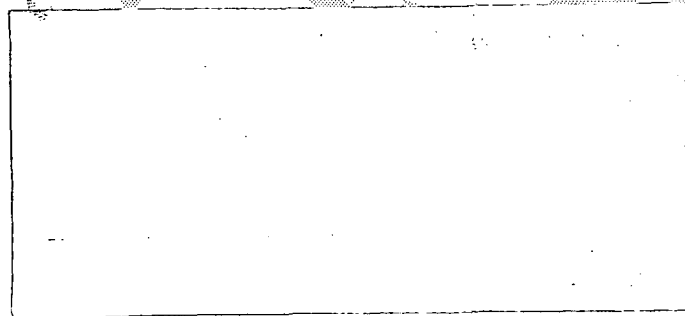
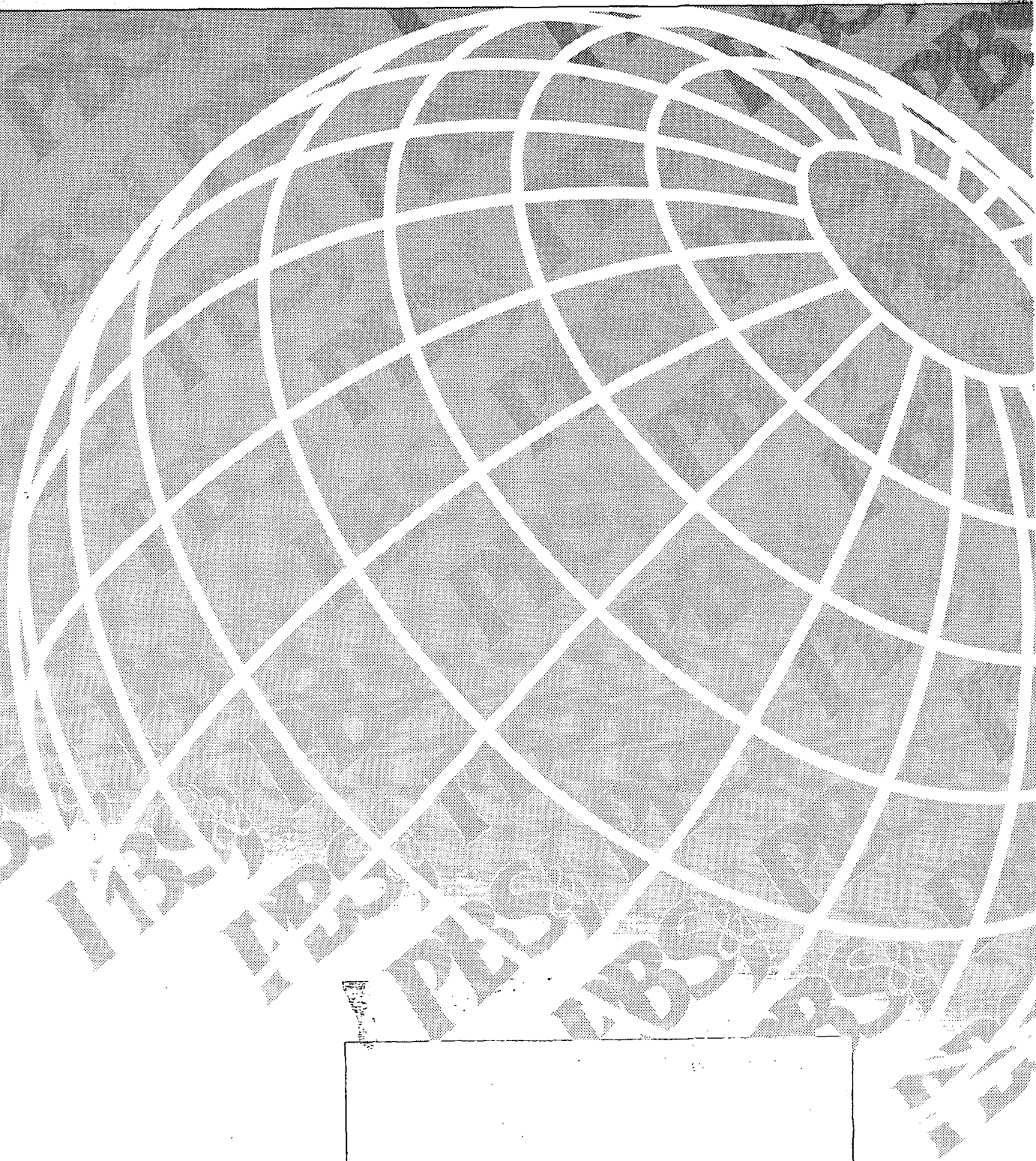




PBS*&*J

Fred C. Babcock/Cecil M. Webb
December, 2000
Quantitative Monitoring Report

FRED C. BABCOCK/CECIL M. WEBB
WILDLIFE MANAGEMENT AREA
CHARLOTTE COUNTY, FLORIDA

QUANTITATIVE MONITORING REPORT
DECEMBER, 2000

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TABLE OF CONTENTS

List of Figures	ii
List of Tables	ii
Appendices.....	ii
1.0 INTRODUCTION	1
1.1 Project Background.....	1
1.2 Monitoring Parameters.....	2
2.0 METHODS	5
2.1 Sampling Methodology.....	5
2.2 Wetland Creation Areas	7
2.3 Wetland Restoration Areas	7
3.0 RESULTS	8
3.1 Hydrologic Conditions.....	8
3.2 Wildlife Utilization	8
3.3 Maintenance Activities	9
3.4 Vegetation Conditions	9
4.0 DISCUSSIONS.....	13
4.1 Vegetative Cover - Wetland Creation Areas.....	13
4.2 Vegetative Cover - Wetland Restoration Areas	15
4.3 Success Criteria.....	15
5.0 SUMMARY	
5.1 Recommendations.....	17
5.2 Conclusions.....	17

LIST OF FIGURES

Figure 1.	Location Map
Figure 2.	Transect Locations
Figure 3.	Wetland Creation Area
Figure 4.	Surface Water Levels - Slough 1
Figure 5.	Surface Water Levels - Slough 2
Figure 6.	Surface Water Levels - Slough 3
Figure 7.	Surface Water Levels - Creation Area #4

LIST OF TABLES

Table 1.	Quantitative Sampling Data For Creation Area #4 - High Wetland
Table 2.	Quantitative Sampling Data For Creation Area #4 - Mid Wetland
Table 3.	Quantitative Sampling Data For Creation Area #4 - Low Wetland
Table 4.	Quantitative Sampling Data For Creation Area #4 - Tree Data
Table 5.	Quantitative Sampling Data For Creation Area #3A
Table 6.	Quantitative Sampling Data For Restoration Area 1A
Table 7.	Quantitative Sampling Data For Restoration Area 1B
Table 8.	Quantitative Sampling Data For Restoration Area 2A
Table 9.	Quantitative Sampling Data For Restoration Area 2B
Table 10.	Quantitative Sampling Data For Restoration Area 2C
Table 11.	Quantitative Sampling Data For Restoration Area 2D
Table 12.	Quantitative Sampling Data For Restoration Area 2E
Table 13.	Quantitative Sampling Data For Restoration Area 3B
Table 14.	Quantitative Sampling Data For Restoration Area 3C
Table 15.	Wildlife Observations

APPENDICES

Appendix A - Vegetative Species and Quantities Installed

Appendix B - Photographic Documentation

Appendix C - Wetland Compensation Monitoring Form

Appendix D - SWFWMD Termination of Wetland Monitoring Letter

1.0 INTRODUCTION

1.1 Project Background

Seminole Electric Cooperative, Inc. (SECI) has licensed and constructed a 230 kV transmission line from the Hardee Power Station to the Lee Substation in Lee County, Florida. In order to mitigate for wetland impacts associated with the line, certification conditions from the Florida Department of Environmental Protection (FDEP), the Southwest Florida Water Management District (SWFWMD), and the U.S. Army Corps of Engineers (USACOE) required a wetland mitigation area to be constructed. The mitigation area is located within the Fred C. Babcock/Cecil M. Webb Wildlife Management Area (Webb), Charlotte County, Florida (see Figure 1). The transmission line project impacted approximately 25 acres of wetlands. To compensate for these impacts, 102 acres of a historic slough system - Myrtle Slough - were restored. A 21.5-acre wetland creation area was also built.

The historical drainage pattern of Myrtle Slough was disrupted by the construction of Zemel Grade. A borrow canal on the east side of the grade intercepts the surface flow from Myrtle Slough, and eventually empties into the Peace River.

This mitigation project has been constructed in accordance with the following permits:

USACOE	199200428 (IP-BL)
FDEP	PA 89-25
SWFWMD	89-3560

The project involved constructing three (3) water impoundment structures to create wetlands, enhance existing wetlands and restore the historical hydroperiod. In addition, a wetland was created via the conversion of an upland pasture to a herbaceous/forested wetland approximately 21.5 acres in size. To compensate for impacts to wetlands claimed by SWFWMD, 12.7 acres of forested wetlands and 6.64 acres of herbaceous wetlands were created. Construction of the mitigation area began in April 1993 and was completed in September 1993. Erosion control and a modification to the weir structure were completed in May 1994. Additional planting was conducted in 1995 and in 1998. Monitoring and nuisance-exotic species control has been ongoing since September 1993. Figure 2 shows the location and relative size and orientation of the three restoration areas and the two creation areas. The 21.5-acre Wetland Creation Area (#4) can currently be classified as Palustrine - Emergent. This area has been divided into three segments defined as high, mid and low wetlands. The low and mid wetland segments of the Wetland Creation Area (#4) are designated to be Palustrine-Emergent, while the high wetland segment of the Wetland Creation Area is designated to be Palustrine-Forested. Figure 3 shows the zonation in Wetland Creation Area #4.

A staff gauge was installed in each of the three Restoration Areas (#1-3) and in the Creation Area (#4). Monthly water level elevations have been collected from all staff gauges (see Figures 4 - 7). The staff gauges in the restoration areas also helped to determine the final elevations for the fixed-crest weirs.

1.2 Monitoring Parameters

Environmental monitoring of the creation and restoration areas is required by USACOE, FDEP, and SWFWMD. Specific monitoring conditions from each governmental agency are outlined below:

USACOE

1. Quantitative data - September & March

- A. Creation Area Forested: belt transects for -
 - survivorship of trees
 - relative health
 - percent nuisance species
 - additional plant species observed but not recorded
 - assessment of growth
 - percent exotic species
 - wildlife utilization
- B. Creation Area Herbaceous: 1m² quadrats for-
 - survivorship
 - percent cover
 - percent exotic species
 - wildlife utilization
 - recruitment
 - growth
 - relative health
 - percent nuisance species
 - evidence of reproduction
 - additional plant species observed
- C. Restoration Area Forested:
 - percent cover of exotic and/or nuisance species
 - wildlife utilization
 - recording of all species not in belt transects
- D. Restoration Area Herbaceous:
 - species present
- E. Creation and Restoration Areas:
 - vitality
 - overall percent cover
 - wildlife utilization
 - percent exotic and/or nuisance species
- F. Rainfall Data from the Charlotte County Airport
- G. Narrative Report:
 - percent increase in obligate species
 - percent increase in facultative wet species
 - increase in nuisance species
 - potential problems
 - concerns with hydrological conditions
 - determination of wetland type for each area with a note of target wetland type
 - field observations and potential problems

2. Qualitative Monitoring - March

A. Creation and Restoration:

- assessment of vitality
- overall percent cover
- occurrence and percent cover of exotic and nuisance species

FDEP

1. Quantitative Sampling

A. Creation Area Forested: belt transects for tree species to determine -

- tree densities
- areal coverage
- basal coverage

B. Creation Area Herbaceous:

- percent coverage of all species present (including 3A)

C. Restoration Area Herbaceous and Forested:

- species present and coverage of each species

D. Narrative Report:

- discussion of overall site conditions
- potential problems
- field observations
- species present, dominance, relative dominance, density
- relative density calculated and reported in tabular form.

2. Qualitative Monitoring

A. Creation and Restoration (March): assessment of -

- vitality
- overall percent cover
- occurrence and percent cover of exotic and nuisance species
- wildlife utilization

SWFWMD

1. Creation Areas (3A, 4A-4E) and Restoration Areas (2A, 2B, 3B) completed on a Standard Compensation Form

2. Creation Areas Forested: belt transects for-

- coverage of nuisance and exotic species

- desirable species
 - coverage of upland vegetation
 - tree density
3. Creation Area Herbaceous: 1m² quadrats for percent cover of -
 - dominant and subdominant wetland species
 - upland species
 - exotic species and nuisance species
 4. Slough 3 Creation Area Herbaceous: 1m² quadrats for percent cover of -
 - dominant and subdominant wetland species
 - upland species
 - exotic species and nuisance species
 - percent cover of desirable wetland species
 5. Restoration Area: percent cover of -
 - exotic and/or nuisance species
 - upland species
 - dominant and subdominant species
 6. Narrative Report:
 - narrative of how percent cover, dominance, tree density and water level fluctuation were determined
 - summary of maintenance activity or corrective actions
 - each area will have a separate compensation monitoring form that includes: deviations, determination of wetland type, water level data.

The USACOE, SWFWMD and FDEP require qualitative monitoring in March. The SWFWMD requires quantitative sampling for all of the Creation Areas and Transects 2A, 2B and 3B of the Restoration Areas during the October events. The ACOE and FDEP require quantitative monitoring off all areas in the October event.

2.0 METHODS

2.1 Sampling Methodology

In order to sample for species composition and dominance in the wetland systems, two strata - canopy and ground cover - were defined. Canopy coverage includes all tree species in the Creation Area and those with a diameter at breast height (DBH) greater than or equal to 4-inches in the Restoration Areas. Ground cover is any herbaceous plant with a DBH less than 4-inches.

The sampling methodology used is based on the general principles of forest sampling as is typically described in the literature (e.g., Smith, 1974; Phillips, 1959). The field sampling techniques are summarized below.

Ground Cover Quadrats

At each of the identified transect locations, a straight sampling transect line (except in Transect 4A) was established in the field, and is identified by permanent rebar stakes. At ten meter intervals along the transect line, a PVC 1m² quadrat was placed on the ground. Species composition and relative percent cover were then determined within the quadrat area.

Data collected in nested 1m² quadrats are used to calculate percent cover, relative dominance, and frequency. These values are calculated using the following formulas:

$$Percent\ Cover_{species\ A} = \frac{\sum estimated\ percent\ cover_{species\ A\ quadrat\ 1..n}}{number\ of\ quadrats\ sampled}$$

$$Relative\ Dominance_{species\ A} = \frac{\sum percent\ cover_{species\ A}}{percent\ cover_{all\ species}} \times 100$$

$$Frequency_{species\ A} = \frac{\sum number\ of\ quadrats\ observed_{species\ A}}{number\ of\ quadrats} \times 100$$

Percent cover, relative dominance and frequency for the restoration areas are presented below. In addition, percent cover by dominant, subdominant, nuisance and exotic and upland species is presented for Wetland Creation Areas 4(A-E) and 3A.

Tree Density - Belt Transects

An estimate of tree density in the Creation Areas was determined by establishing a 15-foot wide belt corridor for each sampling transect. Tree density was estimated by dividing the number of trees observed by acreage of zone.

To calculate tree density in Creation Area #4, the following formula is used:

$$\text{Total No. of Trees Per Acre} = \frac{\text{no. of trees}}{\text{acreage per zone}}$$

Tree density is calculated for each zone in the creation area by calculating the length of each planted zone (high, mid, low) multiplied by the width of the belt transect (15'). The number of trees counted per zone is then divided by the acreage of the zone. Tree density is not based on the entire length of the transect, rather tree data are only used for those quadrats located within a planted zone.

Canopy Cover - Tree Diameter At Right Angle & Point Center Quarter

Canopy data in the Restoration Areas were collected in each transect containing canopy species by using the Point-Center Quarter method. This method consists of dividing each quadrat into four quarters by visualizing a grid line. The tree closest to the point in each corner is selected and the distance of each from the point in the quadrat is recorded. The species and diameter of the canopy along a perpendicular axis (x/y) are then recorded. Four trees (up to 15 feet from point) are measured from each quadrat, if present. This method provides an estimate of trends for the individually marked trees. To estimate tree growth, cover in the canopy strata is measured.

Although tree data are collected in the creation areas, most of the trees are <4-inches DBH. Observed canopy cover is calculated using the following formula:

$$\text{Canopy Cover} = \left(\frac{(\text{Diam. X axis}) + (\text{Diam. Y axis})}{4} \right)^2 \pi$$

2.2 Wetland Creation Areas

The following narratives summarize each area sampled during this monitoring event.

Creation Area 4A-4E

In Wetland Creation Area #4 quantitative analysis of tree species is conducted along five (5) 15-foot belt transects (4A-4E). The transects in Area 4 are generally oriented in an east-west direction (see Figure 3).

Ground cover is estimated for each of the wetland compensation areas in the 99 1m² quadrats distributed throughout the five transects. Each quadrat is located at approximately ten-meter intervals. Coverage by nuisance, desirable and exotic vegetation is estimated for each quadrat and recorded on the SWFWMD Standard Compensation Monitoring Forms. These data are summarized in Tables 1-4.

In order to satisfy SWFWMD regulatory requirements, three major zones were designated in Wetland Creation Area #4. The designation of these three zones is consistent with the construction plans for the project. The low zone includes 26 quadrats, the high zone includes 25 quadrats and the mid zone has 48 quadrats. Data from 68 of these stations were used to calculate tree density (Table 4).

Information on the survivorship, health, growth, evidence of reproduction, additional plant species and wildlife utilization were also documented on the field data sheets.

Creation Area 3A

Transect 3A is oriented in a generally north-south direction. Tree data were obtained from Wetland Creation Area #3A as described above for Creation Area #4 (Belt Transects).

Ground cover was estimated for Transect 3A in eleven 1m² quadrats. Coverage by nuisance, desirable and exotic vegetation was estimated for each quadrat and recorded on the SWFWMD Standard Compensation Monitoring Forms. These data are summarized in Table 5.

2.3 Wetland Restoration Areas

Herbaceous and canopy data were collected in transects 1A, 1B, 2A, 2B, 2C, 2D, 2E, 3B and 3C. Percent cover by species was taken at approximately ten meter intervals in 1m² quadrats (see Tables 6-14).

Data are compiled and analyzed for comparisons to be made over time within each strata. Percent covers of species are calculated for ground cover and canopy strata. Dominance and relative frequency are estimated for ground cover.

3.0 RESULTS

3.1 Hydrologic Conditions

According to the Charlotte County Soil Survey, (SCS, 1984) the total average annual precipitation for the county is 51 inches. Sixty percent (31 inches) of the total annual precipitation usually falls in April through September. Very little standing water was noted in the sloughs or restoration areas during the site visit.

Hydrologic conditions within the Cecil M. Webb Mitigation site range from very dry during the winter and spring months to very wet, with long periods of inundation during the summer and fall months. Based on continual data collection, (Figures 4 - 7), surface water levels have followed the pattern of rainfall.

CHARLOTTE COUNTY AIRPORT RAINFALL DATA - 1999	
MONTH	INCHES
March	0.81
April	0.47
May	0.44
June	7.32
July	5.82
August	10.22
September	9.83
October	0.87
November	0.69

3.2 Wildlife Utilization

The wetland creation and restoration areas attract a diverse assemblage of wildlife. Numerous birds, insects, mammals, fish and herpetofaunal species were noted during the field work effort of this project. A species list of wildlife observed during this monitoring event is presented in Table 15.

3.3 Maintenance Activities

No maintenance of wetland areas has occurred in the last six months.

3.4 Vegetation Conditions

The following is a description of the vegetative conditions for transects within the Restoration and Creation Areas.

Restoration Areas

Transect 1A & 1B - These areas are relatively homogenous in both species and percent cover. The following species are present in this slough system: *Hypericum myrtifolium* (St. John's Wort), *Aristida stricta* (wire grass), *Panicum erectifolium*, *Flavia linearis*, *Iva microcephala*, *Pluchea rosea* (fleabane), *Rhynchospora tracyi*, *Stillingia aquatica* (corkwood), *Fuirena scirpoidea*, *Heliotropium polyphyllum*, *Andropogon glomeratus*, and *Hyptis alata* (musky mint). The dominant species are *Iva microcephala*, *Eragrostis spp.*, *Panicum erectifolium* and *Aristida stricta*.

This area is extremely healthy, with no visible problems. No exotic or nuisance species were observed. Vitality of plants and overall site condition is excellent.

The percent cover for Transect 1A has increased from 45.7% in October 1997 to 102.27% in December 2000. The percent cover for Transect 1B has increased from 55.6% in October 1997 to 133.5% in December 2000.

Transect 2A - This transect includes some open water area and some herbaceous areas. Species present throughout the transect include *Ludwigia repens*, *Bacopa monnieri*, *Heliotropium polyphyllum*, *Erigeron quercifolius*, *Spartina bakeri*, and *Iva microcephala*. This transect is dominated by *Bacopa monnieri* and *Iva microcephala*.

Standing water was present in this transect. No significant problems were noted.

The vitality of plants and the overall site condition is good. The overall percent cover for this transect increased from 40.9% in October 1997 to 131.5% in December 2000.

Transect 2B - This transect is primarily herbaceous. No hydrological problems were noted during the site visit.

The dominant species in this transect included *Iva microcephala* and *Panicum erectifolium*. Other species present included *Aristida stricta*, *Eragrostis spp.*, *Hypericum myrtifolium*, and *Stillingia aquatica*. Some melaleuca trees were noted near the southern end of this transect.

The overall percent cover for this transect in October 1997 was 41.3%. It is now 141.0%. The vitality and overall site condition is good. No potential problems were noted.

Transect 2C & 2D - These transects are relatively homogenous in species composition. All trees within the transect areas appeared healthy.

Species found within these transects include *Hypericum fasciculatum*, *Heliotropium polyphyllum*, *Panicum spp.*, *Andropogon glomeratus*, *Amphicarpum muhlenbergianum*, *Eleocharis cellulosa*, *Panicum erectifolium*, *Eragrostis spp.*, *Rhynchospora tracyi*, *Aristida stricta*, and *Lachnocaulon spp.* No exotic or nuisance species were noted. The dominant species were *Panicum erectifolium*, *Eragrostis spp.* and *Aristida stricta*.

The overall percent cover for Transect 2C in October 1997 was 57.9%. It is now 118.8%. The overall percent cover for Transect 2D in October 1997 was 40.9%. It is now 129.6%. The vitality of the plants and the overall site condition appeared excellent.

Transect 2E - This transect is located within a herbaceous area. No trees are located in this transect. The species present include *Aristida stricta*, *Hypericum fasciculatum*, *Panicum erectifolium*, *Andropogon glomeratus*, *Bacopa monnieri*, *Eragrostis spp.*, and *Panicum spp.* Dominant species include *Aristida stricta* and *Eragrostis spp.*

No nuisance or exotic plants were observed. The overall site condition and vitality of the area was excellent. The percent cover of vegetation for this transect in October 1997 was 72.7%. It is now 131.9%.

Transect 3B - The dominant species located within this transect include *Aristida stricta* and *Panicum spp.* Other species observed included *Cyperus spp.*, *Eragrostis spp.*, *Iva microcephala*, and *Rhynchospora tracyi*.

The overall site condition appeared healthy. No standing water was present in this slough.

The overall percent cover in this area in October 1997 was 36.9%. It is now 120.9%.

Transect 3C - This herbaceous area is vegetated predominantly with *Hypericum fasciculatum*, *Panicum hians*, and *Bacopa caroliniana*. Other species included *Panicum erectifolium*, *Rhynchospora tracyi*, *Utricularia spp.*, and *Pontedaria cordata*.

A large area predominantly of *Pontedaria cordata* is located near this transect. The percent cover for this transect in October 1997 was 106.4%. It is now 152.2%. The vitality in this area is excellent.

Creation Areas

Transect 3A - This area has continued to recruit additional wetland species. It is currently dominated by *Schizachyrium spp.* and *Panicum spp.* Other species noted include *Ludwigia repens* and *Erigeron spp.*, and *Aristida stricta*. Percent cover in this area in October 1997 was 19.5%. It is now approximately 76.8%

This site has a lot of debris from dead pine trees. No exotic or nuisance species were noted. The

vitality of the existing plants is good. The recruitment is slower than that of Sloughs 1 & 2, however, it is increasing in diversity.

Creation Area 4 - (Transects A, B, C, D, E)

The creation area is vegetated with herbaceous species including *Sagittaria lancifolia*, *Pontedaria cordata*, *Hypericum fasciculatum*, *Panicum hemitomon*, *Heliotropium polyphyllum*, *Erigeron* spp. *Andropogon glomeratus*, *Amphicarpum muhlenbergianum*, *Iva microcephala*, *Pluchea rosea*, *Ludwigia repens*, *Eleocharis interstincta*, and *Spartina bakeri*.

The forested portions of the creation area include *Taxodium ascendens* (Cypress), *Fraxinus caroliniana* (Carolina ash), *Myrica cerifera* (Wax myrtle), *Lyonia lucida* (Fetterbush), *Itea virginica* (Virginia Willow), *Cephalanthus occidentalis* (Buttonbush), *Liquidambar styraciflua* (Sweetgum), *Quercus laurifolia* (Laurel Oak), *Ilex cassine* (Dahoon holly), *Persea palustris* (Swamp Bay), *Persea borbonia* (Red Bay), and *Acer rubrum* (Red Maple).

Nuisance species noted within the Creation Area include *Mikania scandens* (hemp vine) and *Euthamia minor*. Several *melaleuca* trees were noted near the northern end of the mitigation area.

The vitality of the forested portion appeared good. Growth (height and DBH) was considerable since October 1999. Very few trees appeared stressed. Foilage was limited due to winter conditions. The relative health of the trees was good. No problems with hydrology, stress, or exotic species were noted. The area appears to be extremely healthy.

A breakdown of the percent coverage of the three zones within the Creation Area is presented below.

Percent Cover of Creation Area				
	1997	1998	1999	2000
Low	53.3	56.19	80.7	138.6
Mid	44.48	72.06	83.4	124.4
High	37.35	85.40	88.0	147.6

4.0 DISCUSSIONS

4.1 Vegetative Cover- Wetland Creation Areas

Creation Area 4 - (A-E)

Site conditions at the SECI Cecil Webb Mitigation consistently meet the success criteria.

Dominant species throughout the creation area include:

- *Sagittaria lancifolia*;
- *Pontedaria cordata*;
- *Andropogon glomeratus*;
- *Ludwigia repens*;
- *Spartina bakeri*;
- *Iva microcephala*;
- *Erigeron spp.*;
- *Heliotropium polyphyllum*;
- *Fuirena scirpoidea*;
- *Panicum hemitomon*.

Subdominant species throughout the creation area include:

- *Eragrostis spp.*;
- *Pontedaria cordata*;
- *Andropogon glomeratus*;
- *Pluchea rosea*;
- *Ludwigia repens*;
- *Iva microcephala*;
- *Panicum hemitomon*;
- *Pluchea spp.*;
- *Heliotropium polyphyllum*.

High species diversity characterizes the high wetland zone located along the perimeter of the creation area. Dominant species within this zone include:

- *Heliotropium polyphyllum*;
- *Erigeron spp.*

Subdominant species located in the high zone include:

- *Andropogon glomeratus* (broom sedge);
- *Pluchea rosea*.

Dominant species in the mid zone of the creation area include:

- *Sagittaria lancifolia* (arrowhead);
- *Panicum hemitomon*;
- *Iva microcephala*.

Subdominant species in the mid zone of the creation area include:

- *Andropogon glomeratus*;
- *Heliotropium polyphyllum*;
- *Pluchea rosea*.

Dominant species in the low zone of the creation area include:

- *Sagittaria lancifolia* (arrowhead);
- *Iva microcephala*;
- *Panicum hemitomon*.

Subdominant species in the low zone of the creation area include:

- *Ludwigia repens*;
- *Heliotropium polyphyllum*;
- *Pontedaria cordata*.

All zones within the Creation Area have increased in percent cover since 1997.

The growth in height of the trees within the Creation Area was significant. Propagation of several species, specifically pines, appeared significant. The creation area consistently meets the density requirements specified in permit conditions.

Creation Area 3A

Dominant species in Slough 3A (Creation Area) include:

- *Schizachyrium spp.*;
- *Panicum spp.*

Subdominant species in Transect 3A (Creation Area) include:

- *Ludwigia repens*;
- *Erigeron spp.*;
- *Aristida stricta*.

Creation Area 3A has increased significantly in species diversity and coverage since October 1997. The majority of pine trees in this area either are very stressed or have died.

No supplemental plantings of herbaceous vegetation, trees or shrubs were completed in this area since the last monitoring event.

4.2 Vegetative Cover - Restoration Areas

Dominant herbaceous species composition within the restoration areas includes:

- *Aristida stricta*
- *Panicum erectifolium*
- *Iva microcephala*
- *Erigeron quercifolius*
- *Andropogon glomeratus*
- *Eragrostis spp.*
- *Bacopa monnieri*
- *Heliotropium polyphyllum*
- *Ludwigia repens*
- *Stillingia aquatica*
- *Eleocharis cellulosa*

All of the Restoration Areas appear to be relatively free of exotic and nuisance species. Some melaleuca trees were noted near Transect 2C. No plantings or maintenance activities have occurred in these areas. Water levels appear to be sufficient for successful recruitment and growth of desirable wetland species.

It should be noted that recruitment species are noted near the west end of Transect 3B. It appears that species present in the Creation Area (*Pontedaria*) have expanded out the northwest corner of the Creation Area towards Slough 3. Recruitment of wetland species is also noted between the southern edge of the creation area and the northern edges of Slough 2 (A&B).

A statistical report was conducted on the restoration areas in August 1998 and was submitted to SWFWMD for review. The report concluded that the success criteria of the slough systems had been met. SWFWMD conducted a site visit in November 8, 1999. The restoration areas were deemed successful on November 24, 1999.

4.3 Success Criteria

Monitoring requirements of the creation and restoration areas were established by the regulatory agencies. The results of this monitoring event indicate that success has been achieved.

According to the USACOE permit "If at the end of the five year monitoring period, the *restored/created* wetlands have achieved the proper hydrological condition, have sustained at a minimum 85 percent obligate wetland and/or facultative wetland species and do not contain more than 10 percent nuisance species in each mitigation site then they can be considered successful and monitoring may end."

The SWFWMD has already released the restoration areas from monitoring requirements. The wetland creation areas will be considered successful when percent cover of desirable species reaches 85%, with less than 10% nuisance or exotic species. Coverage of upland vegetation shall

not exceed 10% of the compensation area during the wet season. The density of trees in the creation area must be 375 trees/acre. All irrigation and removal of vegetation needs to be suspended prior to the final year of monitoring.

The FDEP required the monitoring of the restoration and creation areas. Success of the creation area is based upon having less than 5% nuisance and exotic species coverage.

The restoration areas shall be considered successful when the following criteria are met: wetland ground cover and shrub vegetation and wetland canopy tree species shall be reproducing naturally; the wetland canopy trees are not dying at an accelerated rate due to the altered hydroperiod; and not less than 95% of the vegetation is comprised of the FAC rule 17-301.400 listed species. Nuisance and exotic coverage shall be <5% and not less than 116 acres of restored wetlands are determined to be jurisdictional.

The success criteria set forth by the agencies varies; however, the details provided within the tables and text of this report document the achievement of those criteria. Very few, if any, nuisance species are present in the restoration or creation areas. Percent cover in most transects is over 100%. Tables 1-14 present data that support the meeting of these requirements. The density of trees on-site exceeds the stated requirement (Table 4). No irrigation or removal of vegetation has occurred on-site within the last year.

5.0 SUMMARY

5.1 Recommendations

Wetland Creation Areas

Tree densities meet the required success criteria for the low, mid and high zones. The overall density of all trees in the Creation Area is significantly higher than the success criteria. The majority of trees within the Creation Area are healthy.

No additional work is recommended for Creation Areas 3 & 4.

Wetland Restoration Areas

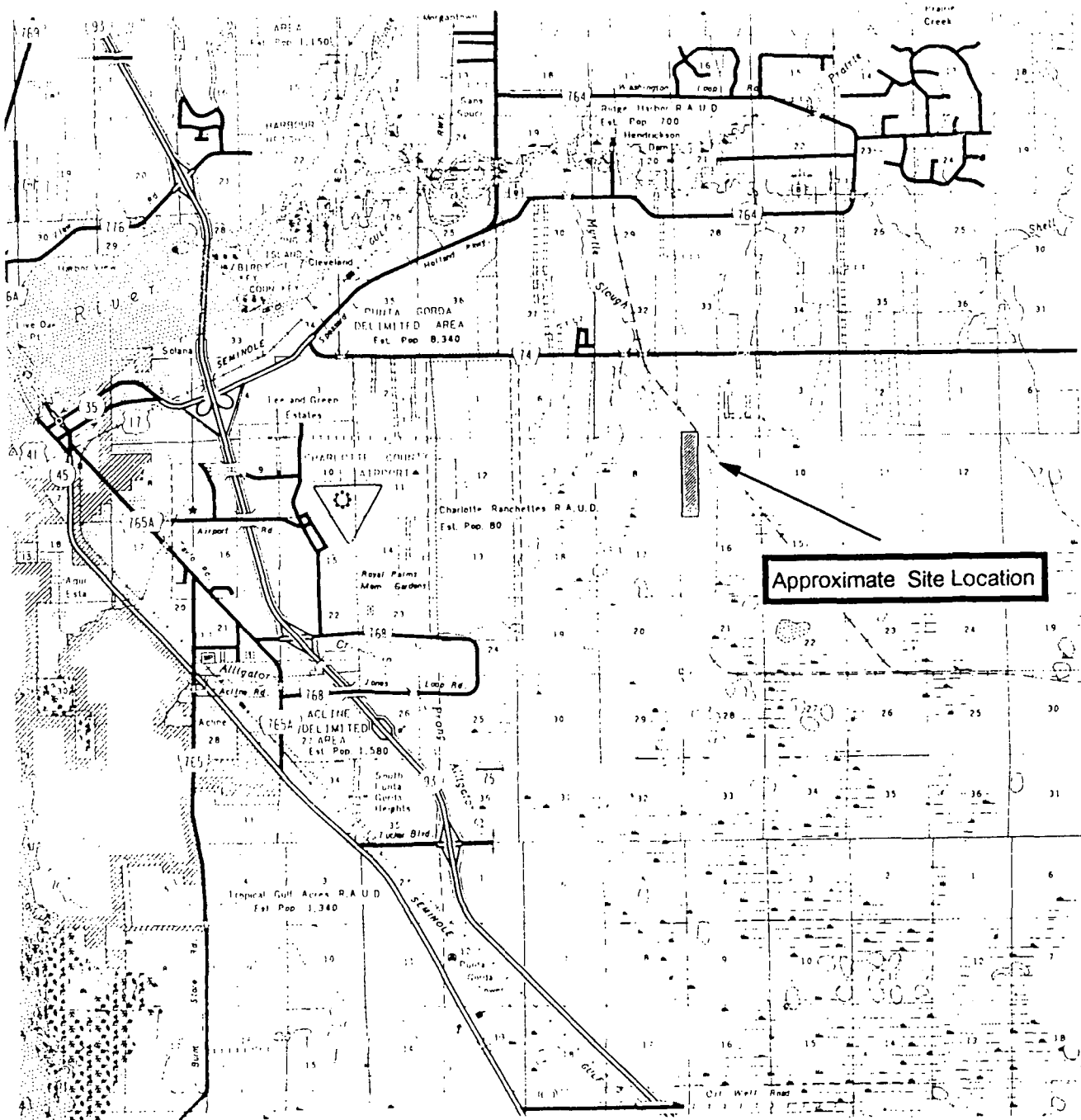
No significant problems with exotics, nuisance species, or water levels were noted. Hand removal of melaleuca trees is recommended.

5.2 Conclusions

Monitoring has been conducted on this site since 1993. The restoration sites were declared successful by SWFWMD in 1996. High percent coverage and lack of nuisance and/or upland species serve as the justification for the termination of additional monitoring on this site. Species composition within the restoration areas is very stable and representative of a wetland community. Natural recruitment of wetland species has steadily helped to increase the percent coverage in the restoration areas. The hydrologic conditions onsite are characteristic of a wetland system.

The wetland creation areas have also met specified success criteria. Dominance and percent coverage are very high, exceeding permit conditions. Coverage by nuisance, exotic or upland species is less than 10%. High reproduction of planted species has been noted. Tree survival is very high, and density requirements have consistently been met. No additional plantings have been recommended by the agencies. No problem or concern areas have been identified by the agencies following the submission of the monitoring reports.

No further monitoring (qualitative or quantitative) should be required at this time due to these conclusions.



October, 2000

Webb Wildlife Management Area

PBS&J

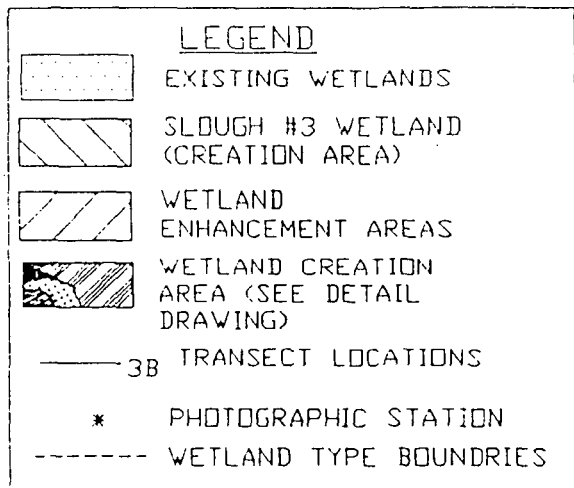
5300 W. Cypress Street, Suite 300

Tampa, FL 33607 (813) 282-7275

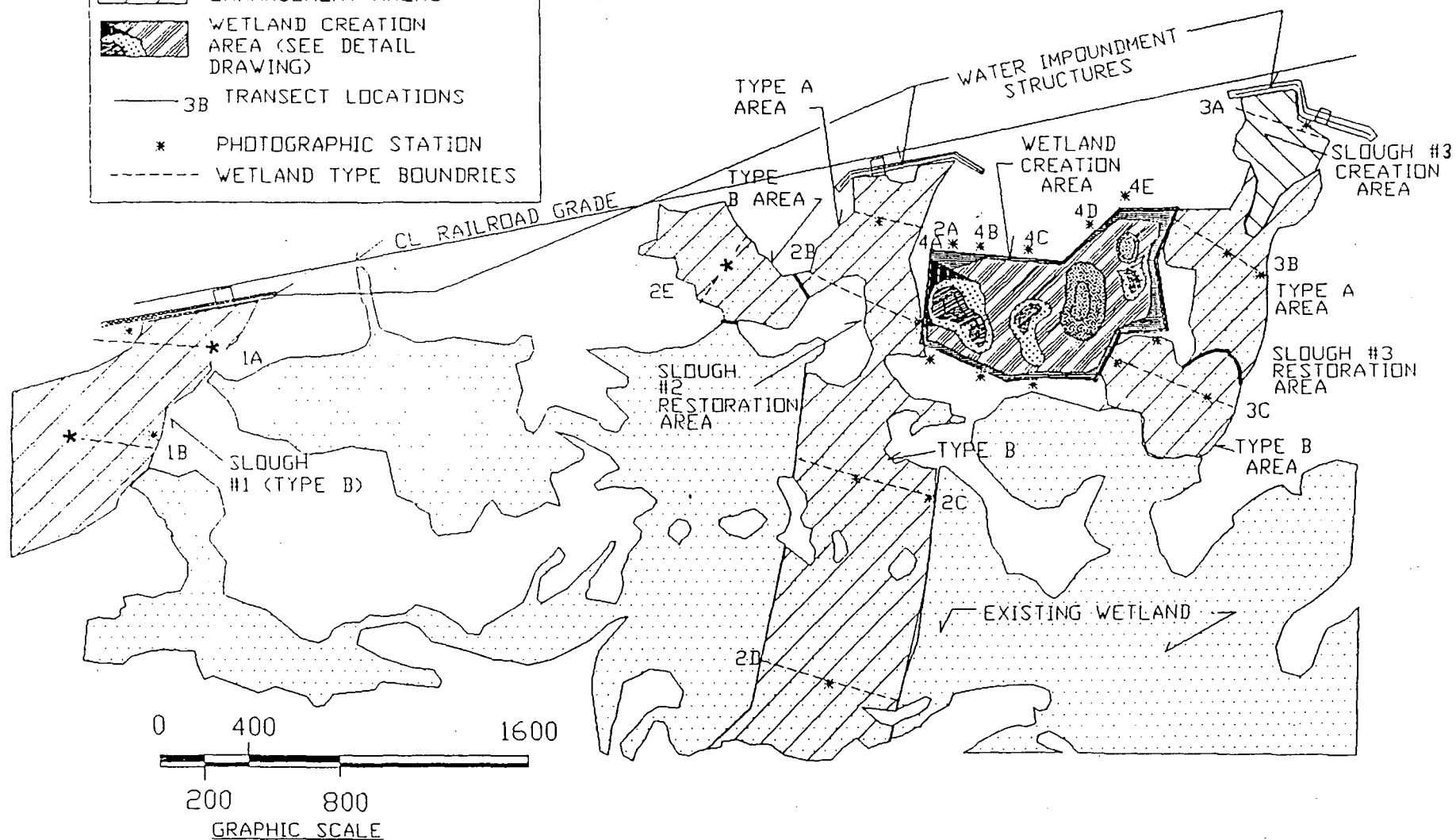
Figure 1

Location of Cecil Webb Mitigation Areas

Job # 100-815.03



NORTH



October, 2000

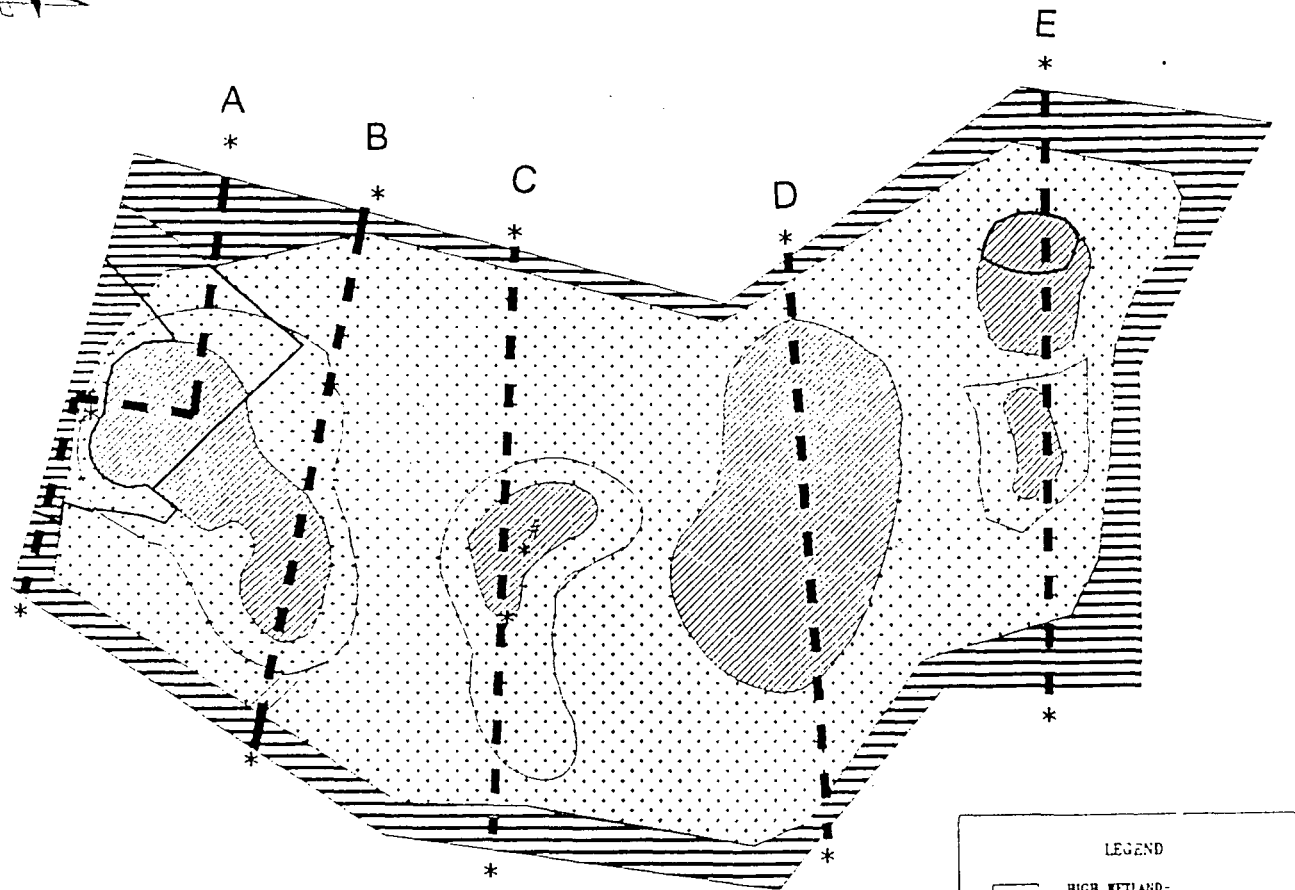
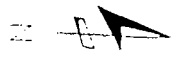
Webb Wildlife Management Area

PBS&J

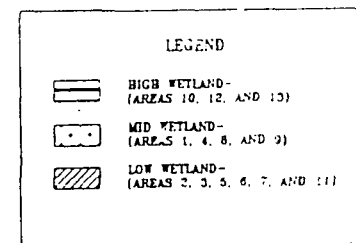
5300 W. Cypress Street, Suite 300
Tampa, FL 33607 (813) 282-7275

Figure 2

Transect & Photographic Locations
Job # 100-815.03



---#--- TRANSECT LOCATIONS
STAFF GAUGE
* PHOTOGRAPHIC STATION



October, 2000

Webb Wildlife Management Area

PBS&J

5300 W. Cypress Street, Suite 300
Tampa, FL 33607 (813) 282-7275

Figure 3
Wetland Creation Area (#4)
Job # 100-815.03

FIGURE 4
SURFACE WATER LEVELS - Slough 1

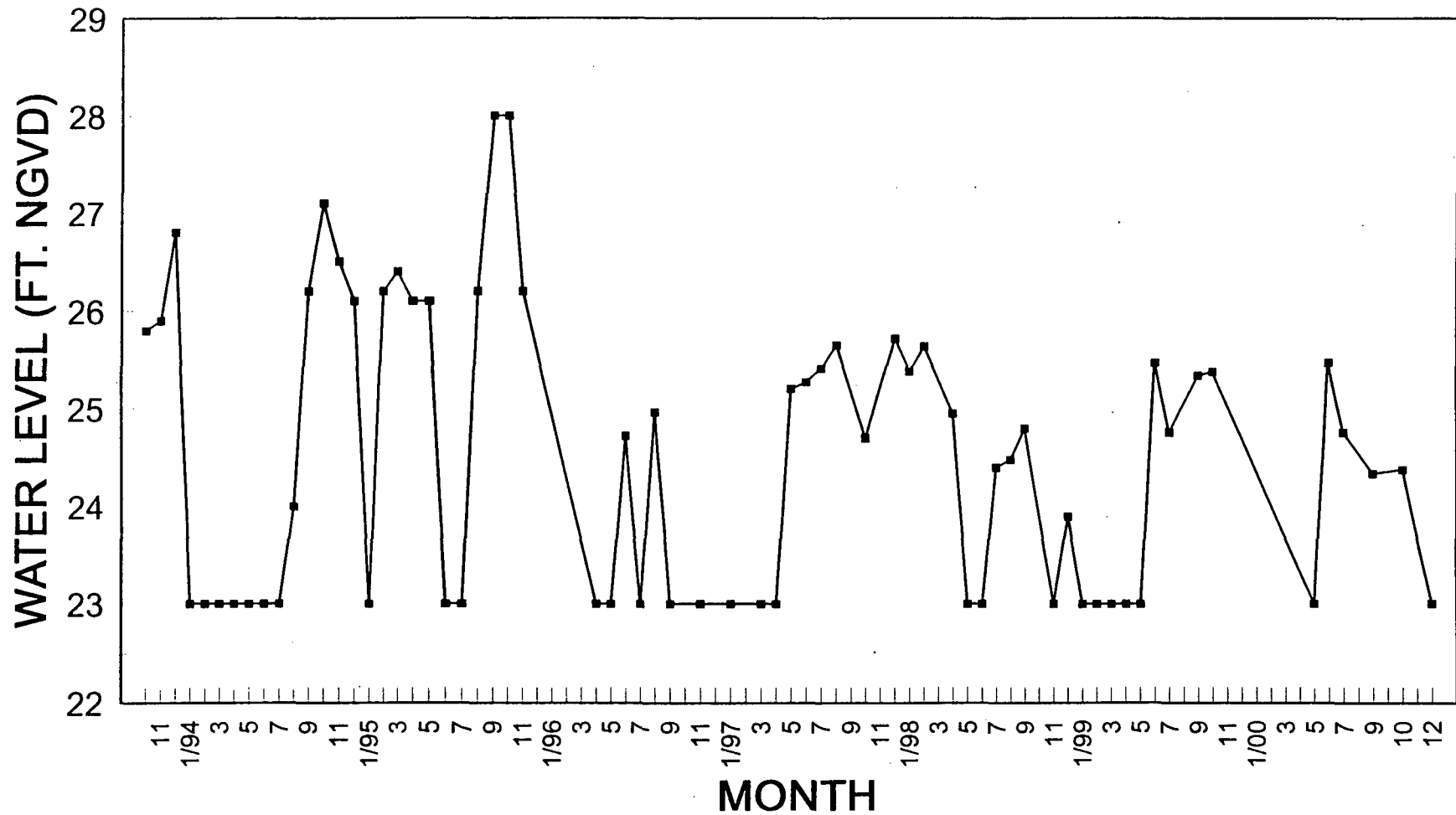


FIGURE 5 SURFACE WATER LEVELS - Slough 2

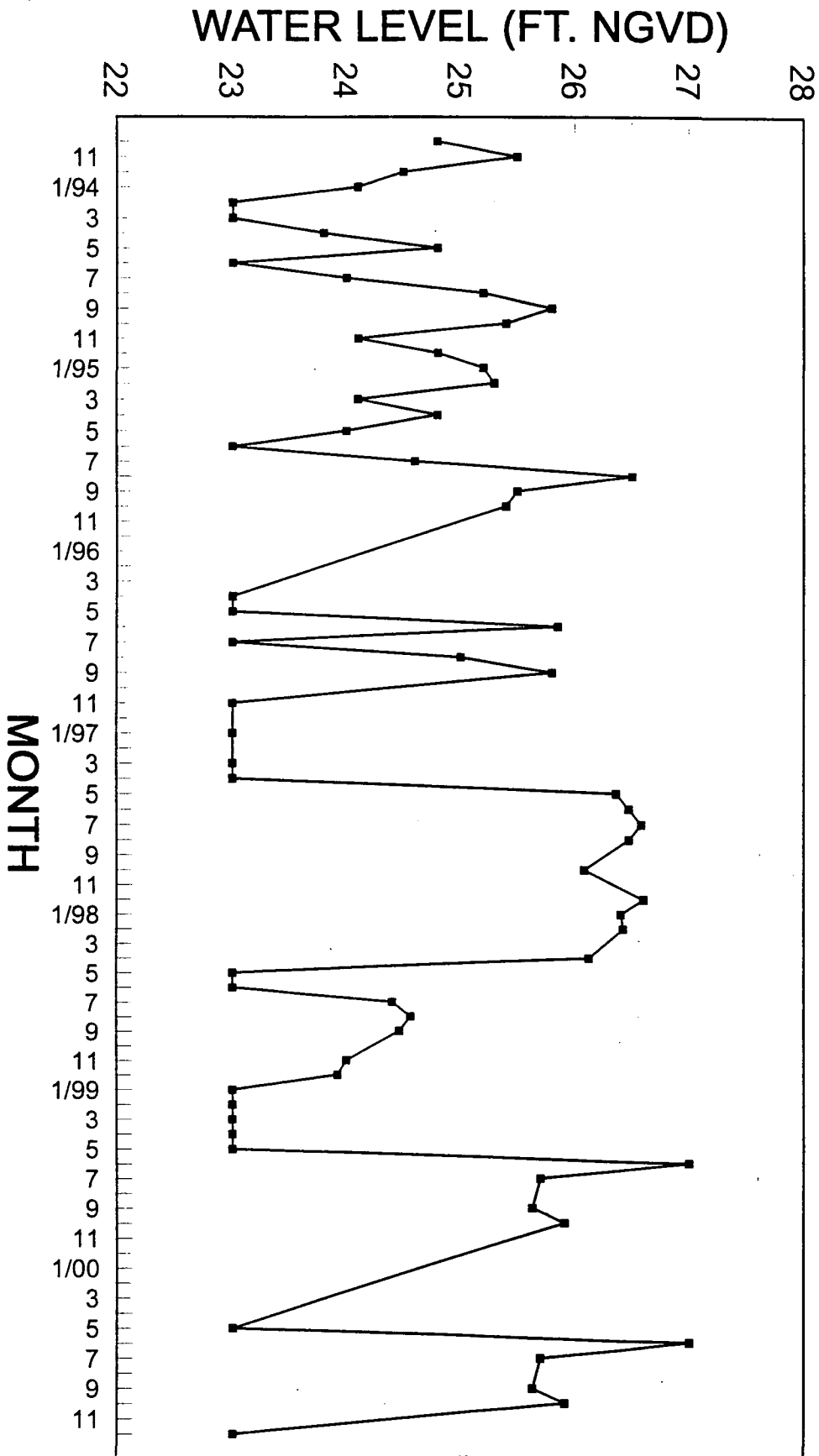
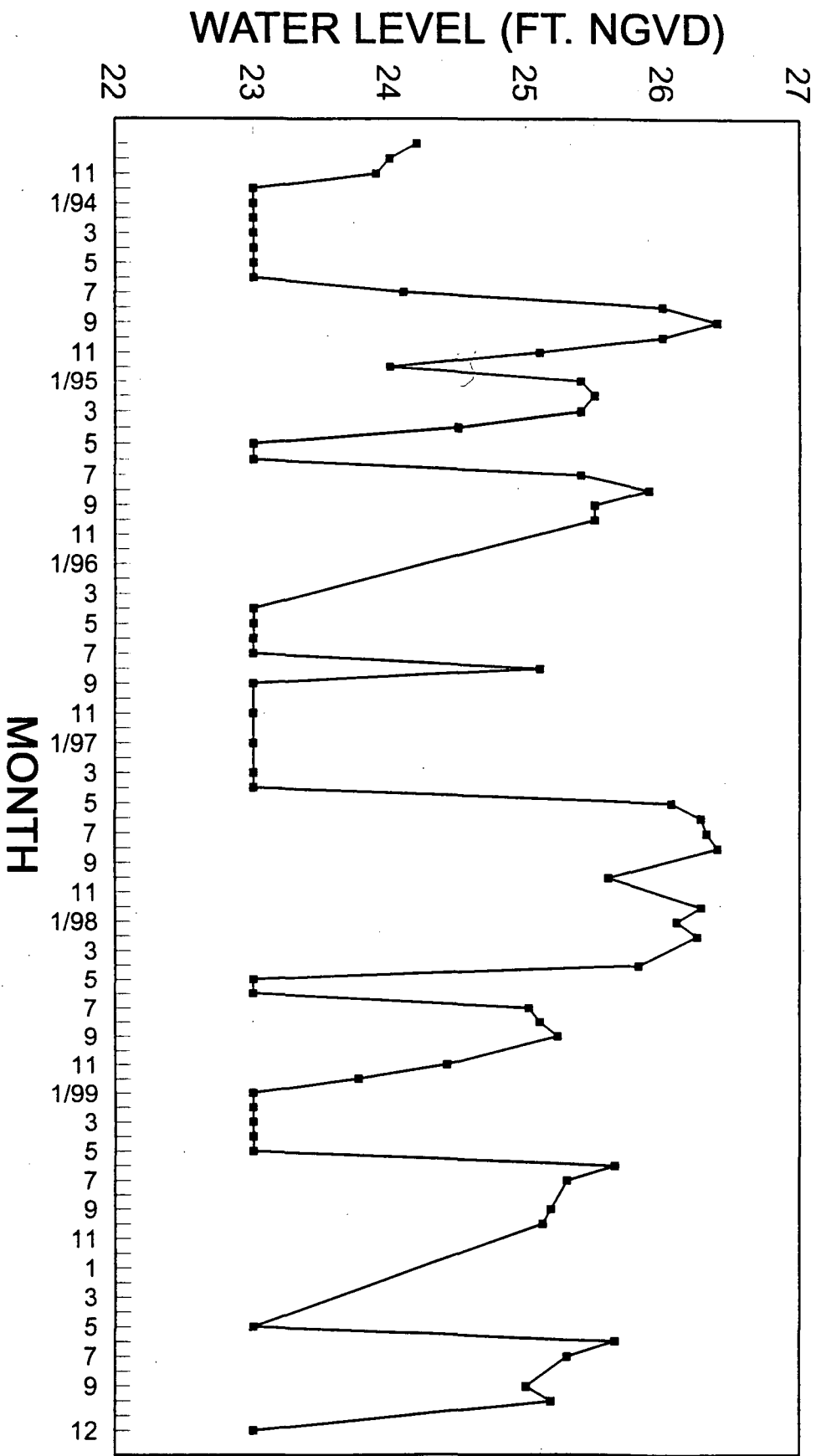
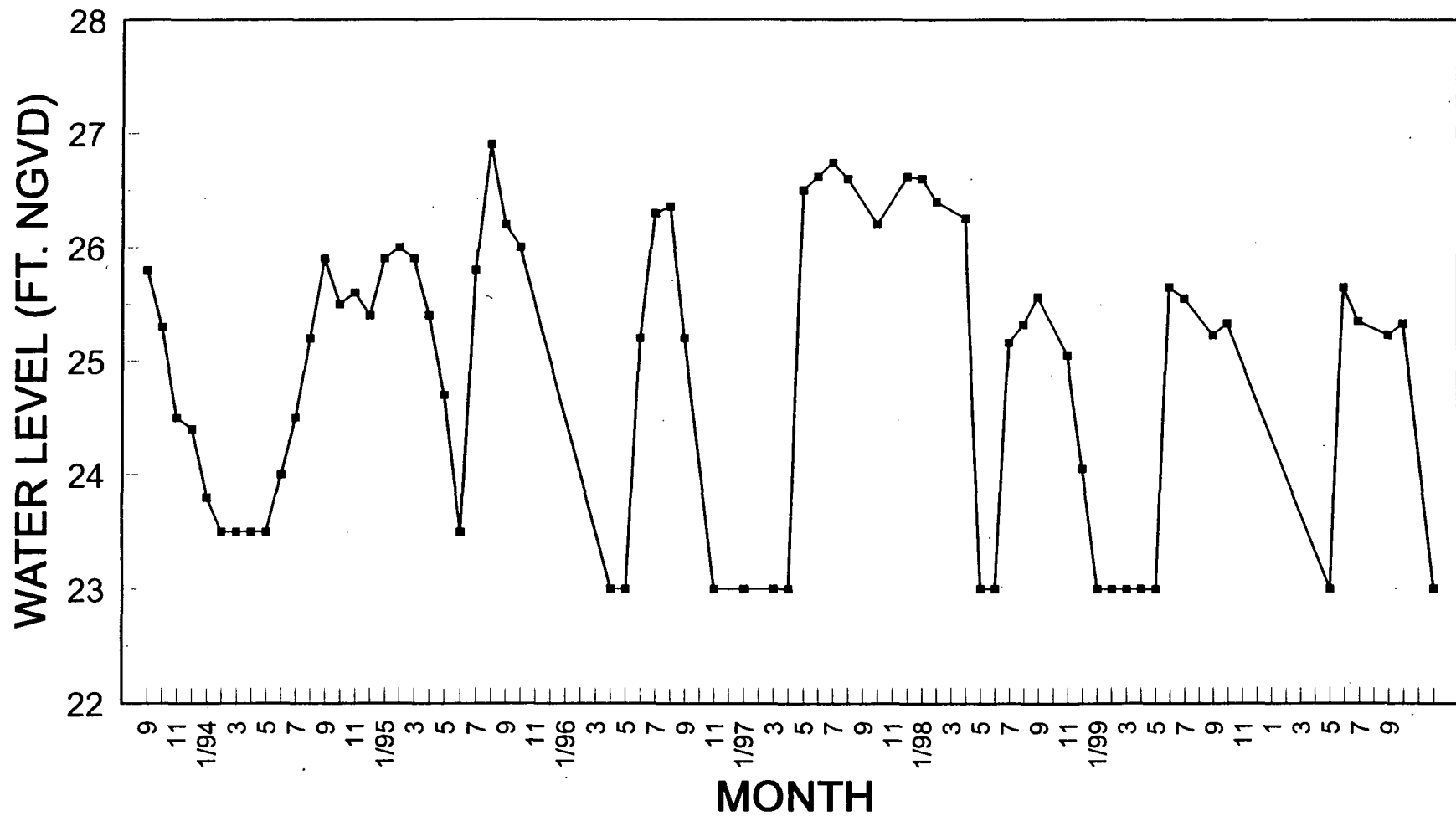


FIGURE 6 SURFACE WATER LEVELS - Slough 3





APPENDIX A

VEGETATIVE SPECIES AND QUANTITIES INSTALLED

VEGETATIVE SPECIES AND QUANTITIES INSTALLED IN
CREATION AREA

HIGH WETLAND (formerly 10,12,13)			
Quantity Planted in May-June, 1993	Quantity Planted in April, 1995	Quantity Planted in September, 1995	Species
4,225	50	500	Cordgrass (<u>Spartina bakeri</u>)
4,207	0	0	Softrush (<u>Juncus effusus</u>)
406	0	2,000	Water Hyssops (<u>Bacopa caroliniana</u>)
4,441	0	0	Beakrush (<u>Rhynchospora spp.</u>)
406	350	600	Golden Canna (<u>Canna flaccida</u>)
406	0	5,000	Red Ludwigia (<u>Ludwigia repens</u>)
812	0	2,000	Sedge (<u>Cyperus odorata</u>)
406	0	460	Umbrella Grass (<u>Fuirena spp.</u>)
1,108	0	800	Redroot (<u>Lachnanthes caroliniana</u>)
500	0	0	Tickseed (<u>Coreopsis levenworthii</u>)
406	5,000	800	Spikerush (<u>Eleocharis spp.</u>)
852	0	0	Yellow-eyed Grass (<u>Xyris spp.</u>)
406	250	0	Swamp Lily (<u>Crinum americanum</u>)
406	0	0	Pennywort (<u>Hydrocotyle umbellata</u>)
406	4,000	0	Blue Iris (<u>Iris hexagona</u>)
73	0	0	Virginia Willow (<u>Itea virginica</u>)
73	0	0	Viburnum (<u>Viburnum obovatum</u>)
155	0	0	St. John's Wort (<u>Hypericum fasciclarum</u>)
73	0	0	Fetterbush (<u>Lyonia lucida</u>)
103	25	40	Wax Myrtle (<u>Myrica cerifera</u>)
296	0	0	Aster (<u>Aster carolinianus</u>)
1,787	0	200	Arrowhead (<u>Sagittaria lancifolia</u>)
1,246	4,000	0	Maidencane (<u>Panicum hemitommon</u>)

VEGETATIVE SPECIES AND QUANTITIES INSTALLED IN
CREATION AREA

Quantity Planted in May-June, 1993	Quantity Planted in April, 1995	Quantity Planted in September, 1995	Species
310	0	0	Rush (<u>Juncus polycephalus</u>)
150	0	0	Water Hyssops (<u>Bacopa caroliniana</u>)
60	0	0	Pipewort (<u>Eriocaulon decangulare</u>)
746	0	500	Pickerelweed (<u>Pontedaria cordata</u>)
168	44	210	Dahoon Holly (<u>Ilex cassine</u>)
437	50	0	Laurel Oak (<u>Quercus laurifolia</u>)
168	0	0	Swamp Bay (<u>Persea palustris</u>)
168	0	0	Red Bay (<u>Persea borbonia</u>)
437	0	0	Sweetgum (<u>Liquidambar styraciflua</u>)
168	0	0	Water Oak (<u>Quercus nigra</u>)
0	0	723	Bald Cypress (<u>Taxodium distichum</u>)
0	0	714	Pop Ash (<u>Fraxinus caroliniana</u>)
0	0	710	Red Maple (<u>Acer rubrum</u>)

VEGETATIVE SPECIES AND QUANTITIES INSTALLED IN
CREATION AREA

MID WETLAND (formerly 1,4,8,9)

Quantity Planted May-June, 1993	Quantity Planted April, 1995	Quantity Planted September, 1995	Species
10,870	0	0	Pickernelweed (<u>Pontedaria cordata</u>)
11,264	0	0	Arrowhead (<u>Sagittaria lancifolia</u>)
1,519	0	0	Arrowhead (<u>Sagittaria graminea</u>)
1,750	0	0	Arrowhead (<u>Sagittaria sublata</u>)
10,574	8,000	0	Maidencane (<u>Panicum hemitomon</u>)
9,139	10,000	0	Smartweed (<u>Polygonum punctatum</u>)
4,865	0	0	Beakrush (<u>Rhynchospora spp.</u>)
1,552	600	0	Swamp Lily (<u>Crinum americanum</u>)
1,788	0	0	St. John's Wort (<u>Hypericum fasciculatum</u>)
1,374	370	700	Golden Canna (<u>Canna flaccida</u>)
4,466	0	0	Lizard's Tail (<u>Saururus cernuus</u>)
2,146	100	0	Pond Cypress (<u>Taxodium ascendens</u>)
229	50	0	Laurel Oak (<u>Quercus laurifolia</u>)
2,790	100	0	Pop Ash (<u>Fraxinus caroliniana</u>)
105	0	0	Sweetgum (<u>Liquidambar styraciflua</u>)
0	0	500	Fireflag (<u>Thalia geniculata</u>)
0	0	240	Umbrella Grass (<u>Fuirena scirpoidea</u>)
0	2,500	800	Spikerush (<u>Eleocharis spp.</u>)

VEGETATIVE SPECIES AND QUANTITIES INSTALLED IN
CREATION AREA

LOW WETLAND (formerly 2,3,5,6,7,11)			
Quantity Planted May-June 1993	Quantity Planted April, 1995	Quantity Planted September, 1995	Species
3,073	0	0	Pickereelweed (<u>Pontederia cordata</u>)
2,686	0	600	Arrowhead (<u>Sagittaria lancifolia</u>)
341	0	0	Arrowhead (<u>Sagittaria graminea</u>)
3,529	0	0	Arrowhead (<u>Sagittaria subolata</u>)
2,919	8,000	0	Maidencane (<u>Panicum hemitomom</u>)
2,847	10,000	0	Smartweed (<u>Polygonum punctatum</u>)
1,379	0	0	Beakrush (<u>Rhynchospora spp.</u>)
211	0	0	St. John's Wort (<u>Hypericum fasciculatum</u>)
1,629	0	1500	Fire Flag (<u>Thalia geniculata</u>)
745	250	0	Spatterdock (<u>Nuphar luteum</u>)
197	0	0	Buttonbush (<u>Cephalanthus occidentalis</u>)
596	0	0	Pond Cypress (<u>Taxodium ascendens</u>)
1,210	0	0	Pop Ash (<u>Fraxinus caroliniana</u>)
7	0	0	Wax Myrtle (<u>Myrica cerifera</u>)
195	0	0	Saw-tooth Fern (<u>Blechnum serulatum</u>)
200	0	0	Lizard's Tail (<u>Saururus cernuus</u>)
180	0	0	Royal Fern (<u>Osmunda regalis</u>)
0	2,500	0	Spikerush (<u>Eleocharis spp.</u>)
0	0	200	Redroot (<u>Lachnanthes spp.</u>)
0	0	1704	Golden Canna (<u>Canna flaccida</u>)

VEGETATIVE SPECIES AND QUANTITIES INSTALLED IN CREATION AREA

Quantity Planted in November, 1996	Species
58	Laurel Oak (<i>Quercus laurifolia</i>)
107	Red Maple (<i>Acer rubrum</i>)
46	Pop Ash (<i>Fraxinus caroliniana</i>)
11	Dahoon Holly (<i>Ilex cassine</i>)
31	Sweetgum (<i>Liquidambar styraciflua</i>)
2	Swamp Bay (<i>Perses palustris</i>)
12	Cypress (<i>Taxodium spp.</i>)
Total 267	

Quantity Planted in August, 1998 (Low Area)	Species
200	Cypress (<i>Taxodium spp.</i>)

APPENDIX B

PHOTOGRAPHIC DOCUMENTATION



Photo #1: 1A - Restoration Area



Photo #2 : 1B - Restoration Area



Photo # 3: 1B - Restoration Area South



Photo # 4: 1B - Restoration Area South



Photo # 6: 1B - Restoration Area North



Photo # 7: 1B - Restoration Area North



Photo # 8: 2E - Restoration Area



Photo # 9: 2E - Restoration Area



Photo # 10: 2A - Restoration Area



Photo # 11: 2A - Restoration Area



Photo # 13: 2B - Restoration Area



Photo # 14: 2B - Restoration Area



Photo # 15: 2C - Restoration Area South



Photo #16: 2C - Restoration Area



Photo # 17: 2C - Restoration Area North



Photo # 18: 2C - Restoration Area North



Photo # 22: 3A - Restoration Area



Photo # 23: 3A - Restoration Area



Photo # 24: 3B - Restoration Area South



Photo # 25: 3B - Restoration Area South

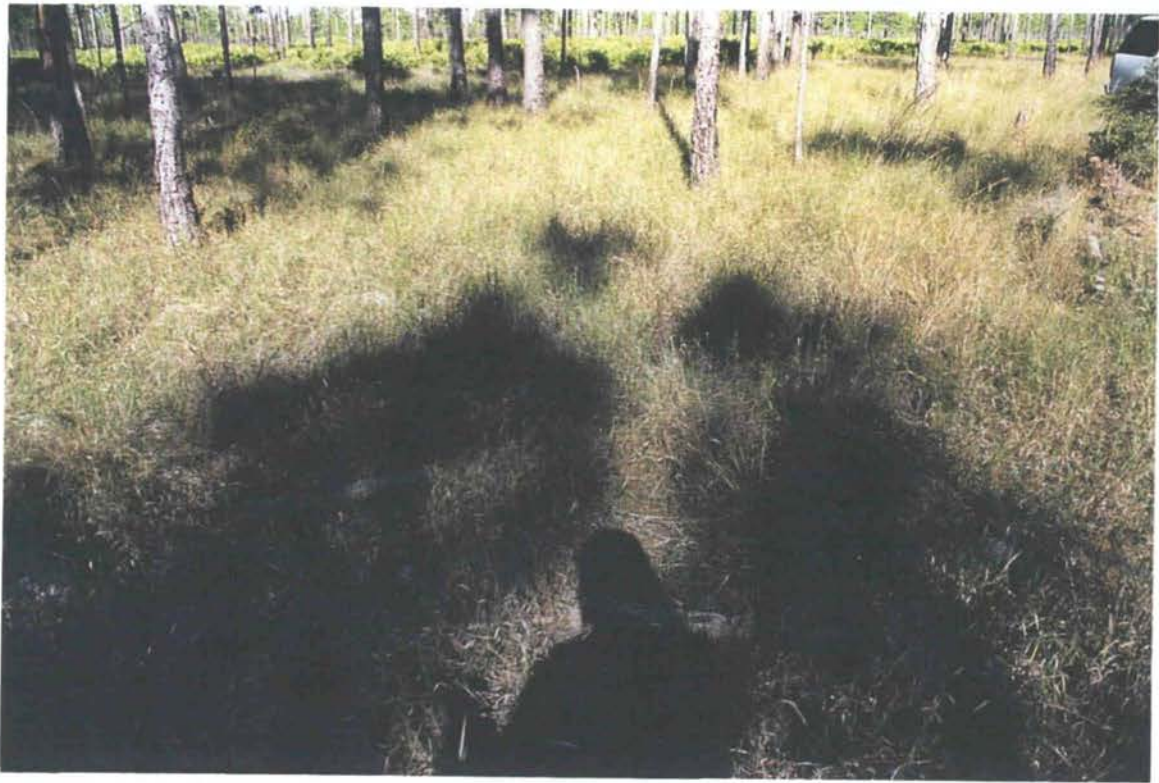


Photo # 26: 3B - Restoration Area North



Photo # 27: 3B - Restoration Area North



Photo # 28: 3C - Restoration Area North



Photo # 29: 3C - Restoration Area North



Photo # 30: 3C - Restoration Area South



Photo # 31: 3C - Restoration Area South



Photo # 32: 4A - Creation Area



Photo # 33: 4B - Creation Area



Photo # 34: 4C - Creation Area



Photo # 35: 4D - Creation Area



Photo # 36: 4E - Creation Area



Photo # 37: 4A - Creation Area



Photo # 38: 4B - Creation Area



Photo # 39: 4C - Creation Area



Photo # 40: 4D - Creation Area



Photo # 41: 4E - Creation Area



Photo # 42: 4A - Creation Area



Photo # 43: 4A - Creation Area



Photo # 44: 4A - Creation Area



Photo # 45: 4A - Creation Area



Photo # 46: 4C - Creation Area



Photo # 47: 4C - Creation Area



Photo # 48: 4C - Creation Area



Photo # 49: 4C - Creation Area



Photo # 50: Slough 1- Wier Structure



Photo # 51: Slough 2 - Wier Structure



Photo # 52: Slough 3 - Wier Structure

APPENDIX C

WETLAND COMPENSATION MONITORING FORM

**WETLAND COMPENSATION
MONITORING REPORT**

1. GENERAL INFORMATION

- A. PROJECT NAME: Hardee Power Station Certification
Seminole Electric Coop. Inc.
- B. PERMIT NO.: 89-3560
- C. MAINTENANCE ENTITY: Applied Aquatic Management Inc.
P.O. Box 1437
Eagle Lake, Fl 33839
- D. ENVIRONMENTAL CONSULTANTS NAME AND ADDRESS: (Responsible for Monitoring):

PBS&J
5300 W. Cypress Street, Suite 300
Tampa, Fl. 33702
(813) 282-7275
- E. COMPLETION DATE OF COMPENSATION AREAS:

Date Graded: 1993
Date Mulched: Topsoil spread during grading activities
Date Planted: May-July 9, 1993; Additional planting completed in Sept. 1993, April 1995, September 1995, November 1996, August 1998.
- F. CURRENT YEAR OF MONITORING/NUMBER OF YEARS REQUIRED:

Monitoring was initiated in September 1993.
- G. NUMBER OF REPORTS SUBMITTED TO DATE/NUMBER OF REPORTS REQUIRED:

Reports submitted every six (6) months since September 1993.
- H. TYPE OF COMPENSATION:

The restoration area can be classified as Palustrine-Emergent (PEM) according to the United States Fish and Wildlife Service's *Classification of Wetlands and Deepwater Habitats of the United States*.

I. LOCATION AND ACREAGE OF COMPENSATION AREA(S):

See Exhibits and Text

J. DATE OF THIS SITE INSPECTION AND LAST SITE INSPECTION:

Monitoring conducted on December 6th and 7th, 2000. The last monitoring event (qualitative) was conducted in March 2000.

K. SIGNIFICANT DIFFERENCE, IF ANY, FROM PERMITTED DESIGN:

Deviations from the permitted design (variations in berm locations, additional fences, plant substitutions, planting locations) have been identified in previous monitoring reports. No new additional deviations have been implemented.

2. TECHNICAL INFORMATION

A. CONSTRUCTION METHODS UTILIZED:

The mitigation area was graded in 1993. Topsoil was spread during grading activities. (See text of report for additional details).

B. NUMBER, SIZE, SOURCE AND SPECIES OF PLANT MATERIALS USED:

See Appendix A

C. PERCENT SURVIVAL OF PLANTED SPECIES (INDICATE METHOD FOR DETERMINATION):

See Tables and Text

D. NUMBER OF PLANTS REPLANTED TO MEET 85% AND WHEN THEY WERE PLANTED:

See Appendix A

E. TOTAL PERCENT COVERAGE OF DESIRABLE VEGETATION:

See Tables

F. PLANT DIVERSIFICATION AND NATURAL RECRUITMENT - LIST SPECIES PRESENT:

See Text

G. MONITORING DATA ON HEIGHT, DBH, PERCENT CANOPY CLOSURE AND SURVIVAL OF TREES (FORESTED SYSTEMS):

See Text and Tables

H. EXISTING WATER CONDITIONS EXPLAINING ANY UNUSUAL CIRCUMSTANCE (E.G., DRYNESS, FLOODING, VISUALLY APPARENT WATER QUALITY CONDITIONS):

Figures 4-7 are the water levels for the time period of November 1993 - November 2000.

I. NUISANCE OR EXOTIC VEGETATION

1. EXTENT OF INVASION (SPECIES AND PERCENT COVERAGE):
2. REMOVAL METHODS AND DATES:
3. ANTICIPATED FUTURE METHODS OF CONTROL:

See Text and Tables

J. WILDLIFE UTILIZATION:

See Text

K. OVERALL ECOLOGICAL EVALUATION:

See Text

L. LOCATE PERMANENTLY MARKED PHOTO STATIONS:

See Appendix B

M. IDENTIFY FACTORS WHICH MAY BE ADVERSELY AFFECTING THE SUCCESS OF A COMPENSATION AREA AND PROVIDE A TIMETABLE FOR CORRECTIVE ACTION:

See Text

N. ANY OTHER MONITORING PARAMETERS SPECIFICALLY REQUIRED BY THE PERMIT:

Not Applicable

APPENDIX D

SWFWMD Termination of Monitoring Letter



An Equal
Opportunity
Employer

Southwest Florida Water Management District

Tampa Service Office
7601 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-4881 or
1-800-536-0797 (FL only)
SUNCOM 578 2070

Bartow Service Office
170 Century Boulevard
Bartow, Florida 33830-7700
(863) 534-1448 or
1-800-492-7862 (FL only)
SUNCOM 572 6231

2379 Broad Street, Brooksville, Florida 34609-6899
(352) 796-7211 or 1-800-423-1476 (FL only)
SUNCOM 628-4150 TDD only 1-800-231-6103 (FL only)
World Wide Web: <http://www.swfwmd.state.fl.us>

Venice Service Office
115 Corporation Way
Venice, Florida 34292-3524
(941) 486-1212 or
1-800-320-3503 (FL only)
SUNCOM 526 6900

Lecanto Service Office
3600 West Sovereign Path
Suite 226
Lecanto, Florida 34461-8070
(352) 527-6131
SUNCOM 667 3271

November 24, 1999

Ronald C. Johnson
Chair, Lake Wales

Graciela Hernandez
Vice Chair, Tampa

Billy Thompson
Secretary, Tampa

Rennin E. Duncan
Treasurer, Safety Harbor

Minroo "Al" Coogler
Lecanto

Joe L. Davis, Jr.
Wauchula

Roberta M. Eger
Sarasota

John P. Hartlee, IV
Bridgerton

Watson L. Haynes, II
St. Petersburg

John K. Neake, III
New Port Richey

Patricia Silhouette-Taylor
Tampa

E. D. "Sonny" Vergara
Executive Director

Gene A. Maath
Assistant Executive Director

Edward B. Melverson
General Counsel

Mr. Robert E. Yarbrough
Senior Environmental Engineer
Seminole Electric Cooperative Inc.
16313 N. Dale Mabry Highway
P. O. Box 272000
Tampa, FL 33688-2000

**Subject: TERMINATION OF WETLAND COMPENSATION
MONITORING (PARTIAL)**

Project Name: Seminole Electric Coop/Hardee
Compliance Tracking No.: 26043/PA 89-25
County: Hardee

Dear Mr. Yarbrough:

Thank you for meeting with District staff on November 8, 1999. During this site meeting we inspected the mitigation areas for the subject property and determined that restoration areas 1, 2, and 3 have achieved the permitted success criteria. Therefore, no further monitoring is required for these restoration areas. Continued monitoring, maintenance, and reporting of the creation areas is required.

While vegetative monitoring of the released restoration areas is no longer required, please be advised of your continued responsibility to maintain these areas in their current or intended condition. These wetland areas are still part of the overall surface water management system and any direct or indirect activities that would adversely impact them would be considered a violation of our rules. Any proposed impacts or alterations will require a permit modification.

Your cooperation in this matter is appreciated. If you have questions regarding this determination or the District's procedures, please contact Betty Freeman or me in our the Bartow Service Office at (863) 534-1448.

Sincerely,

Mark K. Hurst
Environmental Regulation
Bartow Regulation Department

MKH/B.JF kmh211

cc: PBS & J, 5300 W. Cypress Street, Suite 300, Tampa, FL 33607
D. Carpenter B. Freeman

TABLE 1

Creation Area #4 - High Wetland

Pg 1 of 2

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	%
	4A1	4A2	4A3	4A13	4A14	4A15	4A16	4A17	4A18	4A19	4B1	4B2	4B20	4C1	4C2	Cover
Dominant Desirable Species																
Iva microcephala	90	40	40	90		30	20	30	10	15					60	28.33
Erigeron spp.		15	30	10	20	15		20	20	60				25		14.33
Spartina bakeri									30		95		40	15		12.00
Sagittaria lancifolia	10	5	10	10		5	70	40				50				13.33
Heliotropium polyphyllum	40	20	30		30	40			10						25	13.00
Panicum hemitomon							20		10	10		80	30	25	10	12.33
Subdominant Desirable Species																
Hypericum fasciculatum					80			30	15							8.33
Hypericum myrtifolium		10	20			60			20							7.33
Andropogon glom.					5			20	40	40				35		9.33
Subtotal Dominant & Subdominant Species																118.33
Other Desirable Species																
Pluchea rosea							15	10			30	10	25			6.00
Aristida stricta				10												0.67
Eragrostis spp.		5			5			15					25		15	4.33
Panicum repens		20	30													3.33
Cyperus spp.	5	15	10			5						5			15	3.67
Hyptis alata				5			15	5	20	15						4.00
Stillingia aquatica						5				15			10			2.00
Iris virginica										10						0.67
Flaveria linearis							20					5	20	25		4.67
Subtotal Dominant & Subdominant & Other Desirable Species																147.67
Nuisance & Exotic Species																0.00
Subtotal Nuisance & Exotic Species																0.00
Upland Species																0.00
Subtotal Upland Species																0.00

TABLE 1

Creation Area #4 - High Wetland

(pg 2 of 2)

Species	16	17	18	19	20	21	22	23	24	25	% Cover	% Cover	% Cover
	4C20	4D1	4D2	4D20	4D21	4E1	4E2	4E3	4E18	4E19	pg 1	pg 2	Total
Dominant Desirable Species													
Erigeron spp.	15			5		95	10	20			14.33	14.50	14.42
Heliotropium polyphyllum				50	60		40	30			13.00	18.00	15.50
Fuirena scirpoidea			80	30	60		50	30			0.00	25.00	12.50
Iva microcephala											28.33	0.00	14.17
Spartina bakeri		100									12.00	10.00	11.00
Sagittaria lancifolia			20	5			50	10			13.33	8.50	10.92
Subdominant Desirable Species													
Andropogon glomeratus	40					5			30		9.33	7.50	8.42
Pluchea rosea	10				10	15			30		6.00	6.50	6.25
Eragrostis spp.	30		10						30		4.33	7.00	5.67
Panicum hemitomon											12.33	0.00	6.17
Total Dominant & Subdominant Species											112.98	97.00	104.99
Other Desirable Species													
Aristida stricta											0.67	0.00	0.34
Hypericum fasciculatum											8.33	0.00	4.17
Eleocharis cellulosa				60	5	20					0.00	8.50	4.25
Canna flaccida									40		0.00	4.00	2.00
Panicum repens	15							15			3.33	3.00	3.17
Eleocharis interstincta	30										0.00	3.00	1.50
Hypericum myrtifolium							5				7.33	0.50	3.92
Erigeron quercifolius	30										0.00	3.00	1.50
Panicum erectifolium						30					0.00	3.00	1.50
Cyperus spp.					5		20	10			3.67	3.50	3.59
Oxypolis filiformis					10						0.00	1.00	0.50
Stillingia aquatica											2.00	0.00	1.00
Hyptis alata											4.00	0.00	2.00
Iris virginica											0.67	0.00	0.34
Flaveria linearis											4.67	0.00	2.34
Pluchea spp.						30					0.00	3.00	1.50
Crinum americana									5		0.00	0.50	0.25
Total Dominant & Subdominant & Other Desirable Species											147.67	130.00	138.83
Nuisance & Exotic Species											0.00	0.00	0.00
Upland Species											0.00	0.00	0.00

00oct4h2

Creation Area #4 - Mid Wetland

00oct4m

00octm2

[illegible]

00octm2

[illegible]

TABLE 3 (pg 2 of 2)

Creation Area #4 - Low Wetland

Species	20	21	22	23	24	25	26	% Cover	% Cover	Total % Cover
	4E7	4E8	4E9	4E12	4E13	4E14	4E15	pg 1	pg 2	
Dominant Desirable Species										
<i>Sagittaria lancifolia</i>	10	15	20	25	25		30	27.37	17.86	22.61
<i>Iva microcephala</i>	5	20	15	25	30	40	40	13.42	25.00	19.21
<i>Panicum hemitomon</i>	70	40	10	20	5	10		15.33	22.14	18.74
Subdominant Desirable Species										
<i>Ludwigia repens</i>				15			10	17.11	3.57	10.34
<i>Heliotropium polyphyllum</i>			20		60	20		12.11	14.29	13.20
<i>Pontedaria cordata</i>								25.53	0.00	12.77
Total Dominant & Subdominant Species								110.87	82.86	96.86
Other Desirable Species										
<i>Andropogon glomeratus</i>		15				5		0.00	2.86	1.43
<i>Stillingia aquatica</i>	5	40		15			5	0.79	9.29	5.04
<i>Hypericum fasciculatum</i>								2.11	0.00	1.06
<i>Eragrostis</i> spp.							5	0.53	0.71	0.62
<i>Cyperus</i> spp.			10		15	10		1.58	5.00	3.29
<i>Pluchea</i> spp.	10		20			5	5	1.32	5.71	3.52
<i>Eliocharis cellulosa</i>			30				15	0.00	6.43	3.21
<i>Scirpus</i> spp.								0.79	0.00	0.40
<i>Eliocharis</i> spp.								1.58	0.00	0.79
<i>Eliocharis interstincta</i>								4.21	0.00	2.11
<i>Lachnocaulon anceps</i>								0.79	0.00	0.40
<i>Polygala</i> spp.								2.63	0.00	1.32
<i>Panicum</i> spp.								2.37	0.00	1.19
<i>Erigeron</i> spp.								4.21	0.00	2.11
<i>Pluchea rosea</i>								0.79	0.00	0.40
<i>Thallia geniculata</i>								0.79	0.00	0.40
<i>Amphicarpum muhlenbergianum</i>								3.16	0.00	1.58
Total Dominant & Subdominant & Other Species								138.68	112.86	125.69
Nuisance & Exotic Species										
Total Nuisance & Exotic Species								0.00	0.00	0.00
Upland Species										
Total Upland Species								0.00	0.00	0.00

Creation Area #4 - Low Wetland

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TABLE 4
CREATION AREA TREE DENSITIES
OCTOBER, 2000

TREE DENSITIES						
ZONE	# OF TREES	# OF STATIONS	LENGTH OF TRANSECT	ACREAGE PER ZONE	# OF TREES/ACRE	SUCCESS CRITERIA
HIGH	181	24	660	0.227 acres	797	375
MID	213	50	870	0.299 acres	712	375
LOW	109	26	600	0.206 acres	529	375
TOTAL	503	100	2130 Feet	0.732 acres	N/A	N/A

TABLE 5

Slough 3 - Creation Area (3A)

(south to north)

Species	1	2	3	4	5	6	7	8	9	10	11	% Cover
Dominant Desirable Species												
Schizachyrium spp.			60	70		30	40	70				24.55
Panicum spp.		25							30	25	70	13.64
Subdominant Desirable Species												
Ludwigia repens				20	20		25	20			20	9.55
Erigeron spp.		15		20			5		5	30	10	7.73
Aristida stricta	70									10		7.27
					Total Dominant & Subdominant Species							62.73
Other Desirable Species												
Stillingia aquatica			10						5			1.36
Asclepias spp.						15						1.36
Sagittaria lancifolia		10								5		1.36
Andropogon glomeratus	15	15										2.73
Panicum hemitomon	30											2.73
Cyperus alterniflora			10									0.91
Pluchea rosea		5	10	10								2.27
Iva microcephala							5			10		1.36
	Total Dominant & Subdominant & Other Desirable Species											76.82
Nuisance & Exotic Species												
					Total Nuisance & Exotic Species							0.00
Upland Species												
							Total Upland Species					0.00

00oct3a

TABLE 6
Slough 1 - Transect A
(north to south)

Species	1	2	3	4	5	6	7	8	9	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	80	40	40	40	40	85	70	70	90	51.67	50.54	100.00
<i>Iva microcephala</i>	20	40	70	55						20.56	20.11	44.44
<i>Rhynchospora tracyi</i>				5						0.56	0.54	11.11
<i>Hypericum myrtifolium</i>			10			5				1.67	1.63	22.22
<i>Panicum erectifolium</i>		10	5	40	30	5	10	5		11.67	11.41	77.78
<i>Stillingia aquatica</i>		5		5	20					3.33	3.26	33.33
<i>Flaveria linearis</i>	5	5	5		10					2.78	2.72	44.44
<i>Pluchea rosea</i>			20							2.22	2.17	11.11
<i>Hyptis alata</i>				5						0.56	0.54	11.11
<i>Fuirena scirpoidea</i>							15	20		3.89	3.80	22.22
<i>Andropogon glomeratus</i>			5	10						1.67	1.63	22.22
<i>Lachnocaulon anceps</i>					5					0.56	0.54	11.11
<i>Heliotropium polyphyllum</i>							5	5	5	1.11	1.09	33.33
TOTAL										102.22		

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TABLE 7
Slough 1 - Transect B
(north to south)

Species	1	2	3	4	5	6	7	8	9	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	20	30	50	25	30	40	90	50	90	47.22	35.36	100.00
<i>Iva microcephala</i>		60		40				5		11.67	8.74	33.33
<i>Hypericum myrtifolium</i>		20	2				5			3.00	2.25	33.33
<i>Flaveria linearis</i>	30	40			5					8.33	6.24	33.33
<i>Lachnocaulon anceps</i>		5	10		5				5	2.78	2.08	44.44
<i>Fuirena scirpoidea</i>	20			10	5					3.89	2.91	33.33
<i>Eragrostis</i> spp.			15	40	30	40	5	30		17.78	13.31	66.67
<i>Ludwigia repens</i>			20							2.22	1.66	11.11
<i>Panicum</i> spp.		30								3.33	2.50	11.11
<i>Amphicarpum muhlenbergianum</i>						10		20	5	3.89	2.91	33.33
<i>Serenoa repens</i>	25									2.78	2.08	11.11
<i>Setaria geniculata</i>			70							7.78	5.82	11.11
<i>Panicum erectifolium</i>			60	5		10	5	10		10.00	7.49	55.56
<i>Stillingia aquatica</i>			20							2.22	1.66	11.11
<i>Heliotropium polyphyllum</i>				10	5	10	10	10		5.00	3.74	55.56
<i>Panicum</i> spp.									10	1.11	0.83	11.11
<i>Eriocaulon decangulare</i>									5	0.56	0.42	11.11
TOTAL										133.56		

00oct1b

TABLE 8
Slough 2 - Transect A
(north to south)

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	40								20	10		30		7.69	5.85	30.77
<i>Iva microcephala</i>	40					5			50	50	80	50	30	23.46	17.84	63.64
<i>Ludwigia repens</i>			50	30	20	15	15					20		11.54	8.77	54.55
<i>Hyptis alata</i>	15		5					15			5			3.08	2.34	36.36
<i>Panicum hemitomon</i>	10			10							15			2.69	2.05	27.27
<i>Panicum</i> spp.			20											1.54	1.17	9.09
<i>Spartina bakeri</i>		100												7.69	5.85	9.09
<i>Bacopa monnieri</i>			40	30	50	90	80	25						24.23	18.42	54.55
<i>Rhynchospora tracyi</i>													15	1.15	0.88	9.09
<i>Pluchea rosea</i>			25	50				15						6.92	5.26	27.27
<i>Eragrostis</i> spp.									5					0.38	0.29	9.09
<i>Cyperus</i> spp.													30	2.31	1.75	9.09
<i>Andropogon glomeratus</i>	15											40	30	6.54	4.97	27.27
<i>Heliotropium polyphyllum</i>	10			10				5	30	60	30	40		14.23	10.82	63.64
<i>Erigeron quercifolius</i>					30	15	40	15			10	10	15	10.38	7.89	63.64
<i>Alterniflora philoxeroides</i>				20										1.54	1.17	9.09
<i>Amphicarpum muhlenbergianum</i>					50	30								6.15	4.68	18.18
<i>Erigeron</i> spp.													5	0.38	0.29	9.09
TOTAL														131.54		

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TABLE 9
Slough 2 - Transect B
(north to south)

Species	1	2	3	4	5	6	7	8	9	10	11	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	40	20	70	20	10				40		40	21.82	15.46	63.64
<i>Stillingia aquatica</i>		20										1.82	1.29	9.09
<i>Eragrostis</i> spp.		30	20			10	10		40	10	50	15.45	10.95	63.64
<i>Hypericum myrtifolium</i>					10		5	40	5	30		8.18	5.80	45.45
<i>Bacopa caroliniana</i>		20	15				15	20				6.36	4.51	36.36
<i>Erigeron</i> spp.					5						15	1.82	1.29	18.18
<i>Hyptis alata</i>			5	5								0.91	0.64	18.18
<i>Panicum erectifolium</i>	5	60	30	30	20	15	20		30		60	24.55	17.40	81.82
<i>Iva microcephala</i>				70	60	20	60	60	15	60		31.36	22.23	63.64
<i>Rhynchospora tracyi</i>	2		5									0.64	0.45	18.18
<i>Heliotropium polyphyllum</i>	5			5	15							2.27	1.61	27.27
<i>Andropogon glomeratus</i>		30						10				3.64	2.58	18.18
<i>Stillingia aquatica</i>				5	5	20	30	40	40	50		17.27	12.24	63.64
<i>Setaria geniculata</i>					5			15		15		3.18	2.26	27.27
<i>Eliocharis interstincta</i>						15						1.36	0.97	9.09
<i>Fuirena</i> spp.							5					0.45	0.32	9.09
TOTAL												141.09		

00oct2b

TABLE 10
Slough 2 - Transect C
(east to west)

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	90	30	50	20	80	30	85	50	50	50	60	80	80	58.08	48.87	100.00
<i>Lachnocaulon</i> spp.						5								0.38	0.32	7.69
<i>Eragrostis</i> spp.		30			30	25		15		40	10			11.54	9.71	46.15
<i>Panicum erectifolium</i>			20	40		10		5		10			30	8.85	7.44	46.15
<i>Hypericum fasciculatum</i>				40				40	5					6.54	5.50	23.08
<i>Lachnocaulon</i> spp.										5				0.38	0.32	7.69
<i>Hyptis alata</i>													5	0.38	0.32	7.69
<i>Eleocharis cellulosa</i>			20		15		30	20	15		15			8.85	7.44	46.15
<i>Amphicarpum muhlenbergianum</i>							10							0.77	0.65	7.69
<i>Fuirena</i> spp.	5												5	0.77	0.65	15.38
<i>Andropogon glomeratus</i>		60							30		10			7.69	6.47	23.08
<i>Heliotropium polyphyllum</i>		15	5		5									1.92	1.62	23.08
<i>Stillingia aquatica</i>			5	10										1.15	0.97	15.38
<i>Dicromena colorata</i>					5									0.38	0.32	7.69
<i>Flaveria</i> spp.						40			15					4.23	3.56	15.38
<i>Panicum</i> spp.						20			20					3.08	2.59	15.38
<i>Setaria geniculata</i>								5					5	0.77	0.65	15.38
<i>Rhynchospora tracyi</i>				10	15						5		10	3.08	2.59	30.77
TOTAL														118.85		

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TABLE 11
Slough 2 - Transect D
(north to south)
(pg. 1 of 2)

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	% Cover	Rel. Dom	Frequency
<i>Aristida stricta</i>	80		15	10	10		40	30	70	20	80	50	95	70	80	43.33	33.42	86.67
<i>Andropogon glomeratus</i>				40	15	30		30	30	15	30	30				14.67	11.31	53.33
<i>Eragrostis spp.</i>			15	10			20					20		10	20	6.33	4.88	40.00
<i>Hypericum fasciculatum</i>					15			10								1.67	1.29	13.33
<i>Flaveria linearis</i>				5	5	20				15						3.00	2.31	26.67
<i>Hypericum myrtifolium</i>		5	15						5							1.67	1.29	20.00
<i>Panicum erectifolium</i>	25	90	20	80	70	90	40	15	15		30	30	20	15	15	37.00	28.53	93.33
<i>Eriocaulon decangulare</i>										10						0.67	0.51	6.67
<i>Oxypolis filiformis</i>	5															0.33	0.26	6.67
<i>Rhynchospora tracyi</i>														15		1.00	0.77	6.67
<i>Setaria geniculata</i>									5							0.33	0.26	6.67
<i>Stillingia aquatica</i>	15											5		15	15	3.33	2.57	26.67
<i>Heliotropium polyphyllum</i>	5						15	20				20	10	15	30	7.67	5.91	46.67
<i>Eliocharis interstincta</i>			5							20			20			3.00	2.31	20.00
<i>Lachnocaulon anceps</i>			10				10									1.33	1.03	13.33
<i>Panicum spp.</i>							10			10	20			10	15	4.33	3.34	33.33
SUBTOTAL																129.67		

TABLE 11

Slough 2 - Transect D

(north to south)

(pg 2 of 2)

Species	16	17	18	19	20	21	22	23	24	25	26	27	28	29	% Cover pg 1	% Cover pg 2	Total % Cov	Rel. Dom.	Freq. pg 1	Freq pg 2	Total Freq.
<i>Aristida stricta</i>	60	60	25	20	90	70	100	90	20	60	80	60	60		43.33	56.79	100.12	51.83	86.67	92.86	179.53
<i>Bacopa monnieri</i>														60	0.00	4.29	4.29	2.22	0.00	7.14	7.14
<i>Hyptis alata</i>											5				0.00	0.36	0.36	0.18	0.00	7.14	7.14
<i>Flaveria linearis</i>														20	3.00	1.43	4.43	2.29	26.67	7.14	33.81
<i>Iva microcephala</i>												40	50		0.00	6.43	3.21	1.66	0.00	14.29	7.14
<i>Panicum spp.</i>		15													0.00	1.07	0.54	0.28	0.00	7.14	3.57
<i>Andropogon glomeratus</i>	15	30	20	60	15	20	20	20			5			15	14.67	15.71	15.19	7.86	53.33	71.43	62.38
<i>Panicum erectifolium</i>			40		30	20		10	20	30	15		15		37.00	12.86	24.93	12.90	93.33	57.14	75.24
<i>Eragrostis spp.</i>	15	10	40	10	30			20	40	50		40		30	6.33	20.36	13.34	6.91	40.00	71.43	55.71
<i>Setaria geniculata</i>			40		5			5	50			5		50	0.33	11.07	5.70	2.95	6.67	42.86	24.76
<i>Stillingia aquatica</i>	5			15						5		10	40		3.33	5.36	4.34	2.25	26.67	35.71	31.19
<i>Heliotropium polyphyllum</i>	40	20		15			10	5		10	30	10			7.67	10.00	8.84	4.57	46.67	57.14	51.91
<i>Panicum spp.</i>														20	4.33	1.43	2.88	1.49	33.33	7.14	20.24
<i>Mikania scandens</i>					5										0.00	0.36	0.18	0.09	0.00	7.14	3.57
<i>Hypericum fasciculatum</i>															1.67	0.00	0.84	0.43	13.33	0.00	6.67
<i>Hypericum myrtifolium</i>															1.67	0.00	0.84	0.43	20.00	0.00	10.00
<i>Eriocaulon decangulare</i>															0.67	0.00	0.34	0.17	6.67	0.00	3.34
<i>Oxypolis filiformis</i>															0.33	0.00	0.17	0.09	6.67	0.00	3.34
<i>Rhynchospora tracyi</i>															1.00	0.00	0.50	0.26	6.67	0.00	3.34
<i>Eliocharis interstincta</i>															3.00	0.00	1.50	0.78	20.00	0.00	10.00
<i>Lacnocaulon anceps</i>															1.33	0.00	0.67	0.34	13.33	0.00	6.67
TOTAL															129.66	147.50	193.17				

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TABLE 12
Slough 2 - Transect E
(north to south)

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	20	60	60	15	15	20	20	70	70	15	10			10	27.50	20.84	85.71
<i>Hyptis alata</i>		15			15	5									2.50	1.89	21.43
<i>Andropogon glomeratus</i>			30								30	60	60		12.86	9.75	28.57
<i>Xyris elliotii</i>		5													0.36	0.27	7.14
<i>Flaveria</i> spp.	15	5		10			20							15	4.64	3.52	35.71
<i>Lachnocaulon anceps</i>		25								10	15			5	3.93	2.98	28.57
<i>Iva microcephala</i>		10								10					1.43	1.08	14.29
<i>Hypericum fasciculatum</i>			25	15		5	5					5	5	10	5.00	3.79	50.00
<i>Eragrostis</i> spp.	20			30	30	60	30	20	15		30	40	30	40	24.64	18.68	78.57
<i>Eliocharis cellulosa</i>			5					5	20						2.14	1.62	21.43
<i>Bacopa monnieri</i>					50	25					30	15	30	40	13.57	10.29	42.86
<i>Oxypolis filiformis</i>											5			5	0.71	0.54	14.29
<i>Panicum erectifolium</i>	30	20	20		10	10	30	60	30	15		30	25	5	20.36	15.43	85.71
<i>Stillingia aquatica</i>	5			5				5	5					5	1.79	1.35	35.71
<i>Heliotropium polyphyllum</i>	5						5			15					1.79	1.35	21.43
<i>Paspalum distichum</i>		25													1.79	1.35	7.14
<i>Eriocaulon</i> spp.			30				5								2.50	1.89	14.29
<i>Erigeron</i> spp.				2	5			5							0.86	0.65	21.43
<i>Panicum</i> spp.							20								1.43	1.08	7.14
<i>Setaria geniculata</i>								15							1.07	0.81	7.14
<i>Fuirena</i> spp.							5								0.36	0.27	7.14
<i>Hypericum myrtifolium</i>											10				0.71	0.54	7.14
TOTAL															131.93		

TABLE 13
Slough 3 - Transect B
(north to south)

Species	1	2	3	4	5	6	7	8	9	10	11	% Cover	Rel. Dom.	Freq.
<i>Aristida stricta</i>	25	15				10	15	90	70	70	70	33.18	27.44	72.73
<i>Panicum erectifolium</i>										40		3.64	3.01	9.09
<i>Ludwigia repens</i>					10							0.91	0.75	9.09
<i>Fuirena</i> spp.											10	0.91	0.75	9.09
<i>Flaveria</i> spp.					5							0.45	0.38	9.09
<i>Panicum</i> spp.		80	50	5	5	40	75	10	25		60	31.82	26.32	81.82
<i>Eleocharis cellulosa</i>										15		1.36	1.13	9.09
<i>Cyperus</i> spp.	60						40	30	15	15		14.55	12.03	45.45
<i>Eragrostis</i> spp.		20				70			25	40		14.09	11.65	36.36
<i>Andropogon glomeratus</i>					30							2.73	2.26	9.09
<i>Iva microcephala</i>	10			50	40							9.09	7.52	27.27
<i>Rhynchospora tracyi</i>									5			0.45	0.38	9.09
<i>Hypericum fasciculatum</i>										10		0.91	0.75	9.09
<i>Eupatorium capillifolium</i>			5					10				1.36	1.13	18.18
<i>Erigeron</i> spp.			5		5							0.91	0.75	18.18
<i>Heliotropium polyphyllum</i>				5	10							1.36	1.13	18.18
<i>Andropogon glomeratus</i>							15					1.36	1.13	9.09
<i>Setaria geniculata</i>									10			0.91	0.75	9.09
<i>Stillingia aquatica</i>									10			0.91	0.75	9.09
TOTAL												120.91		

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TABLE 14

Slough 3 - Transect C

(south to north)

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	% Cover	Rel. Dom.	Freq.			
Setaria geniculata																								5	0.22	0.14	4.35		
Andropogon glomeratus								25	60		40						40	50		20		15			10.87	7.14	30.43	34.78	
Stillingia aquatica												15												5	0.87	0.57	8.70	13.04	
Iva microcephala																				30	15	80	30		6.74	4.43	17.39	21.74	
Lachnocaulon anceps												40			30	30	30	40	15						8.04	5.28	26.09	30.43	
Ludwigia repens					30	20	20						20	30	40											6.96	4.57	26.09	30.43
Nymphoides aquatica				10			15						15	15	5											2.61	1.71	21.74	26.09
Rhynchospora tracyi	25																									1.09	0.71	4.35	4.35
Hyptis alata	5							20										5								1.30	0.86	13.04	13.04
Panicum erectifolium								20		30										15	40		20	20		6.30	4.14	26.09	30.43
Panicum hians				30									80	80	60	50										13.04	8.57	21.74	26.09
Hypericum fasciculatum		15	30					20	5	15	15	40			30	40	25	25								11.30	7.42	47.83	52.17
Panicum virgatum											20															0.87	0.57	4.35	8.70
Fuirena spp.			50					40		20					30		30					15				8.04	5.28	26.09	30.43
Bacopa caroliniana		50	20					40	60	80	70	40				40			40		10					19.57	12.85	43.48	47.83
Rhynchospora tracyi			2																							0.09	0.06	4.35	8.70
Xyris caroliniana																						5				0.22	0.14	4.35	8.70
Utricularia spp.				50	30	20							30	50	25											8.91	5.85	26.09	30.43
Panicum hemitomon				50	50	50	80																			10.00	6.57	17.39	21.74
Pontedaria cordata					50	60	30																			6.09	4.00	13.04	17.39
Eliocharis cellulosa		20									30							30	60	40	25					8.91	5.85	26.09	30.43
Myrica cerifera	10																									0.43	0.29	4.35	4.35
Eragrostis spp.	30	10																	15		15					3.04	2.00	17.39	17.39
Erigeron spp.		5	25													30										2.61	1.71	13.04	17.39
Eriocaulon spp.		20						25										30								3.26	2.14	13.04	17.39
Panicum spp.		30	15							15										30	15		15			5.22	3.43	26.09	30.43
Heliotropium polyphyllum									5													5	5			0.65	0.43	13.04	17.39
Flaveria linearis																					20					0.87	0.57	4.35	8.70
Oxypolis filiformis			15														20									1.52	1.00	8.70	13.04
Cladium jamaicense																							40			1.74	1.14	4.35	8.70
Aristida stricta																							20			0.87	0.57	4.35	8.70
TOTAL																										152.26			

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Wetland Restoration Areas

