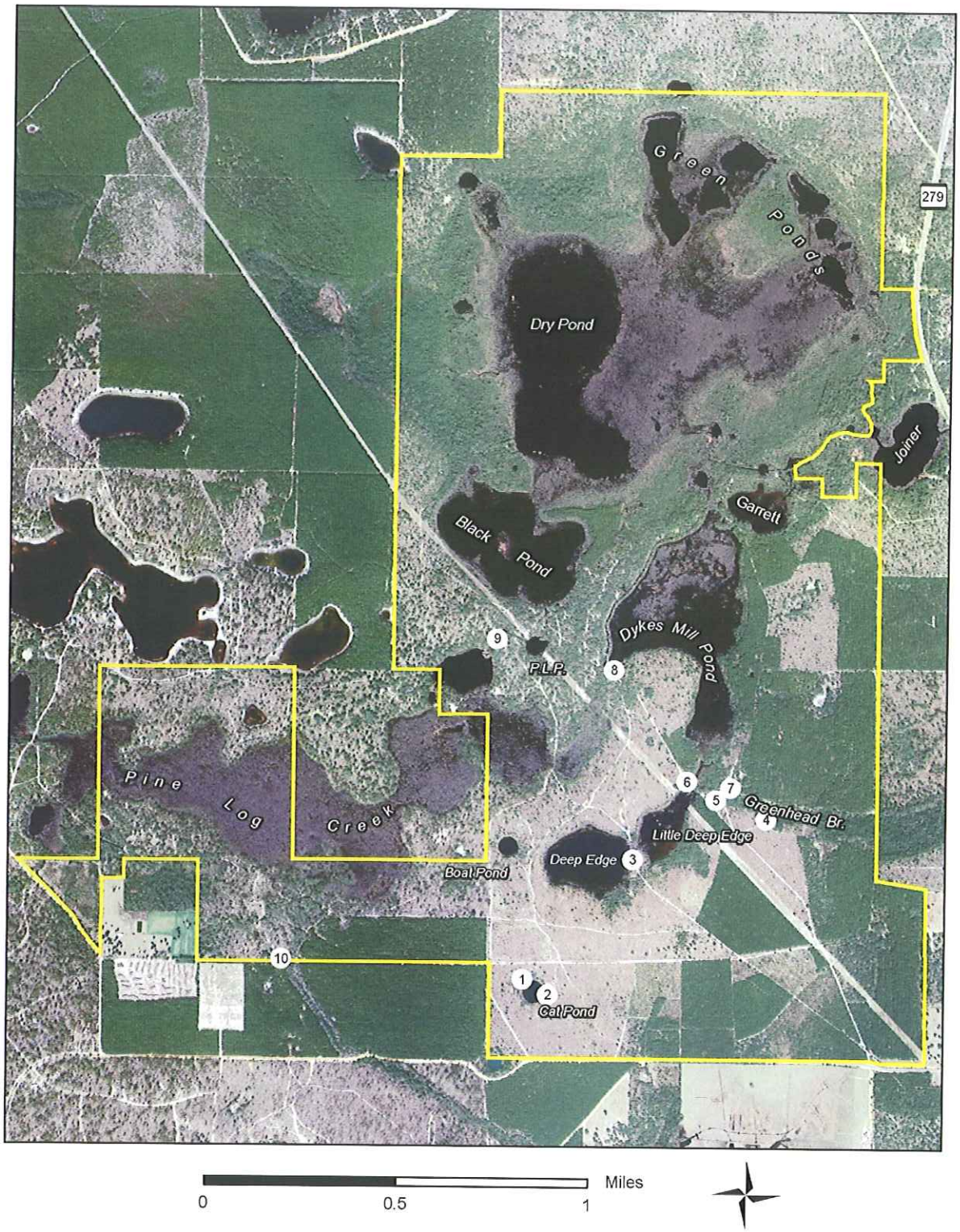


Figure 4 - Erosion Stabilization Sites



Fire Management

The bank is divided into 14 Management Units that range from 0.25 to ~580 acres. Prescribed fire is an integral component of the management, enhancement and restoration for six of the management units (Management Units 2, 3, 8, 10, 11, and 12), and will also be used to manage portions of the power line ROW(Figure 5). The remaining Management Units are wetlands or aquatic systems not typically managed with fire, although fire from adjacent Units may be allowed to burn into them when conditions allow. Prescribed burns have generally be conducted during the growing season (March through August), although initial dormant-season fuel-reduction fires have been required in some areas. Burns are planned for 1-3, 3-5 and 5-7 year cycles, although fuel levels, prevailing weather patterns and other on-site conditions may necessitate modification of burn cycles. Burn coverage of 80% or more within a polygon has been considered a successful burn. Prescribed fire is intended to inhibit establishment of woody species, promote fire-adapted species, and stimulate seed production of desirable herbs. Fire prescriptions have been written to comply with open burning laws (Florida Statutes 590) and liability considerations. Safety and protection of property will be the priority concern of the Florida Certified Prescribed Burn Manager (FCMB).

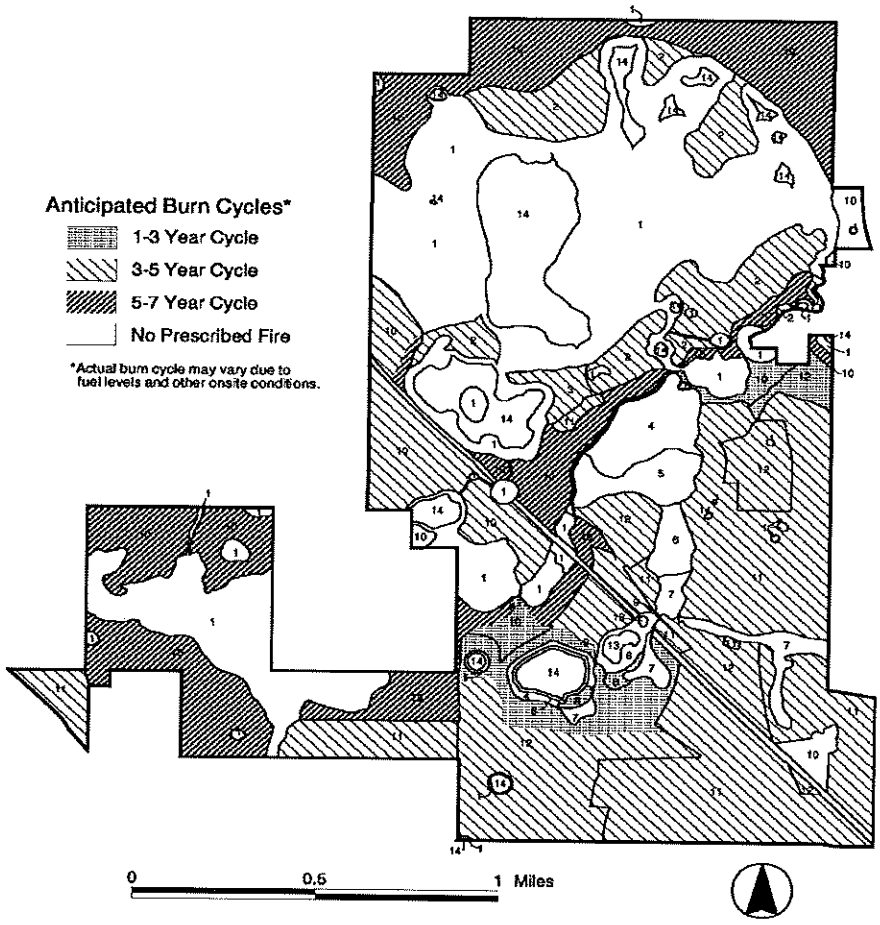
Fire was re-introduced to the SHLMB during the winter of 2004 to portions of Management Unit 11 and 12. Subsequently portions of the sand hills and hydric pine flatwoods were burned during the summer of 2005 with the remaining initial burns completed by December of 2005 in accordance with the Fire Management Plan (Figure 6). In areas with a high fuel loads such as Management Unit 2, 3, 8 and some portions of Management Unit 10 adjacent to Black pond dormant season fuel reduction fires were utilized. However in Management Unit 11 and 12 initial burns reduced fuel loads to the extent that warm season burns were conducted. Wire grass flowered in these areas following the fire and plants appeared healthy. The burns at the SHLMB have also been successful in reducing woody vegetation coverage as well as stimulating a seed bank of fire adapted species. Prior to the initiation of fire, woody goldenrod was the dominant herbaceous species, but the initial fires greatly reduced the woody goldenrod cover and stimulated the wire grass. Currently wire grass is the dominant herbaceous species and the sand hills and wet flatwoods have greatly reduced shrub cover.

In 2007, it was anticipated that 287 acres would be burned during winter 2006/2007. However, due to the extended drought and unsafe fire conditions only 69 acres were burned with 66 acres meeting the 80% requirement. No warm season burns were attempted due to the extended drought.

In 2008, a total of 384 acres of burns are planned at the SHLMB (Figures 6a, 6b, 7, 7a-7e)). Warm season burns will be conducted at Garret Pond and adjacent to Pine Log Creek and winter burns will be conducted for the areas with off-site pine removal.

As of 2009, a total of 2 burn cycles have been completed for the entire SHLMB to date although areas requiring more frequent fires such as sand hills and wet flatwoods have had as many as 4 burn cycles completed. During the winter of 2009 a total of 600+ acres were burned in Management Unit 2, 3, 10, 11, 12. Hydric flatwood wetland areas were burned in preparation for planting of wire grass or to reduce the dead shrubs that had been treated with herbicide (Table 6a). In the uplands the sand hill areas that had been treated with ULW to reduce oak coverage were also burned to reduce standing dead shrubs and to stimulate the herbaceous layer.

Figure 5 - Anticipated Burn Cycles



Note: Numbers refer to Management Unit No.

Figure 6 - Areas Burned Since Inception of Bank Through 2006

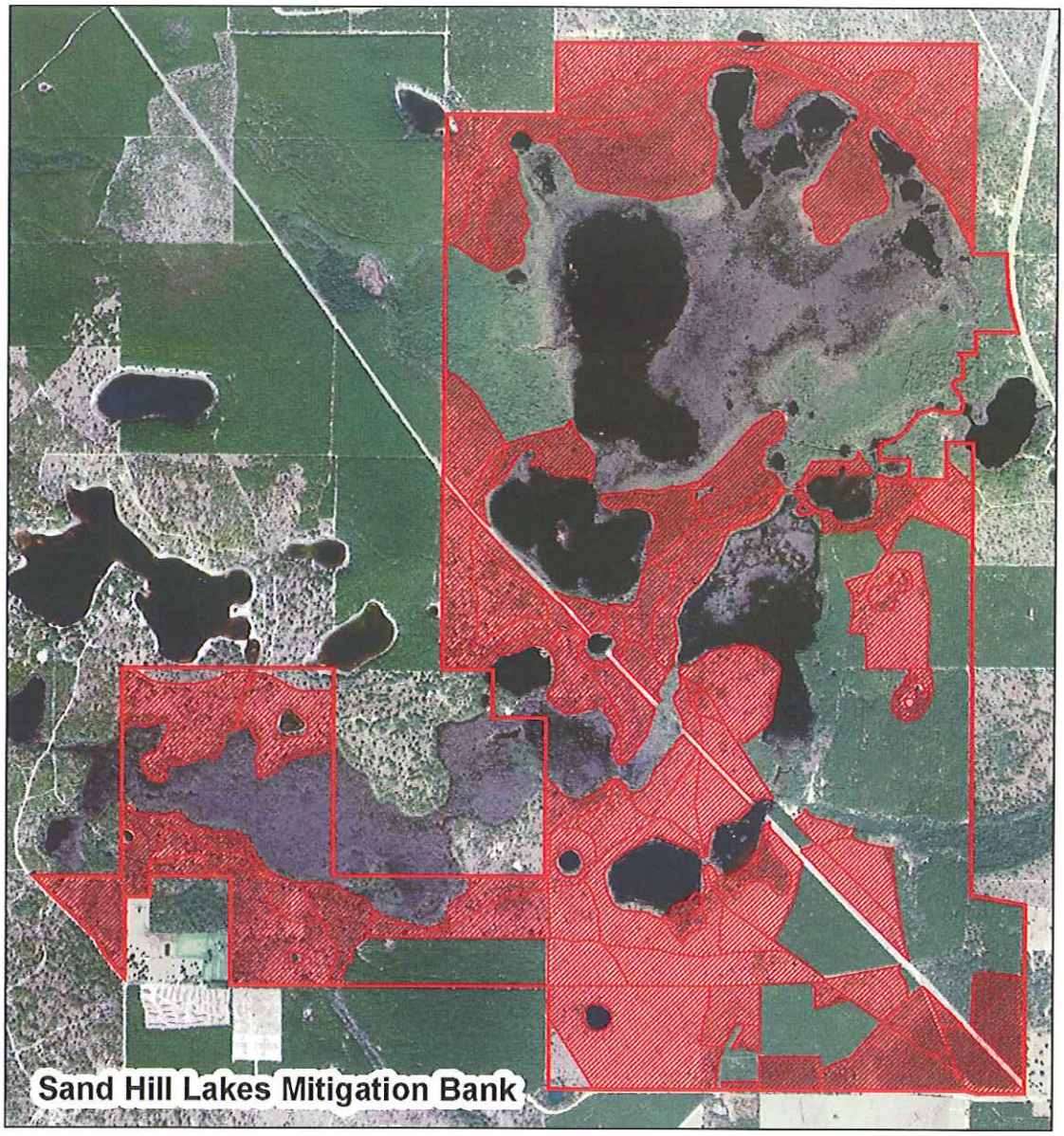
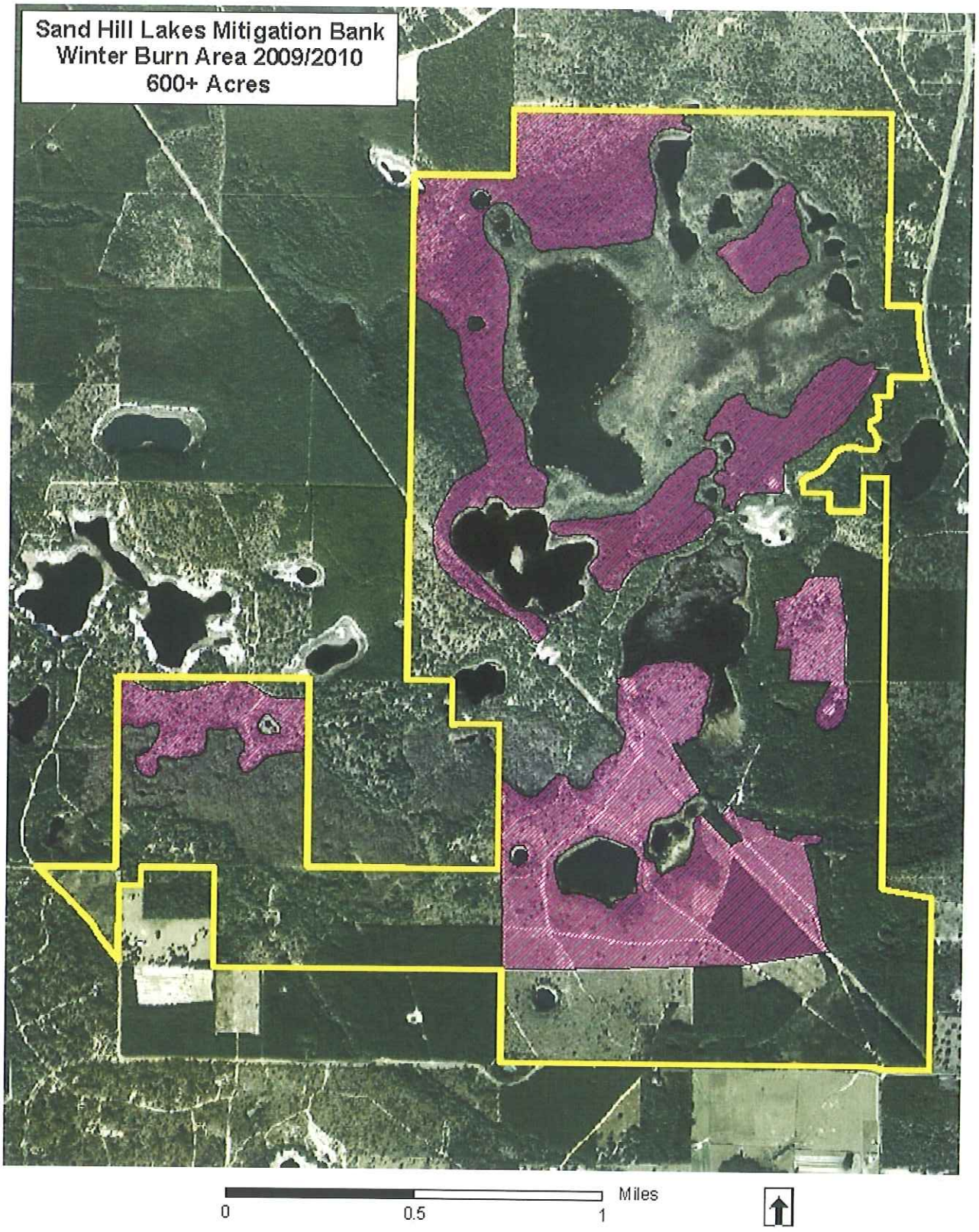


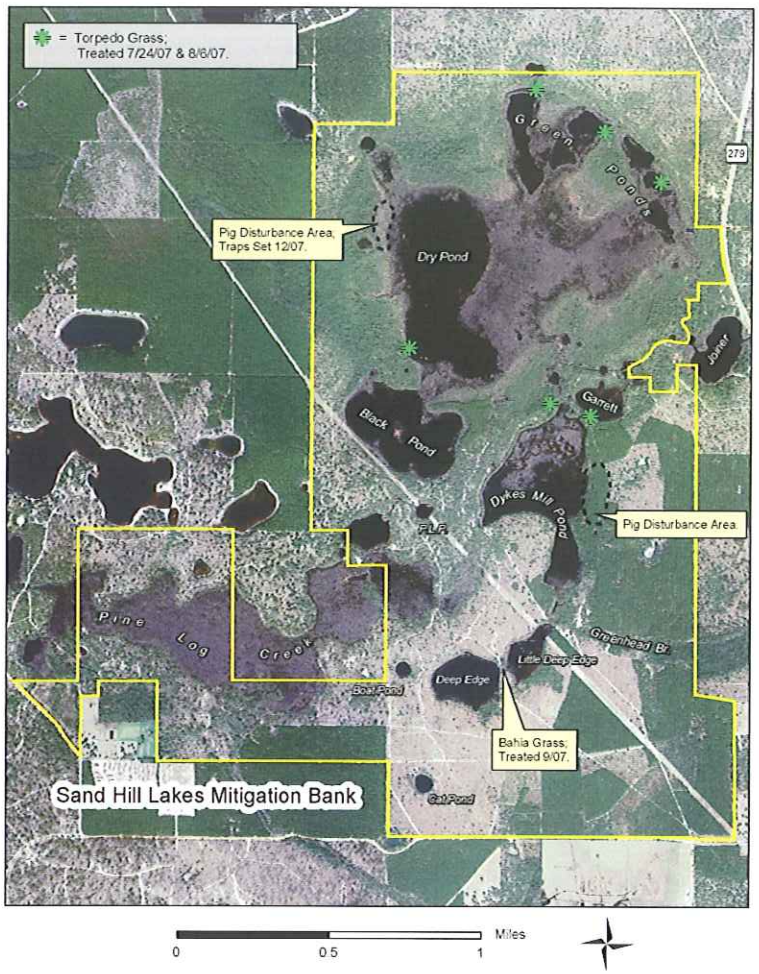
Figure 7. SHLMB 2009 Burns



Exotic Fauna and Vegetation

Surveys nuisance species have been conducted throughout the year. In 2006, one female hog was trapped and patches of torpedo grass were observed at historic boat launches. These areas were treated by the Bureau of Invasive Plant Management on July 20th 2006. In 2007, several small patches of torpedo grass were again observed at the historic boat launch areas of several ponds (Figure 8). These areas were treated twice with Habitat on July 26th and August 6, 2007. No visible living plant material was observed during subsequent site visits or during the 2008 fall monitoring. Inadvertently the contractor working on the road removal and stabilization of erosion areas used inappropriate Bahia grass hay to stabilize the soils for erosion areas 1 and 2 and 3 the road removal between Deep Edge and Little Deep Edge. The contractor was required to treat these areas with herbicide until the Bahia grass was killed. Treatments occurred in May and September. No living material was observed during the fall monitoring. In the summer of 2008, small patches of Bahia grass developed from the seed bank in the road removal areas and were again treated twice in 2009. In addition, scattered Bahia grass plants were observed on 83 acres adjacent to Green Head Branch that had been planted in sand pine and 53 acres adjacent to the check station that had been planted in slash pine. Based on weeds associated with these areas, it is probably that these sites had been used for agriculture or pasture prior to conversion to sand pine plantations. The Bahia grass in these areas was treated by hand crews twice in 2009 and Bahia grass cover was greatly reduced. In 2010 hand treatment will continue in the areas described above. Some hog damage was observed in 2008 during the drought adjacent to Dry Pond and the Green ponds. However, in 2009, no real hog damage was observed. In 2009, several packs of dogs were observed chasing wildlife harassing day visitors. The dogs were aggressive and had threatened visitors and one bit a staff member. The County Sherriff department, and animal control were contacted and helped in the investigation. Traps were set to capture the dogs. It appears the owner has been located and dogs in question are now under control.

Figure 8 - Nuisance and Exotic Species Tracking



Monthly Water Gage Assessments:

Water levels gauges were installed and surveyed in on December of 2005 for 10 locations throughout the bank. These locations include Black Pond, Power Line Pond, Pine Log Creek, Deep Edge Pond, Little Deep Edge Pond, Dykes Mill Pond, Ditch connecting to Pine Log Creek #7, natural channel from Joiner Lake to the Green Pond, Green Ponds, and Dry Lake (Table 2, Figure 9). The gauges were read monthly by the Florida Wildlife Conservation Commission staff and the results submitted to the NWFWMD (Table 2, Figure 9). In 2006, the water levels were above the gages until April, then from May to December then

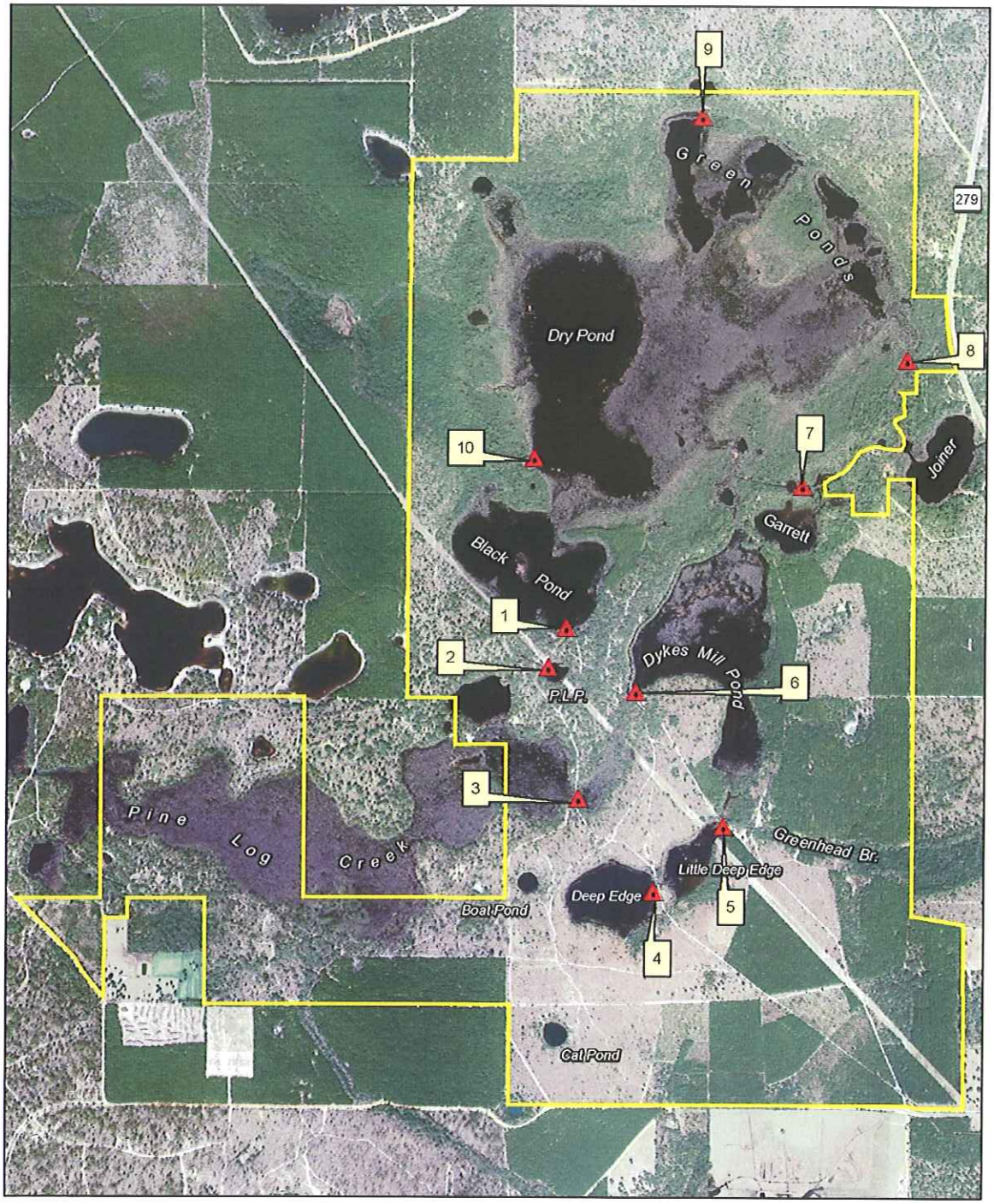
Table 2. Monthly Water Gage Readings

Readings in Feet	(1) Black Pond	(2) Power Line Pond	(3) Pine Log Creek	(4) Deep Edge Pond	(5) Little Deep Edge Pond	(6) Dykes Mill Pond	(7) Green Ponds Channel	(8) Joiner Lake Canal	(9) Green Ponds	(10) Dry Pond
Date	1/5/2009	1/5/2009	1/5/2009	1/5/2009	1/5/2009	1/5/2009	1/5/2009	1/5/2009	1/5/2009	1/5/2009
Reading	below gauge	no water	1.72	below gauge	2.52	3.38	3.05	no water	below gauge	2.98
Date	2/12/2009	2/12/2009	2/12/2009	2/12/2009	2/12/2009	2/12/2009	2/12/2009	2/12/2009	2/12/2009	2/12/2009
Reading	below gauge	no water	0.3	below gauge	2.15	3.13	below gauge	no water	below gauge	2.60
Date	3/3/2009	3/3/2009	3/3/2009	3/3/2009	3/3/2009	3/3/2009	3/3/2009	3/3/2009	3/3/2009	3/3/2009
Reading	below gauge	no water	1.98	below gauge	2.44	3.30	2.90	no water	below gauge	2.90
Date	4/3/2009	4/3/2009	4/3/2009	4/3/2009	4/3/2009	4/3/2009	4/3/2009	4/3/2009	4/3/2009	4/3/2009
Reading	1.80	below gauge	3.78	below gauge	2.72	4.40	3.52	4.26	3.30	3.92
Date	5/1/2009	5/1/2009	5/1/2009	5/1/2009	5/1/2009	5/1/2009	5/1/2009	5/1/2009	5/1/2009	5/1/2009
Reading	6.60	6.11	4.12	below gauge	2.52	3.40	3.96	4.44	6.34	>6.70 submerged
Date	6/3/2009	6/3/2009	6/3/2009	6/3/2009	6/3/2009	6/3/2009	6/3/2009	6/3/2009	6/3/2009	6/3/2009
Reading	6.37	5.89	3.88	below gauge	2.52	3.42	3.74	4.58	6.13	6.70
Date	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009
Reading	5.16	5.22	3.45	below gauge	2.53	3.28	2.70	3.18	4.94	5.49
Date	8/5/2009	8/5/2009	8/5/2009	8/5/2009	8/5/2009	8/5/2009	8/5/2009	8/5/2009	8/5/2009	8/5/2009
Reading	4.58	4.6	2.88	below gauge	2.5	3.27	below gauge	2.52	4.31	4.79
Date	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009
Reading	4.35	4.17	2.45	below gauge	2.50	3.22	1.75	2.39	4.09	4.61
Date	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009
Reading	4.60	4.29	2.58	below gauge	2.42	3.29	below gauge	3.09	4.30	4.90
Date	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009
Reading	4.58	4.16	2.45	below gauge	2.44	3.39	2.42	2.85	4.31	4.90
Date	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009
Reading	4.45	3.89	2.18	below gauge	2.42	3.30	2.38	2.50	4.20	4.75

<Gage = Water level was down slope of staff gage.

DRY = Site is dry. No data – site was inaccessible or unread

Figure 9 - Water Level Staff Gage Locations



water levels were below the staff gages for all but Little Deep Edge and Dykes Mill Pond. The drought continued in 2007 and 2008. In 2009, the extended drought subsided and the Green Ponds that had dried down, along with the Power line pond and Pine Log Creek and Joiner canal were once again filled with water and the water levels at Deep Edge, Black and Dry Pond levels returned to pre-drought levels.

Sand Hill Restoration

Activities: oak eradication, planting of pine, wire grass planting

Oak eradication

A total of 1,150 acres longleaf pine / wiregrass community, live oak forest and other buffer habitats occur on the SHLMB. The NWFWMD will provide perpetual ecological management for these habitats. Oak eradication in Management Unit 12 was completed for the majority of the site in August of 2005 with a small remaining portion completed in September of 2006. Turkey and live oaks were reduced to less than 150 trees per acre and stumps were painted with an approved herbicide to reduce stump sprouts. Similarly, oak coverage was reduced for significant acreage in Management Unit 10 in September of 2006. These areas have excellent wire grass cover and a well developed understory of sand hill species. To date a total of 550 acres of sandhills have had the oaks thinned, far exceeding permit requirements (Figure 10).

In 2007, these areas were again burned, but it was noted that the thinned oaks and hardwoods had re-sprouted and oak densities from the sprouts had increased exceeding target densities. These areas were monitored in 2008, and increasing cover of oaks was observed.

In April of 2009, a comprehensive field review of the uplands at the SHLMB was conducted to determine if additional oak reduction was needed. It was determined that oak numbers from re-sprout were significant and threatened to shade out the wire grass and the oak numbers should be further reduced. Two treatment types were utilized, hand application for small areas or areas adjacent to acceptable oak numbers, and aerial application to treat large areas. The prescription was based on previous experience in similar habitats and a rate of 1.67 pounds per acre of Velpar ULW was applied to 546 acres in May of 2009 (Figure10a). After approximately 3 weeks noticeable results were observed and after 6 months the oak numbers were significantly reduced. Velpar was applied by a licensed applicator and rates were followed accurately, however, some minor impacts were observed to wire grass cover in scattered locations. Symptoms observed included culms browning and decline. This was not observed widely and it is thought that the sand content of the soil, combined with high temperatures may have caused the problem.

Long Leaf Pine Planting

Prior to permit issuance, longleaf pine seedlings were planted in portions of Management Unit 12 in the winter of 2004. However, intense winter burns in early 2007 destroyed most of the planted. Additional plantings of longleaf pine at a rate of 436 trees per acre occurred in Management Unit 12 and portions of Management Unit 10 during the dormant season of 2007/2008.

Pine Plantation Harvest

Restoration activities for the existing sand pine plantation (~385 acres) and slash pine plantations (11.5 acres) were initiated in June, 2007 (Figure 11). The sand pine and slash pine plantations harvest began on June 15 and completed in November 16, 2007. All sand pine and slash pine scheduled for removal was completed in accordance with permit requirements. These areas were burned in the fall of 2008 and 319 acres were replant in the winter of 2008/2009 with long leaf pine (Figure 11a). The planted long leaf pine established well with excellent survival.

Figure 10 - Oak Removed Through 2006

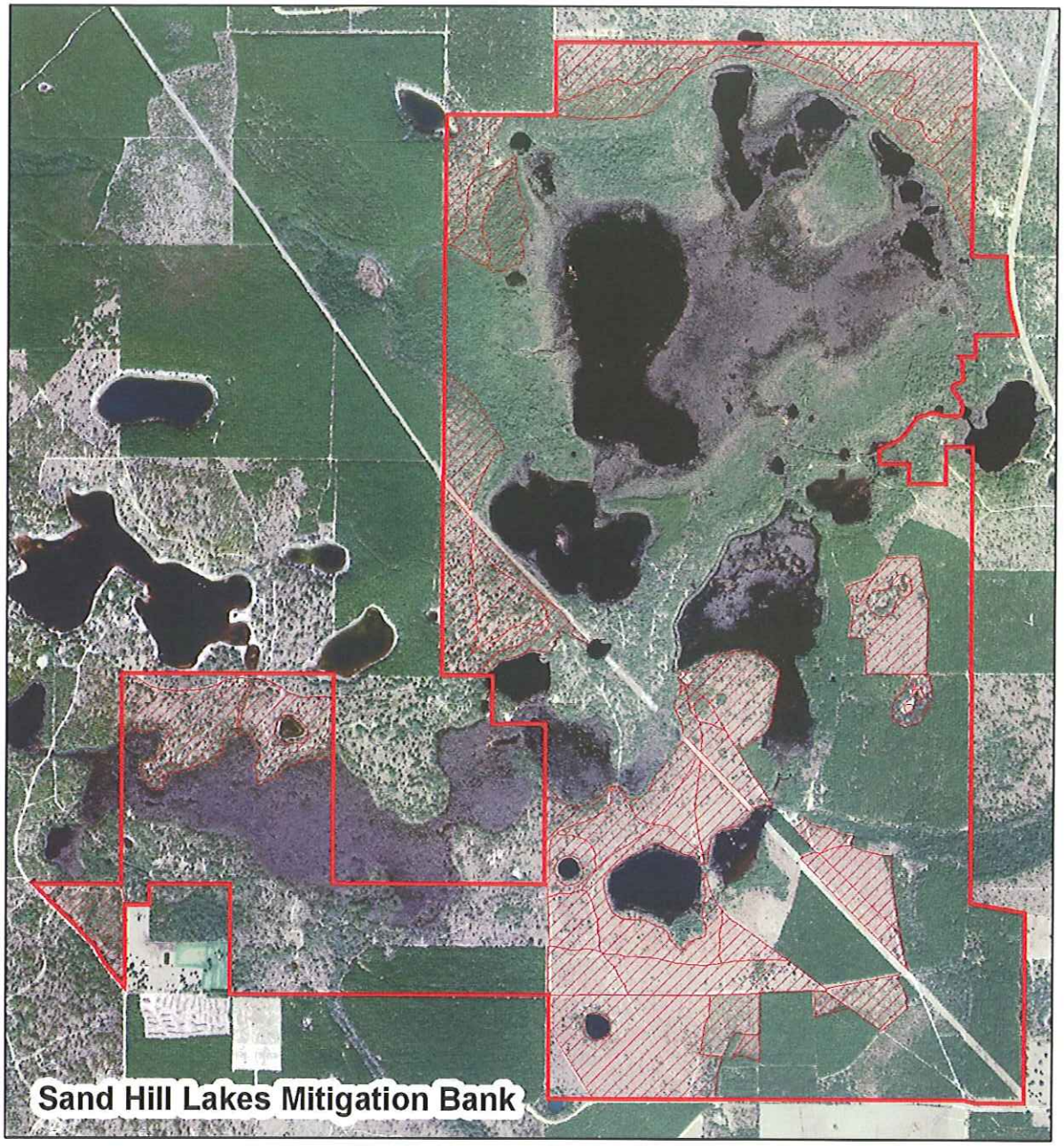


Figure 10a. 2009 Oak Eradication

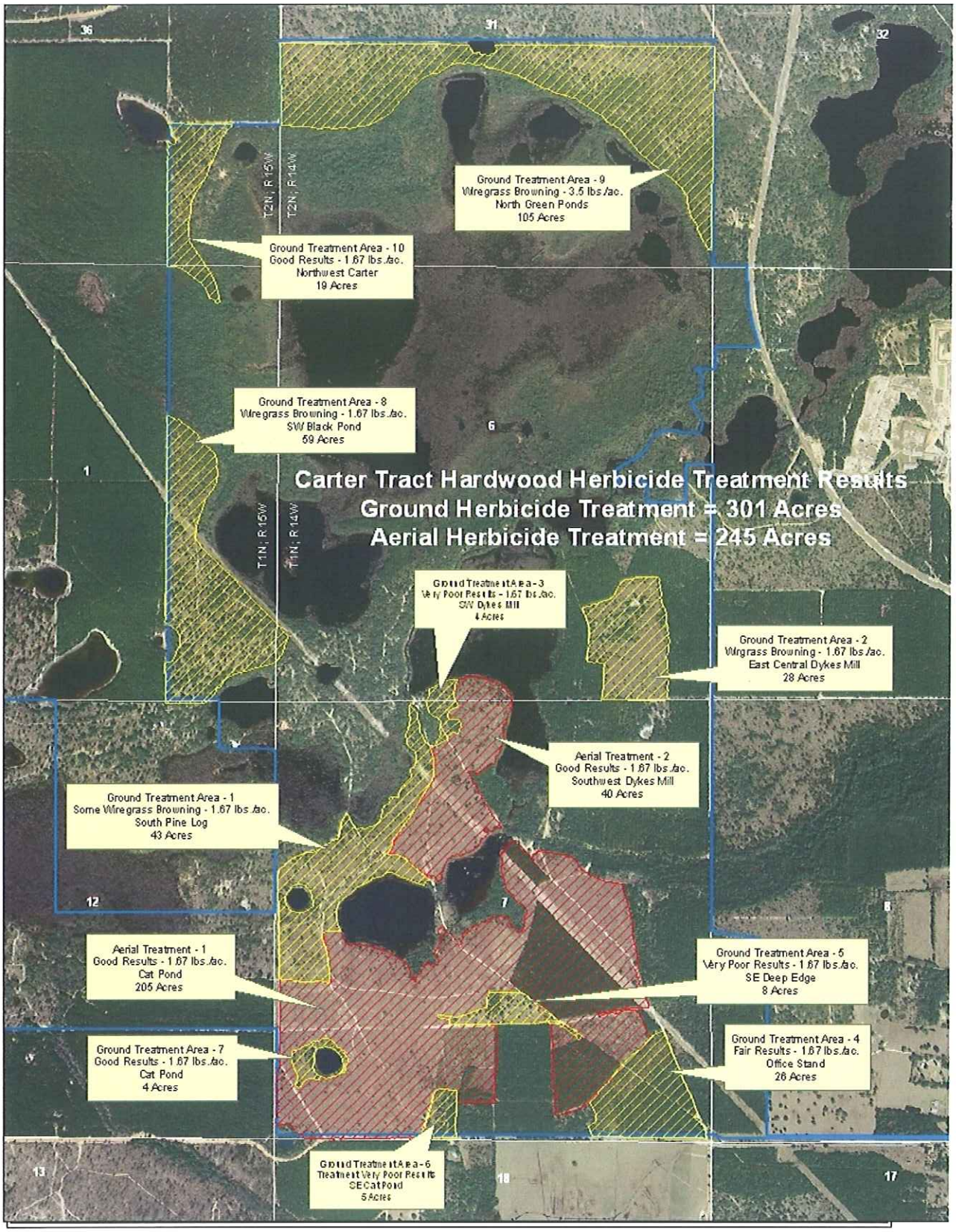


Figure 11 - Management Unit 11 Pine Removal

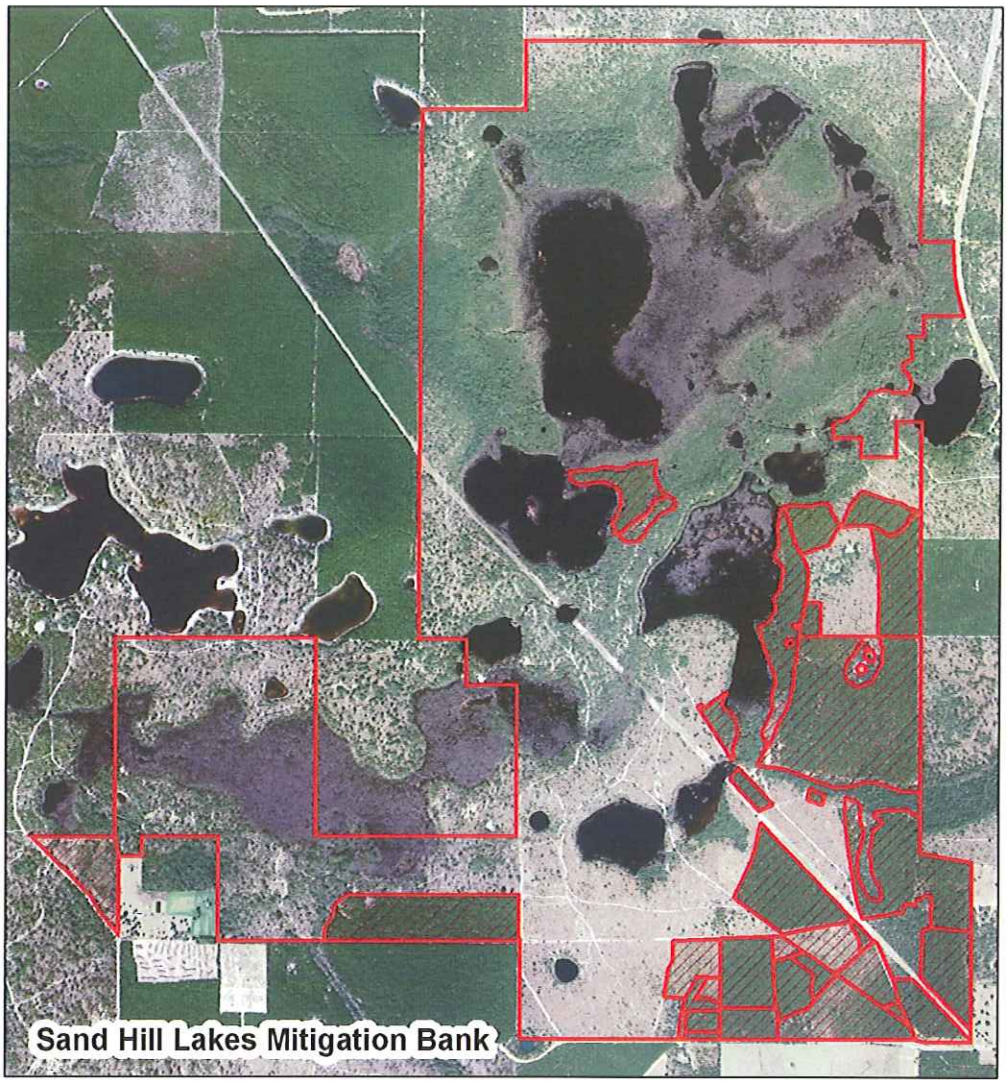
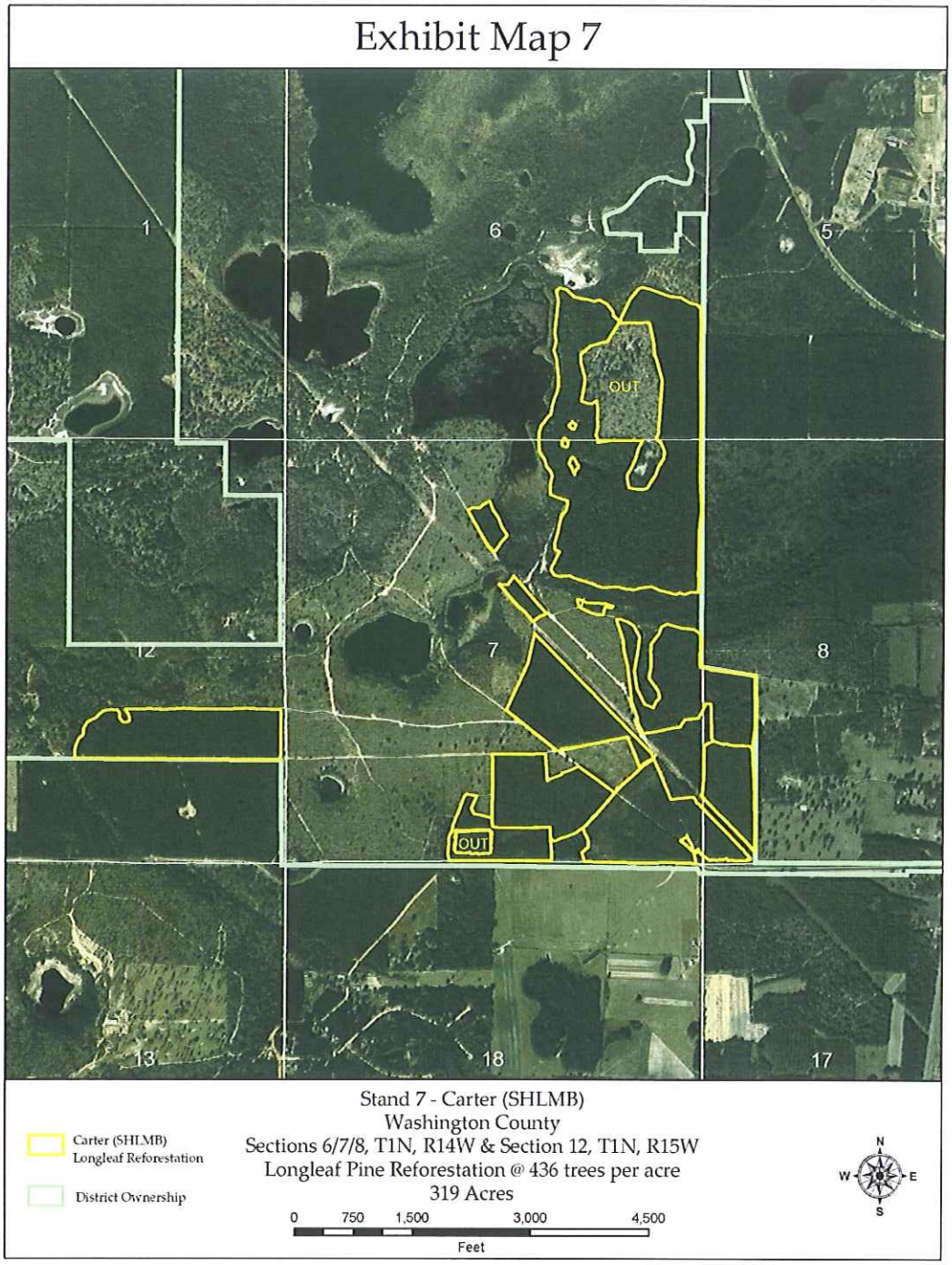


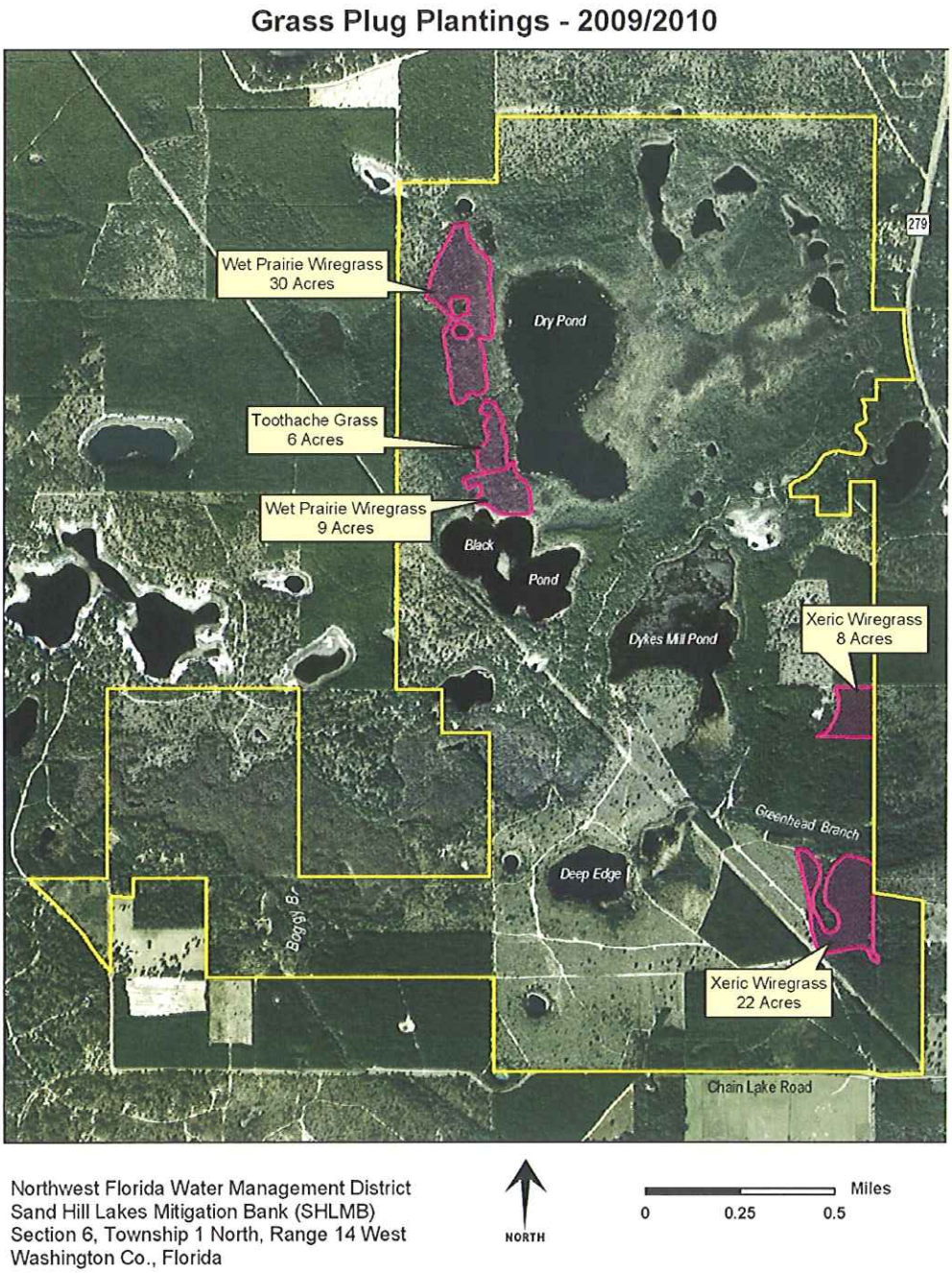
Figure 11A. 2008 Sand hill longleaf pine planting



Upland Wire Grass Planting

The majority of the areas with sand pine plantation had remnant sand hill species in the understory prior to harvest of the sand pine. Once the sand pine was removed, the sand hill seed bank and remnant wire grass greatly increased in cover in response to added light. However, in areas where few sand hill species were observed or areas without wire grass, wire grass tublings have or will be planted. Due to limited seed source a maximum of 30 acres each year will be planted in accordance with the permit requirements. In 2008, 53 acres of historic sand hill were planted with upland wire grass tublings on 3' centers (256,520 plants). In 2009, an additional 27 acres of upland wire grass tublings were planted on 4' centers (130,680 plants) in areas where the sand hill species were absent (Figure11b). An additional 30 acres of upland wire grass tublings are scheduled for planting in 2010.

Figure 11b. Wire grass plantings at SHLMB



Wet Flatwoods Restoration

According to the permit requirements, 147 acres of wet flatwood restoration was scheduled to occur at the SHLMB., Management Unit 2. However, District staff identified and additional 18 acres that historically was wet flatwoods and added this acreage to Management Unit two for a total acreage of 165 acres of wet , flatwoods restoration (Figure 12). Standing biomass of shrubs (primarily titi, gallberry and fetterbush) has been reduced to ground level with the use of a Gyro-Trac followed by winter burns. The gyrotack work was initiated on March 13 and was completed by August 20, 2007. The black titi in these areas was extremely thick often with a dbh of 10-14" and 25 – 30' tall. Even with the large "tree" size black titi, the gyrotrack was excellent in reducing the thick dense shrub cover to ground level. There were no noticeable track marks or ruts left by the Gyrto-Track. The mulch within these areas was allowed to dry for several months prior to burning. Sites were burned in December of 2007.

By March 2008, it was apparent, that while the shrub cover was greatly reduced, re-sprouting of the shrubs had occurred in all Gyro-Trac areas. Average shrub densities were determined through randomly established transects and stems per meter squared were determined. In areas with a hot fire 50-80 stems per meter squared were observed while in areas with an incomplete burn, 100 to 135 stems per meter squared were common. Based on these observations, the shrubs would return if not significantly reduced further. In an effort to determine if selected herbicides could aid in reducing shrubs numbers to an acceptable level, two polygons, the Whale, a 12 acre polygon adjacent to the Dry Pond parking, and a 16.2 acre polygon adjacent to Dry Pond and the slash pine restoration sites were chosen. These two areas were treated twice by Entrix with appropriate wetland approved herbicides, once in July and again in September. The 16.2 acre polygon was burned in the winter of 2008-2009 with a very hot fire. The 16.2 acre polygon was planted with wire grass plugs while the whale, had previously been direct seeded with wire grass seed. Preliminary results indicate that the shrub cover was greatly reduced from greater than 85% cover to less than 15% cover. Based on the positive results in these areas, herbicide was used to reduce shrub cover throughout the 165 acres of wet flatwood restoration.

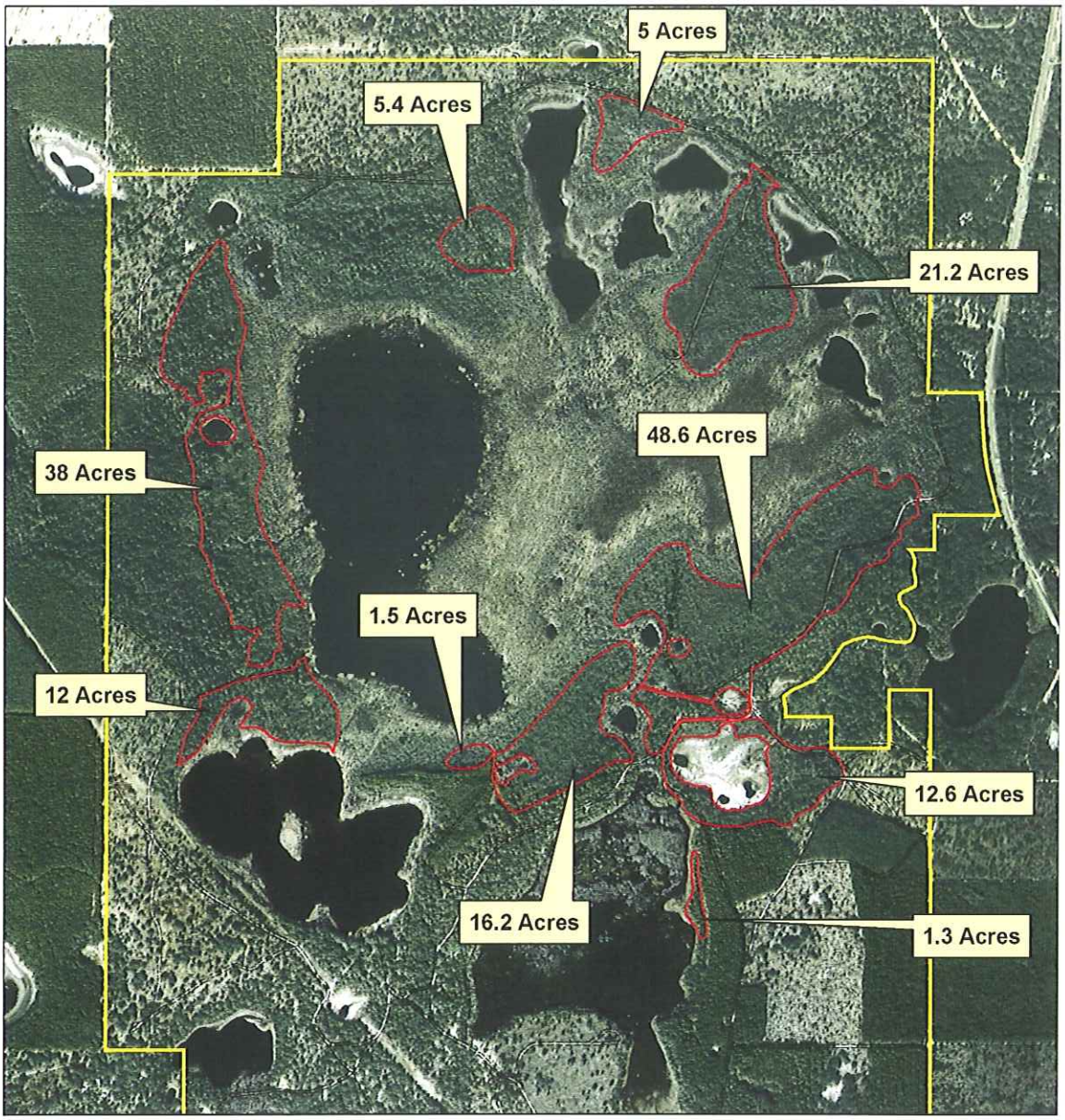
In Management Unit 3, Planted slash pine area restored to wet flatwoods), the shrub layer was limited due to the dense overstory of planted pine. Wet flatwood herbaceous species were more common in these areas after the initial warm season burn (2006) and recent slash pine thinning (2007). The initial fire in this area reduced most of the shrubs to coppice sprouts. It was hoped that the shrubs in this area could be managed through successive warm season fires. The fire was conducted for Management Unit 3 in December 2008. The burn had good coverage and shrubs were reduced to the ground level. However, shrub cover increased following the thinning of the pine, and the area was burned during the winter of 2009/2010. In 2010, the area will be treated with herbicide to further reduce the shrub cover and it will be planted with wet prairie wire grass in the winter of 2010/2011.

Wire grass planting continued in the wet flatwood restoration areas in 2008. A total of 32 acres of wet wire grass tublings (143,880 plants) were planted in December 2008. Tublings were planted on 3 foot centers for the 5.4 acre area north of Dry Pond, the 16.2 acre polygon adjacent to the southern portion of Dry Pond and east of black pond, and the 12.6 acre area surrounding Garret Pond (Figure 12a).

In 2009, the original 165 acres of wet pine flatwoods areas that had shrub reduction were treated with selective herbicides to further reduce shrub cover. Shrubs were hand treated three times in 2009, (April, July and October) to reduce shrub cover without impacting the understory or planted wire grass. This treatment will continue in 2010.

Figure 12. Pine Flatwood Restoration Areas

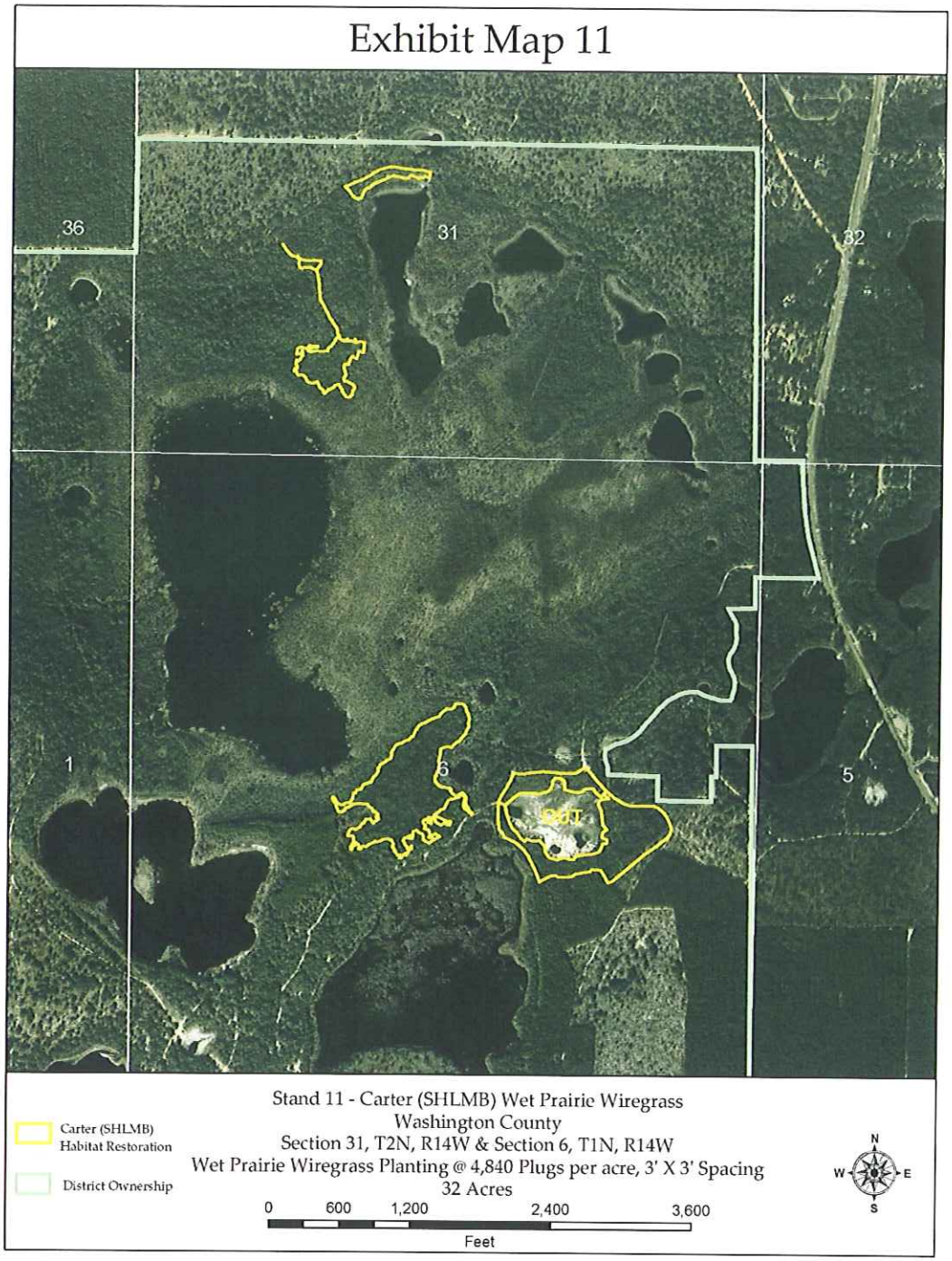
Brush Reduction



Northwest Florida Water Management District
Sand Hill Lakes Mitigation Bank (SHLMB)
Brush Reduction (Gyro-Track Mulching) - ~165 Acres
Section 6, Township 1 North, Range 14 West
Washington Co., Florida

Feet
0 610 1,220
NORTH

Figure 12a. Wet wire grass planting areas (Winter 2009).



Annual Monitoring

In accordance with Specific Condition 26, all sampling locations have been identified (Figure 13). Fall monitoring methods as well as data analysis are described below. Raw data, computational analysis, pedestrian surveys and photographic documentation are included in Appendix 2, 3 and 4 and found at the

District website: http://www.nwfwmdwetlands.com/index.php. Similarly, Oblique aerials of the SHLMB on October 19, 2009 and can be found at the District website (see above).

The 2008-2009 Annual report by the Florida Fish and Conservation Commission was completed in October and can be found on the District website (see above) in accordance with Specific Condition 25f.

Quantitative Monitoring

Materials and Methods

Quantitative monitoring has been conducted in accordance with the methods described in Attachment H – Monitoring Plan. Quantitative vegetation monitoring occurred at the end of the growing season. This is the second annual monitoring report for the SHLMB.

The percent vegetation cover was monitored at transect locations shown in Figure 13. One-meter square quadrats were established along 600' transects at 20' intervals. In addition, each transect contained a permanently established photographic documentation stations, where qualitative quadrat (north, east, south, and west) observations were recorded (Appendix 4). Transect termini will be marked using iron rebar surrounded by PVC pipe.

Vegetation species coverage statistics were developed from the recorded coverage of each species (or bare ground or open water) within a given quadrat. The percent coverage for each species (and bare ground or open water) was generated by adding all quadrat observations together, and dividing the total coverage by the cover of each species within each transect. This represents a modified Daubenmire cover scale where vegetation species statistics are used to determine the percent cover by bare ground, water, individual species and groups, such as wetland species, invasive exotic and nuisance species, and present.

Tree density was monitored using the "line strip" (belt transect) technique. Transects were co-located with each vegetation transect. The belt transects will be 600± feet in length and 30± feet in width. Within each belt transect, the height and condition of each planted tree will be recorded.

Photographic Stations:

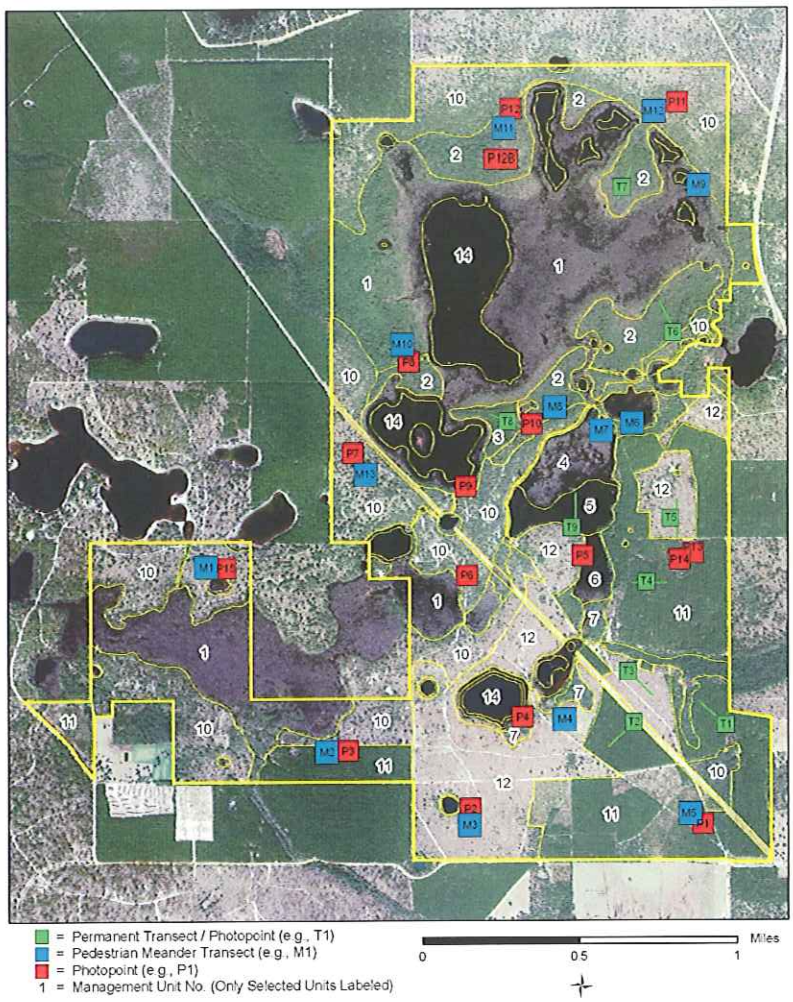
Panoramic photographs were taken from the permanently established stations at each transect and are found on the District website: http://www.nwfwmdwetlands.com/index.php. **Please note: photographic station 12 was abandoned as it was not placed in the correct habitat. The photographic station was inadvertently placed in a mesic hammock on the edge of management unit 2. To remedy this, a new photopoint 12b was established in the in management unit 2 to the south of the original photo point (Figure 13).**

Wildlife Utilization:

During the vegetation monitoring described above, wildlife observations will be recorded in each community. These observations will consist of direct sightings, scat, tracks, or vocalizations.

Fuel loads and prescribed fires within wet flatwood and sandhill communities: Semi-annual status reports will detail the condition of the communities relative to the need and potential for a burn, the conditions required for the next desirable burn, and the anticipated timeframe for the next burn. This data was included for each pedestrian survey transect found on the District website (see above).

Figure 13 - Monitoring Locations



Results and Discussion

UMAM Polygon II, Management Unit 11- Sand Pine Plantation

UMAM Polygon II, Management Unit 11, consists of 383.484 acres of planted sand pine plantation that will be converted to long leaf pine and sand hill habitat. Baseline conditions indicated a sand pine canopy with nearly 100 percent canopy closure and an average of 446 sand pine trees per acre occur in the sand pine plantations. Removal of the sand pine was completed in November 2007. Three transects (transect #1, #2 and #4) were located within UMAM Polygon II, Management Unit 11.

In 2008, a total of 10 species were observed in transect 1, 16 in transect 2, and 20 in transect 4. Two transects (1 and 4 lost one and two species respectively, while transect two increased by 11 species (Tables 4-6) (Figures 13-15). Wire grass was observed only in transect 2 with 8.5% cover, an increase of 3% cover from last year and was the dominant species occurring in that transect. The dominant cover class for all transects was bare ground with a range of 82% bare ground (transect 2) to 40% bare ground (transect 4). Bare ground was greatly reduced from the previous year along each transect. The exotic species Bahia grass (*Paspalum notatum*) was observed in transects 1 and increased from 0.1% cover to 0.7% cover. Bahia grass was also observed in transect 4 reduced from 1.5% cover to one percent cover. However, centipede grass increased in cover from 10.6% to

23.2% cover and again was the dominant species within that transect. Herbicide treatments targeting Bahia and centipede grass without impacting the native species will be applied in spring and fall of 2009.

In 2009, a total of 19 species were observed in transect 1, 23 in transect 2, and 23 in transect 4. Increasing species numbers were observed in all transects ranging from and increase of 9 species in transect 1 to 3 in transect 4 (Table 3,4 and Figures 15 and 16). A total of 11 species common to sandhills were found in transect 1, 21 in transect 2, and 17 in transect 4. Since the sand pine plantation was removed there has been increasing numbers of sand hill species present within the transects. Wire grass was observed in transects 2 and 4. Percent cover of wire grass had increased from 8.5% to 25.7% cover in transect 1 and from 3% cover to 12.3 % cover in transect 4 within the last year. Transect 1 will be planted in wire grass tublings during the winter of 2009. Vegetative cover continues to increase for transect 1 and 2 with 35.9 % cover for transect 1, and 34% cover in transect 2. Cover was slightly reduced from 48% cover to 40% cover in transect 4 potentially due to herbicide treatment of the centipede and Bahia grass. Bahia grass was again observed in transect 1 and cover increased from 0.7% cover to 3% cover. Bahia grass was treated last year and will continue to be treated in the following year. However, while Bahia grass cover was greater than desired in transect 1, the cover of Bahia grass is spotty and below 2% cover for the polygon.

Interim Success Criteria:
The sand pine plantation was harvested in 2007. Site preparation burns occurred during the winter of 2008 and the area that included transect 4 and transect 2 was planted in the winter of 2008/2009 with long leaf pine. Wire grass tublings were planted on 3' centers in the polygons surrounding transect 1, and 4 in 2008 and the polygon including transect 1 (22 acres) will be planted in the winter of 2009/2010 (Table 11b). The transects are measurably increasing in species number and vegetation cover, Bahia grass was eliminated from transect 2 and 4, and fire has been re-introduced to the areas.

Table 3. Transect 1 Species cover and occurrence (Former Sand Pine Plantation)

Date 11/4/09 Time: 11:00 Am

Collector: David Clayton Condition, Fair and cool

Wildlife observed: Red wing black bird, titmouse, chipping sparrow titmouse, chipping sparrow

Community description: Former Sand Pine Plantation

Replanted with LLP

Scientific Name	Species	Percent Cover
Aster pilosus	Frost aster	0.5
Artemisia campestris	Wormwood	11.6
Axonopus furcatus	Big carpet grass	0.6
Chrysoma pauciflosculosa	Woody goldenrod	0.5
Cyperus sp.	Sedge	7.6
Dichanthelium aciculare	Needle leaf witch grass	0.66
Diospyros ebenum	Persimon	0.16
Eupatorium capillifolium	Dog fennel	2
Eupatorium mohrii	Mohr's thorough wort	0.5
Mollugo verticillata	Indian chickweed	1
Opuntia humifusa	Prickly pair cactus	0.167

Paspalum notatum	Bahia grass	3.1
Pinus clausa	Sand pine	2.3
Pinus palustris	Long leaf pine	0.83
Quercus hemisphearica	Diamond oak	0.167
Rubus cuneifolius	Sand black berry	1.7
Sida rhombifolia	Indian hemp	0.167
Tradescantia hirsutiflora	Hairy spiderwort	0.33
Yucca filamentosa	Adam's needle	1.6
Bare ground	Bare ground	64.1

Figure 14. Transect 1. Percent Cover and occurrence (Sand Pine Plantation)

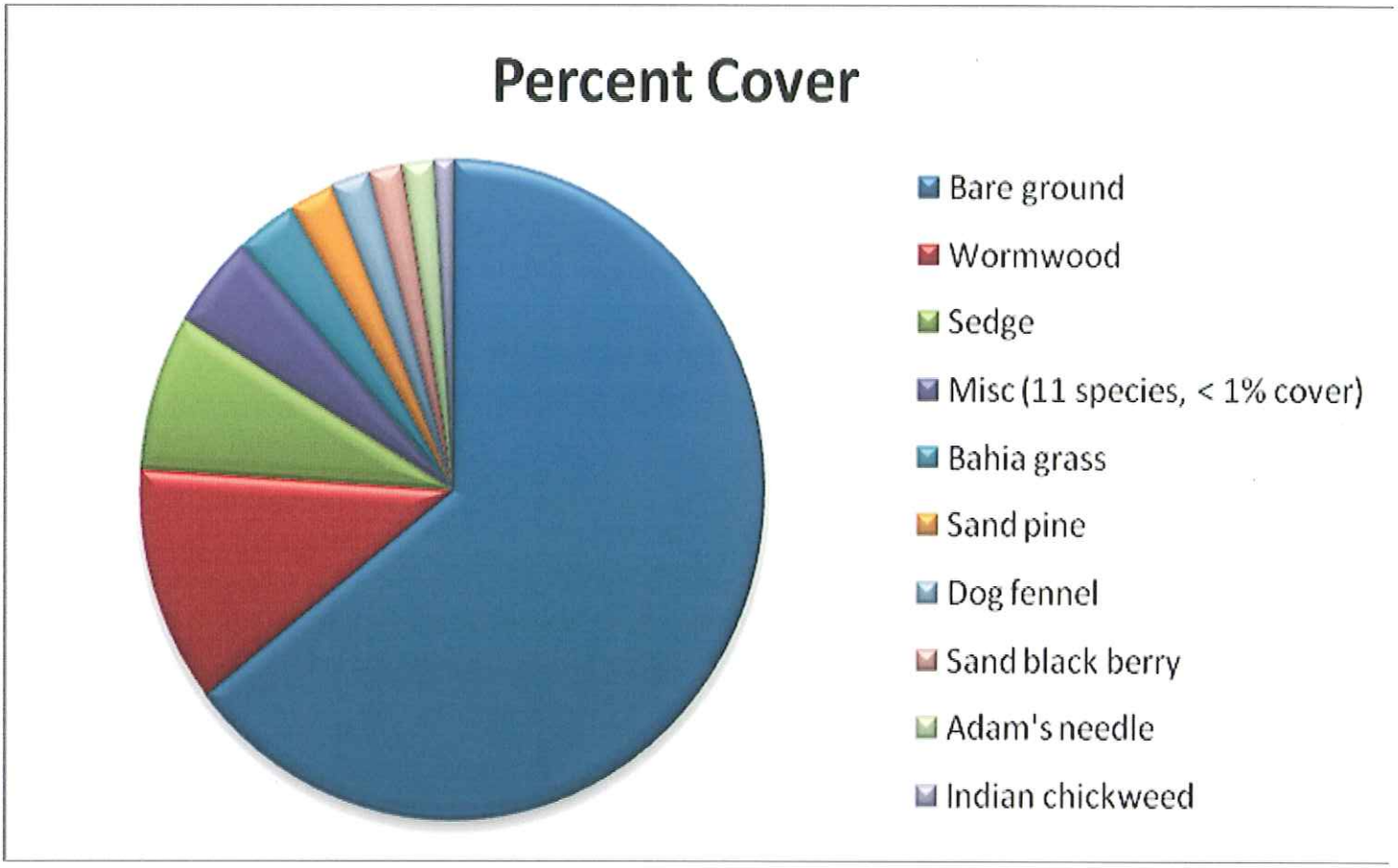


Table 4. Transect 2. Species cover and occurrence (Sand Pine Plantation)

Date 11/4/09	Time: 11:30 Am
Collector: David Clayton	Condition, Fair and cool
Wildlife observed: Titmouse, chipping sparrow titmouse, chipping sparrow	Fuel load: Low
Community description: Former Sand Pine Plantation	State Threatened species Wire grass and sandhill species regenerating

Scientific Name	Species	Percent Cover
Andropogon arctatus	Pinewoods bluestem	1
Andropogon glomeratus	Bushy broom sedge	0.17
Andropogon virginicus	Broom sedge	0.33
Aristida stricta	Wire grass	25.7
Axonopus furcatus	Big carpet grass	0.16
Cyperus sp.	Sedge	0.16
Dichanthelium aciculare	Needle leaf witch grass	0.33
Dichaenthelium sp.	Witch grass	0.33
Diodia teres	Poor Joe	0.33
Eragrostis spectabilis	Purple lovegrass	0.167
Eupatorium compositifolium	Yankeeweed	0.67
Gaylussacia dumosa	Dwarf huckleberry	0.33
Haplopappus divericatus	Scratch Daisy	0.33
Hypericum gentianoides	Orange weed	0.33
Liatris tenuifolia	Shortleaf gayfeather	0.67
Licania michauxii	Gopher apple	0.33
Pinus clausa	Sand pine	0.16
Pteridium aquilinum	Brachen	0.15
Quercus laevis	Turkey oak	2.2
Schizachyrium sp	Little blue stem	1.5
Solidago tortifolia	Twisted leaf goldenrod	0.5
Stylisma patens	Coastal plain dawnflower	0.16
Vaccinium corymbosum	High bush blueberry	1
	Bare ground	66

Figure 15. Transect 2: Species Cover and Occurrence (Sand Pine Plantation)

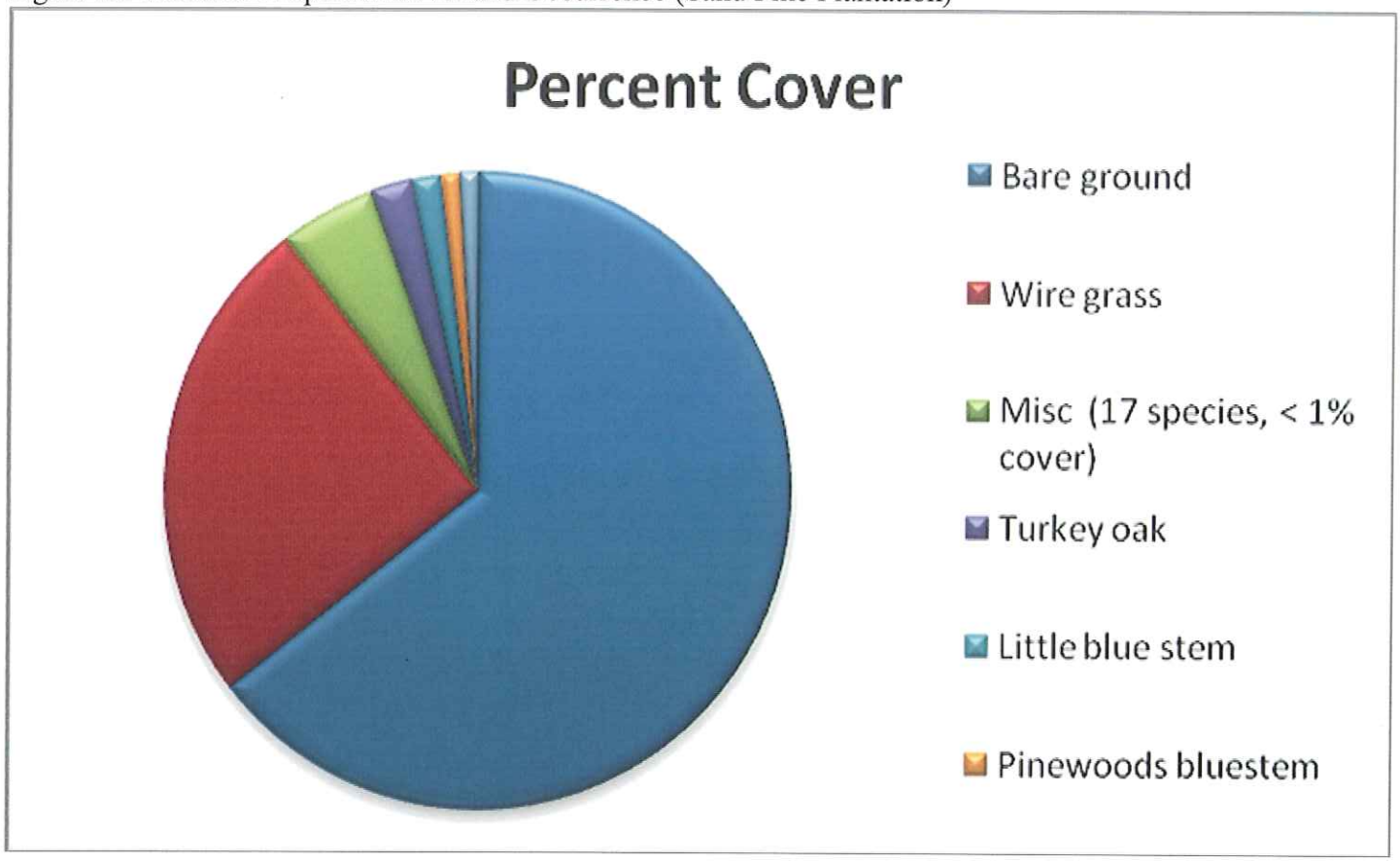


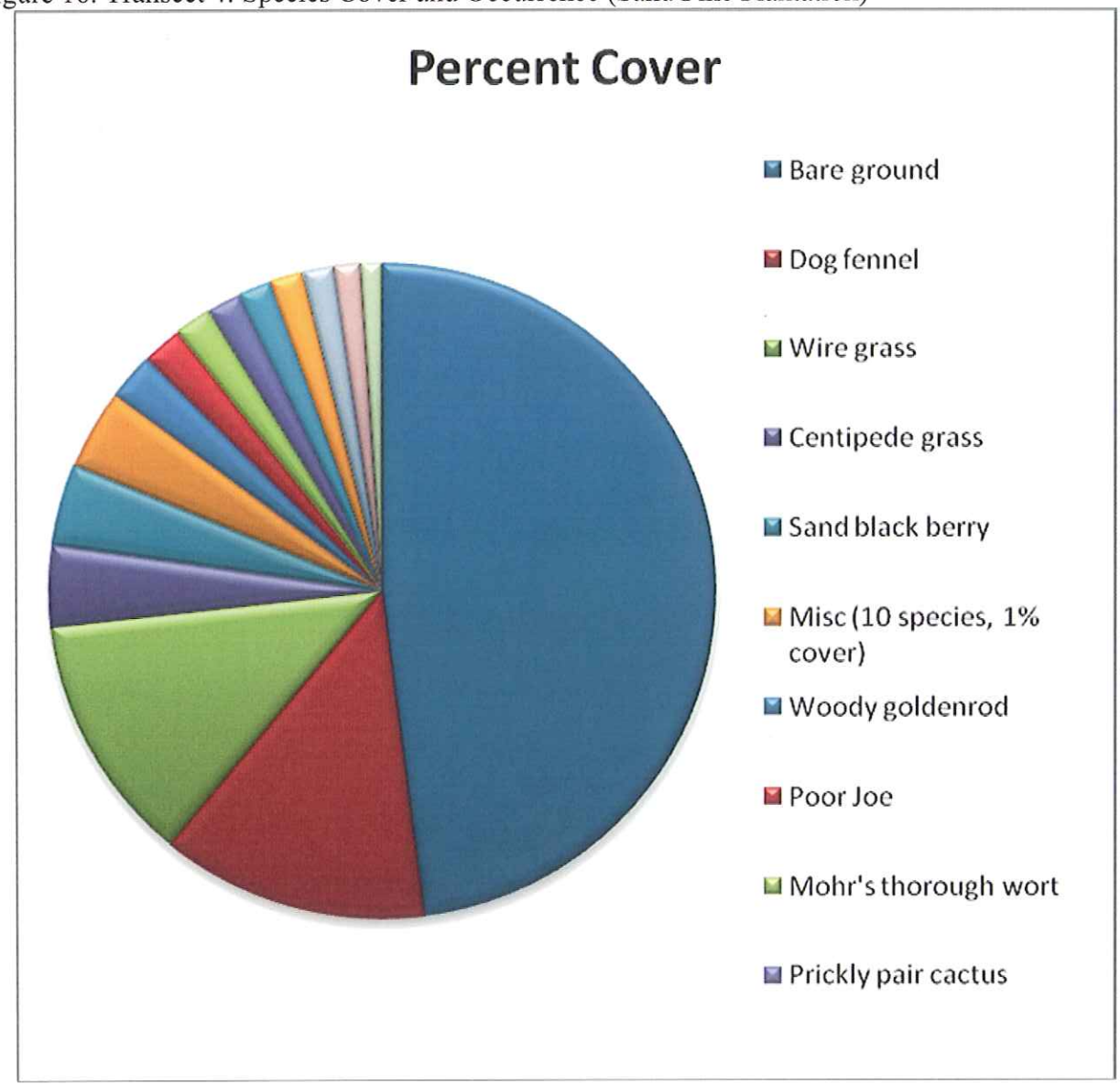
Table 5. Transect 4. Species cover and occurrence (Sand Pine Plantation)

Date 11/5/09	Time: 10.30 Pm
Collector: David Clayton	Condition, Fair and cool
Wildlife observed: None	Fuel load: low
Community description: Sand pine plantation removed	East side Dykes Mill Pond and Green Head

Scientific Name	Species	Percent Cover
Aeschynomene americana	Aeschynomene	0.167
Andropogon virginicus	Broom sedge	0.33
Aristida stricta	Wire grass	12.3
Bulbostylis ciliatifolia	Capillary hair sedge	0.167
Chrysoma pauciflosculosa	Woody goldenrod	2.3
Chrysopsis lanuginosa	Lynn Haven goldenaster	1.5
Conyza canadensis	Canadian horseweed	1.6
Cyperus sp.	Sedge	0.83
Dichaenthelium sp.	Witch grass	1
Diodia teres	Poor Joe	2
Diospyros virginiana	Persimon	0.5
Eremochloa ophiuroides	Centipede grass	4
Eupatorium capillifolium	Dog fennel	13

Eupatorium mohrii	Mohr's thorough wort	1.8
Galactia sp.	Milk pea	0.167
Hypericum gentianoides	Orange weed	1.6
Ilex vomitoria	Yaupon	0.5
Pinus paulustris	Long leaf pine	0.83
Opuntia humifusa	Prickly pair cactus	1.67
Quercus hemaespherica	Diamond Oak	0.33
Rubus cuneifolius	Sand black berry	4
Schizachyrium sp	Little blue stem	1.3
Vaccinium arboreum	Sparkle berry	0.16
	Bare ground	48

Figure 16. Transect 4: Species Cover and Occurrence (Sand Pine Plantation)



UMAM Polygon I, Management Unit 12- Sand Hill

UMAM Polygon I, Management Unit 12, consists of 263.52 acres. This polygon is dominated by a sand hill community with an overstory dominated by turkey and live oaks with scattered remnant longleaf pine and an understory dominated by wire grass and a wide variety of herbaceous species. Reclamation activities within this upland community include re-introduction of fire, thinning of oaks to less than 150 trees per acre and planting of long leaf pine seedlings at a density not to exceed 200 trees per acre at final release. Fire was re-introduced to this area during the winter of 2004. A winter burn scheduled for the areas that had oak reduction. Prior to the re-introduction of fire, the dominant understory species was woody goldenrod. Oaks were thinned for the majority of Management Unit 12 in August of 2005. However, the portion of Management Unit 12 which contains Transect 5 was thinned in September of 2006. The re-introduction of fire and thinning of the turkey and live oaks have led to significant changes in the species composition. Two transects (transect #3 and #5) were located within UMAM Polygon I, Management Unit 12, and reflect baseline conditions (Table 6, 7 and Figure 16, 17).

In 2006, a total of 23 species were observed in transect 3 and 31 species in transect 5. A diverse understory of plants typical of sand hill vegetation was observed within each transect. No nuisance or exotic species cover occurred within these transects. The greatest cover class for each transect was bare ground with 47.5% (transect 3) and 68.5% for transect 5. Wire grass was the dominant vegetative species for both transects with 27.2 % cover for transect 3 and 22.2% cover for transect 5. A total of 12 species, Elliot's bluestem, wiregrass, Coastalplain honeycombhead, woody goldenrod, silver croton, witch grass, persimmon, pineland spurge, milk pea, pineweed, gopher apple and bracken fern were common to both transects.

In 2008, a total of 18 species were observed in transect 3 and 27 species in transect 5 slightly higher for transect 3 and lower for transect 5 than last year. A diverse understory of sand hill vegetation was observed again this year and no nuisance or exotic species were observed (Table 6, 7, Figure 16 and 17). The greatest cover class again was bareground with 36.1% cover for transect 3 and 37% for transect 5. The amount of bareground for each transect was greatly reduced and may be due to the re-introduction of fire. Wire grass was again the dominant vegetative species for both transects with 34% for transect 3 and 38% cover for transect 5. Wire grass cover increased by 6.8% for transect 3 and 15.8% cover for transect 5. A total of 9 species were common to both transects.

In 2009, a total of 15 and 29 species were observed within transects 3 and 5 respectively. The number of species is lower for transect 3 by three species and slightly higher by two species for transect 5. A diverse understory of sand hill vegetation was again observed during this monitoring event. No nuisance or exotic species were observed (Table 6, 7, Figure 17 and 18). The greatest cover class was bare ground for transect 3 with 44% cover while wire grass cover was the great percent cover with 42.5% cover for transect 5. Wire grass was again the dominant vegetative species for both transects with 39% for transect 3 and 42.8% cover for transect 5. Wire grass cover increased by 5% for transect 3 and 4.8% cover for transect 5.

Longleaf pines were planted in portions of UMAM polygon I, Management Unit 12 in the winter of 2004. However, longleaf pines were only observed in Transect 3 in 2006. A belt transects 600' feet in length and 30' feet in width was co-located with the vegetation transect. The number, height and condition of each planted tree were recorded. A total of 36 trees were observed or an average of 871 trees per acre. However, the winter burn in 2006 was extremely intense and killed nearly all planted pines. A total of 2 seedling pines were observed in 2007 both close to the ground and in the grass stage. During the 2008 monitoring, two planted pine seedlings were again observed, both in the grass stage. These areas were planted with less than 300 trees per acre during

the winter of 2008 During the 2009 sampling event, a total of 38 long leaf pines were observed along transect 3 and 24 along transect 5. Seedlings were in the grass stage and appeared healthy..

Interim success Criteria:

The interim success criteria have been met for UMAM I polygon I. Fire was re-introduced to the site, turkey and live oaks were thinned to less than 150 trees per acre and long leaf pine have been planted. In June of 2009, due to an increase in oak sprouts from the felled trees in the sand hills, ULW, and herbicide selective for oaks. It is hoped that this will reduce oak cover to less than the 150 oaks per acre required by the permit. No nuisance or exotic species occurred were observed within transects, fire adapted species dominate the vegetative cover, while wood species cover has been greatly reduced. Wire grass cover continues to increase and sandhill species dominate the polygons.

Table 6. Transect 3. Species cover and occurrence (Sand Hill)

Transect 3

Date 11/4/09 Time: 1:00 Pm

Collector: David Clayton Condition, Fair and cool

Wildlife observed: Crow Fuel load: Moderate

Community description: Sandhill with oaks thinned Greenhead branch

Scientific Name	Species	Percent Cover	# speices
Andropogon arctatus	Pinewoods bluestem	3.3	1
Andropogon virginicus	Broom sedge	0.167	2
Aristida stricta	Wire grass	39	3
Chrysoma pauciflosculosa	Woody goldenrod	1.7	4
Diospyros virginiana	Persimon	0.167	5
Gaylussacia dumosa	Dwarf huckleberry	1	6
Persea borbonia	Red bay	1	7
Pinus paulustris	Long leaf pine	0.33	8
Polygonella gracilis	Wire weed	0.167	9
Opuntia humifusa	Prickly pair cactus	0.167	10
Quercus incana	Blue jack oak	0.167	11
Quercus laevis	Turkey oak	3.5	12
Serenoa repens	Saw palmetto	5.3	13
Vaccinium darrowii	Darrow's blueberry	0.167	14
Vaccinium arboreum	Sparkle berry	0.167	15
	Bare ground	44	

Figure 17. Transect Three Percent Cover

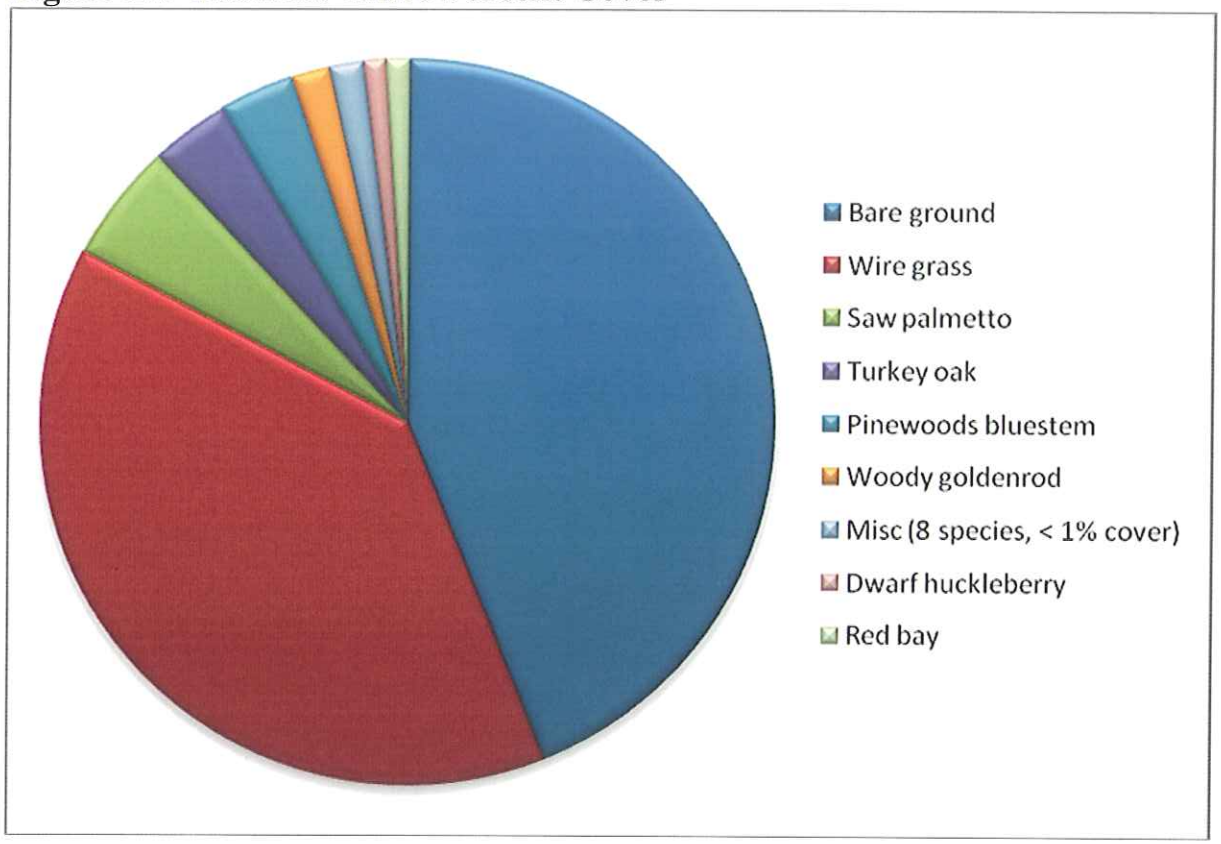


Table 7. Transect 5 Species and Occurrence (Sand Hill)

Transect 5

Date 11/5/09 Time: 8:50 am

Collector: David Clayton Condition, Fair and cool

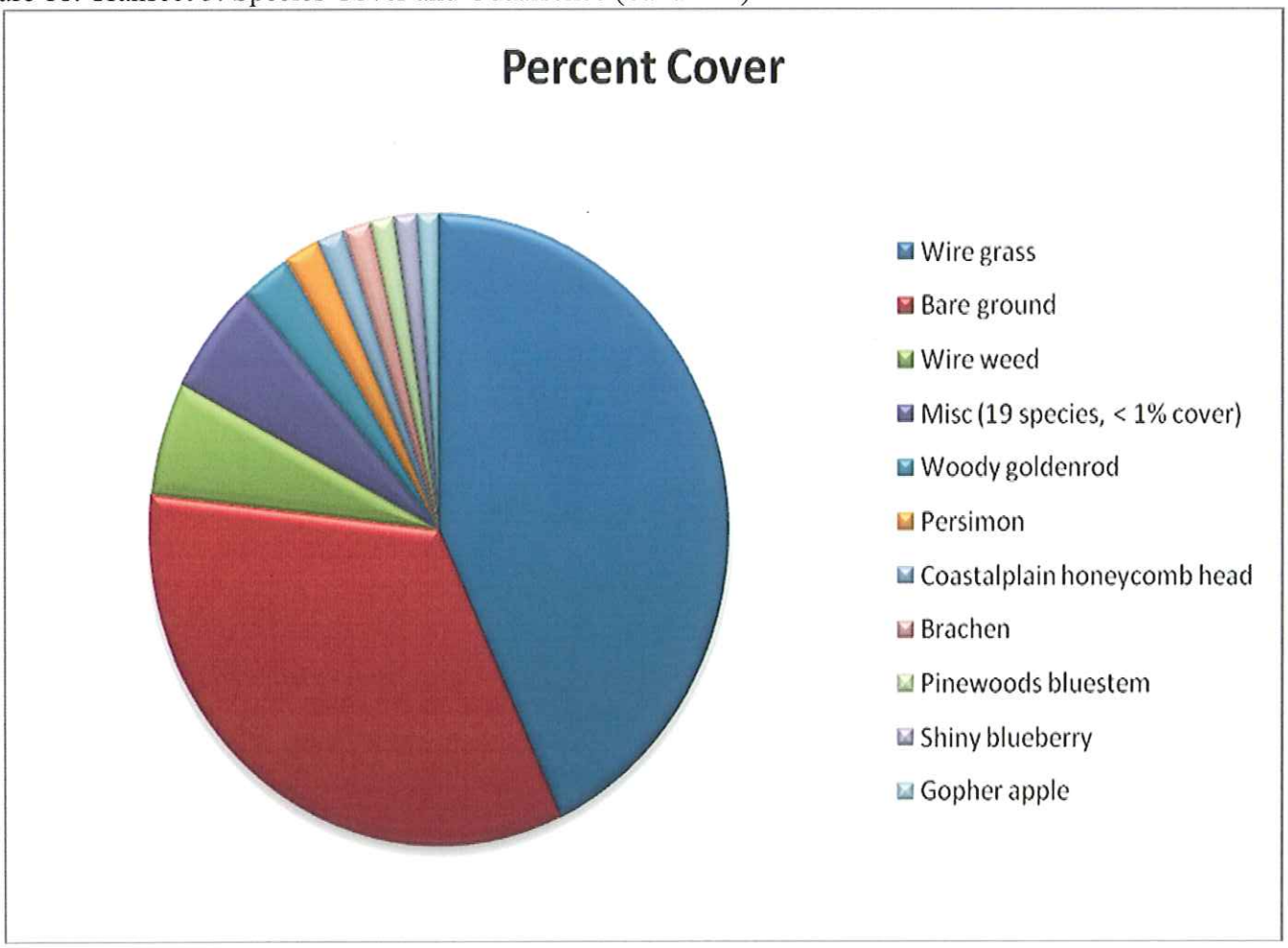
Wildlife observed: Wren, chipping sparrow Fuel load:moderate due to herbicide of oaks

Community description: Sandhill

Scientific Name	Species	Percent Cover	# speices
Andropogon arctatus	Pinewoods bluestem	1.3	1
Andropogon virginicus	Broom sedge	0.33	2
Aristida stricta	Wire grass	42.8	3
Asimina angustifolia	Slimleaf paw paw	0.167	4
Aster pilosus	Frost aster	0.167	5
Balduina angustifolia	Coastalplain honeycomb head	1.5	6
Baptisia lanceolata	Gopherweed	0.167	7
Bulbostylis ciliatifolia	Capillary hair sedge	0.167	8
Chrysoma pauciflosculosa	Woody goldenrod	2.67	9
Crataegus michauxii	Michaux's hawthorn	0.33	10
Dichanthelium sp.	Witch grass	0.167	11
Diospyros virginiana	Persimon	2	12
Eriogonum tomentosum	buckwheat	0.167	13

Gelsemium sempervirens	Yellow jessamine	0.167	14
Hypericum gentianoides	Orange weed	0.5	15
Ilex vomitoria	Yaupon	0.167	16
Licania michauxii	Gopher apple	1.167	17
Penstemon multiflorus	Manyflowered beardtongue	0.167	18
Pityopsis graminifolia	Narrow leaf silkgrass	0.167	19
Polygonella gracilis	Wire weed	5.8	20
Pteridium aquilinum	Brachen	1.5	21
Opuntia humifusa	Prickly pair cactus	0.66	22
Quercus incana	Blue jack oak	0.167	23
Scleria sp.	Nutrush	0.167	24
Smilax sp.	Smilax	0.83	25
Vaccinium corymbosum	High bush blueberry	0.83	26
Vaccinium myrsinites	Shiny blueberry	1.3	27
Yucca filimentosa	Adam's needle	0.33	28
	Bare ground	33.5	

Figure 18. Transect 5: Species Cover and Occurrence (Sand Hill)



UMAM Polygon(s): VII, Management Unit 3- Planted Slash Pine Plantation

UMAM Polygon VII, Management Unit 3, consists of 11.5 acres of bedded planted slash pine that will be restored to a hydric pine flatwood. The overstory was dominated by planted slash pine. The shrub and understory was largely been shaded out by the near complete canopy closure of the slash pine. Pines were thinned to 225 trees per acre in 2007. Following the initial burn in the summer of 2005, it was determined that the shrubs could be kept to coppice sprouts with successive warm season burns. In winter 2011, wire grass tublings will be planted on 3' centers throughout the polygon.

In 2006, a total of 17 species were observed. The majority of the species were common to wet flatwoods. No nuisance or exotic species were observed. The greatest cover class observed was bare ground at 80.5%. The dominant vegetation was black ti ti with 6.5 percent coverage. The total shrub coverage was approximately 12%. No wire grass was observed within this polygon.

In 2007, a total of 18 species were observed, similar to baseline observations. The majority of the species were common to wet flatwoods. No nuisance or exotic species cover was observed. The greatest cover class was again bare ground with 77.3 percent cover. The slight increase in vegetative cover may be due to increased light reaching the understory since the dense pine canopy has been thinned. Swamp dog hobble had the greatest percent vegetative, each with 5 percent. Black titi cover was reduced from 6.5 % to 3.7%. This represents a reduction in black titi cover from the baseline observations. Overall shrub coverage within this polygon slightly increased from 12% in 2006 to 13.4% in 2007 and herbaceous cover has increased from last year. Wildlife observations included a blue jay, towhee, and cardinal.

In 2008, a total of 30 species were observed. The majority of the species were common to wet flatwoods. No nuisance or exotic species were observed. Bare ground again had the largest cover class with 58% down from 77.3% the year before. Black titi had the greatest cover class of the vegetation with 5.4%, increasing by1.7%. Overall shrub cover within the polygon has increased from 13.4% in 2007 to 17% in 2008. Herbaceous cover also continues to increase over time. In 2008, herbaceous cover within the transect increased to 23.7%.

In 2009, a total of 28 species were observed. The majority of the species were common to wet flatwoods. No nuisance or exotic species were observed. Bare ground again had the largest cover class with 52% down from 58% the year before. Muscatine grape had the greatest cover class of the vegetation with 9.5%. Shrub cover within the polygon has decreased significantly from 17% in 2008 to 8.5% in 2009. Herbaceous cover also continues to increase over time. In 2008, the herbaceous cover increased to 30% and increase of 6.3% from the previous year.

Interim success Criteria:
Many of the management activities that will be used to restore UMAM VII, Management Unit 3 have been implemented and interim management activities completed or initiated. The forested canopy has been reduced to approximately 200 trees per acre (225) and is expected to further decline with the continuation of warm season burns. No exotic or nuisance species were observed. Herbaceous species cover is increasing and species present are consistent with wet pine flatwoods. A warm season burn was introduced in 2006, and the slash pines were reduced in density. The area will be planted with wire grass during the winter of 2009/2010 and a winter burn is planned for the winter of 2009/2010.

Transect 8 Hydric Pine flatwoods

Date 11/2/09 Time: 11:30 am

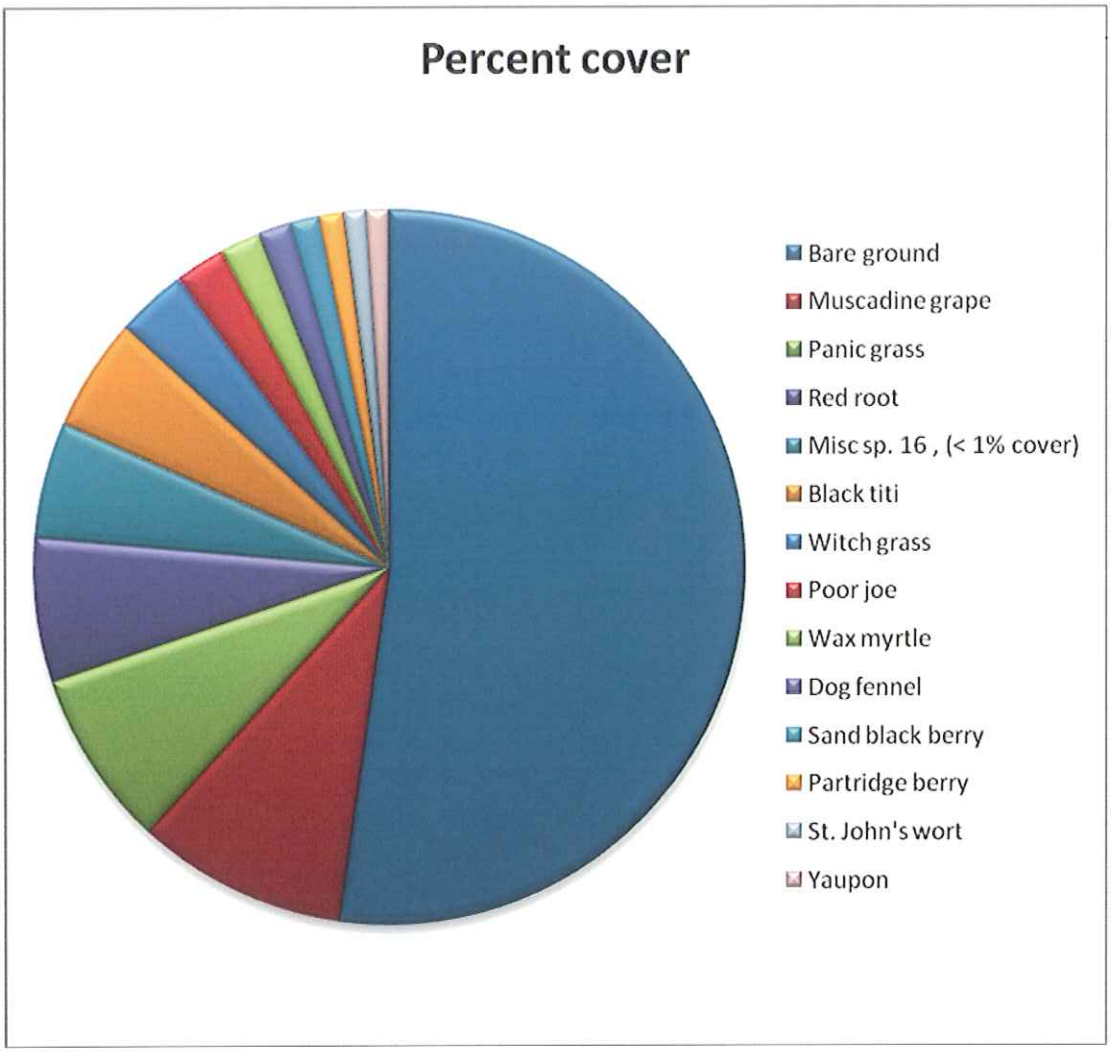
Collector: David Clayton Condition, Fair and cool

Wildlife observed:Red shouldered hawk, titmouse, red bellied woodpecker

Community description: Wet flatwoods, slash pine thinned Fuel load:low

Scientific Name	Species	Percent Cover	# speices
Andropogon glomeratus	Bushy bluestem	0.167	1
Carex verrucosa	Warty Sedge	0.5	2
Centella asiatica	Centella	0.8	3
Chamaecrista nictitans	Partridge berry	1.1	4
Cliftonia monophylla	Black titi	5.1	5
Cyrilla racemiflora	Red titi	0.167	6
Dichanthelium sp.	Witch grass	3.16	7
Diodia teres	Poor joe	2.3	8
Eupatorium capillifolium	Dog fennel	1.5	9
Gelsemium sempervirens	Jessamine	0.33	10
Hyper sp.	St. John's wort	1	11
Ilex glabra	Gall berry	0.5	12
Ilex vomitoria	Yaupon	1	13
Lachnanthes caroliniana	Red root	6.5	14
Leucothoe racemosa	Swamp dog hobble	0.167	15
Ludwigia decurrens	Seedbox	0.5	16
Lycopus virginicus	Water horehound	0.3	17
Myrica cerifera	Wax myrtle	1.8	18
Panicum sp.	Panic grass	8	19
Persea palustris	Swamp bay	0.8	20
Pinus palustris	Longleaf pine	0.1	21
Polygala lutea	Candy weed	0.16	22
Rhexia alifanus	Savannah meadow beauty	0.06	23
Rhynchospora microcephola	Bunched beaksedge	0.167	24
Rubus cuneifolius	Sand black berry	1.3	25
Smilax laurifolia	Cat briar	0.167	26
Vaccinium corymbosum	Highbush blueberry	0.3	27
Vitus rotundifolia	Muscadine grape	9.5	28
	Bare ground	52	

Figure 19. Transect 8, Planted slash pine species cover and occurrence



(UMAM Polygon V, Management Unit 2, Hydric Pine Flatwoods

UMAM Polygon V, Management Unit 2 consists of 165 acres of fire suppressed shrub dominated hydric pine that will be restored to a hydric pine flatwood. The overstory is dominated by a near impenetrable shrub layer with a largely lacking tree canopy and herbaceous layer. Reclamation activities within this polygon include removal of shrub overstory with a Gyro-trac followed by continued treatment with selective herbicides if necessary, re-introduction of fire, planting of longleaf and slash pine trees at a rate of 436 trees per acre, planting wiregrass tubelings on 3' centers, and monitoring for nuisance / exotic plant species. If the seed bank does not respond, additional keystone flatwood species will be introduced as tublings.

Fire was re-introduced into this polygon during the summer of 2005. Two transects, 6 and 7 were established in different portions of the hydric pine flatwoods. The warm season burn was effective in reducing the overstory of shrubs in transect 7, however, by the time of the initial sampling event, the majority of the shrubs had sprouted from the roots and already formed an extremely dense shrub layer approximately 3-4' in height. The fire was less effective in the area surrounding transect 6. Many of the black ti ti within this transect did not burn.

In 2006, a total of 14 species were observed within the transect 6 and 16 in transect 7. Seven species were common to both sites, and all were shrubs. Both sites were dominated by shrubs with little overstory and little to no understory species due to the extremely thick shrub layer. No exotic species were observed. The greatest cover class observed for both transects was black ti ti with 69.87 % cover in transect 6 and 31.77 percent cover in transect 7. No wire grass was observed within this polygon. One other shrub species Fetterbush (15.3%) had significant cover within transect 6, myrtle leaved holly (15.4%) had significant cover in transect 7. Little bare ground was observed in transect 6 (3.7%) while 11.5% bare ground was observed in transect 7.

In 2007, a total of 12 species were observed within transect 6 and 9 in transect 7. Transect 6 had a similar species composition to the baseline while transect 7 had significantly fewer species observed probably due to the gyrotrack. Seven species were common to both sites, and all were shrubs. Both sites were dominated by 3-3.5' shrubs though each had an herbaceous component. While this did not represent significant cover in transect 6, 3.7% cover in transect 7 was red root, and early colonizing wetland species. The greatest cover class for both transects was bare ground with 40.8% for transect 6 and 48.2% cover for transect 7. This represents a significant shift in cover from black titi to bare ground due to the gyrotrack. Black titi cover was also greatly reduced from nearly 70% to 14% in transect 6 and from 31.77% to 28.1% cover in transect 7. The relative minor decrease in black titi cover in transect 7 may be the result of the intense warm season fire in 2006. Fetterbush was the dominant species by cover in transect 6 while black titi remained the dominant plant species by cover in transect 7. Continued management activities will further reduce shrub coverage.

In 2008, a total of 24 species were observed within transect 6 and 16 in transect 7. The represents a 50% increase in transect 6 and 56% increase in species in transect 7. The seed bank along both transects has started to respond and herbaceous species not identified previously have emerged. A total of 10 new herbaceous species were observed along transect 6 and 7 new herbaceous species in transect 7. Shrub cover along transect 6 increased from 3.7% to 47.57% an increase of 43.87% and along transect 7 remained approximately the same 48.1% in 2007 to 48.38% in 2008. Shrub levels at each site were beyond acceptable levels. Test plots using selective herbicides that eradicate target shrubs without impacting the native understory showed great promise. In the test plots, shrub levels were reduced from near 50% cover to less than 15% with two applications. In 2009, these treatments will be expanded across the landscape.

In 2009, a total of 11 species were observed in transect 6 and 14 in transect 7. This is a significant drop in species observed along transect 6 but a similar number of species observed along transect 7. The drop in species along transect 6 may be due to a reduction in shrub species found in transect 6. Six shrub species found in transect 6 in 2008 were absent in 2009, probably from the selective herbicide treatment. However the number of shrub species remained constant along transect 7. Herbaceous species cover along transect 6 was slightly lower in 2009 with 7.1%, down from 10.4 %. Similarly along transect 7 herbaceous cover was down from 12.07% in 2008 to 10.45 in 2009. However wire grass cover increased from 2% for transect 6 and 7 in 2008 to 3.8% for transect 6 and 2.8% in transect 7 in 2009. Nuisance shrub cover along transect 6 decreased dramatically from 47.57% in 2008 to 23% in 2009. Similarly, shrub cover along transect 7 decreased from 43.87% cover in 2008 to 25.2 along transect 7. This represents about a 48 and 60% reduction in shrub cover over the last year respectively for transect 6 and 7.

Interim Success Criteria:
Most of the management activities were completed by 2007 for of the UMAM V, Management Unit 2. Fire was introduced in 2005 and a second site prep burn occurred in December of 2007. A gyrotrack was employed (April-July) to reduce the shrub cover to basal sprouts. Wire grass tublings and long leaf pine seedlings were planted in late December/January 2008. No exotic vegetation has been observed at anytime in this polygon. In 2008, the herbaceous species observed within the polygon greatly increased by more

than 50%, indicating that the seedbank was responding to the shrub reduction. Planted wire grass had about a 65% survival. During the last year wire grass survival dropped to about 45%. As available additional wire grass will be added to these areas. The polygon will was treated with selective herbicides in 2009 to target nuisance shrubs, followed by a cool season burn during the winter of 2009/2010. A total of 5 acres of toothache grass will be planted near Dry Pond and 38 acres of wet prairie wire grass will be planted adjacent to Dry Pond. In addition, 5 acres of mixed wet flatwood species will be planted adjacent to Dry pond during the winter 2009/2010. Overall, shrub cover has been significantly reduced. In addition, a masters student will be evaluating the seed bank within the wet flatwood areas over the next year to determine viability of the seed bank. In addition in future the District will be adding diverse wet flatwoods species at the time of planting the wire grass to ensure a diverse habitat emerges.

Table 9. Transect 6 Species Cover and Occurrence (Hydric Pine Flatwoods)

Date 11/3/09 Time: 10:00 am

Collector: David Clayton Condition, Fair and cool

Wildlife observed: titmouse Fuel load:low

Community description:Wet flatwoods

Scientific Name	Species	Percent Cover	# species
Aristida stricta	Wire grass	3.8	1
Cliftonia monophylla	Black titi	4.6	2
Cyrilla racemiflora	Red titi	1	3
Ilex glabra	Gall berry	1.3	4
Ilex myrtifolia	Myrtle-leaved holly	2.6	5
Lachnanthes caroliniana	Red root	0.16	6
Lyonia lucida	Fetter bush	16.1	7
Osmanthus americanus	Wild olive	0.16	8
Persea palustris	Swamp bay	0.66	9
Rhynchospora microcephala	Bunched beaksedge	3.2	10
Vaccinium corymbosum	Highbush blueberry	0.167	11
	Bare ground	66.5	

Figure 20. Transect 6: Species Cover and Occurrence (Hydric Pine Flatwoods)

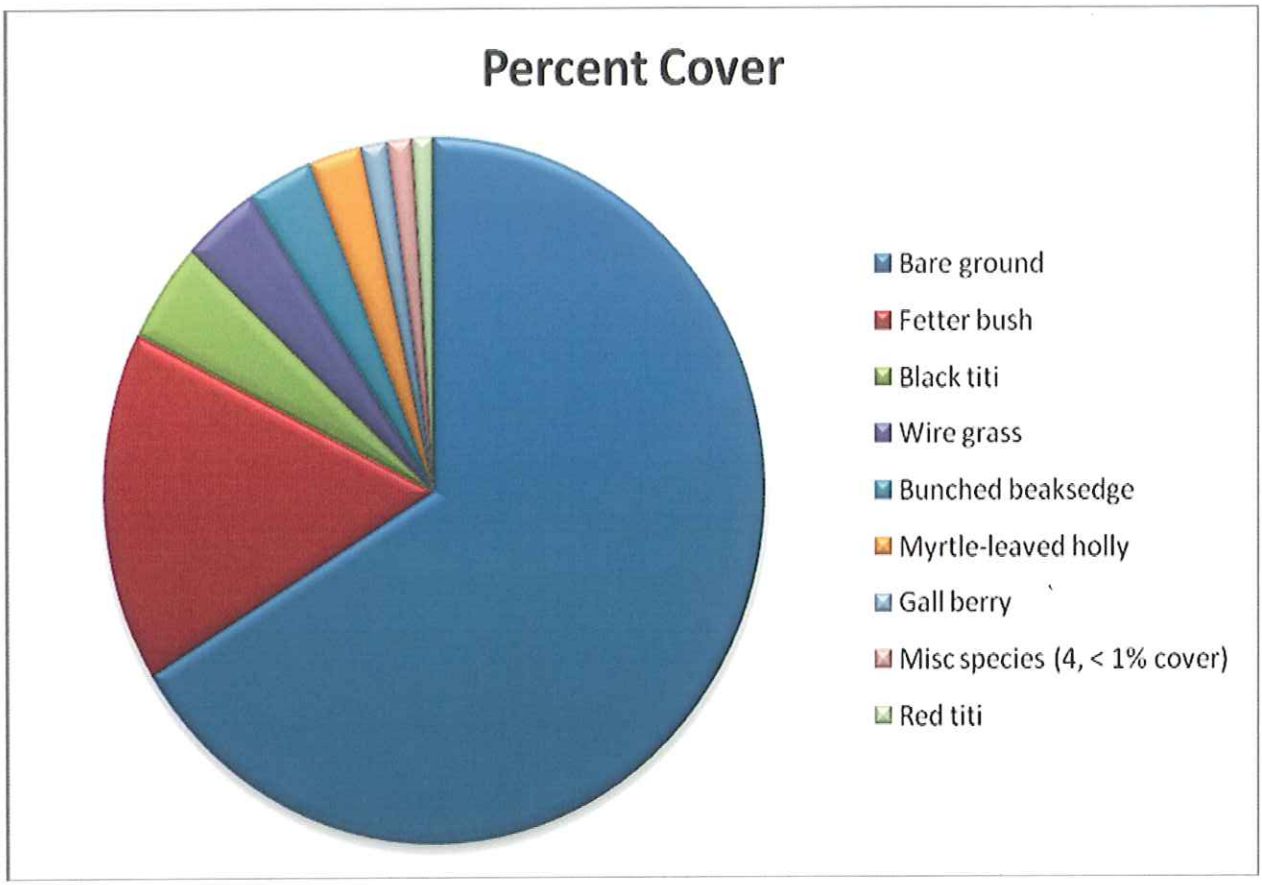


Table 10. Transect 7. Species and Occurrence (Hydric Pine Flatwoods)

Date 11/2/09 | Time: 10:00 am

Collector: David Clayton | Condition, Fair and cool

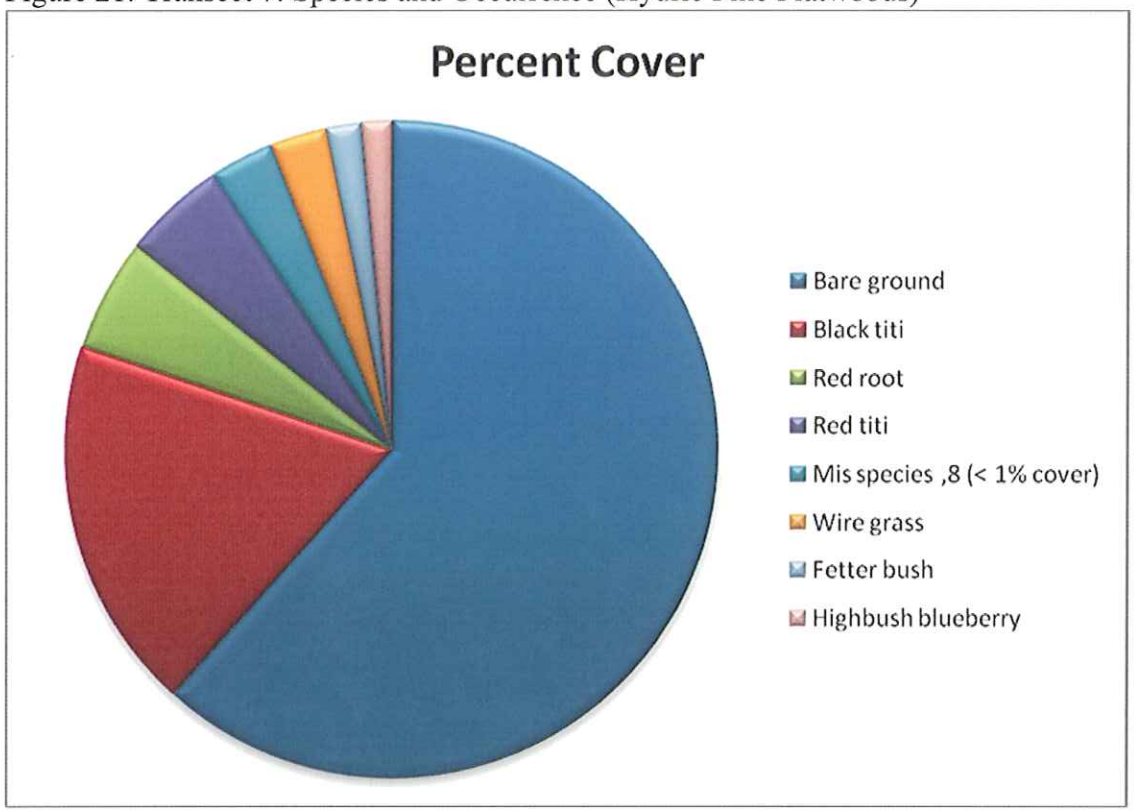
Wildlife observed:none | Fuel load:low

Community description: Wet flatwoods

Scientific Name	Species	Percent Cover	# speices
Scientific Name	**Species**		
Andropogon glomeratus	Bushy bluestem	0.67	1
Aristida stricta	Wire grass	2.8	2
Cliftonia monophylla	Black titi	18.3	3
Cyrilla racemiflora	Red titi	5.1	4
Eupatorium capillifolium	Dog fennel	0.5	5
Gaylussacia dumosa	Dwarf blueberry	0.8	6
Ilex glabra	Gall berry	0.5	7
Ilex myrtifolia	Myrtle-leaved holly	0.16	8
Lachnanthes caroliniana	Red root	5.5	9
Leucothoe racemosa	Swamp dog hobble	0.167	10
Lyonia lucida	Fetter bush	1.7	11

Persea palustris	Swamp bay	0.167	12
Rhynchospora microcephala	Bunched beaksedge	0.167	13
Vaccinium corymbosum	Highbush blueberry	1.5	14
	Bare ground	61.1	

Figure 21. Transect 7. Species and Occurrence (Hydric Pine Flatwoods)



UMAM Polygon V1, Management Unit 5, Inland Ponds and Sloughs

UMAM Polygon V1, Management Unit 5 consists of 24.880 acres of a dammed slough (Dykes Mill Pond) that will be restored to slough/marsh. The overstory for most of the area is absent though a fringe of cypress remains along the ponds edge. The majority of the area is dominated by water lilies and other aquatic submerged vegetation. Reclamation activities within this polygon include the removal of Dykes Mill Pond dam, and spanning the gap with railcar bridge, planting of cypress and black gum saplings and planting the area with herbaceous and shrub species, if after 2 years, the native wetland understory is < 50%. Dykes Mill Pond was removed in August of 2006 and bridge construction completed in April 2007. With the removal of the dam there have been great changes to the pond. By September 2007 most of the pond had evaporated leaving only small flooded areas. Wet prairie vegetation has greatly spread across the newly exposed sediments and a braided stream channel has emerged across most of the previously flooded area. Sampling last year occurred from a canoe while this year I was able to walk across the entire pond.

In 2006, a total of 7 species were observed within transect 9. The species were common to freshwater marshes within the region. No exotic species were observed. The dominant species observed was fragrant water lily with 45 % cover. Florida yellow bladderwort was also common with 19.2 % cover. Open water

was common with 34% cover, indicating that much of the transect occurs in what is currently a pond. Wildlife was observed included wood ducks and a great egret.

In 2007, a total of 11 species were observed within transect 9. Species were common to wet prairies with some minor freshwater marsh species. This represents a major shift in species composition and reflects the shift from an aquatic to wet prairie. No exotic species were observed. Fragrant water lily cover was greatly reduced from 45% in 2006 to 3.23% cover in 2007. Florida yellow bladderwort was not observed within the transect and open water was also greatly reduced from 34% cover to 2.2 % cover. Another significant occurrence was the cover of bare ground which did not exist in 2006, but represented 41% of the cover in 2007. The two dominant plant species were horned beaksedge with 30% cover and a beaksedge that was not in flower with 12% cover, both species common to wet soils and not tolerant of aquatic systems. A species of note, *Drosera intermedia* (Water Sundew) a state threatened species was commonly observed. Wildlife observations included a pair of sandhill cranes (State Threatened species), fresh hog tracks, little blue heron, great egret, and chipping sparrows.

In 2008, a total of nine species were observed along transect 9. Followed by two years of drought, Dykes Mill ponds water level came up flooding most of the historic foot print. The removal of the dam reduced the water level by approximately 6' but not the expected 20 to 30'. The transect was flooded with 6" to 3' of water. Water lilies and aquatic vegetation abound and are thriving providing important habitat for wildlife. An alligator nest was observed along the bank and baby alligators were observed with their 6' mother during sampling. Open water was the dominant cover class with 46.3 percent cover. The dominant vegetative species was fragrant water lily with 33 percent cover.

In 2009, a total of 9 species were again observed along transect 9. Water levels remained high flooding most the historic footprint. Since reclamation activities took place Dykes Mill Pond water levels appear to be more or less stable approximately 6' lower along the shore line than were observed during the baseline condition. The entire transect length was inundated with 4" to 3' of water. Water lilies and aquatic vegetation abound and are thriving providing important habitat for wildlife. Open water was the dominant cover class with 38 percent cover. The dominant vegetative species was fragrant water lily with 35.3 percent cover

Interim Success Criteria:
Most of the management activities used to restore UMAM VI, Management Unit 5 have been completed. The archeological study was completed and the dam removed in August of 2006. The new bridge was completed in April of 2007. Since the removal of the dam the pond drained during the drought and much of the dry pond area was dominated by grasses and sedges. In 2008, the water levels increased due to the end of the drought and a shallow pond formed in 2008. Cypress trees and black gums were planted along the edges of this system in the spring of 2007/2008. The shrub areas adjacent to Dykes Mill Pond were Gyro-Trac'd in 2007. Due to increasing shrub cover in the area, selective herbicides will be used to reduce shrub cover.

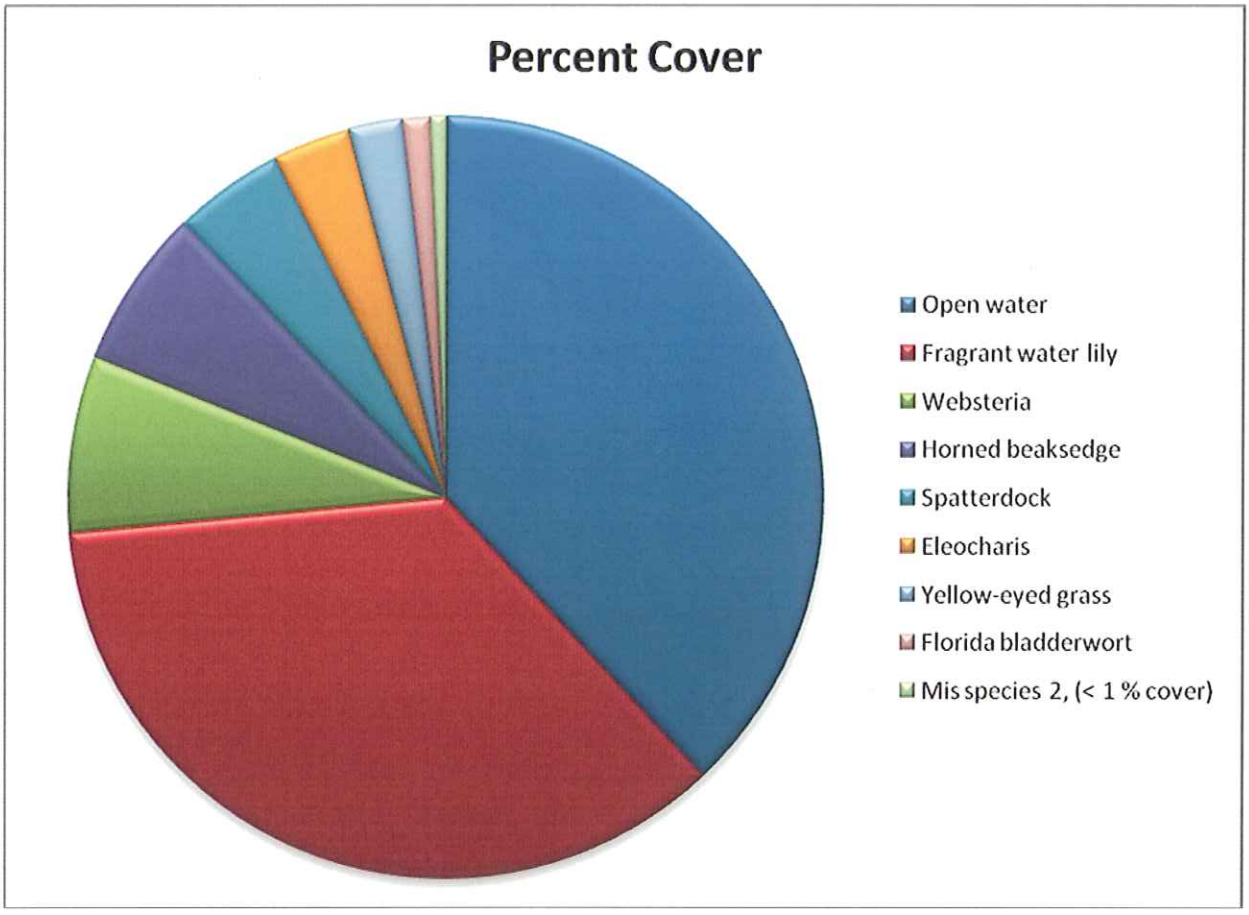
Table 11. Transect 9. Species and Occurrence (Slough / Marsh)

Date 11/6/09	Time:9:30 am
Collector: David Clayton	Condition, Fair and cool
Wildlife observed:Great white egret, little blue heron, alligator	
Community description: Marsh	Fuel load: N/A

Scientific Name	Common Name	Percent Cover	# species

Drosera intermedia	Water sundew (Fl threatened)	0.16
Eleocharis cellulosa	Eleocharis	3.3
Lachnanthes caroliniana	Red root	0.5
Nuphar advena subsp. Orbiculata	Spatterdock	4.7
Nymphaea odorata	Fragrant water lily	35.5
Rhynchospora inundata	Horned beaksedge	6.8
Utricularia floridana	Florida bladderwort	1.2
Websteria confervoides	Websteria	7.5
Xyris sp	Yellow-eyed grass	2.3
	Open water	38

Figure 22. Transect 9. Species and Occurrence



Qualitative Monitoring

Materials and Methods

Qualitative vegetation monitoring will include assessment of the vegetation, both ground cover and planted trees, wildlife use observations, and general habitat health. Pedestrian surveys increase site coverage and include a 30+ minute meandering walk-path intended to provide information useful in management and to

determination the success of management activities. A walk path traversed as much habitat as possible. The pedestrian walk-path continued as long as species were being added, however, once additional species were not recorded for 3 minutes the survey was complete. Representative photos and a community description and health were provided for each walk-path. Fuel load for each habitat was determined and the presence of any threatened or endangered species were recorded. Plants were listed in the data sheet in the following categories (tree, shrub, vine or herbaceous) to give a better understanding of composition of the habitat. Wildlife observations were also recorded for each walk-path (Figure 13) provides the location and coverage of transects and the data sheets can be found in (Appendix 4).

Results and Discussion

A total of 13 pedestrian transects were located at the SHLMB (Figure 13) Three pedestrian surveys were located in Management Unit 1, portions of UMAM Polygon IV, one in Management Unit 2, UMAM Polygon V, one in Management Unit 4, portions of UMAM Polygon IV, four in Management Unit 10, Polygon III, three in Management Unit 12, UMAM Polygon I, and one in Management Unit 14, portions of UMAM Polygon IV (Appendix 7).

Management Unit 1, UMAM Polygon IV, Preserved High Quality Forested and Herbaceous Wetlands

Management Unit 1, UMAM Polygon IV consists of 574.839 acres of a wide variety of preserved wetland habitats including approximately FLUCCS: 621 – Cypress, 617 – Mixed Wetland Hardwoods, 644 – Emergent Aquatic Wetlands, 611 – Bay Swamps, 641 – Freshwater Marshes, 616 – Inland Ponds and Sloughs, 640 – Vegetated Non-Forested Wetlands and 643 – Wet Prairies. The management goal for this polygon is the preservation of the existing high quality wetlands. Two of the pedestrian survey paths (M8 and M9) in Management Unit I, UMAM Polygon IV, were located in cypress dominated wetlands, while the third pedestrian survey path (M10) was located in an overgrown hydric pine flatwoods. However it is suggested that this transect be kept but the designation and analysis changed to the more appropriate Management Unit 2, UMAM Polygon V.

In 2006, a total of 38 species were observed in M8, while 32 species were observed in M9. Twenty nine of the species were common to both transects. Five tree species were observed in M8 while 3 tree species were observed for M9. Eight and nine shrub species were observed in M9 and M8 respectively, though cover of shrubs was not significant. Twenty one herbaceous species were observed in M8, while 19 herbaceous species were observed in M9. No nuisance or exotic species were found in M8, though a small patch of torpedo grass was observed in M9. Fuel load was low for each area and no threatened or endangered species were observed. Water levels in both areas were extremely low due to the drought and many of the herbaceous species such as pickerel weed, duck potato (*Sagittaria latifolia*) and fragrant water lily (*Nymphaea odorata*) had browned or appeared dead. Cypress seedlings were numerous in both areas. Wildlife was abundant.

In 2007, a total of 39 species were observed for M8 similar in number to last year four new species, bushy bluestem, beauty berry, sweet pepperbush, and pale meadow beauty were observed. These were observed in the normal pool area and germinated due to the prolonged drought that has left the lake beds dry. Three species previously observed, water shield, bog buttons, and bladder wort were not observed, primarily due to the absence of an aquatic habitat. Along M9, a total of 31 species were observed, again similar in number to last year. However 8 species were not observed this year and include water shield, clustered sedge, Virginia willow, silver bay, pickerel weed, duck potato, bladderwort and yellow eyed grass. These are primarily aquatic species and were not found on the dry lake beds. Nine additional species were observed including bushy

bluestem, sedge, black titi, witch grass, yaupon, sweet gum, savannah meadow beauty and American cupscale. The new species with the exception of the American cupscale are facultative wet species that have invaded the dry lake beds. Shrub cover for both transects was very low. No nuisance or exotic species were observed. Fuel load was low for each area and no threatened or endangered species were observed. Water levels in both areas were extremely low due to the drought and many of the herbaceous species aquatic species were absent. A wildfire occurred within this polygon and destroyed approximately 12 acres of cypress by burning the roots and occasionally the trunk of the cypress. Details on the wildfire have been recorded in the Fire Management section. Aside from the continued drought this polygon is very similar to last year.

In 2008, a total of 42 species were observed in M8 and increase of 3 species, swamp dog hobble, swamp laurel oak and savannah meadow beauty (Appendix 4).
. Bladderwort and bog buttons were again not observed in these areas along with water shield and Marsh St. Johns Wort. The area is starting to recover from the prolonged drought. Water levels were about ½" above the soil surface and aquatic plants were starting to emerge. Along transect M9, a total of 36 species were observed, a slight increase from the previous year (Appendix 4). Water levels were starting to increase in this area with the average water depth approximately 2" in depth. The species observed were transitional or upland species that had germinated in the wetland during the drought and included groundsel tree, winged sumac and pine barrens goldenrod. As the system recovers and water levels increase it is expected that the system will recover and the upland species will be removed by increasing water levels. No nuisance or exotic species were observed. Fuel load was low for each area and no threatened or endangered species were observed. Water levels in both areas were extremely low due to the drought and many of the herbaceous species aquatic species were absent. Wildlife observed included chipping sparrows, southern cricket frogs, a kingfisher and a red bellied wood pecker.

In 2009, a total of 39 species were observed along M8, probably a result of recovering from the drought. Water shield and St. John's wort were again observed now that the water has returned. Dog fennel, red root, and centella were again observed within the area. Water levels were between 12" and 14". Along M9, a total of 44 species were observed a marked increase from the low of 36 from the previous year. Many of the wetland herbaceous species absent in the drought have returned and are flourishing once again. No nuisance or exotic species were observed in this area nor any threatened or endangered species.

Interim Success Criteria:
Interim success criteria have been met and include exotic vegetation cover < 2% per acre, nuisance vegetation cover < 5% per acre, and maintaining or improving in ecological function. Water levels have recovered and both areas had an increase in wetland dependant species.

Management Unit 2, UMAM Polygon V, Hydric Pine Flatwoods

Management Unit 2, UMAM Polygon V consists of 146.678 acres of FLUCCS 635 hydric pine flatwoods. The management goal for this polygon includes the enhancement and restoration of the degraded hydric pine flatwoods. Two pedestrian transects (M10 and M11) were located in Management Unit 2, UMAM Polygon V. Both of these areas are overgrown, degraded hydric pine flatwoods dominated by a variety of tree and shrub species. Both areas were burned during the summer of 2005, though fuel loads in both areas are moderate and additional fires are warranted. Dominant species cover along M10 was black ti ti with some silver bay and slash pine, while M11 was moved slightly in 2007 to better reflect the wet flatwoods. The previous transect was located in a mixed bayhead. Wire grass was present in M11, but absent in M10.

In 2006, a total of 32 species (8 trees, 17 shrubs, 4 vines and 3 herbaceous species) were observed along M10.

In 2007, shrub reduction was completed in both areas using a gyrotrack. Shrubs were thinned in June and the areas were burned in December 2007. A total of 40 species were observed in along M10 while 16 species were observed in M11. No nuisance exotic species were observed in either area. The increase in species along M10 may be due to increased access to the area due to the gyrotrack and the fact that the site is more of a mixture of wet flatwoods with species from an adjacent bayhead. Successive fires should remove the bayhead species. A total of 22 species were observed along M11 in 2007. The lower number of species found in M11 is more reflective of a site that had been overgrown with shrubs and recently reduced to ground level by the gyrotrack. Over time it is expected a greater number of species will germinate from the seed bank. Wildlife observed included robin, kingfisher, black vulture, phoebe, anole and cardinal.

In 2008, a total of 51 species were observed, eleven species more than the year before. The seed bank has started to respond in this area and additional species observed were primarily herbaceous species commonly found in wet flatwoods. Shrubs in this area had also increased in cover and will be targeted in the coming year with selective herbicides to reduce shrub cover while preserving the understory vegetation. A total of 26 species were observed along M11 in 2008, an increase of 4 species. No nuisance or exotic species were observed during the 2008 sampling. A minor amount of hog damage was observed adjacent to polygon, and trappers have been notified. Wildlife observed included titmouse, red bellied wood pecker, flicker, blue jay and raccoon tracks.

In 2009, a total of 54 species were observed within the meandering transect of M 10. This represents an increase of 3 species. Several shrub species that had been a problem in the area were not observed in this year's sampling. The species observed were common to wet flatwoods. Targeted shrub densities have greatly decreased in these areas and wire grass will be planted in the winter of 2009/2010. A total of 28 species were observed along M11, a slight increase from the previous year. This area continues to develop, and additional herbicide work is needed here to insure that the shrub density continues to decline. Positioned adjacent to the Green Ponds, this area should have good natural recruitment. No nuisance or exotic species were observed. Wildlife observed included deer tracks and a titmouse.

Interim Success Criteria:

Interim success criteria include exotic vegetation cover < 2% per acre, nuisance native vegetation cover < 5% per acre, increasing herbaceous groundcover, decreasing density of woody shrub layer, planted pines are surviving and healthy and prescribed burns have been conducted in accordance with fire management plan. The interim success criteria have been met for this polygon. No nuisance exotic or nuisance native species cover has been observed, and the prescribed burns have been conducted in accordance with the fire management plan. Shrubs were reduced to ground level in both areas using a gyrotrack and both areas and herbaceous vegetation cover is increasing within the polygon. These sites were burned in December 2007 and will be burned again in 2009. Positioned adjacent to the Green Ponds, this area should have good natural recruitment. Wildlife observed included deer tracks and a titmouse. Due to the numbers of existing pine trees this area will not need supplemental tree planting, however, wire grass will be added to the polygon in 2009.

Management Unit 10, UMAM Polygon III, Xeric and Live Oak

Management Unit 10, UMAM Polygon III consists of 493.852 of FLUCCS 421 – Xeric Oak and 427 – Live Oak. Management goals include the preservation and the re-introduction of fire to upland sandhill communities dominated by oaks. Management activities include the introduction of fire using dormant season burns, and the eventual introduction of growing-season burns (anticipated 3 to 5-year and 5 to 7-year burn cycles), and the reduction of oak in portions of management unit as selected by QMS (Qualified Mitigation Supervisor), and monitoring for nuisance / exotic plant species. Other management activities may include the supplemental planting of longleaf pine (436 trees per acre) and wiregrass (6' centers or direct seeding as 2-5 pounds per acre

as determined by the QMS. Live and turkey oaks were selectively harvested from portions of Management Unit 10, UMAM Polygon III in September of 2006. As a result the fuel load is high for most of these areas and a prescribed burn is scheduled for a dormant season burn in the winter of 2008/2009. Good coverage of wire grass was observed throughout Management Unit 10 so no additional planting will be required. Initial burns for portions of Management Unit 10 were conducted during the growing season. Wire grass was observed in flower for these areas. Continued warm season burns should ensure an increasing cover of wire grass throughout the polygon. Four transects were located within Polygon 10, M1, M2, M12 and M13).

In 2006, two transects M1 with 44 species (9 trees, 5 shrubs, 3 vines and 27 herbs) and M13 with 54 species (9 trees, 6 shrubs, 2 vines and 37 herbs) were species rich, while M2 with 29 species (6 trees, 6 shrubs, 3 vines and 14 herbs) and M12 with 26 species (12 trees, 3 shrubs, 3 vines and 8 herbs) were generally lacking a diverse herbaceous cover. This may be due to the shading of the understory by overstory oaks. However, all of the transects had between 19 and 35 species in common. Scattered diamond oak and sand pine may also be reflective of a historic lack of fire. No nuisance exotic coverage was observed, though a small patch of Bahia grass was found at the gate adjacent to the road for the transect M1. In the transect M1, a Florida threatened species Gulf coast lupine (*Lupinus westianus*) was located throughout the sand hill upland while smooth barked St. John's wort, a Florida Endangered species, was located adjacent to the solution pond 1. Gopher tortoise burrows were observed along pedestrian transects M12 and M13.

In 2007, two transects, M1 was observed with 67 species (10 trees, 16 shrubs, 3 vines and 38 herbaceous species) while, along M13 62 species (9 trees, 7 shrubs, 3 vines and 43 herbaceous species) was observed (Appendix 4). Along M2 38 species (8 trees, 5 shrubs, 2 vines and 23 herbaceous species) were observed and 34 species were observed along transect M12 (13 trees, 4 shrubs, 3 vines and 14 herbaceous species) (Appendix 4). M1 had 5 newly observed species and 3 species were not observed in 2007 and were sky blue lupine, bladderwort and yellow eyed grass. Ten new species were observed along M13 and two species, dwarf huckleberry and bracken fern were not observed. Along M2 13 additional species were observed while, 4 species Florida jasmine, red chokeberry, pale meadow beauty and lopsided Indian grass were not observed. Finally, M12 also had 13 additional species observed while 5 species were not observed and included American holly, gopher apple, sand pine, shiny blueberry, and Adam's needle. The observation of additional species may be due to increased scrutiny of the polygon and habitat improvement due to successive fires. Aside from a small patch of Bahia grass at the entrance to M1 no nuisance or exotic species were observed. Gulf coast lupine was observed at two transects, M1 and M13. Sand pine and Florida jasmine may have been removed by earlier fires. The habitat all appears healthy and vigorous. These areas were burned during the winter burns in December of 2007. Wildlife observed included a downy woodpecker, pileated woodpecker, raccoon tracks, otter tracks, gopher tortoise, deer tracks, turkey tracks, cardinal, towhee, titmouse and mockingbird.

This polygon is represented by four transects, M1, M2, M12 and M13. In 2008, M1 was observed with 69 species, 2 species greater than in 2007. M2 was observed with 35 species, three fewer than the previous year. In 2008, M12 was observed with 44 species, 10 species greater than in 2007 and M 13 was observed with 59 species, three species fewer than in 2007. Species observed were typical of sand hill species. Gulf coast lupine was again observed in this location and is thriving in M1, M2 and M13. Wire grass continues to thrive in these areas. No nuisance or exotic species were observed, except for a small area at the entrance to M1.

This polygon is represented by four transects, M1, M2, M12 and M13. In 2009, M1 was observed with 74 species, 4 species greater than in 2007. This area is recovering from the drought and many of the species not observed adjacent to the pond have been seen again with the filling of the pond. The associated uplands are in increasing in fuel and will be burned in 2010. M2 was again observed with 35 species. This area is managed under a 5-7 year burn cycle and as fuels increase perhaps species may become less common that require more light. A total number of 48 species were associated with M12, four greater than the previous year. A selective herbicide was used in this area to reduce the cover of hardwoods and help release the wire grass. Several hard

wood species cover was dramatically reduced in this area. Along M 13, 64 species, five species greater than in 2008 were observed. Species observed were typical of sand hill species. Gulf coast lupine was again observed in this location and is thriving in M1, M2 and M13. Wire grass continues to thrive in these areas. No nuisance or exotic species were observed, except for a small area at the entrance to M1.

Interim Success Criteria:
Interim success criteria have been met, no nuisance native or exotic vegetation have been observed, except for a small patch and M1's entrance. Diverse is good and continued fire within these areas will ensure a diverse sand hill community. Wire grass cover is good to excellent and oaks have been thinned.

Management Unit 11, UMAM Polygon II, Upland Slash or Sand Pine Plantations

Management Unit 11, UMAM Polygon II consists of 383.484 acres of FLUCCS 411
Longleaf Pine / Wiregrass restored from slash or sand pine plantations. The restoration goal for this area is to restore the sites to a sand hill community from a sand or slash pine plantation. Management activities will include the re-introduction of growing season burns, removal of planted pines, re-planting with 436 long leaf pine seedlings per acre and if needed the addition of wire grass tublings or seeding. Initial fire was introduced to the slash pine areas in 2005, while site prep burns will take place in the winter of 2008 for the previous sand pine areas. Trees were harvested from April to November 2007. One transect (M5) was located within Management Unit 11, UMAM Polygon II. This area had already undergone a warm season burn that greatly reduced the shrub cover. Overstory was removed in April 2007. Much of the understory was in fairly good condition with good diversity typical of the sand hills.

In 2006, a total of 50 species (6 trees, 7 shrubs, 2 vines, and 35 herbaceous species) were observed. Wire grass was the dominant grass species within the area. However, the emerging shrub layer was dominated by diamond oak.

In 2007, a total of 49 species were observed (7 trees, 8 shrubs, 2 vines and 32 herbaceous species) (Appendix 4). Nine new species were observed while 10 species initially present were not observed. The changes in species composition may be due to the tree harvest which greatly disturbed the understory. Species were common to the sandhill community. Wire grass was common and appeared to be the dominant species. Much of the shrub layer was reduced to sprouts and much of the diamond and live oak was destroyed during the tree harvest. A site prep burn is planned for winter 2008. Wildlife observed included: cardinal, fence lizard, titmouse, mourning dove, fish crows, red bellied wood pecker, phoebe, squirrel, two deer and lined race runner.

In 2008, a total of 59 species were observed (7 trees, 8 shrubs, 3 vines and 41 herbaceous species). Three additional species were observed. These were all typical dry sand hill species. Changes in composition are likely due to increased light from harvest of slash pine, followed by the initial burn. Wire grass continues to thrive and flowered this year. The area is returning to a sand hill from the planted pine plantation. Diversity will probably continue to increase due to increased fire rotations and response of the seed bank. No wild life was observed during sampling.

In 2009, a total of 61 species were observed (7 trees, 8 shrubs, 3 vines and 43 herbaceous species). Three additional species were observed. These were all typical dry sand hill species. Wire grass continues to increase in cover. The area has increased litter and will be burned during the winter of 2009/2010. The area is returning to a sand hill from the planted pine plantation. Diversity will probably continue to increase due to increased fire rotations and response of the seed bank.

Interim Success Criteria:
The interim success criteria have been met within this transect. No nuisance or exotic species were observed. Wire grass is the dominant species. The ground cover is diverse and typical of a sandhill. Diversity will likely continue to increase as the seed bank responds and with frequent fires.

Management Unit 12, UMAM Polygon 1, Sand Hill

Management Unit 12, UMAM Polygon 1 consists of 263.52 acres of FLUCCS: 411 – Longleaf Pine / Wiregrass (Mesic Pine Flatwoods) restored from 421 –Xeric Oak habitat.
The goal for this polygon is to restore a diverse sand hill. Restoration activities include the re-introduction of growing season burns, removal of oak ≤ 12 inches DBH and herbicide treatment of stumps, planting of longleaf pine (436 trees per acre), and monitoring for nuisance / exotic plant species. Oak eradication was conducted for Management Unit 12, UMAM Polygon 1 during the summer of 2005. . Fire was re-introduced in 2004 to the polygon and cover of the once dominant shrub woody goldenrod has been greatly reduced. Since the initial fire, two additional fires, the most recent in December of 2007, further reduced shrub and woody goldenrod cover. Wire grass has flowered for two consecutive years in most of this habitat. Wire grass is again the dominant herbaceous species within this polygon. The sand hill habitat within this polygon is very diverse and considered high quality with an excellent herbaceous species composition. The majority of the polygon was planted with longleaf pines in 2004, however, several areas on the north side of Green Head Branch will be re-planted with in 2008. Two transects (M3 and M4) were located within this polygon.

In 2006, a total of 35 species (7 trees, 2 shrubs, 2 vines, and 24 herbs) were observed along pedestrian transect M3, while 68 species (8 trees, 9 shrubs, 2 vines and 49 herbs) were observed within M4. The species were typical of the sand hill though in wetter areas of M4 adjacent to Little Deep Edge Pond, more pine flatwood vegetation occurred. Small patches of centipede grass were observed along the pedestrian transect M3.

In 2007, a total of 42 species (8 trees, 7 shrubs, 2 vines and 25 herbs) were observed along M3 (Appendix 4). The additional, shrub species observed may be due to expanding the path further to the west and up an old ridgeline. Shrubs were typical of the sandhill and high in wildlife value. Twelve new species were observed within this transect and may again be due to expanding the pedestrian survey. Five species, Southern magnolia, golden aster, bracken fern, Carolina milkweed and pinewoods milkweed were not observed in this years sampling. This may be due to the later sampling when some of these species are less noticeable following flowering and fruiting. Along the pedestrian transect M4 a total of 69 species (8 trees, 11 shrubs, 2 vines and 48 herbaceous) species were observed. A total of 17 new species were seen this year and 13 species previously observed were not seen this year. The area surrounding this pedestrian meander was burned during the winter of 2007 and the fire was particularly hot killing some turkey and live oaks and also may have removed some of the less fire tolerant species. Centipede grass which was observed as a minor component in the polygon was completely absent following the fire. Another species apparently removed by the fire was the slender crab grass. Other new species may have emerged from the seedbank once the fire exposed bare ground. Wildlife observed within this polygon included rabbit and raccoon tracks, and an active gopher tortoise burrow. In addition several threatened and endangered species were observed including southern crab apple, smooth barked St. John's wort and Gulf Coast lupine.

In 2008, a total of 53 species were observed along M3, an increase of 11 species from the previous year. The additional species were common to sand hills and species number may be increasing as a result of the shrub layer reduction due to successive fires. M4 is the most diverse of the areas of the bank. A total of 87 species were observed within this area. This is an increase of 18 species and may be due to a recent prescribed fire. Oak and shrub densities are low in this area and there are pockets of wet flatwoods within the sand hill vegetation. As shrub levels are reduced and continued fires will help in keeping the observed diversity. No nuisance or exotic species were observed though small patches of centipede grass were observed by staff. Some

expansion of turkey and live oaks were observed within these areas and will be reduced if cover continues to expand. Wildlife observed within this area included turkey and raccoon tracks, active gopher tortoise burrow, down wood pecker, chickadee. Threatened and endangered species include gulf coast lupine, crab apple and smooth barked St. Johns wort adjacent to cat pond.

In 2009, a total of 55 species were observed along M3, an increase of 2 species from the previous year. This area is quite diverse and additional species were common to sand hills and species number may be increasing as a result of the shrub layer reduction due to successive fires. In order to reduce oak sprouts from felled trees, the area was treated with Velpar (ULW), an herbicide selective for hardwood species. The area will be burned in the winter of 2009/2010. It is expected that Velpar will reduced the hard wood cover to below 150 trees per acre and keep the sand hill open and park like. M4 is the most diverse of the areas of the bank. This area historically had a low density of pines and oaks and continued fires should keep this area in excellent condition. A total of 91 species were observed within this area, and increase of 4 species. This area has an abundance of late successional sand hill species and quality of habitat in this area is very high. Oak and shrub densities are low and there are pockets of wet flatwoods within the sand hill vegetation. As shrub levels are reduced and continued fires will help in keeping the observed diversity. No nuisance or exotic species were observed though small patches of centipede grass were observed by staff. Some expansion of turkey and live oaks were observed within these areas and will be reduced if cover continues to expand. Threatened and endangered species include gulf coast lupine, crab apple and smooth barked St. John's wort adjacent to cat pond.

Interim Success Criteria:
This polygon has reached the restoration goals set forth in the interim success criteria. The three controlled burns within this polygon have greatly reduced the cover of woody golden rod and stimulated the cover of wire grass and other grasses and forbs. Oaks have been reduced to less than 150 trees per acre and the herbaceous vegetation is dominated by wire grass. Longleaf pines have been planted throughout the polygon in winter 2005.

Management Unit 14, portions of UMAM Polygon IV, Lakes

Management Unit 14, portions of UMAM Polygon IV consists of 164.958 acres of FLUCCS 520, lakes. The goal for this polygon is the preservation of the lake and aquatic habitat. One pedestrian transect (M6) was placed within the polygon around Garret Pond. The water levels at Garret pond were very low due to the summer drought. Much of the lake bottom was exposed and had been colonized by a variety of wetland grasses and sedges. Two small pools remained.

In 2006, a total of 36 species (5 trees, 7 shrubs, 1 vine and 23 herbs) were observed. Vegetation was typical of a diverse pond within the region. A small patch of torpedo grass was observed at the boat ramp to the pond. A zone of Smooth barked St. John's wort and seedlings was observed just below the shrub layer surrounding the pond. Some species such as pickerel weed appear to have been set back by the drought and most of the leaves and stem have browned.

In 2007, a total of 24 species were observed (5 trees, 7 shrubs, 1 vine and 11 herbs) (Appendix 4). Due to the extended drought, this pond has been dry for approximately a year. The reduction in herbaceous species is due to the lack of water. Most of the absent species were aquatic or required wet conditions to thrive. The small patch of torpedo grass at the old boat launch had been sprayed during the summer and none was observed during the fall sampling. Dog fennel has continued to invade the site and many of the aquatic species were absent.

In 2008, a total of 20 species were observed (5 trees, 7 shrubs, 1 vine and 8 herbs) (Appendix 4). Due to the extended drought, this pond has been dry for approximately 2 years. The reduction in herbaceous species is due

to the lack of water. Most of the absent species were aquatic or required wet conditions to thrive. Dog fennel has continued to invade the site and several wet flatwood species have been observed. No torpedo grass was observed during the fall monitoring.

In 2009, a total of 35 species were observed (5 trees, 7 shrubs, 1 vine and23 herbs). The drought has ended and Garret Pond is again filling with water. Many of the wetland dependant species are once again flourishing within the pond and shoreline. The dog fennel and invading upland species have been drown and are being replaced by wetland vegetation. No torpedo grass was observed during the fall monitoring.

Interim Success Criteria:
No nuisance or exotic species were observed. Since the end of the drought, the water has returned to Garret Pond and spatter dock has re-emerged from the sediments. The site appears to be maintaining normal ecological functions and wetland vegetation again thrives in the pond.

Qualitative Field Assessment Form

Date: 10/30/2009 **Time:** 10:00 am **Data Collector:** David Clayton
Location: Pedestrian Transect # M1 near photo point 15
Management Unit: 10

Nuisance Species: Bahia grass at gate entrance
Fuel Load: Moderate

Wildlife Observations: wren, towhee

T& E Species: Moderate population of Gulf Coast Lupine in sand hill and Smooth Barked St. John's Wort around pond

Community Description: Sandhill upland adjacent to a solution pond. Sandhill with good diversity and excellent groundcover. Marsh zonation still present, pond dry most of year, center full of dog fennel.

Scientific Name	Common Name	Tree	Shrub	Vine	Herb
Agalinis setacea	Threadleaf false foxgloves				X
Amphicarpum muhlenbergianum	Blue maidencane				X
Andropogon glomeratus	Busy blue stem				X
Aristida stricta var. beyrichiana	Wiregrass				X
Asimina angustifolia	Slim leaved paw-paw				X
Baptisia lanceolata	Gopher weed				X
Baulduina angustifolia	Coastal plain honeycombhead				X
Bulbostylis ciliatifolia	Cappilary hairsedge				X
Ceanothus microphyllus	Redroot				X
Centella asiatica	Centella				X
Cephalanthus occidentalis	Button bush		X		
Chrysoma pauciflosculosa	Woody Goldenrod				X
Cliftonia monoplylla	Black ti ti		X		
Crysopsis scabrella	Goldenaster				X
Cyrilla racemiflora	Titi		X		
Dalea pinatta	Summer farewell				X
Dicanthelium scoparium	Panic grass				X
Dicanthelium spp.	Panic grass				X
Diospyros virginiana	Persimon	X			
Eleocharis sp.	Eleocharis				X
Eriogonum tomentosum	Wild Buckwheat				X
Eupatorium capillifolium	Dog fennel				X
Eupatorium compositifolium	Yankee weed				X
Eupatorium mohrii	Eupatorium				X
Euphorbia inundata	Florida pineland spurge				X
Euthamia caroliniana	Flat-topped goldenrod				X
Galactia sp.	Milk pea				X
Gaylussacia dumosa	Dwarf huckleberry		X		
Gelsemium sempervirens	Florida Jasmine			X	
Haplopappus divaricatus	Scratch daisy				X
Hypericum crux-andreae	St. Peter's wort				X
Hypericum reductum	Atlantic St. John's wort				X
Hypericum gentinoides	Orangeweed				X
Hypericum lissophloeus	Smooth Bark St. John's wort		X		

Hypericum spp.	St. John's wort		X		
Ilex glabra	Gall berry		X		
Ilex myrtifolia	Myrtle leaf holly		X		
Ilex vomitoria	Yaupon		X		
Lachnocaulon ancepts	White topped bog buttons				X
					Page 2 of 2
Scientific Name	**Common Name**	**Tree**	**Shrub**	**Vine**	**Herbaceous**
Licania michauxii	Gopher apple				X
Lupinus diffusus	Sky-blue lupine				X
Lupinus westianus	Gulf Coast Lupine				X
Magnolia virginiana	Silver bay	X			
Myrica cerifera	Wax myrtle		X		
Opuntia humifusa	Pricklypear cactus				X
Panicum dichotimiflorum	Fall panic grass				X
Panicum hemitomon	Maidencane				X
Paspalum notatum	Bahia grass				X
Persea borbonia	Red Bay	X			
Penstemon multiflorus	Many flowered beardtongue				X
Polygonella gracillis	Wire weed				X
Pinus clausa	Sand Pine	X			
Pinus elliottii	Slash pine	X			
Pinus palustris	Longleaf pine	X			
Pityopsis graminifolia	Golden Aster				X
Polygonella gracilis	Wireweed				X
Quercus geminata	Sand Live Oak	X			
Quercus hemisphearica	Diamond oak	X			
Quercus incana	Blue jack oak	X			
Quercus laevis	Turkey oak	X			
Quercus virginiana	Live Oak	X			
Rhexia mariana	Pale meadow beauty				X
Rhus copallinum	Sumac		X		
Rubus cuneifolius	Sand blackberry		X		
Schrankia microphylla	Sensitive briar				X
Scoparia dulcis	Sweet Broom				X
Serenoa repens	Saw Palmetto		X		
Smilax sp.	Catbriar			X	
Stylisma sylvatica	Queen's delight				X
Stylisma patens	Coastal plain dawnflower				X
Trichostema dichotomum	Forked blue curls				X
Utricularia floridana	Bladderwort				X
Vaccinium corymbosum	High bush blueberry		X		
Vaccinium myrsinites	Shiny blue berry		X		
Viburnum obovatum	Walter's viburnum		X		
Vitus rotundifolia	Muscadine			X	
Xyris sp.	Yellow-eyed grass				X
Yucca filamentosa	Adam's needle				X

*** Present in previous survey but not observed, ** New observation, * Nuisance Exotic Species