



Jeb Bush  
Governor

# Department of Environmental Protection

Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

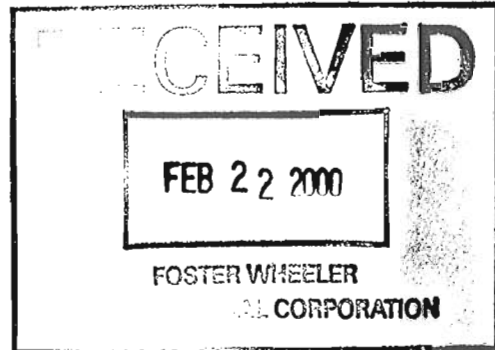
David B. Struhs  
Secretary

## CERTIFIED MAIL - RETURN RECEIPT REQUESTED

February 18, 2000

Mr. James R. Jackson  
Foster Wheeler Environmental Corporation  
759 S. Federal Highway, Suite 100  
Stuart, Florida 34994

Dear Mr. Jackson:



Enclosed is Mitigation Bank Permit, Permit No. 0140969-001 issued pursuant to Part IV of Chapter 373, Florida Statutes, and Title 62, Florida Administrative Code. Because minor changes have been incorporated into the final permit since the draft permit issuance was published, the Department has determined that additional public notice is required. Therefore, you (the applicant) are required to publish at your own expense the enclosed Notice of Permit Issuance. The notice is to be published one time within 30 days, in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this requirement, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the three counties where the activity and service area occurs. The applicant shall provide proof of publication to:

Department of Environmental Protection  
Bureau of Submerged Land and Environmental Resources  
MS 2500  
2600 Blair Stone Road  
Tallahassee, Florida 32399

The proof of publication shall be provided to the above address within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time shall be grounds for revocation of the permit.

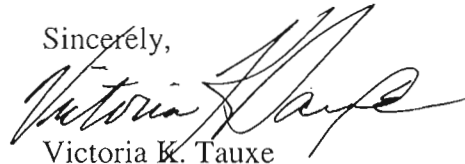
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**Notice of Final Permit**  
**Loxahatchee Mitigation Bank**  
**Permit No. 0140969-001**  
**Page 2**

The permit contains conditions that must be met when permitted activities are undertaken. Please review this document carefully to ensure compliance with both the general and specific conditions contained herein. If you have any questions about the document, please contact me at 850-921-9594.

Sincerely,

A handwritten signature in black ink, appearing to read 'Victoria K. Tauxe', written over a horizontal line.

Victoria K. Tauxe

Bureau of Submerged Lands and  
Environmental Resources

cc:

M. B. Adelson, DEP, Office of General Counsel  
Mary Murphy, DEP Southeast District  
Tori Agramonte, US Army Corps of Engineers, Vero Beach  
Spencer Simon, USFWS, Vero Beach  
Brad Rieck, EPA, West Palm Beach  
Rob Robbins, SFWMD, West Palm Beach  
John Wrublik, Florida Game and Freshwater Fish Commission, Vero Beach  
Eric Myers, Broward County Commission  
Richard Walesky, Palm Beach County Dept. of Environmental Management  
Martin County Board of Commissioners  
File



Jeb Bush  
Governor

# Department of Environmental Protection

Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

David B. Struhs  
Secretary

## MITIGATION BANK PERMIT

### PERMITTEE:

Foster Wheeler Environmental Corporation  
759 South Federal Highway  
Suite 100  
Stuart, FL 34994-2936

Permit Number: 0140969-001  
Date of Issue: February 18, 2000  
Expiration Date: Perpetual  
County: Palm Beach  
Project: Loxahatchee Mitigation Bank

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This permit is issued under the authority of Part IV of Chapter 373, F.S., and Title 62, Florida Administrative Code (F.A.C.). The activity is not exempt from the requirement to obtain an Environmental Resource Permit. Pursuant to Operating Agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity.

This permit also constitutes certification of compliance with water quality standards under Section 404 of the Clean Water Act, 33 U.S.C. 1344.

A copy of this authorization also has been sent to the U.S. Army Corps of Engineers (USACOE) for review. The USACOE may require a separate permit. Failure to obtain this authorization prior to construction could subject you to enforcement action by that agency. You are hereby advised that authorizations also may be required by other federal, state, and local entities. This authorization does not relieve you from the requirements to obtain all other required permits and authorizations.

The above named permittee is hereby authorized to construct the work shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof. **This permit is subject to the limits, conditions, and locations of work shown in the attached drawings, and is also subject to the attached General Conditions and Specific Conditions, which are a binding part of this permit.** You are advised to read and understand these drawings and conditions prior to commencing the authorized activities, and to ensure the work is conducted in conformance with all the terms, conditions, and drawings. If you are utilizing a contractor, the contractor also should read and understand these drawings and conditions prior to commencing the authorized activities. Failure to comply with all drawings and conditions shall constitute grounds for revocation of the permit and appropriate enforcement action.

Operation of the facility is not authorized except when determined to be in conformance with all applicable rules and with the general and specific conditions of this permit, as specifically described below.

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### **PROJECT DESCRIPTION:**

This permit authorizes Foster Wheeler Environmental Corporation to establish a mitigation bank on 1,264 acres in Palm Beach County, which will be known as the Loxahatchee Mitigation Bank. The permittee is under contract with the South Florida Water Management District (SFWMD) who owns the necessary property and easements, and will assume the long-term maintenance. The project is designed to enhance degraded Everglades mosaic habitat by constructing perimeter levees with water control structures to improve hydrology and water quality, by eradicating exotic and nuisance vegetation, and by establishing a long-term management program, including prescribed fires. The work to be implemented under this permit is to be used as mitigation for future wetland impacts to herbaceous and forested systems typical of historic or disturbed Everglades mosaic habitat within the service area. Additionally, Foster Wheeler Environmental Corporation has entered into an agreement with Broward County that governs the use of the Bank in Broward County. The bank is allocated 524.3 herbaceous and 123.2 forested freshwater credits, for a total of 647.5 credits.

### **PROJECT LOCATION:**

The activity is located in Palm Beach County, approximately 1 mile west of U.S. 441, between S.R 806 (Atlantic Ave.) and S.R. 808 (Glades Rd.), directly east of the Loxahatchee National Wildlife Refuge, Sections 14, 23, 26 and 35, Township 46 South and Range 41 East, and Section 2, Township 47 South and Range 41 East, Class III Waters (Figure 1).

### **GENERAL CONDITIONS:**

1. All activities authorized by this permit shall be implemented as set forth in the plans, specifications and performance criteria as approved by this permit. Any deviation from the permitted activity and the conditions for undertaking that activity shall constitute a violation of this permit and Part IV, Chapter 373, F.S.
2. During construction, this permit or a copy thereof, complete with all conditions, attachments, exhibits, and modifications shall be kept at the work site of the permitted activity. The complete permit shall be available for review at the work site upon request by the Department staff. The permittee shall require the contractor(s) to review the complete permit prior to commencement of the activity authorized by this permit.
3. Activities approved by this permit shall be conducted in a manner which does not cause violations of state water quality standards. The permittee shall implement best management practices for erosion and pollution control to prevent violation of state water quality standards. Temporary erosion control shall be implemented prior to and during construction, and permanent control measures shall be completed within 7 days after completion of any construction activity.

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Turbidity barriers shall be installed and maintained at all locations where the possibility of transferring suspended solids into the receiving waterbody exists due to the permitted work. Turbidity barriers shall remain in place at all locations until construction is completed and soils are stabilized and berm vegetation has been established. All practices shall be in accordance with the guidelines and specifications described in Chapter 6 of the Florida Land Development Manual; A Guide to Sound Land and Water Management (Department of Environmental Regulation, 1988), unless a project-specific erosion and sediment control plan is approved under this permit. Thereafter the permittee shall be responsible for the removal of the barriers. The permittee shall correct any erosion or shoaling that causes adverse impacts to the water resources.

4. The permittee shall notify the Department of the anticipated construction start date within 30 days of the date that this permit is issued. At least 48 hours prior to commencement of activity authorized by this permit, the permittee shall submit to the Department an "Environmental Resource Permit Construction Commencement" notice (Form No. 62-343.900(3), F.A.C.) indicating the actual start date and the expected completion date.

5. When the duration of construction will exceed one year, the permittee shall submit construction status reports to the Department on an annual basis utilizing an "Annual Status Report Form" (Form No. 62-343.900(4), F.A.C.). Status Report Forms shall be submitted the following June of each year.

6. Within 30 days after completion of construction of the permitted activity, the permittee shall submit a written statement of completion and certification by a registered professional engineer or other appropriate individual as authorized by law, utilizing the supplied "Environmental Resource Permit As-Built Certification by a Registered Professional" (Form No. 62-343.900(5), F.A.C.). The statement of completion and certification shall be based on on-site observation of construction or review of as-built drawings for the purpose of determining if the work was completed in compliance with permitted plans and specifications. This submittal shall serve to notify the Department that the system is ready for inspection. Additionally, if deviation from the approved drawings are discovered during the certification process, the certification must be accompanied by a copy of the approved permit drawings with deviations noted. Both the original and revised specifications must be clearly shown. The plans must be clearly labeled as "as-built" or "record" drawing. All surveyed dimensions and elevations shall be certified by a registered surveyor.

7. The operation phase (identified in Specific Condition 13 as the completion of construction and submittal of the "as-built" report) of this permit shall not become effective: until the permittee has complied with the requirements of condition (6) above, has submitted a "Request for Transfer of Environmental Resource Permit Construction Phase to Operation Phase" (Form No. 62-343.900(7), F.A.C.), and the Department determines the system to be in compliance with the permitted plans and specifications.

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8. Each phase or independent portion of the permitted system must be completed in accordance with the permitted plans and permit conditions prior to the initiation of the permitted use of site infrastructure located within the area served by that portion or phase of the system.

9. General Condition 9 is not applicable and has been omitted from this permit because the permittee will also be the entity managing the operational phase of the permit. It is retained here only as a placeholder to be consistent with adopted General Condition numbering.

10. Should any other regulatory agency require changes to the permitted system, the permittee shall notify the Department in writing of the changes prior to implementation so that a determination can be made whether a permit modification is required.

11. This permit does not eliminate the necessity to obtain any required federal, state, local and special district authorizations prior to the start of any activity approved by this permit. This permit does not convey to the permittee or create in the permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the permittee, or convey any rights or privileges other than those specified in the permit and Chapter 40E-4 or Chapter 40E-40, F.A.C.

12. The permittee is hereby advised that Section 253.77, F.S. states that a person may not commence any excavation, construction, or other activity involving the use of sovereign or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund without obtaining the required lease, license, easement, or other form of consent authorizing the proposed use. Therefore, the permittee is responsible for obtaining any necessary authorizations from the Board of Trustees prior to commencing activity on sovereignty lands or other state-owned lands.

13. The permittee is advised that the rules of the South Florida Water Management District require the permittee to obtain a water use permit from the South Florida Water Management District prior to construction dewatering, unless the work qualifies for a general permit pursuant to subsection 40E-20.302(4), F.A.C., also known as the "No Notice" rule.

14. The permittee shall hold and save the Department harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any system authorized by the permit.

15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered binding unless a specific condition of this permit or a formal determination under section 373.421(2), F.S., provides otherwise.

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16. The permittee shall notify the Department in writing within 30 days of any sale, conveyance, or other transfer of ownership or control of a permitted system or the real property on which the permitted system is located. All transfers of ownership or transfers of a permit are subject to the requirements of section 62-343.130, F.A.C. The permittee transferring the permit shall remain liable for corrective actions that may be required as a result of any violations prior to the sale, conveyance or other transfer of the system.

17. Upon reasonable notice to the permittee, Department authorized staff with proper identification shall have permission to enter, inspect, sample and test the system to insure conformity with the plans and specifications approved by the permit.

18. If historical or archaeological artifacts are discovered at any time on the project site, the permittee shall immediately notify the appropriate Department office.

19. The permittee shall immediately notify the Department in writing of any previously submitted information that is later discovered to be inaccurate.

## **SPECIFIC CONDITIONS:**

### **General**

1. The permittee is hereby advised that Florida law states: "No person shall commence any excavation, construction, or other activity involving the use of sovereign or other lands of the state, title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund or the Department of Environmental Protection under Chapter 253, until such person has received from the Board of Trustees of the Internal Improvement Trust Fund the required lease, license, easement, or other form of consent authorizing the proposed use." Pursuant to Florida Administrative Code Rule 18-14, if such work is done without consent, or if a person otherwise damages state land or products of state land, the Board of Trustees may levy administrative fines of up to \$10,000 per offense.

2. If historical or archaeological artifacts, such as Indian canoes, are discovered at any time within the project site the permittee shall immediately notify the district office and the Bureau of Historic Preservation, Division of Historical Resources, R. A. Gray Building, 500 S. Bronough St., Tallahassee, Florida 32399-0250.

### **Commencement requirements**

3. At least 48 hours prior to commencement of work authorized by this permit, the permittee shall notify the Department of Environmental Protection, Bureau of Submerged Lands and Environmental Resources, MS 2500, 2600 Blair Stone Road, Tallahassee, Florida 32399, and

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the Southeast District Office, P.O. Box 15425, West Palm Beach, FL 33416-5425 in writing of this commencement.

4. Unless otherwise specified, all reports and other information required for this permit shall be submitted to the Florida Department of Environmental Protection, Bureau of Submerged Lands and Environmental Resources, MS 2500, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

5. The permittee shall not commence any construction activities authorized by this permit until the following requirements are completed and the Department has been notified in writing:

- a. A copy of the recorded clerk-of-the-court certified Conservation Easement has been received by the Department as required in Specific Condition 8;
- b. A Qualified Mitigation Supervisor is retained as required in Specific Condition 7; and
- c. Proof of financial responsibility is obtained as required in Specific Condition 9.

6. This mitigation bank permit shall automatically expire five years from the date of issuance if the permittee has not started the permitted restoration construction in accordance with the permit requirements or has not obtained an extension for start of restoration construction under DEP Rule 62-343.110(1)(c) F.A.C. Except as provided above, this mitigation bank permit shall be perpetual unless revoked or modified.

7. Project Oversight. Prior to commencement of any construction activities, the permittee shall retain a Qualified Mitigation Supervisor (QMS) (a person or persons) to oversee all aspects of mitigation bank site implementation, management, monitoring, and corrective actions in this permit until final success criteria are met.

- a. The QMS shall have the responsibility to ensure that the mitigation bank work is conducted in accordance with the permit.
- b. Not less than 45 days prior to commencing any construction and/or eradication activities authorized in this permit, the permittee shall submit the name of the QMS retained to oversee the mitigation work and provide supporting documentation demonstrating that the QMS is qualified to oversee this work. The QMS must be approved by the Department prior to commencement of the mitigation bank work. The Department shall complete such approval within 30 days of receipt of a written request from the permittee for QMS approval. If the Department does not inform the permittee within that 30 day period that the proposed QMS is denied, then the proposed QMS shall be deemed approved.



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c. Within 30 days of the discharge of any approved QMS, the permittee shall submit the name and supporting documentation of a new QMS to the Department for its review and approval.

d. The permittee shall have the approved qualified QMS review the conditions of this permit that pertain to environmental improvement. The purpose of this review is to ascertain whether any criteria need to be modified to ensure ecological success. If the Department concurs that any proposed modifications would improve the likelihood of mitigation success, these changes shall be incorporated into this permit as a minor modification.

8. Protection and Preservation. Prior to any construction activities or release of credits, the SFWMD property on which the Loxahatchee Mitigation Bank is to be implemented shall be preserved and protected in accordance with a conservation easement granted to the Department. A copy of the draft language to be used for this conservation easement is contained in the permit application file (see Draft Mitigation Banking Instrument, April 1999).

The permittee shall also provide the following with the recorded conservation easement:

- a. A title insurance policy updated to the date of conveyance.
- b. Subordination, release, or joinder agreements for any lien on the property, as identified by the Title Commitment, unless such lien does not adversely affect the ecological viability of the Bank (Rule 62-342.650 F.A.C.).
- c. Legal descriptions and sketches of the conservation easement certified by a Florida registered land surveyor.
- d. A clerk-of-the-court certified copy of the conservation easement.

9. Financial Assurance. The permittee shall provide the Department with the financial responsibility mechanisms required by Rule 62-342.700 F.A.C. (September 12, 1995). The permittee shall secure financial assurance for construction activities, monitoring, maintenance and reporting prior to success, and long-term management activities after the bank has reached success.

- a. The permittee shall establish the financial assurance for the construction and implementation at least 60 days prior to initiation of construction. This assurance shall be in the form of a surety bond (Bond 1) in the amount of \$4.5 million, payable into a contemporaneously established Standby Trust Account. The amount of Bond 1 is based on the estimated costs for construction, monitoring and maintenance prior to success. The permittee may request, and the Department will grant, a partial reduction in the amount of the construction assurance after the successful completion of construction and initial exotic eradication activities. The permittee may request, and the Department will grant, a release from its construction financial assurance obligation upon the

determination that the bank has reached success criteria and the long-term management has been properly funded.

b. The permittee shall establish the financial assurance for long-term management at least 60 days prior to the withdrawal of credits (Rule 62-342.700(5)(c), F.A.C.). This assurance shall be in the form of a surety bond (Bond 2) and the contemporaneous establishment of a standby trust to receive payments from Bond 2. The standby trust account may be the same as that provided for in paragraph a. above. Bond 2 shall be funded in an initial amount not less than \$950,000.

All cost-estimates shall be reviewed and appropriate financial responsibility instrument adjustments shall be conducted every two years in accordance with Rule 62-342.700 (7) F.A.C. In addition, the permittee shall conduct another cost estimate during the establishment of final construction plans and accounting for any changes in construction costs required by other permits or conditions, weather, contractors costs, and other such costs. If the new cost estimate exceeds \$4.5 million by more than 5%, the financial assurances shall be adjusted accordingly prior to commencing construction.

## **Construction requirements**

### **10. Construction.**

a. Hydrologic and water quality enhancements depend on the successful construction of a perimeter berm with water control structures to retain rainfall and a bypass ditch to re-route existing runoff and agricultural discharges around the site. Figure 4 provides an overview of the proposed hydrological enhancements. Figure 5 indicates the temporary and permanent construction activities planned to restore hydrology. Engineering details of these improvements are provided in Figures 6, Key and Sheets A-G.

Prior to release of final retained credits for construction and initial eradication activities under Specific Condition 18, the temporary construction features, which include a 20,000-square-foot office/storage pad, shall be removed and revegetated. Permanent construction to implement the designed hydrologic improvements includes the following elements (beginning at the upper right corner of Figure 6-Key and moving clockwise):

i. Construct one control structure and one emergency discharge structure on the western bank of the E-1W-N. The control structure will regulate the project site water levels in the North parcel at an elevation of 15.5' NGVD. The emergency control structure, set at 17' NGVD, is designed to "fail" in the event of a 100-year or greater storm in order to protect the integrity of the rest of the berm (Details 3 and 4, Fig. 6-G).

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- ii. Improve the western bank of the E-1W-N (northeastern boundary of the bank) to a minimal elevation of 18' NGVD. Extend a soil cement berm, constructed to elevation 18' NGVD, westward from the northern boundary of this E-1W-N bank improvement to intersect with Levee 40 (Figs. 6-E and 6-F; and cross sections D-1 and D-2, Fig.6-H).
  - iii. Construct one control structure in the new berm in the northeast corner of the Southeast Parcel. This control structure will regulate the project site water levels in the South and Southeast Parcels at elevation 15.5' NGVD (Fig 6-D; Detail 2 on Fig. 6-G).
  - iv. Construct a soil-cement berm around the eastern and southern boundaries of the Southeast Parcel (Fig 6-C, cross sections C1 and C2, Fig 6-G).
  - v. Construct a 36 ft. wide levee (berm) along the eastern and southern boundaries of the South Parcel (Figs. 6-A - 6-C, cross sections A1, A2, B1, B2 on Fig 6-F – 6-G).
  - vi. Construct a bypass drainage ditch system to collect runoff and agricultural discharge of adjacent property owners and re-route it along the eastern and southern boundaries of the South Parcel (Figs. 6-A - 6-C, cross sections A1, A2, B1, B2 on Fig 6-F and 6-G). The northern portion of the constructed bypass ditch will connect to the Lake Worth Drainage District (LWDD) Lateral-40 and the southern portion of the constructed bypass ditch will connect the Lateral-40 to the E-1W-S canal (see Details, Fig 6-G).
  - vii. Install erosion protection where pumped agricultural discharge water will discharge into the LWDD Lateral-40 (Fig 6-A).
  - viii. Construct one emergency discharge structure along the southern border of the South Parcel designed to “fail” in the event of a 100-year or greater storm in order to protect the integrity of the rest of the berm (Detail 1, Fig 6-F).
  - ix. Improve the access road adjacent to E-1W-S to a graded elevation of 19.5' NGVD sloping to 18' NGVD with an inboard swale, and improve the access road adjacent to L-36½ to an elevation of 18' NGVD (Figs. 6-A – 6-C, sections Fig 6-G).
  - x. Construct a soil cement berm with a minimum elevation of 18' NGVD to provide a southern barrier to the North Parcel and to protect the LWDD's Horticultural Disposal Area (Fig. 6-D).
  - xi. Remove the road and side ditches that traverse the South Parcel (Fig. 6-C).
  - xii. Plant areas where necessary with appropriate vegetation in accordance with planting procedures defined in Attachment C and Figure 12.
- b. In addition to the hydrologic improvements, the following habitat enhancements are proposed and shall be implemented as described.

- i. Install appropriate security measures around the perimeter of the Loxahatchee Mitigation Bank site in accordance with the plan in Attachment G.
- ii. "Mudflat" habitat will be constructed according to Figure 3 and Figures 7-8 by scraping the topsoil to create a shallow depression that will retain water longer than the surrounding wetlands and discourage emergent vegetation.
- iii. Shallow depression channels are proposed throughout the site for aquatic fauna refugia and to promote water flow within the site. These drainages are shown typically in Figures 3 and 9, and are to be constructed by compressing soils connecting existing low areas with heavy equipment, rather than by dredging.
- iv. In order to better stabilize the berm and discourage exotic plant invasion along the berm area, berm slopes and setback areas shall be planted with appropriate vegetation. The QMS shall be responsible for determining the appropriate type and location for transitional tree, shrub and groundcover species plantings within the following guidelines. Trees and shrubs are to be planted on a minimum of 7.5' centers; groundcover species on a minimum of 3' centers. The primary transitional vegetation shall be wax myrtle, red maple, dahoon holly, button bush, green buttonwood, live oak and fern species capable of surviving the site conditions.
- v. At least 10 Wood Stork and 3 Osprey nesting platforms shall be erected in locations determined by the QMS.

c. Within 30 days after construction activities are successfully completed in any parcel, the permittee shall submit "as-built" engineering drawings of the perimeter berm and control structures, the by-pass ditch, and the habitat enhancements, as appropriate for the subject parcel(s). These drawings shall be signed and sealed by an engineer registered in the State of Florida. The "as-builts" shall be submitted consistent with General Condition 6. Additionally, this submittal shall be accompanied by a written statement from the QMS summarizing the construction activities and testifying that, within his/her supervision, those activities were conducted in accordance with permit drawings and conditions or indicating why, when, and where any construction plans were altered.

After submittal of the as-built report, the permittee shall arrange a post-construction site visit including the Department, the QMS, the construction engineer, if possible, and any MBRT members that are available to inspect the construction, review the permit drawings and conditions, and discuss the next management/compliance activities. The permittee shall submit a summary of the site visit for the file to facilitate future compliance reviews.

11. Turbidity controls. Best management practices for the control of turbidity and erosion shall be implemented during all work on site. Prior to the start of the construction, all dredge and fill areas shall be delimited by erosion control and/or turbidity barriers. Particular attention shall be

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paid to the bank boundaries adjacent to the E-1W-N, the L36 ½, and the E-1W-S canals where perimeter berms are being constructed. The erosion and turbidity control measures shall be inspected regularly and turbidity monitored in accordance with Specific Condition 23 until work has been completed to ensure that water quality standards are not violated.

The berm shall be constructed using a clean fill source of appropriate particle size, free of exotic and nuisance vegetation, and shall be stabilized within 48 hours of attaining final grades and at any other time necessary to prevent erosion, siltation and turbid discharges in violation of state water quality standards in waters of the state. Specifications for berm construction shall be submitted to the Department for review at least 30 days prior to start of berm construction.

The following measures shall be taken by the permittee whenever construction activities result in turbidity levels within waters of the state surrounding the project site exceed state water quality standards pursuant to Rule 62-302, F.A.C.:

- a. Immediately cease all work contributing to the exceedence of the water quality standard.
- b. Modify the work procedures that were responsible for the exceedence, install more turbidity controls if necessary, and repair any non-functioning turbidity containment devices.
- c. Notify the Bureau, 850-488-0130, and the West Palm Beach District office, 561-681-6600, within 24 hours of the time the exceedence is first detected.

12. Exotic vegetation eradication. Enhancement of wetland vegetation and wildlife habitat is dependent on both hydrologic enhancements and exotic and nuisance species control. The methods selected for initial eradication of exotic vegetation depend on the type of vegetation targeted, its location within the Bank, the cost of application, the effectiveness of the method, and the expected environmental impact. These methods, described below, are depicted graphically on Figure 10 and detailed in Attachment A.

- a. Inundation is proposed as the primary means of eradicating Brazilian pepper and other undesirable shrubs in the South and Southeast Parcels where infestation is greatest. Water shall be pumped from adjacent canals into these locations and maintained at a depth of 1.5 to 2 feet (i.e., 15.5 to 16' NGVD) for approximately 3 months. During the inundation period, the site shall be inspected every two weeks by the QMS to determine the degree of successful eradication of target species and any impacts on desirable vegetation. Upon consultation with the Department technical staff and other experts, as necessary, the QMS shall modify the depth and duration of the inundation to optimize effectiveness while minimizing negative impacts on the desired vegetation.

- b. Manual herbicide treatments (see Attachment A) and limited use of a HYDRO-AX\*, when appropriate, are proposed for initial eradication of Brazilian pepper in the North Parcel and on high ground elsewhere within the site. Use of a HYDRO-AX\* will be carefully monitored to minimize disturbance of the substrate, which could hinder restoration of the site or foster growth of cattails. This technique will be largely restricted to edges along roadways and areas where earthwork activities are proposed. If a HYDRO-AX\* is determined by the QMS to be appropriate in other areas, the substrate will be monitored for firmness and mats will be used when necessary to minimize disturbance of the soils.
- c. Herbicide treatments will also be used to eradicate any exotics and nuisance vegetation throughout the site and those that do not succumb to inundation (see Attachment A).
- d. Following initial treatment, prescribed burns will be used to control re-growth of exotic, inappropriate and invasive species, promote regeneration of native Everglades marsh plants, and restore historic slough habitats. The fire management plan to be used is depicted in Figure 11 and detailed in Attachment B.

It is expected that natural recruitment will account for most of the re-vegetation after exotic vegetation removal in most areas. However, in order to meet the vegetation cover and structure success criteria in Specific Condition 21, planting may be required in some areas. The QMS is responsible for determining the area to be planted and the types of materials to be used in order to optimize success and minimize exotic re-infestation. The re-vegetation shall be accomplished in accordance with Figure 12 and the plan detailed in Appendix C.

13. Work schedule. Completion of construction activities, attainment of success criteria and the overall release of credits are expected to occur over a five to six year period. The following sequence of activities shall be followed; however, the dates given below are relative estimates to be used as guidelines. Performing these activities before or after these dates does not constitute noncompliance with the permit, so long as the sequence is followed.

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\* HYDRO-AX is the trade name of a class of forestry machinery, including a machine designed to quickly and efficiently cut and shred plant material.

### Sequence and Estimated Timetable for Construction and Implementation

Activity	Date
File Conservation Easement	30-60 days post issuance
Establish Financial Assurance Mechanism for Construction and Implementation	30-60 days post issuance
Establish Financial Assurance Mechanism for Long-Term Management	30-60 days post issuance
Submit Pre-Construction Monitoring Report	90 days post issuance
<b>Construction and Eradication Activities</b>	
Initiate activities	3-9 months post issuance
Submit As-Built Report (by parcel)*	9-24 months post issuance
Complete Exotics Eradication (by parcel)*	9-24 months post issuance
<b>Short-Term Monitoring and Maintenance Period</b>	
Submit Time Zero Report (after completion of entire bank construction)	~fall 2000/2001
Submit First Annual Report (one year after time-zero report)	~fall 2001/2002
Submit Second Annual Report	~fall 2002/2003
Submit Third Annual Report	~fall 2003/2004
Submit Fourth Annual Report	~fall 2004/2005
Submit Fifth Annual Report	~fall 2005/2006
Demonstrate Success Attainment	~fall 2005/2006
<b>Start Long-Term Management Period</b>	~winter 2006

\* Initial eradication in the North Parcel may precede completion of construction in that parcel, while berm construction may be completed in the South and Southeast Parcels prior to the initial eradication.

This timetable does not presume that a success determination would occur in the fall of 2005 or 2006; it may be earlier or later. The determination will be made according to the success criteria in Specific Condition 21, not on the elapsed time since permit issuance.

### Banking Operations

14. The purpose of this permit is to authorize the permittee to implement a mitigation bank. The permittee is obligated to perform certain actions described herein. A material part of the reasonable assurances the Department is relying upon in issuing this permit is that the permittee will timely and completely implement all of the conditions in this permit. The permittee understands that its failure to completely and timely comply with all of the conditions of this permit may result in a revocation or suspension of the permit and that the release or withdrawal of mitigation credits may be suspended.

15. As specified in Rule 62-342.470(6) F.A.C., if at any time the bank is not in material compliance with the terms of this permit, no mitigation credits may be withdrawn. Mitigation credits shall again be available for withdrawal if the permittee comes back into compliance.

16. Mitigation Plan and Potential Credits. As a result of the authorized habitat restoration, enhancement, and preservation activities (Figure 3), the Loxahatchee Mitigation Bank will be comprised of the following wetland community types and features of approximately these acreages:

ACREAGES				
Dominant Cover	North Parcel	South Parcel	Southeast Parcel	Total
Freshwater Marsh	194.7	638.1	68.8	901.6
Coastal Plain Willow	14.2	61.9	0	76.1
Cypress	0	83.9	0	83.9
Pond Apple	0.3	19.9	0	20.2
Red Maple Mixed	56.5	59.8	26.5	142.8
Access Roads	0	6.5	0	6.5
Berms & 15' Setback	2.7	14.6	2.6	19.9
Ditches/Canals	0	13.0	0	13.0
<b>TOTAL</b>	<b>268.4</b>	<b>897.7</b>	<b>97.9</b>	<b>1264.0</b>

The total number of potential of credits was determined by the M-WRAP\* methodology based on these acreages, and Mitigation Bank Suitability Index (MBSI), with calculations detailed in Attachments D and E. This methodology accounted for impacts (berm and by-pass ditch construction) to the existing wetland acreage within the bank boundaries and within adjacent easement areas, as well as for the bank's proposed wetland enhancements within the property boundaries. Some adjustments to the final acreages may be required based on information from the final conservation easement survey and the final construction "as-builts." Should changes occur that would affect the potential total number of credits, the permittee shall request a minor modification to the permit. Since these numbers are expected to be minimal, the change in credits would be incorporated into the final credit release.

The 647.5 total credits for the bank are allocated as 524.3 freshwater herbaceous credits (marsh) and 123.2 freshwater forested credits (willow, red maple, pond apple and cypress). These credits will be released and withdrawn in accordance with Specific Conditions 18 and 19.

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\* MWRAP - Miller, R.E., Jr and B.E. Gunsalus. 1996. Modified Wetland Rapid Assessment Procedure for Mitigation Banks in Florida. Modified by the Mitigation Bank Review Team Development Workgroup. October 3, 1996 Draft. South Florida Water Management District, West Palm Beach, FL.



17. Ledger. In order to track credit releases and withdrawals, a ledger shall be kept indicating all potential, released, withdrawn and available credits. The format for the ledger, indicating potential credits, is attached as Attachment F.

18. Credit Release Schedule. Mitigation credits will be released for use according to the following Credit Release Schedule:

Credit Release Activity	Release Percent	Est. Timetable	Credits	Associated Specific Conditions
<b>Initial Credit Release</b> Conservation Easement and Financial Assurance	15%	3 months post issuance	97	8 and 9
<b>Construction Credit Releases</b> Construction Completion*	12.5%	9-24 months post issuance	81	10
Exotic Eradication*	12.5%	9-24 months post issuance	81	12
<b>Interim Success Attainment</b> Years 1 – 5 (more or less)	Up to 50%	1-5± years after issuance	324 total	22
<b>Full Success Attainment</b>	10%		64.5	21
<b>Total</b>	100%		647.5	

\* This permit provides the flexibility to release credits by parcel for construction and exotic eradication activities only, based on each parcel's percentage of the bank's total potential credits (North =14.5%, South =79%, and Southeast =6.5%). Ten percent of the construction and eradication credits will be retained until construction and initial eradication for the entire bank are completed, as shown below:

North Parcel	11 credits
South Parcel	57 credits
Southeast Parcel	5 credits
<u>Entire bank</u>	<u>8 credits</u>
<b>Total</b>	<b>81 credits</b>

The credit release timetable is for estimation purposes only. The actual credit release will be determined by when the specified activity is completed, which may be before or after the estimated date.

All credit releases shall be allocated as "herbaceous" and "forested" in the same ratio as the bank's total potential credits (0.81 herbaceous and 0.19 forested).

Whenever the permittee feels that a credit release activity has been successfully completed, it may submit a minor modification request (with fee), along with supporting documentation, for the release of the appropriate number of credits. This request shall be made in writing to the Bureau of Submerged Lands and Environmental Resources. The Department shall review the documentation, conduct a site visit to determine if the documentation is representative of on-site conditions, and perform a compliance review of the permit, prior to the issuance or denial of the minor modification to release credits. An updated ledger indicating the additional available credits shall be attached to the minor modification.

19. Mitigation Credit Withdrawal. Withdrawal of the mitigation bank credits as mitigation for wetland impacts shall be accomplished through a minor modification of this permit. Modification requests for credit withdrawal shall not require a modification fee. Modification requests shall be made in writing to the Bureau of Submerged Lands and Environmental Resources in Tallahassee. Minor modification requests shall only be submitted by the bank permittee. The modification request shall include:

- a. a complete list of all Department or Water Management District permits (or other applicable regulatory actions) that require mitigation credits from the Loxahatchee Mitigation Bank,
- b. the permit number, issue date and environmental permit processor/reviewer,
- c. an identification of the number and type of wetland credits required under each of these permits.

Minor modification approvals for credit withdrawal shall be issued only to the bank permittee. An updated mitigation bank credit ledger sheet shall be included by the Department as an attachment to each minor modification approval for credit withdrawal.

20. Mitigation Service Area. The mitigation service area (MSA) is the geographic area within which adverse impacts may be offset by the bank. The MSA for the Loxahatchee Mitigation Bank includes small portions of southern Martin County and most of Palm Beach and Broward Counties west of the US Highway 1, within the South Florida Water Management District as shown in Figure 13A. Because of the ecological importance of the Loxahatchee River and Slough (portions of which are Outstanding Florida Waters and Wild and Scenic River), an area surrounding these waterbodies has been excluded from the MSA (Figure 13B). The MSA shall have an exclusion zone consisting of the north and south forks of the Loxahatchee River to 500 feet beyond the 100 year floodplain or 50 feet beyond the landward extent of wetland (delineated according to Rule 62-340, F.A.C., effective July 1, 1994) contiguous with the Loxahatchee River, whichever is greater (Figure 13C). The exclusion zone above the 100 year floodplain shall not include isolated wetlands or historically isolated wetlands that are currently connected to the Loxahatchee River by artificial means, such as ditch, canal, swale, pipe or culvert. A narrative description of these MSA aspects is provided in Figure 13D.

Additionally, Foster Wheeler Environmental Corporation has entered into an agreement with Broward County that governs the use of the Bank in Broward County.

Impacts most likely to be offset in the Loxahatchee Mitigation Bank are those proposed in habitats typical of the historic or disturbed eastern Everglades herbaceous or forested wetland systems. Regulated impacts occurring outside the mitigation service area and which meet the requirements of Section 373.4136, F.S., and Rule 62-342.600, F.A.C. may be eligible to use the bank as mitigation and will be reviewed on a case-by-case basis.

### Success Criteria

21. Final Success. The bank shall be deemed successful when all of the following criteria have been met for a period of at least one full year without intervention in the form of artificial manipulation of water levels, eradication of undesirable vegetation or replanting of desirable vegetation. The bank shall enhance or restore the following five wetland polygon types: marsh, red maple, pond apple, willow and cypress. Twelve acres of "mudflat" habitat is proposed to be constructed within the marsh polygon.

- a. **Hydrology:** Water levels shall show seasonal variation with inundation or saturation for ten consecutive months of the year ( $14' \text{ NGVD} \pm 3 \text{ inches}$ ) and with at least one of these months having average monthly level of 1.5 ft. above the ground ( $\sim 15.5' \text{ NGVD}$ ). Additionally, water levels shall fall to  $14' \text{ NGVD}$  or lower at least once during a 12 month period, demonstrating seasonal fluctuating water levels. These water level targets were derived from average water levels found in healthy wetland systems of these types in the region. Since this system is dependent on rainfall as its primary source of water, and since annual rainfall varies greatly, targets may not be met every year. For final success determination, there shall be at least three out of five years demonstrating water levels within these parameters and when there has been no manipulation of the  $15.5' \text{ NGVD}$  elevation at the control structure. All water level monitoring sites shall be required to demonstrate success.
- b. **Nuisance and exotic species:** Invasive exotic and nuisance vegetation (Group I) shall not exceed a total of 1% cover of any polygon, and potentially noxious exotic and nuisance vegetation (Group II) shall not exceed a total of 3% cover of any polygon. For the purposes of this permit, these groups of exotic and nuisance vegetation are listed in Attachment A. It is understood that nuisance and exotic species will be treated on an as needed and/or yearly cycle; however, for the purposes of determining the final success and final credit release, these criteria shall be met after at least one full year with no plant eradication treatments.

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**c. Vegetation coverage:**

- iv. Ten to twenty percent of open water in the form of meandering watercourses and small depressions is considered desirable in each wetland types.

“Appropriate” vegetation is considered to be non-nuisance, native wetland species, such as those listed in the tables in Specific Condition 21. d.

**d. Plant community composition:** For a success determination, each polygon shall demonstrate the species types and densities typical of natural systems as shown in the following tables.

- i. The marsh polygon shall exhibit at least 8 species, with appropriate density ranges, listed in the table below, with less than 25% coverage by woody species.

[illegible]

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MARSH SPECIES	PERCENTAGE COVER							
↓ Water hyssop <i>Bacopa</i> spp.								
St. John's Wort <i>Hypericum fasciculatum</i>								
Marsh pink <i>Sabatia bartrami</i>	<5							
↓ Red ludwigia <i>Ludwigia repens</i>	<5							
↓ White bract sedge <i>Dichromena</i> spp.	<5							

↓ Species present on the site

- ii. The willow polygon shall exhibit at least 4 species, with appropriate density ranges, listed in the table below.

[illegible]

↓ Species present on the site

- iii. Each of the remaining forested polygons shall exhibit at least 6 species, with appropriate density ranges, listed in the tables below.

[illegible]

↓ Buttonbush <i>Cephalanthus occidentalis</i>										
↓ Wax myrtle <i>Myrica cerifera</i>										
Groundcover										
↓ Royal fern <i>Osmunda regalis</i>										
↓ Virginia chain fern <i>Woodwardia virginica</i>	<5									
↓ Giant leather fern <i>Acrostichum danaeifolium</i>										
↓ Lizard's tail <i>Saururus cernuus</i>										
↓ Shield fern <i>Thelypteris</i> spp.										
↓ Cinnamon fern <i>Osmunda cinnamomea</i>										
↓ Swamp fern <i>Blechnum serrulatum</i>										

↓ Species present on the site

POND APPLE SPECIES	PERCENTAGE COVER									
	10	20	30	40	50	60	70	80	90	100
Canopy										
↓ Pond apple <i>Annona glabra</i>										
↓ Sweet bay <i>Magnolia virginiana</i>										
Shrub/middlestory										
↓ Dahoon holly <i>Ilex cassine</i>										
↓ Buttonbush <i>Cephalanthus occidentalis</i>										
↓ Wax myrtle <i>Myrica cerifera</i>										
Groundcover										
↓ Royal fern <i>Osmunda regalis</i>										
↓ Virginia chain fern <i>Woodwardia virginica</i>										
↓ Giant leather fern <i>Acrostichum danaeifolium</i>										
↓ Lizard's tail <i>Saururus cernuus</i>										
↓ Shield fern <i>Thelypteris</i> spp.										
↓ Swamp fern <i>Blechnum serrulatum</i>										

↓ Species present on the site

CYPRESS SPECIES	PERCENTAGE COVER									
	10	20	30	40	50	60	70	80	90	100
Canopy										
↓ Bald cypress <i>Taxodium distichum</i>										
↓ Sweet bay <i>Magnolia virginiana</i>										
Shrub/middlestory										
↓ Dahoon holly <i>Ilex cassine</i>										
↓ Buttonbush <i>Cephalanthus occidentalis</i>										
↓ Wax myrtle <i>Myrica cerifera</i>										
Groundcover										
↓ Royal fern <i>Osmunda regalis</i>										
↓ Cinnamon fern <i>Osmunda cinnamomea</i>										
↓ Virginia chain fern <i>Woodwardia virginica</i>										
↓ Giant sword fern <i>Nephrolepis biserrata</i>										
↓ Giant leather fern <i>Acrostichum danaeifolium</i>										
↓ Lizard's tail <i>Saururus cernuus</i>										
↓ Shield fern <i>Thelypteris</i> spp.										
↓ Swamp fern <i>Blechnum serrulatum</i>										

↓ Species present on the site

**e. Wildlife utilization:** Successful wildlife and fish usage shall be determined using reference wetland data. The Strazzula Tract marsh will be the reference wetland for the bank's marsh polygon and the cypress swamp located in the Loxahatchee Wildlife Refuge will be the reference wetland for the bank's forested polygons. Each year, the total number of wetland dependent fish, amphibian, reptile, bird and mammal species recorded during all monitoring events will be tallied, by class, for each of the two reference wetlands, for the bank's marsh polygon, and for the bank's forested polygons. Each year, the bank shall be determined to be successful for that year if the herbaceous polygon and the grouped forested polygon have as many wetland dependant species in each class as the relevant reference wetland. Because wildlife usage is linked to vegetation coverage, the bank's final success determination shall require that these annual success criteria are met for at least two years in which the vegetation coverage success criteria (Specific Condition 21c. above) are also met.

**f. Acreage:** A minimum of 1,224 acres of wetlands within the perimeter berms shall be determined to be jurisdictional pursuant to Section 373.421, F.S. and the five wetland

community polygons are each within ten percent of their target acreages as listed in the acreage table in Specific Condition 16.

**g. Compliance:** All of the structures in the bank have operated as designed and have required no repairs or maintenance beyond that specified in Specific Condition 24 for at least three years. The permittee has submitted all required reports to the satisfaction of the Department.

**h. M-WRAP Assessment:** Utilizing the monitoring data and reports and in conjunction with the permittee, the SFWMD, and the Mitigation Bank Review Team, the Department shall inspect the site and conduct an M-WRAP analysis to determine that all polygons have reached the criteria required to attain the “with bank” scores, as shown in Attachment D, that were used to determine the potential credits for the bank. The M-WRAP score of 3 for the vegetation component requires that the site be completely free of exotic vegetation. Should the bank be determined to have between 0 and 1% cover, a M-WRAP score of 2.75 would be assigned. The difference between scores of 2.75 and 3 represents 26.8 credits. The final credit release would then be decreased by 26.8 credits.

22. Interim release criteria. Progressive environmental enhancement or trending toward success provides environmental lift for which credit may be released incrementally prior to achieving all the final success criteria delineated in Specific Condition 21. Fifty percent (324 credits) of the total potential credits are reserved for interim releases as indicated in Specific Condition 18. The interim releases shall be based on the environmental enhancement criteria **a-e** in Specific Condition 21 above, each of which is assigned a potential of 64.8 credits. Each year that the bank attains any one of the criteria **a-e**, it will receive one third of that criterion’s potential credits (21.6). The next year the criterion is met, it would receive another third, and the third year would net the remaining third of that criterion’s credits. To allow for variation in ecological conditions (drought, freeze, storms, etc.), the criteria need not be met continuously for three years. Additionally, the bank may be determined to be fully successful in accordance with Specific Condition 21, without all of the individual criteria, **a-e**, having three years of success. In the latter case, any credits for an individual criterion not yet released would be added to the final success credit release. For example:

Criteria	Year 1	2	3	4	5
a	X	X		X	(X)
b	X	X	X	(X)	(X)
c			X	X	X
d					X
e	X			X	X
total X's	3	2	2	3	3
credits/year	64.8	43.2	43.2	64.8	64.8

In this example, X indicates that the criterion has been met and a partial credit (21.6) is available. (X) indicates that the criterion was met, but all the available credits for this criterion have already been released. In this example, year 5 would represent final success (provided that all the criteria in Specific Condition 21 were also met), and would receive the 64.8 credit partial release along with all other credits not previously released (the 43.2 credits remaining from criterion d.)



### Management, Monitoring and Reporting

23. Monitoring and Management During Construction. Monitoring during construction activities is intended to ensure compliance with best management practices, to minimize wetland impacts, to ensure stabilization, and to ensure that there are no turbidity plumes or violations of state water quality standards.

Turbidity monitoring shall be conducted daily for any discharge event and otherwise no less than once per week using a portable turbidimeter. The three "background" monitoring sites shall be the E-1W-N 100 yards north of the site, the E-1W-S 100 yards south of the site, and the L-36 ½ 100 yards east of the site. "Compliance" monitoring sites shall be in these same three canals within 10 yards downstream of the final turbidity control measures at any ongoing construction activity. Turbidity monitoring data shall be compiled and submitted to the Department on a monthly basis. It is the responsibility of the permittee to quickly rectify any problems found and to inform the Department by phone, FAX or e-mail (with follow-up written memo) of these maintenance activities.

24. Management and Maintenance After Construction. The wetlands are expected to be self-sustaining once the exotics are controlled and the hydrology is restored. Water level control is the primary factor in wetland sustainability. Monitoring data and the QMS's professional judgement will dictate the type and frequency of short-term maintenance activities. Bank maintenance activities shall include, but are not limited to:

- a. Manipulating the water levels and flows - Evaluate water level data to ensure that the anticipated modeled targets are being met by the designed control elevations, and make corrections, as necessary, to achieve and maintain hydrology similar to historic conditions by creating a slowly flowing system with appropriate hydroperiods and depths. However, prior to making any changes or corrections in design or operation, the Department shall be informed, and a minor modification may be required;
- b. Conducting prescribed burns, consisting of selective burning of areas congested with undesirable vegetation density or species, using licensed personnel and approved methodologies and in accordance with the fire management plan in Attachment B and Figure 11;
- c. Removing exotic vegetation manually followed by herbicide treatment of the stump by a licensed applicator. It is anticipated that semi-annual treatments will be required for the first year, with annual treatments thereafter (Attachment A);
- d. Removing feral/exotic terrestrial animals such as feral hogs by trapping, and removing aquatic species such as the walking catfish manually or by using approved chemical means to the extent practical;
- e. Planting supplemental wetland vegetation as necessary to maintain the wetland functions and values (Attachment C and Figure 12);

- f. Maintaining berms, culverts, and geofabric as necessary to repair washout or weakened areas, remove debris from culverts and control structures, or restore the geofabric's soil stabilization characteristics;
- g. Repairing and revegetating berms as necessary to control erosion;
- h. Maintaining staff gauges and piezometers to ensure the proper monitoring of surface and ground waters;
- i. Repairing or restoring osprey and wood stork nesting platforms damaged by storms and normal wear, as necessary; and
- j. Maintaining site security (fencing and signage) and inspecting for poaching or dumping (Attachment G).

25. Long-term Management. After the banking operations are complete and the bank has been determined to be fully successful according to Specific Condition 21, the permittee shall initiate the long-term management responsibilities as follows:

- a. Quarterly inspection and maintenance, as necessary to ensure the berm and control structures in good working order;
- b. Conducting exotic and nuisance plant control, as necessary, to avoid a re-infestation of these species. At no time shall the cover of these species exceed 10% prior to remedial eradication activities;
- c. Conducting prescribed burns at a frequency and season optimal to promote desirable vegetation and wildlife;
- d. Repairing or restoring osprey and wood stork nesting; and
- e. Maintaining site security and inspecting for signs of poaching or dumping.

The permittee shall be the responsible party for long-term management until the permit and the long-term management funding is transferred to the South Florida Water Management District. The permittee shall provide the Department with proof of this transfer.

26. Monitoring. The Department has reviewed the proposed monitoring plan submitted with the Draft Mitigation Banking Instrument dated April 1999 which is contained in the permitting file. This plan, schematically represented in Figure 14, has been determined to be substantively adequate to evaluate progress toward restoration goals, identify potential roadblocks or impacts that may hamper attaining those goals, provide opportunities for scientific assessment of wetland functions and processes, and ultimately demonstrate that the Bank's success criteria have been met. However, in order to accommodate any changes necessitated by permitting conditions and/or operational restrictions, the permittee shall submit, for the Department's written approval, a final monitoring plan 60 days prior to conducting monitoring associated with the determination of success for this permit. The Department shall complete such approval within 60 days of receipt of a written submittal the final monitoring plan. If the Department does not inform the permittee in writing within that 60 day period that the monitoring plan is denied, then the

monitoring plan shall be deemed approved. This plan shall include the following attributes for each of the major sampling parameters (hydrology, vegetation cover including nuisance and exotic species, plant community composition, and wildlife utilization):

- a. a figure showing all sampling locations, both within the bank and the reference wetlands;
- b. a table indicating all sampling frequencies and/or dates;
- c. a detailed description of all sampling methodologies to be utilized;
- d. samples of field and data tables;
- e. photographic information.

In addition, this monitoring plan shall include a section detailing the proposed analyses and reporting that will be conducted utilizing the collected data. This section shall include:

- f. proposed reporting format;
- g. sample data summary tables and graphs;
- h. proposed analytical assessments and discussion contents; and
- i. a success/progress assessment.

27. Progress Reports. Beginning six months after permit issuance until final success determination, the permittee shall submit semi-annual progress reports containing the following information regarding the project:

- a. Date permitted activity was begun or is anticipated to begin;
- b. Brief description and extent of work completed since the previous report or since permit was issued;
- c. Copies of permit drawings indicating areas where work has been completed;
- d. A description of problems encountered and solutions undertaken;
- e. A brief description of the work and/or site management the permittee anticipates commencing, continuing or completing in the next six months; and
- f. Site management undertaken, including type of management and dates each type was undertaken.

28. Annual Reports. The Annual Report is a summary of the yearly monitoring for success and an assessment of the degree to which the bank is attaining success. This report shall be submitted within 45 days after completion of the vegetation monitoring (about early November) and shall be prepared according to the format required and approved in accordance with Specific Condition 26. This report shall be submitted annually until the Bank site has been determined to be successful. The Annual Report that requests a determination of final success in accordance with Specific Condition 21 shall also include the following information:

- a. a summary of all of the previous Annual Reports, including, as appropriate, timeline graphics;
- b. a list of each success criteria and documentation of how and when it was attained;

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- c. a notation of problems encountered in attaining the success criteria and how the problems were solved, and a notation of any exceptionally successful management activity;
- d. a summary of compliance and/or enforcement submittals or actions during the implementation of the bank; and
- e. any other information helpful for the continued success of the mitigation.

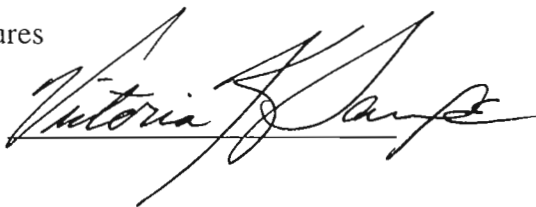
The Report requesting the final success determination shall be submitted to both the Department and the South Florida Water Management District.

29. Compliance. Sixty days prior to commencing construction, the permittee shall submit a checklist of all compliance activities required in this permit, and actual or relative dates for these activities, to the Department for approval. This checklist, with appropriate items "checked", shall be included with each report submittal or credit release modification. The Department shall complete such approval within 60 days of receipt of a written submittal the compliance checklist. If the Department does not inform the permittee in writing within that 60 day period that the checklist is denied, then the checklist shall be deemed approved.

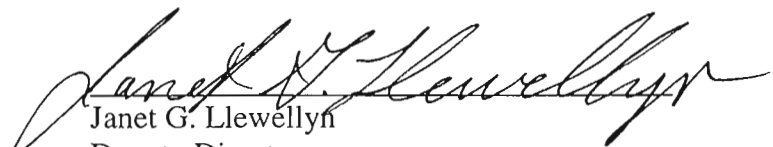
**List of Attachments:**

- A. Exotic and Nuisance Species Control Plan
- B. Prescribed Burn Management Plan
- C. Manual Revegetation Plan
- D. M-WRAP Spreadsheet Calculations
- E. Mitigation Bank Suitability Index Calculation
- F. Ledger
- G. Security Measures

Recommended by:



STATE OF FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION



Janet G. Llewellyn  
Deputy Director  
Division of Water Resource Management

Executed in Tallahassee, Florida.

## ATTACHMENT A: Exotic and Nuisance Species Control Plan

### Target Species:

#### Invasive Exotic and Nuisance Species – Group I

Common Name	Scientific Name
Rosary pea	<i>Abrus precatorius</i>
Earleaf acacia	<i>Acacia auriculiformis</i>
Mimosa	<i>Albizia julibrissin</i>
Woman's tongue	<i>Albizia lebbbeck</i>
Coral ardisia	<i>Ardisia crenata</i>
Shoebutton ardisia	<i>Ardisia elliptica</i>
Asparagus fern	<i>Asparagus densiflorus</i>
Orchid tree	<i>Bauhinia variegata</i>
↓ Bishopwood	<i>Bischofia javanica</i>
Santa maria	<i>Calophyllum antillanum</i>
↓ Australian pine	<i>Casuarina equisetifolia</i>
Suckering Australian pine	<i>Casuarina glauca</i>
Day jasmine	<i>Cestrum diurnum</i>
Taro	<i>Colocasia esculenta</i>
Lather leaf	<i>Columbrina asiatica</i>
Carrotwood	<i>Cupaniopsis anacardioides</i>
Winged yam	<i>Dioscorea alata</i>
Air-potato	<i>Dioscorea bulbiflora</i>
↓ Water hyacinth	<i>Eichornia crassipes</i>
Surinam cherry	<i>Eugenia uniflora</i>
Laurel fig	<i>Ficus microcarpa</i>
Hydrilla	<i>Hydrilla verticillata</i>
Green hygro	<i>Hygrophila polysperma</i>
West Indian marsh grass	<i>Hymenachne amplexicaulis</i>
Cogon grass	<i>Imperata cylindrica</i>
Water spinach	<i>Ipomoea aquatica</i>
Gold coast jasmine	<i>Jasminum dichotomum</i>
Jasmine	<i>Jasminum fluminense</i>
↓ Lantana	<i>Lantana camara</i>
Hedge privet	<i>Ligustrum sinense</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Japanese climbing fern	<i>Lygodium japonicum</i>
↓ Old World climbing fern	<i>Lygodium microphyllum</i>
Claw vine	<i>Macfadyena unguis-cati</i>
↓ Melaleuca	<i>Melaleuca quinquenervia</i>
Chinaberry	<i>Melia azedarach</i>
Catclaw mimosa	<i>Mimosa pigra</i>
Heavenly bamboo	<i>Nandina domestica</i>
↓ Sword fern	<i>Nephrolepis cordifolia</i>
Asian sword fern	<i>Nephrolepis multifora</i>
Cane grass	<i>Neyraudia reynaudiana</i>
Onion vine	<i>Paederia craddasiana</i>
Skunk vine	<i>Paederia foetida</i>
↓ Torpedo grass	<i>Panicum repens</i>
Napier grass	<i>Pennisetum purpureum</i>
↓ Water lettuce	<i>Pistia stratiotes</i>

Common Name	Scientific Name
Strawberry guava	<i>Psidium cattleianum</i>
↓ Guava	<i>Psidium guajava</i>
Kudzu	<i>Pueraria montana</i>
Downy rose-myrtle	<i>Rhodomyrtus tomentosa</i>
Oyster plant	<i>Rhoeo spathacea</i>
Scaevola	<i>Scaevola sericea</i>
Schefflera	<i>Schefflera actinophylla</i>
↓ Brazilian pepper	<i>Schinus terebinthifolius</i>
↓ Climbing cassia	<i>Senna pendula</i>
Aquatic soda apple	<i>Solanum tampicense</i>
Turkey berry	<i>Solanum torvum</i>
Tropical soda apple	<i>Solanum viarum</i>
↓ Jambolan plum	<i>Syzygium cumini</i>
Incised halberd fern	<i>Tectaria incisa</i>
Seaside mahoe	<i>Thespesia populnea</i>
White-flowered wandering jew	<i>Tradescantia fluminensis</i>
Para grass	<i>Urochloa mutica</i>

↓ Species present on or near the site

### Noxious exotic and Nuisance Species – Group II

Common Name	Scientific Name
↓ Tung-oil tree	<i>Aleurites fordii</i>
↓ Alligator weed	<i>Alternanthera philoxeroides (P)</i>
↓ Cunningham's Australian pine	<i>Casuarina cunninghamiana</i>
↓ Cordia	<i>Cordia myxa (Syn. Cordia obliqua)</i>
↓ South American water primrose	<i>Ludwigia octovalvis</i>
↓ Bahia grass	<i>Paspalum notatum</i>
↓ Chinese brake	<i>Pteris vittata</i>
↓ Natalgrass	<i>Rhynchelytrum repens</i>
↓ Castor bean	<i>Ricinus communis</i>
↓ Rose-apple	<i>Syzygium jambos</i>
↓ Cattail (nuisance)	<i>Typha domingensis</i>
↓ Cattail (nuisance)	<i>Typha latifolia</i>
↓ Caesar weed	<i>Urena lobata</i>
↓ Wedelia, creeping oxeye	<i>Wedelia trilobata</i>

↓ Species present on or near the site

### Vegetation Eradication Plans by Parcel

**North Parcel.** The North Parcel is historic sawgrass, wet prairie and slough habitat that has experienced shorter hydroperiods as a result of human intervention. Successional changes have resulted in the establishment of exotic and nuisance vegetation species, predominately Brazilian pepper, melaleuca, and cattails. The extent of exotic species varies greatly, ranging from dense monocultural stands of Brazilian pepper or melaleuca to an infestation close to 5-10 percent of the vegetative composition. The perimeter edges and dryer areas contain the greatest extent of exotic and nuisance species. The remnant slough area that now resembles a sawgrass marsh is the least impacted by exotic species. However, a dramatic increase in the presence of melaleuca and cattails has been observed over the last 18 months. At present, melaleuca is limited to small stands in the northern



portion of the parcel. It has reached a density of seed trees which, unless controlled, will enable it to become a dominant species in the North Parcel within a short time.

Exotics in the North Parcel will generally be controlled manually (see Figure 10). The hydrological design of the parcel will not facilitate inundation as a means for eradication. Manual treatment methods will include predominately herbicidal treatment with limited hand clearing. Herbicidal treatments will include Frill, Basal Bark, Stump, and Foliar applications. When sparse concentrations of species exist, care shall be taken when using a backpack sprayer for foliar applications to selectively spray only the target species and minimize damage to the non-target species.

The initial eradication efforts will be timed to coincide with the dry season for maximum effectiveness. Six months to one year following completion of the initial treatment, a second herbicidal treatment will be conducted to eradicate any species that were inadvertently overlooked or to re-treat exotics where regrowth has occurred.

Fire as a management and exotic control technique will be introduced at the first available opportunity following the successful herbicide control of exotics. Additionally, the HydroAx may be used for continuing exotics control. Using fire or the HydroAx at the appropriate frequency will reduce the fuel load resulting from dead exotic vegetation, control the density of native shrub thickets, and minimize the regeneration of exotic and nuisance species.

**South Parcel.** The South Parcel has been dramatically altered from its historic Everglades mosaic community as a result of significant hydrologic alterations. While this parcel contains the greatest diversity with respect to vegetative associations, it also includes the greatest extent of exotic infestation—mainly Brazilian pepper, cattail, and Jambolan plum. The vegetative associations classified as cypress/mixed, strangler fig/mixed, and red maple/mixed are also infested with exotic Japanese climbing fern.

Inundation will be the primary control technique used within the South Parcel (see Figure 10), which will effectively eradicate most of the exotics within this portion of the Bank. Following inundation, the dead Brazilian pepper will be burned to remove the suffocating mesh of intertwining branches. This will open the substrate and return vital nutrients to the soil. Exotics on tree islands and berm side slopes will be treated with herbicide. Herbicide treatments will be used to control or eliminate exotics such as climbing fern, if they do not readily succumb to inundation. Manual, HydroAx, and/or herbicide treatment are expected to be required along the raised edges of this parcel and within the higher elevations of the historic tree islands.

Inundation to control exotic vegetation will be implemented in accordance with the District's technical memorandum (Exhibit 6 of Draft MBI, April 1999). To the extent feasible, initial inundation treatments will be timed to coincide with the natural wet season. The parcel will be flooded with an average sustained depth of 2 feet for a period of about 90 days. Field observations will be conducted weekly to monitor and document the effectiveness of the treatment. **Once a month, a written report will document**

**general conditions and the results of flooding on the exotics and native plant populations.** If appropriate, the length of the inundation period can be increased or decreased to maximize eradication efforts and minimize damage or loss of the remaining appropriate natives. Appropriate red maples, for example, occur in tree islands at higher elevations and are expected to be less affected by inundation. Following the successful completion of the initial inundation treatment, a detailed site survey will be conducted and any exotics that have not succumbed to flooding will be treated with an approved herbicide.

Fire or limited use of the HydroAx will be introduced to reduce the biomass and fuel loading as soon as practical. Subsequent inundation treatments may be implemented if necessary.

**Southeast Parcel.** This parcel has been significantly degraded and is hydrologically isolated from the other parcels. The Southeast Parcel contains Brazilian pepper/mixed and red maple/ mixed habitat. Within the Brazilian pepper/mixed habitat, dense mature Brazilian pepper dominates the landscape. Isolated red maple, pond apple and strangler fig are found in limited numbers. The groundcover layer is laden with decaying debris, with a few scattered ferns and herbaceous plants.

The red maple/mixed areas within the parcel contain predominately red maple with smaller percentages of Brazilian pepper, strangler fig, pond apple and Jambolan plum scattered throughout.

The exotic eradication effort in the Southeast Parcel will consist of inundation and mechanical removal (see Figure 10). In areas where created mud flats are proposed (where the density of exotics is the greatest), a bulldozer or front end loader with a root rake will be used to mechanically remove exotics. No replanting will occur here. In areas where suitable vegetative species can be retained, such as areas where Brazilian pepper and Jambolan plum are mixed with red maple, the exotics will be eradicated by manual means, primarily herbicidal treatments. As with the North Parcel, fire will be introduced as a management and control technique for exotic vegetation following successful eradication efforts.

Light machinery (i.e., a front-end loader or small bulldozer) may be used to aid in creation of the proposed mudflats, where exotic eradication will be achieved using mechanical means. These areas may also be used as a staging area for burning vegetative debris from throughout the site.

#### **Herbicide Treatment Methods.**

Several herbicide treatment methods are planned, with both herbicides and application methods tailored to particular species. The following table indicates the planned herbicide mixtures and methods by species. If pertinent new information is obtained during exotic eradication, this information will be evaluated to determine if a different application or a new chemical will more effectively control exotics. If so, the planned applications may be altered with Corps concurrence.



## Herbicides to be Used for Eradication

Exotic and Inappropriate Plant	Parcel Locations <sup>1/</sup>	Herbicide/Application Method <sup>2,3/</sup>
Australian Pine ( <i>Casuarina equisetifolia</i> )	North	Garlon-4, Basal Bark
Brazilian Pepper ( <i>Schinus terebinthifolius</i> )	North, South, Southeast	Garlon-4, Basal Bark, Cut Stump Arsenal, Cut Stump, Foliar Application Rodeo, Cut Stump, Foliar Application
Melaleuca ( <i>Melaleuca quinquenervia</i> )	North	Arsenal, Frill Application, Cut Stump
Jambolan Plum ( <i>Syzygium cumini</i> )	South, Southeast	Garlon-4, Frill Application or Cut Stump Arsenal, Frill Application
Guava ( <i>Psidium guajava</i> )	South, Southeast	Garlon-4, Cut Stump or Basal Bark
Bischofia ( <i>Bischofia javanica</i> )	South	Garlon-4, Basal Bark or Cut Stump Arsenal, Basal Bark
Cordia ( <i>Cordia</i> spp)	Southeast	Arsenal, Frill Application
Cattail ( <i>Typha</i> spp)	North	Rodeo, Foliar Application
Japanese Climbing Fern ( <i>Lygodium</i> spp)	South	Round-up, Foliar Application Rodeo, Foliar Application
Torpedograss ( <i>Panicum repens</i> )	North	Arsenal (dry) Rodeo, Foliar Application (wet)
Water Primrose ( <i>Ludwigia octovalis</i> )	North, South, Southeast	Garlon-3A, Foliar Application Rodeo, Foliar Application
Senna ( <i>Senna pendula</i> )	North, South, Southeast	Garlon-4, Basal Bark and Foliar Application Arsenal, Basal Bark and Foliar Application

<sup>1/</sup> Noted parcels are the primary locations of listed species on the Bank site. Listed species may occasionally occur on other parcels.

<sup>2/</sup> Herbicides will be applied according to manufacturers' label recommendations.

<sup>3/</sup> Langeland, K.A. and R. K. Stocker, 1997. Control of Non-Native Plants in Natural Areas of Florida.

**Frill Application.** This application involves complete scarification, which requires cutting through the cambium around the circumference of the tree trunk and applying herbicide. Immediately after the cambium is cut, concentrated herbicide is applied to the open wound with a spray applicator. Garlon 4 will be the herbicide of choice for Jambolan Plum that is not located over water and Arsenal for Melaleuca and Bischofia. Blue Tracker dye will be used to monitor overspray and to identify trees that have been treated.

**Basal Bark.** This method involves the application of herbicide directly to the bark around the circumference of each stem. This method has proven effective for Brazilian pepper, Cattley guava and other exotic shrub species less than 6 inches in diameter. Garlon 4 used with a penetrating oil and blue Tracker dye will be applied using a backpack sprayer or spray application directly to the bark of targeted species.

**Stump Application.** This method involves cutting targeted trees and shrubs close to ground level and above the surface water elevation. Immediately after cutting, herbicide is applied to the fresh wound/stump and is translocated to the roots,

killing the plant. This method will predominately be used when eradicating small seedling melaleuca too large to pull out by hand and large trees that cannot remain in place to die and naturally decompose. Garlon 4 will be used to treat species that are not in or over water, excluding Melaleuca and Bischofia which are more appropriately treated with Arsenal. Blue Tracker dye will be applied using a spray application immediately after cutting. Large trees that are cut down will be cut into smaller pieces and left in place to provide reptile and amphibian habitat and hasten natural decomposition. All cut pieces of Melaleuca will be piled above the water line to completely dry out and avoid regeneration.

***Foliar Application.*** This method involves applying systemic herbicide to the foliage of targeted species. Rodeo by Monsanto will be the herbicide of choice. The herbicide is applied using pressurized backpack sprayers that apply chemical to the foliage of targeted species. Blue Tracker dye and surfactant will be used to ensure an effective and complete coverage as well as to avoid unnecessary overspray.

Exotic and nuisance species to be treated by a foliar application include: Mexican primrose willow, torpedo grass, sword fern, Japanese climbing fern, castor bean, dog fennel, and cattails.

To implement herbicide treatments, the Bank will be mapped into 500' x 500' quadrants. Using a global positioning system (GPS), each quadrant will be staked with an identifiable marker (i.e., A1, A2, B1, B2, B3). Exotic eradication teams will establish and follow these quadrants in transects for more effective ground coverage. Photographs will be taken in each direction to provide baseline documentation. This quadrant methodology has proven effective for managing exotic eradication programs on large parcels. During eradication efforts, photographs will again be taken to document baseline and success.

Monitoring will begin following initial exotic control efforts. The extent of the existing exotic seed bank requires regular maintenance of exotics for the first five years following restoration activities. As the viable exotic seed bank diminishes, the site will become relatively self-sustaining in the post-operational, long-term management period. Post-operational maintenance efforts are anticipated to be limited to edges of canal banks and the FPL transmission line right-of-way, which are favorable environments for the establishment of opportunistic species.

## **ATTACHMENT B: Prescribed Burn Management Plan**

### **Introduction**

This Fire Management Plan (FMP) is a component of the Mitigation Banking Instrument (MBI) for the Loxahatchee Mitigation Bank (Bank). The MBI calls for enhancement of wetland quality in the Bank through restoration/protection of hydrologic conditions, eradication/removal/control of exotic plants, replanting of native vegetation and the application of prescribed fire. The FMP provides for the use of prescribed fire as a follow-up treatment in the control of exotic vegetation and as a tool to maintain the wetland quality of this wet prairie–slough–sawgrass–tree island mosaic. The FMP for the Bank provides for the coordination of all burn activities with the Manager of the Refuge, thereby ensuring compatibility and reducing the risk of uncontrolled burns in both areas.

The fire management goal for the Bank is to use fire as a follow-up to the inundation and chemical control of melaleuca (*Melaleuca quinquenervia*) and Brazilian pepper (*Schinus terebinthifolius*) and to maintain a natural mosaic of vegetation types. To meet these goals, fire will be prescribed every 1-4 years for herbaceous plants and every 4-10 years for shrub plants. Fire units will range in size from 50 to 300 acres. Establishment of control lines and prescribed fire operations will be conducted from airboats, with possible ground support from existing dikes.

### **Sensitive Issues and Constraints**

#### Endangered and Threatened (T & E) Species

Plant and animal species dependent upon the natural communities of the Loxahatchee ecosystem will generally benefit from fire management. Based on available information, no T&E species will be adversely affected by prescribed burning on the Bank site. Ground surveys will be conducted as required to determine if any colonial wading bird rookeries are present. If so, burning will be postponed until after the nesting season.

#### Smoke Management

The FMP follows established smoke management procedures, which include a 3-step process of avoidance, dilution and emission reduction (National Wildfire Coordinating Group 1985). Smoke screening, as described below, is part of the 3-step process (Wade and Lunsford 1988).

The smoke screening process identifies fuel types, expected smoke impact areas from these fuels and smoke sensitive areas within the impact area. The smoke sensitive areas adjacent to the Bank wetlands are residential communities to the east and south, and U.S. 441/State Road 7 and two electrical transmission lines to the east. The most critical smoke sensitive areas are the residential areas. Smoke impacts to these areas will be avoided by burning only when there is no westerly or northerly components to the wind.

### Avoidance

The best and most common solution to smoke management is avoidance of contact between smoke produced and smoke sensitive areas. Smoke is produced during the actual burning period as well as the subsequent smoldering period, which can last from a few hours to a few days. This entire period is considered in smoke management planning.

### Dilution

Smoke dilution involves the use of weather and burning strategies to reduce the ratio of smoke components to the available volume of air in which they are dispersed. Changes to the burn unit design or ignition strategies are made to increase the dilution of smoke in the air column.

### Emission Reduction

If the first two smoke management steps do not sufficiently reduce the potential for smoke impacts to smoke sensitive areas, then the burn plan can be altered to reduce the smoke emissions further. Post-burn mop-up procedures are important also in reducing total emissions. If the amount of smoke emissions must be reduced, then the burn plan will include an appropriate mop up.

## **Specific Burn Plans**

The final burn plans will need to be closely coordinated with the chemical and inundation control efforts for melaleuca and Brazilian pepper and with the seasonal changes in water levels and wind directions.

### *Melaleuca*

A primary goal of the prescribed fire program on the Bank is to aid the melaleuca control efforts and hopefully reduce the cost of these efforts.

### *Brazilian Pepper*

Equally important to the success of the Bank is the control of the exotic shrub/tree, Brazilian pepper. A goal of the prescribed burn/fire management program is to complement the inundation control technology of the Brazilian pepper. A combination of inundation, chemical control (Garlon 4) and fire methods should ensure the long-term eradication of Brazilian pepper.

### *Water Levels*

The location of the Bank wetlands adds a number of smoke management challenges to the prescribed burning effort. One of these is the danger of igniting the muck organic soils. As a result, the prescribed fires must be conducted when water levels will prevent organic soils from igniting.

Timing of the prescribed fires in relation to the water levels is also important for the control of the melaleuca. Sufficient rainfall must occur between the chemical control effort and the fire to allow germination of the melaleuca seeds. Coordination of the

chemical treatment and the prescribed fire in relation to water levels will be worked out in response to changing environmental conditions during the treatment process.

#### *Wind Directions*

The speed and direction of surface and transport winds is critical to the proper management of smoke produced by prescribed fires. A prescribed fire at the Loxahatchee Bank site has the greatest potential for impacting US 441/State Road 7, among the several smoke sensitive areas east of the site. Prescriptions will avoid west wind components to keep smoke from impacting this road. These wind variables will be taken into consideration with the above-listed environmental variables in the development of the final prescriptions.

## **ATTACHMENT C: Manual Revegetation Plan**

### **Overview**

Manual revegetation will occur as part of both Bank construction and during the monitoring and maintenance process. Natural recruitment is expected to revegetate nearly all of the wetland portion of the Bank. The only areas where manual revegetation is planned during construction are those associated with soil stabilization of berms and roads and in wetland transition areas. Manual revegetation during monitoring and maintenance is intended to diversify wetland areas and to supplement wetland plant coverage where natural recruitment is either not occurring or not occurring quickly enough. The specific areas requiring manual revegetation during monitoring and maintenance will be identified following construction and during the early natural recruitment period.

The manual planting methods described below are applicable to both construction and the monitoring and maintenance revegetation tasks. Supplemental planting plans will be prepared following each year if the success criteria goals are not achieved. During the first growing season after exotic eradication, monitoring data will be gathered to determine revegetation requirements. The Qualified Mitigation Specialist (QMS) will use this data to determine the appropriate number of trees or plants to install. The data will also be used to monitor progress in achieving Bank success criteria goals.

The manual revegetation plan will include identifying and labeling areas where replanting will be necessary. The vegetation to be planted at the Bank will be purchased from nurseries located within the Natural Resources Conservation Service sub-hardiness zone 10. Plants that are not available through local nurseries may be obtained by licensed collectors from the Martin County, Palm Beach County and Broward County area. The project may collaborate with the Everglades Research Botanical Facility to utilize “baby” sawgrass for revegetation. Horticultural weeds or plants defined as nuisance or exotics will be removed from plant material prior to transportation to the Bank. Plant materials will be defined by specific pot sizes, with canopy heights specified for each pot size (Tables C-1 through C-3) for each parcel. The majority of nursery-grown material will be classified as Florida Grade #2 or better.

The locations in the Bank most vulnerable to re-establishment of Brazilian pepper are associated with the transition areas along berms and roads. The top surfaces of these features will be maintained in old field condition. The sides of berms, roads and setbacks will be planted with species that should compete well against Brazilian pepper.

### **Revegetation Process by Parcel**

The revegetation effort is described below for the three parcels contained within the Bank. This effort is intended to achieve the Bank’s restoration and enhancement goals, as measured by the success criteria.

### North Parcel

The North Parcel historic sawgrass, wet prairie, slough habitat, and tree islands will require a site evaluation after the exotics removal program. An evaluation of each of the four major habitat types will provide information necessary to restore the North Parcel. After the removal of the exotics, it may be necessary to randomly install some species to achieve a level of plant diversity that represents the goals of the Bank. These plants will be chosen from the species listed in Table C-1.

Table C-1: North Parcel Plant Criteria

Common Name	Scientific Name	Pot Size	Height/Size Description	Field Collected	Planted on Foot Center
<b>Canopy and Middle-story</b>					
Pond apple	<i>Annona glabra</i>	2 gal	24"		15'
Red maple	<i>Acer rubrum</i>	3 gal	24"		15'
Sweet bay	<i>Magnolia virginiana</i>	3 gal	24"		15'
Swamp bay	<i>Persea palustris</i>	3 gal	24"		15'
Dahoon holly	<i>Ilex cassine</i>	3 gal	24"		7.5'
Buttonbush	<i>Cephalanthus occidentalis</i>	3 gal	24"		7.5'
<b>Ground Cover</b>					
Royal fern	<i>Osmunda regalis</i>	1 gal	12"X12"		3.5'
Virginia chain fern	<i>Woodwardia virginica</i>	1 gal	12"X12"		3.5'
Giant leather fern	<i>Acrostichum danaeifolium</i>	3 gal	24"X24"		7.5'
Lizards tail	<i>Saururus cernuus</i>	1 gal	12"	X	3.5'
Shield fern	<i>Thelypteris</i> spp.	1 gal	12"X12"		3.5'
Swamp fern	<i>Blechnum serrulatum</i>	1 gal	12"X12"		3.5'

### South Parcel

Most of the South Parcel is expected to revegetate by natural recruitment, although it is recognized that sawgrass, especially, may need supplemental planting. The parcel will be evaluated after removal of the exotics and during the growing season. A determination will be made regarding the extent of natural recruitment and the viability of the native seed bank. Monitoring the marsh will result in a determination of the acreage of land not supporting native recruitment that may require supplemental planting. Plantings that may be needed in this parcel will be chosen from the species listed in Table C-2. Some open areas may require soil stabilization by a relatively rapid-growing native colonizer such as spikerush and/or pickerelweed. These species will be planted in high densities in order to expedite stabilization of the open substrate that might otherwise be colonized by cattail species.

Table C-2: South Parcel Plant Criteria

Common Name	Scientific Name	Available Pot Size	Height Description, if Applicable	Field Collected	Planted on Foot Center
Herbaceous Species					
Sawgrass	<i>Cladium jamaicense</i>			X	1'
Smartweed	<i>Polygonum</i> spp.			X	3'
Canna lily	<i>Canna</i> spp.	1 gal	12"		3'
Redroot	<i>Lachnanthes caroliniana</i>			X	3'
Swamp lily	<i>Crinum americanum</i>	1 gal		X	3'
Spider lily	<i>Hymenocallis</i> spp.	1 gal		X	3'
Water hyssop	<i>Bacopa monnieri</i>	1 gal		X	3'
Red ludwigia	<i>Ludwigia repens</i>	1 gal		X	1'
Hatpins	<i>Eriocaulon</i> spp.			X	1'
Sedges	<i>Carex</i> spp.			X	1'
Yellow-eyed grass	<i>Xyris elliotii</i>			X	1'
Pickernelweed	<i>Pontederia cordata</i>	1 gal		X	3'
Arrow arum	<i>Peltandra virginica</i>	1 gal		X	3'
Spikerush	<i>Eleocharis</i> spp.			X	3'
White water lily	<i>Nymphaea odorata</i>			X	3'

#### Southeast Parcel

The Southeast Parcel is hydrologically isolated. The mudflat areas will be monitored for herbaceous colonization that will naturally recruit into the area during the first full growing season after creation. These areas should remain partially open. No replanting will take place on the mudflats.

The Brazilian pepper/mixed area will be mapped during the following growing season to determine the extent of revegetation species composition. Areas that do not appear to be regenerating will require introduction of rapid-growing native colonies to stabilize the substrate. One or two species will be planted at a high density to provide this initial stability. Into this framework, independent colonies of slower growing desirable herbaceous vegetation will be planted with colonies of various species to provide vegetation diversity. The red maple/mixed polygons will be intermittently planted with middle-story/shrub vegetation chosen from species listed in Table C-3 to produce a more diversified plant community.

Plants will be chosen to suit the specific site conditions. Similar to the plan for the South Parcel, the areas that do not appear to regenerate will be planted with a rapid-growing native colonizer such a pickernelweed or spikerush as described above in the South Parcel description. These planting colonies will stabilize the substrate and allow the plant diversity to follow natural variations in site topography.



Table C-3: Southeast Parcel Plant Criteria

Common Name	Scientific Name	Pot Size	Height Description	Field Collected	Planted on Foot Center
<b>Canopy and Middle-story</b>					
Pond apple	<i>Annona glabra</i>	2 gal	24"		15'
Red maple	<i>Acer rubrum</i>	3 gal	24"		15'
Sweet bay	<i>Magnolia virginiana</i>	3 gal	24"		15'
Swamp bay	<i>Persea palustris</i>	3 gal	24"		15'
Dahoon holly	<i>Ilex cassine</i>	3 gal	24"		7.5'
Buttonbush	<i>Cephalanthus occidentalis</i>	3 gal	24"		7.5'
<b>Ground Cover</b>					
Royal fern	<i>Osmunda regalis</i>	1 gal	12"X12"		3.5'
Virginia chain fern	<i>Woodwardia virginica</i>	1 gal	12"X12"		3.5'
Giant leather fern	<i>Acrostichum danaeifolium</i>	3 gal	24"X24"		7.5'
Lizards tail	<i>Saururus cernuus</i>	1 gal	12"	X	3.5'
Shield fern	<i>Thelypteris</i> spp.	1 gal	12"X12"		3.5'
Swamp fern	<i>Blechnum serrulatum</i>	1 gal	12"X12"		3.5'

## ATTACHMENT E: Mitigation Bank Suitability Index (MBSI) Calculation

PARAMETERS	SCORE
<b>ESTABLISHED WATERSHED ISSUES:</b> The mitigation bank will result in identifiable ecological benefits to established watershed issues recognized to be critical to the watershed of the Bank. Yes .....3 No .....0	3
<b>LANDSCAPE MOSAIC COMPATIBILITY:</b> The ecological communities present at the mitigation bank site blend seamlessly with the adjacent native communities and that relationship is expected to remain in perpetuity. Site will blend seamlessly on 95–100% of its perimeter .....3 Site will blend seamlessly on 67–95% of its perimeter .....2 Site will blend seamlessly on 25–66% of its perimeter .....1 Site will blend seamlessly on <25% of its perimeter .....0	1
<b>THREATENED AND ENDANGERED SPECIES:</b> Establishment of the mitigation bank improves the status of federal and/or state listed threatened or endangered species. Increases population of one or more listed species .....3 Meets identified task within a recovery plan or provides protection to candidate species .....2 Attracts species to the site .....1 Maintains the status-quo .....0	1
<b>EXPANSION OF SCARCE HABITATS:</b> The landscape contains ecological features considered to be unusual, unique or rare in the region and is of sufficient size. Yes .....3 No .....0	3
<b>ADJACENT LAND USES:</b> The Bank will result in identifiable ecological benefits to adjacent lands or waters of regional importance such as State/National Park, State/National Forest, SWIM, OFW, AP, refuges and lands managed for conservation. Yes .....3 No .....0	3
<b>STRATEGIC HABITAT CONSERVATION AREA (SHCA):</b> The Bank site is within or will result in identifiable benefits to the GAP analysis designating lands essential to providing the land base necessary to sustain populations into the future. Yes .....3 No .....0	0
<b>AQUIFER RECHARGE AREA:</b> The site includes lands that have been identified as having significant aquifer recharge potential See Aquifer Recharge reference sheet for specific scoring criteria .....0-3	1.5
<b>TOTAL</b>	<b>12.5</b>
MBSI COMPUTATION    12.5 $MBSI = (TOTAL \div MAXIMUM POSSIBLE) (0.1) + 1.0$	1.1

**ATTACHMENT F: Ledger**

**Loxahatchee Mitigation Bank  
Permit Number 0140969-001  
Ledger  
February 18, 2000**

<b>Impact Permit # (or Release Mod)</b>	<b>Project Name</b>	<b>Issue Date</b>	<b>Issuing Agency</b>	<b>Credits Available</b>	<b>Credits Released/ Withdrawn (+/-)</b>	<b>Balance</b>
<b>Total Herbaceous Credits = 524.3</b>						
0140969-001	Loxahatchee Mit-Bank		DEP	0	0	0
<b>Total Forested Credits = 123.2</b>						
0140969-001	Loxahatchee Mit-Bank		DEP	0	0	0

# ATTACHMENT D - CREDIT AND MWRAP ANALYSIS

## Loxahatchee Mitigation Bank

11/16/99

### Credit Type Analysis

Parcel	North	East	South	Totals
<i>Acres</i>	268.4	97.9	897.7	1264.0
<b>Herbaceous (Marsh, LD Shrub, Mud Flats)</b>				
Without Bank Proportionate Score	0.44	0.36	0.26	
With Bank Proportionate Score	0.71	0.68	0.70	
Delta	0.27	0.33	0.44	
Functional Credits	71.66	32.03	391.17	494.86
MBSI	0.06	0.06	0.06	
Site Suitability Credits	4.26	1.91	23.27	29.44
Total Credits	75.92	33.94	414.44	524.30
<b>Hardwoods (Willow, Red Maple, Pond Apple, Cypress)</b>				
Without Bank Proportionate Score	0.19	0.19	0.14	
With Bank Proportionate Score	0.26	0.26	0.25	
Delta	0.07	0.08	0.10	
Functional Credits	17.50	7.58	93.93	119.01
MBSI	0.06	0.06	0.06	
Site Suitability Credits	1.04	0.45	5.59	7.08
Total Credits	18.54	8.03	99.52	126.09
<b>Other (Ditches, Berms &amp; Canal)</b>				
Without Bank Proportionate Score	0.00	0	0.00	
With Bank Proportionate Score	0.00	0	0.00	
Delta	0.00	0.00	0.00	
Functional Credits	0.00	0.00	-0.97	-0.97
MBSI	0.06	0.06	0.06	
Site Suitability Credits	0.00	0.00	-0.06	-0.06
Total Credits	0.00	0.00	-1.03	-1.03
<b>Summary Totals</b>				
Functional Credits	89.16	39.61	484.13	612.89
MBSI	0.06	0.06	0.06	
Site Suitability Credits	5.30	2.36	28.81	36.47
Total Credits	94.46	41.97	512.93	649.36
Mitigation Credits Needed for Impacts Outside the Bank	1.14	0.01	0.71	1.86
<b>Adjusted Total Credits</b>				<b>647.50</b>

## North Cell

Polygon Category	Acres	% of Assessment Area	MWRAP Parameters				MWRAP Score	Weighted MRWAP Score
			Wildlife	Vegetation	Hydrology	Water Quality		
Brazilian Pepper	43.68	0.163	1.25	0.5	1	2.75	0.458	0.075
Brazilian Pepper Mix	23.17	0.086	1.5	1.1	1	2.75	0.531	0.046
Brazilian Pepper Shrub	67.56	0.252	1.5	1.3	1.5	2.75	0.583	0.147
Marsh	3.30	0.012	2.5	1.8	2	2.75	0.750	0.009
Melaleuca	4.50	0.017	1.5	1.3	2	2.75	0.625	0.010
LD Shrub	22.60	0.084	2	1.6	2	2.75	0.698	0.059
Wax Myrtle	31.40	0.117	2.5	2.3	2.5	2.75	0.833	0.098
C.P. Willow	14.20	0.053	2	2	2	2.75	0.729	0.039
Pond Apple	0.30	0.001	2	2.5	2	2.75	0.771	0.001
R Maple Mixed	56.76	0.211	2.5	1.5	2	2.75	0.729	0.154
Strangler Fig	0	0.000					0.000	0.000
Cypress	0	0.000					0.000	0.000
Cypress Mix	0	0.000					0.000	0.000
Access Roads	0.90	0.003	0	0	0	0	0.000	0.000
Ditches	0	0.000	0	0	0	0	0.000	0.000
Totals	268.4	100%						0.637

## East Cell

Polygon Category	Acres	% of Assessment Area	MWRAP Parameters				MWRAP Score	Weighted MRWAP Score
			Wildlife	Vegetation	Hydrology	Water Quality		
Brazilian Pepper	0	0.000					0.000	0.000
Brazilian Pepper Mix	67.80	0.693	1.25	1.0	0.83	2.75	0.486	0.336
Brazilian Pepper Shrub	3.40	0.035	1.33	1.3	1.33	2.75	0.555	0.019
Marsh	0	0.000					0.000	0.000
Melaleuca	0	0.000					0.000	0.000
LD Shrub	0	0.000					0.000	0.000
Wax Myrtle	0	0.000					0.000	0.000
C.P. Willow	0	0.000					0.000	0.000
Pond Apple	0	0.000					0.000	0.000
R Maple Mixed	26.70	0.273	1.5	2	2	2.75	0.688	0.188
Strangler Fig	0	0.000					0.000	0.000
Cypress	0	0.000					0.000	0.000
Cypress Mix	0	0.000					0.000	0.000
Access Roads	0	0.000					0.000	0.000
Ditches	0	0.000					0.000	0.000
Totals	97.9	100%						0.543

## South Cell

Polygon Category	Acres	% of Assessment Area	MWRAP Parameters				MWRAP Score	Weighted MRWAP Score
			Wildlife	Vegetation	Hydrology	Water Quality		
Brazilian Pepper	275.70	0.307	1	0.3	0.67	1.49	0.291	0.089
Brazilian Pepper Mix	270.61	0.301	1.2	1.05	1.1	1.49	0.403	0.122
Brazilian Pepper Shrub	98.38	0.110	1.33	1.25	1.33	1.49	0.450	0.049
Marsh	0.00	0.000					0.000	0.000
Melaleuca	0.00	0.000					0.000	0.000
LD Shrub	0.00	0.000					0.000	0.000
Wax Myrtle	0.00	0.000					0.000	0.000
C.P. Willow	61.90	0.069	2	1.8	1.75	1.49	0.583	0.040
Pond Apple	19.90	0.022	2	1.5	1	1.49	0.499	0.011
R Maple Mixed	59.80	0.067	2	2.25	1.875	1.49	0.635	0.042
Strangler Fig	9.90	0.011	1.5	1.0	0.5	1.49	0.374	0.004
Cypress	39.10	0.044	2	1.5	1	1.49	0.499	0.022
Cypress Mix	52.60	0.059	1.5	1.0	0.5	1.49	0.374	0.022
Access Roads	8.03	0.009	0	0	0	0	0.000	0.000
Ditches	1.80	0.002	2.5	0.5	2	1.49	0.541	0.001
Totals	897.7	100%						0.403

ATTACHMENT D (con't)- Loxahatchee Mitigation Bank  
MWRAP Functional Assessment "With Bank" Summary Sheet

11/11/99

## North Cell

Polygon Category / Community Type	Community Type Acres	% of Assessment Area	MWRAP Parameters				MWRAP Score	Proportional MWRAP Score
			Wildlife	Vegetation	Hydrology	Water Quality		
Marsh	141.04	0.526	3	3	3	2.75	0.979	0.515
LD Shrub	53.64	0.200	3	3	3	2.75	0.979	0.196
Willow	14.20	0.053	3	3	3	2.75	0.979	0.052
P Apple	0.3	0.001	3	3	3	2.75	0.979	0.001
RM Mixed	56.45	0.210	3	3	3	2.75	0.979	0.206
Cypress	0	0.000					0.000	0.000
Cypress Mix	0	0.000					0.000	0.000
Mud Flats	0	0.000					0.000	0.000
Access Roads	0	0.000	0	0	0	0	0.000	0.000
Ditches	0	0.000	0	0	0	0	0.000	0.000
Berms & 15 Setback	2.74	0.010	0	0	0	0	0.000	0.000
Totals	268.4	100%						0.969

## East Cell

Polygon Category / Community Type	Community Type Acres	% of Assessment Area	MWRAP Parameters				MWRAP Score	Proportional MWRAP Score
			Wildlife	Vegetation	Hydrology	Water Quality		
Marsh	57.67	0.589	3	3	3	2.75	0.979	0.577
LD Shrub	0	0.000		0.0			0.000	0.000
Willow	0	0.000		0			0.000	0.000
P Apple	0	0.000		0			0.000	0.000
RM Mixed	26.49	0.271	3	3	3	2.75	0.979	0.265
Cypress	0	0.000		0			0.000	0.000
Cypress Mix	0	0.000		0			0.000	0.000
Mud Flats	11.1	0.113	3	2.50	3	2.75	0.938	0.106
Access Roads	0	0.000	0	0	0	0	0.000	0.000
Ditches	0	0.000	0	0	0	0	0.000	0.000
Berms & 15 Setback	2.64	0.027	0	0	0	0	0.000	0.000
Totals	97.9	100%						0.948

## South Cell

Polygon Category / Community Type	Community Type Acres	% of Assessment Area	MWRAP Parameters				MWRAP Score	Proportional MWRAP Score
			Wildlife	Vegetation	Hydrology	Water Quality		
Marsh	638.12	0.711	3	3	3	2.75	0.979	0.696
LD Shrub	0.00	0.000					0.000	0.000
Willow	61.90	0.069	3	3	3	2.75	0.979	0.068
P Apple	19.87	0.022	3	3	3	2.75	0.979	0.022
RM Mixed	59.80	0.067	3	3	3	2.75	0.979	0.065
Cypress	37.25	0.041	3	3	3	2.75	0.979	0.041
Cypress Mix	46.65	0.052	3	3	3	2.75	0.979	0.051
Mud Flats	0.00	0.000					0.000	0.000
Access Roads	6.52	0.007	0	0	0	0	0.000	0.000
Ditches	13.01	0.014	0	0	0	0	0.000	0.000
Berms & 15 Setback	14.61	0.016	0	0	0	0	0.000	0.000
Totals	897.7	100%						0.942

Assessment Area	Acres	With Out	With Bank	Delta	Credits	MBSI	Credits
North Cell	268.4	0.64	0.97	0.33	89.16	0.06	94.46
East Cell	97.9	0.54	0.95	0.40	39.61	0.06	41.97
South Cell	897.7	0.40	0.94	0.54	484.13	0.06	512.93
Totals	1264.0				612.89		649.36

ATTACHMENT D (con't) - Loxahatchee Mitigation Bank  
MWRAP Functional Assessment "Impacts Outside the Bank"

11/16/99

North Cell

Polygon Category	Acres	MWRAP Parameters				MWRAP Score	Credits
		Wildlife	Vegetation	Hydrology	Water Quality		
Brazilian Pepper (LWDD)	1.42	1.25	0.5	1	2.75	0.458	0.65
Brazilian Pepper Mix (LWDD)	0.23	1.5	1.1	1	2.75	0.531	0.12
Brazilian Pepper Shrub (LWDD)	0.24	1.5	1.3	1.5	2.75	0.583	0.14
Red Maple Mixed (LWDD)	0.14	2.5	1.5	2	2.75	0.729	0.10
Brazilian Pepper Shrub (FWS)	0.21	1.5	1.3	1.5	2.75	0.583	0.12
Totals	2.24						1.14

East Cell

Polygon Category	Acres	MWRAP Parameters				MWRAP Score	Credits
		Wildlife	Vegetation	Hydrology	Water Quality		
Brazilian Pepper Mix (FPL)	0.03	1.25	1.0	0.83	2.75	0.486	0.01

South Cell

Polygon Category	Acres	MWRAP Parameters				MWRAP Score	Credits
		Wildlife	Vegetation	Hydrology	Water Quality		
Brazilian Pepper Mix (LWDD)	0.96	1.2	1.05	1.1	1.49	0.403	0.39
Brazilian Pepper Shrub (LWDD)	0.72	1.33	1.25	1.33	1.49	0.450	0.32
Totals	1.68						0.71

	Acres	Credits
Lake Worth Drainage District	3.71	1.73
Fish and Wildlife Service	0.21	0.12
Florida Power and Light	0.03	0.01
<b>Total</b>	<b>3.95</b>	<b>1.86</b>

## **ATTACHMENT G. Security Measures**

### **General Security**

The bank site will be encompassed with “No Trespassing” signs, as detailed in Florida Statutes Chapter 810.011(5)(a). The bank site will also be monitored by a security patrol on a monthly basis. This patrolling will occur during both the initial maintenance and monitoring period and the long-term management. During this patrol, security personnel will check for evidence of poaching or dumping, as well as the condition of fencing, gates and signs.

### **North Parcel**

There are two gated vehicular entry points to the North Parcel (see attached figure “Security Measures”). The first is through the gated Levee 40 (Gate 1) located within the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge) near the Boat Ramp area. The second point of entry is gated (Gate 4), just west of the intersection of State Road 7 and the L-36 ½ canal/levee. The L-36 ½ is managed by the Lake Worth Drainage District (LWDD) and public access is prohibited. In the North Parcel, the eastern perimeter is bounded by the E-1W-N canal. This canal is also managed by the Lake Worth Drainage District (LWDD) and public access is prohibited. The proposed soil cement berm commencing at Levee 40, running parallel to E-1W-N and travelling south and west around LWDD’s horticultural disposal area and terminating at the Levee 40 will be gated at points of entry. These gates will remain locked at all times. The western perimeter of the bank site coincides with the eastern boundary of the Refuge and Levee 40. “No Trespassing” signs along the western boundary of the Bank will provide notice to the public using the Levee 40. The intersection of Levee 40 and Lateral (L-) 36½ is gated (Gate 2), making unauthorized travel improbable. Additionally, there is a gate on the south side of the bridge crossing L-36½ (Gate 3). The boat ramp used for ecological monitoring located northeast of LWDD’s horticultural disposal area will be gated and secured at all times.

### **South Parcel**

Gate 4, approximately 1 mile east of the bank site and west of State Road 7, provides the only vehicular entry point to the South Parcel. The South Parcel is bounded on the west by the E-1W-S and on the north by the L-36½ which are under the control of LWDD and public access is prohibited. The southern border is contiguous with the Saturnia housing development. Saturnia is fenced along this perimeter. The eastern border has three interfaces:

- Florida Power & Light (FPL) Broward-Corbett Transmission Line- This right of way is controlled by FPL and access is limited to those parties in possession of a right of way use agreement.



- Boca Chase housing development – Most of the homes of this community are separated from the site by water (lakes and canals). The rest of the homes are adjacent to the property with no physical separation.
- Lakes at Boca Raton housing development - The homes of this community are separated from the site by a wooden fence.

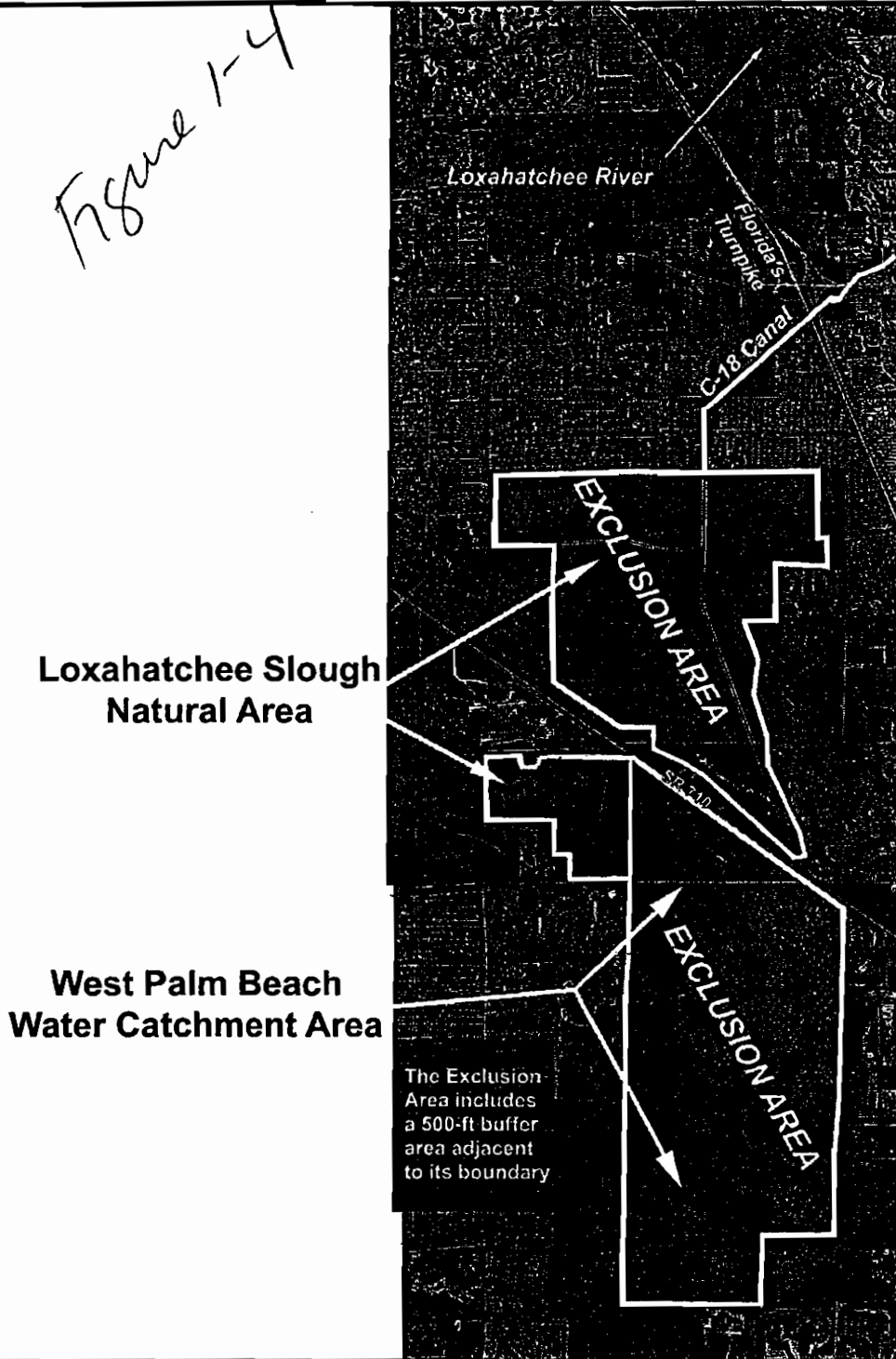
The proposed earthen berms along the eastern and southern borders will be gated at possible points of entry. These gates will remain locked at all times. It is highly unlikely that unauthorized entry will occur along the eastern and southern borders due to this proposed system of ditch and berm.

### **Southeast Parcel**

The northern boundary of this parcel, like the South Parcel, is adjacent to the L-36½, which is under the control of LWDD and public access is prohibited. The western border is met by FPL's Broward-Corbett Transmission Line. This right of way is controlled by FPL and access is limited to those parties in possession of a right of way use agreement. The eastern and southern borders are separated by a soil cement berm, which will be gated at possible points of entry. These gates will remain locked at all times.

Gate #	General Location	Controlling Entity	Schedule
1	Levee 40 within ARM Lox NWR near boat ramp and parking lot	South Florida Water Management District	This gate is locked at all times.
2	East of Levee 40, West of Horticultural Disposal Area	Lake Worth Drainage District, FPL	This gate is locked at all times.
3	South of L-36½, North side of access road	Lake Worth Drainage District	This gate is locked after 3:30 pm weekdays and all day weekends and holidays.
4	West of State Road 7, South of L-36½	Lake Worth Drainage District, FPL	This gate is locked after 3:30 pm weekdays and all day weekends and holidays.

Figure 1-4



Sources: Foster Wheeler Environmental Corp.  
759 South Federal Highway Suite 100  
Stuart, FL 34994;  
Dept. of Environmental Resources Management  
Palm Beach County (1998)

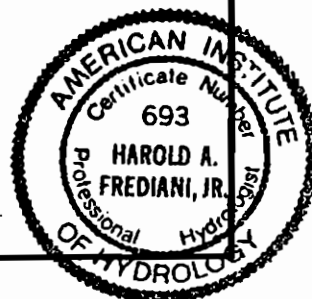
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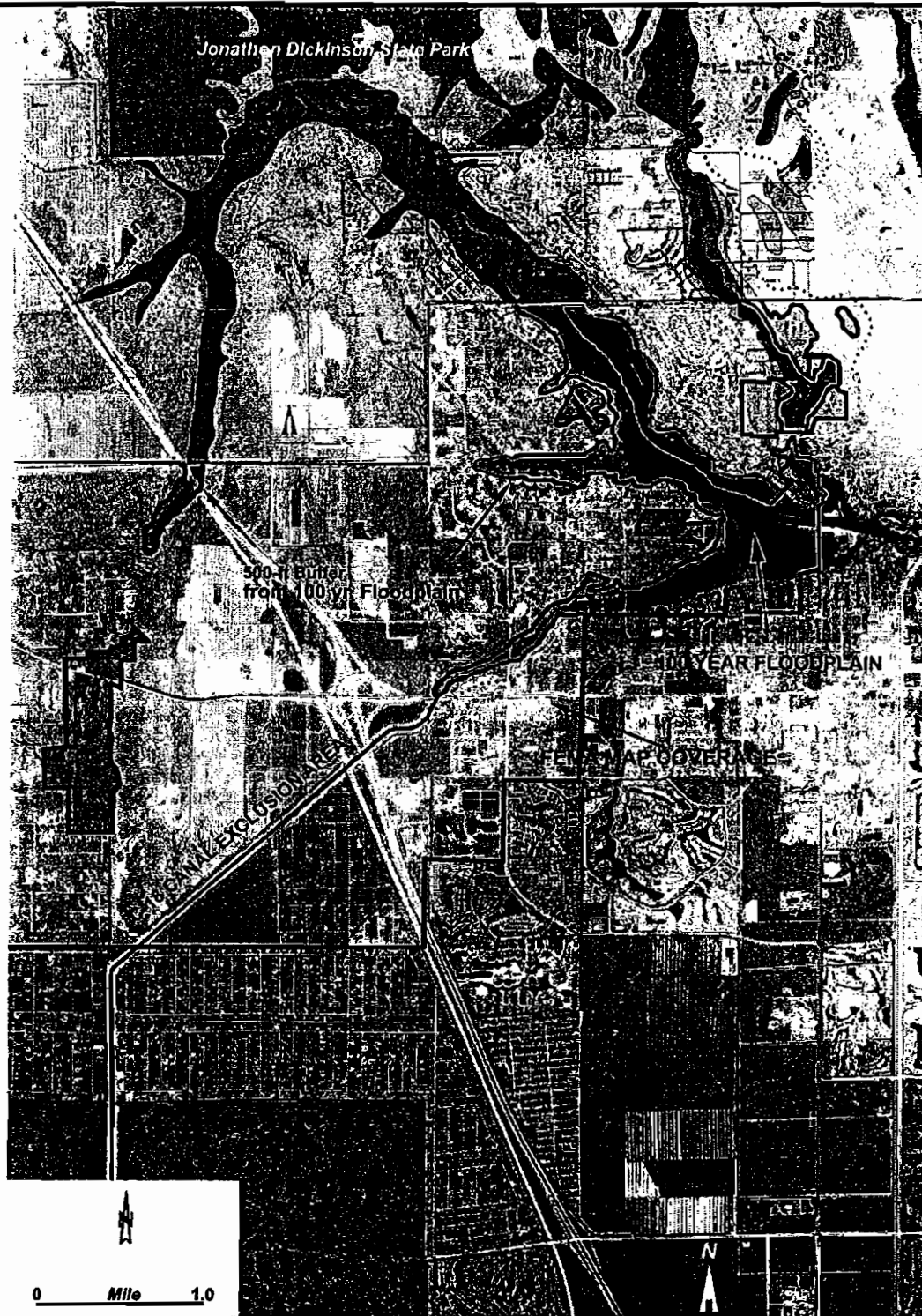
Loxahatchee Mitigation Bank  
LOXAHATCHEE SLOUGH EXCLUSION AREAS  
FIGURE 13B

*Harold A. Frediani, Jr.*  
2/3/00

Engineering Certificate  
of Authorization No. 7130

Note: Text description on Figure 13D





Source: Foster Wheeler Environmental Corp.  
 759 South Federal Highway Suite 100  
 Stuart, FL 34994

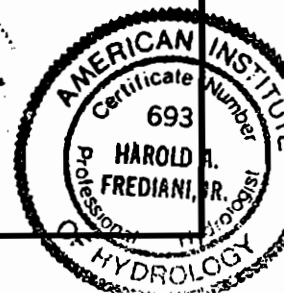
January 28, 2000  
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 2/3/00

**Loxahatchee Mitigation Bank  
 LOXAHATCHEE RIVER AND  
 ASSOCIATED EXCLUSION AREA  
 FIGURE 13C**

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 of Authorization No. 7130

Note: Text description on Figure 13D



### Service Area Boundary (Figure 13A)

The northern boundary of the Service Area is located in Martin County. Starting at the intersection of SR 708 and US1, follow SR 708 west to where it intersects with SR 76, then follow SR 76 to the St. Lucie Canal. Follow the St. Lucie Canal to the Herbert Hoover Dike, which surrounds Lake Okeechobee. Follow the Herbert Hoover Dike south and then west around the Lake to the point that intersects the Palm Beach/Hendry County line. Follow the Palm Beach County line south until it reaches the Broward County Line. Follow the Broward County line south to the southwest corner of the County, then head east along the Broward/Dade County line until it intersects US1. Follow US1 north for the eastern boundary until it intersects SR 708.

### Exclusion Area Boundaries

#### ***Loxahatchee Slough (Figure 13B)***

The Loxahatchee Slough Natural Area, estimated to be 10,329 acres, located in north central Palm Beach County, will be excluded from the Mitigation Service Area. The area encompassed by this County Managed Natural Area lies north of SR 710 where it intersects Northlake Boulevard (Palm Beach County Department of Environmental Resources Management: Map of Natural Areas and Preserves in Palm Beach County, 1998). Another portion of the Loxahatchee Slough Natural Area is located just south of 710 and north of Northlake Boulevard. A portion of the Loxahatchee Slough adjoining the Natural Area will also be excluded. This additional exclusion area is located south of SR 710 and includes the West Palm Beach Water Catchment Area. The Water Catchment Area is an approximately 19-square mile wetland system that stores and purifies water for the City of West Palm Beach.

#### ***Canal C-18 (Figure 13B)***

Canal C-18, from the Loxahatchee River to the northern extent to the Loxahatchee Slough, is excluded from the Loxahatchee Mitigation Bank.

#### ***Loxahatchee River (Figure 13C)***

The Loxahatchee River Exclusion Area includes the Loxahatchee River proper, including the North and Southwest Forks, and the area up to 500 feet beyond the limits of the 100- year flood zone, or 50 feet beyond the landward extent of wetlands (delineated according to Rule 62-340 FAC) contiguous with the River, whichever is greater. The 100-year flood zone is delineated in the Federal Emergency Management Agency (FEMA) National Flood Insurance Program, Flood Insurance Rate Maps (FIRM) for Martin and Palm Beach Counties (Community-Panel Numbers 120161-0340C, -0485B, -0505E, 120192-0102B, -0105B, -0106B, and -0108B). The Exclusion Area above the 100-year floodplain shall not include isolated wetlands nor historically isolated wetlands that are currently connected to the River by artificial means, such as ditch, canal, swale, pipe or culvert.

Source: Foster Wheeler Environmental Corp.  
759 South Federal Highway Suite 100  
Stuart, FL 34994;

January 28, 2000  
fig13Drev2.doc

Dept. of Environmental Resources Management,  
Palm Beach County (1998)

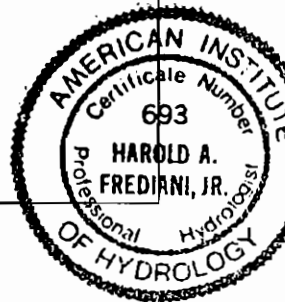
Loxahatchee Mitigation Bank

**BOUNDARIES OF THE MITIGATION BANK  
SERVICE AREA AND EXCLUSION AREAS**

**FIGURE 13D**









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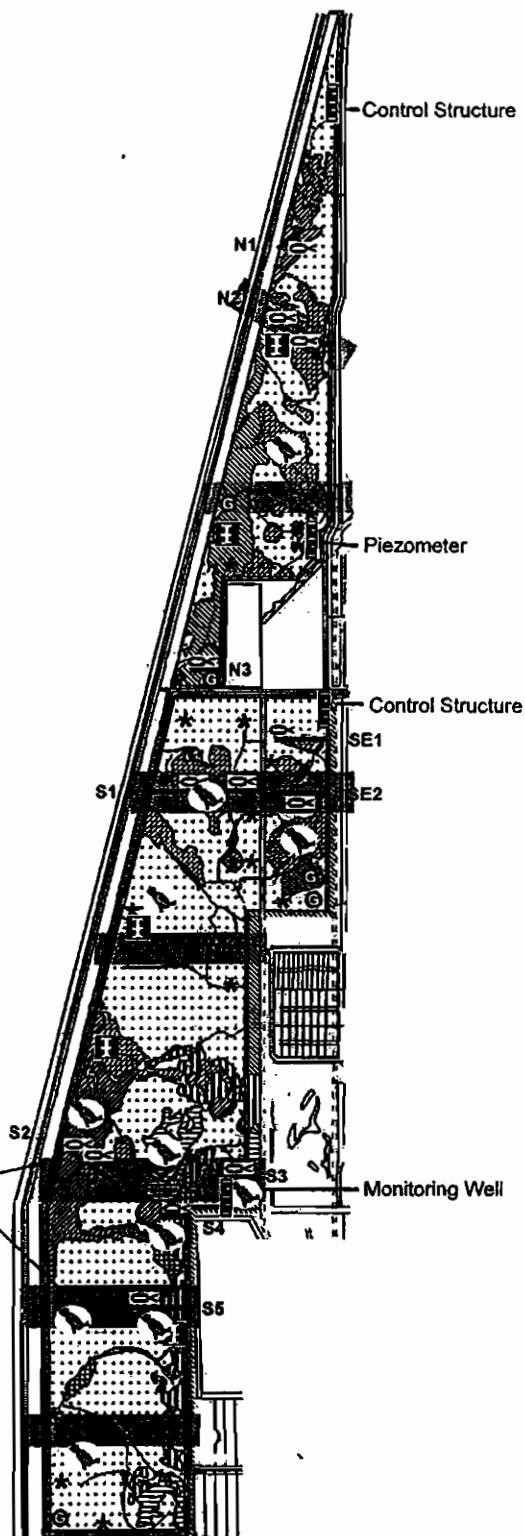
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2/3/00



-  Marsh with Open Water
-  Low Density Shrub
-  Willow - High Density Shrub
-  Cypress
-  Cypress/Mixed
-  Red Maple/Mixed
-  Pond Apple/Mixed
-  Mud Flats
-  Canals/Ditches
-  Access Roads and Containment Berms

0 2000  
Feet

-  Monitoring Transects
-  Fish Trap Sampling
-  Bird/Wildlife Survey Locations
-  Continuous Water Level Monitors
-  Additional sampling to cover MWRAP locations not found along monitoring transects
-  Staff Gage
-  Low Level Photographic Coverage
-  Drift Fence Location



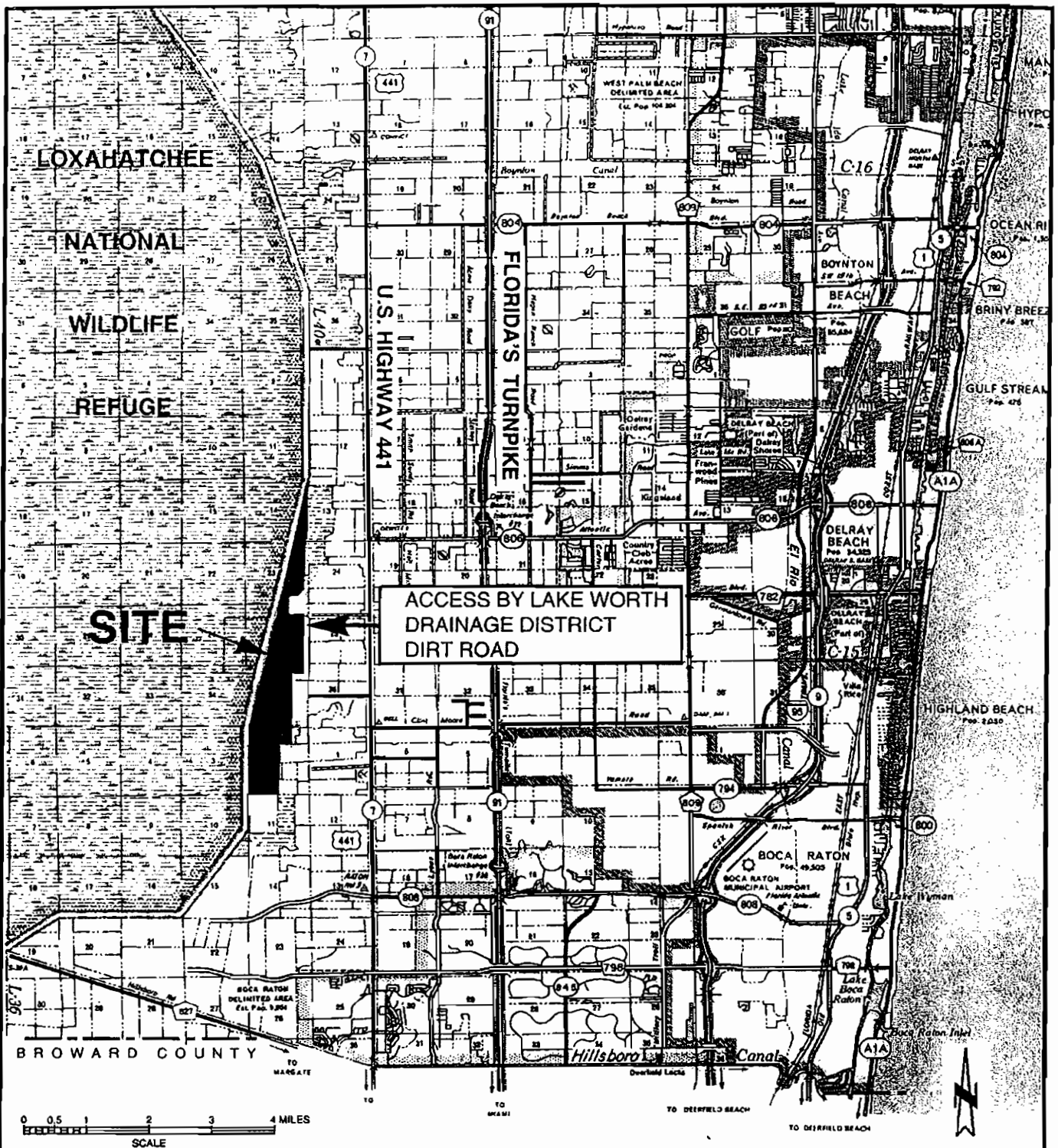
Source: Foster Wheeler Environmental Corp.  
Suite 100  
750 South Federal Highway  
Stuart, FL 34994

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2/3/00  
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## Loxahatchee Mitigation Bank PROPOSED MONITORING LOCATIONS FIGURE 14

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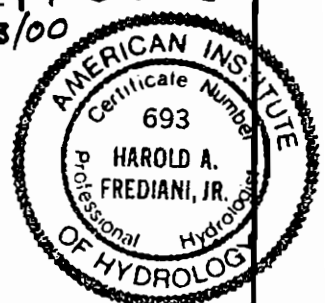
Source: FDOT General Highway Map of Palm Beach County  
 Foster Wheeler Environmental Corp.  
 759 South Federal Highway Suite 100  
 Stuart, FL 34994

January 28, 2000

Permit rev.tif

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 2/3/00


Loxahatchee Mitigation Bank  
**LOCATION MAP**  
**FIGURE 1**

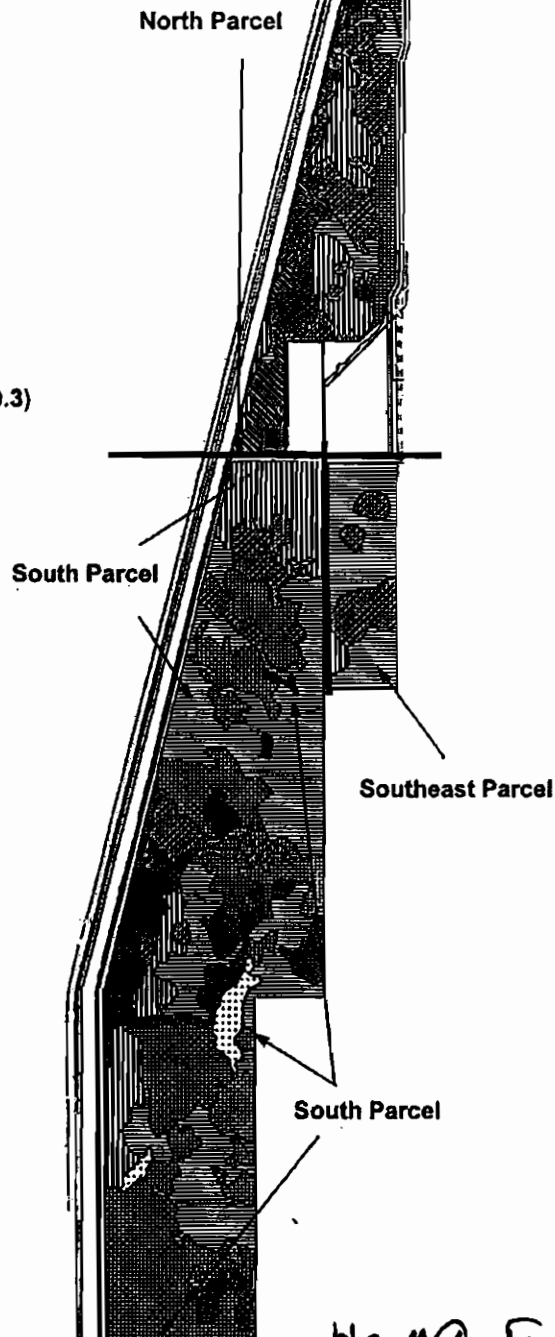


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# **Vegetative Classifications and Acreages**

-  Marsh (3.3)
-  Low Density Shrub (22.6)
-  Wax Myrtle - (31.4)  
High Density Shrub
-  Willow - (76.1)  
High Density Shrub
-  Brazilian Pepper (319.4)
-  Brazilian Pepper/Mixed (361.6)
-  Brazilian Pepper/HD Shrub (169.3)
-  Cypress (39.1)
-  Cypress/Mixed (52.6)
-  Red Maple/Mixed (143.3)
-  Pond Apple (20.2)
-  Strangler Fig/Mixed (9.9)
-  Melaleuca (4.5)



*Harold A. Frediani, Jr.*

Source: Foster Wheeler Environmental Corp.  
Scale 1:00  
759 South Federal Highway  
Stuart, FL 34994






## **Loxahatchee Mitigation Bank EXISTING VEGETATION MAP FIGURE 2**

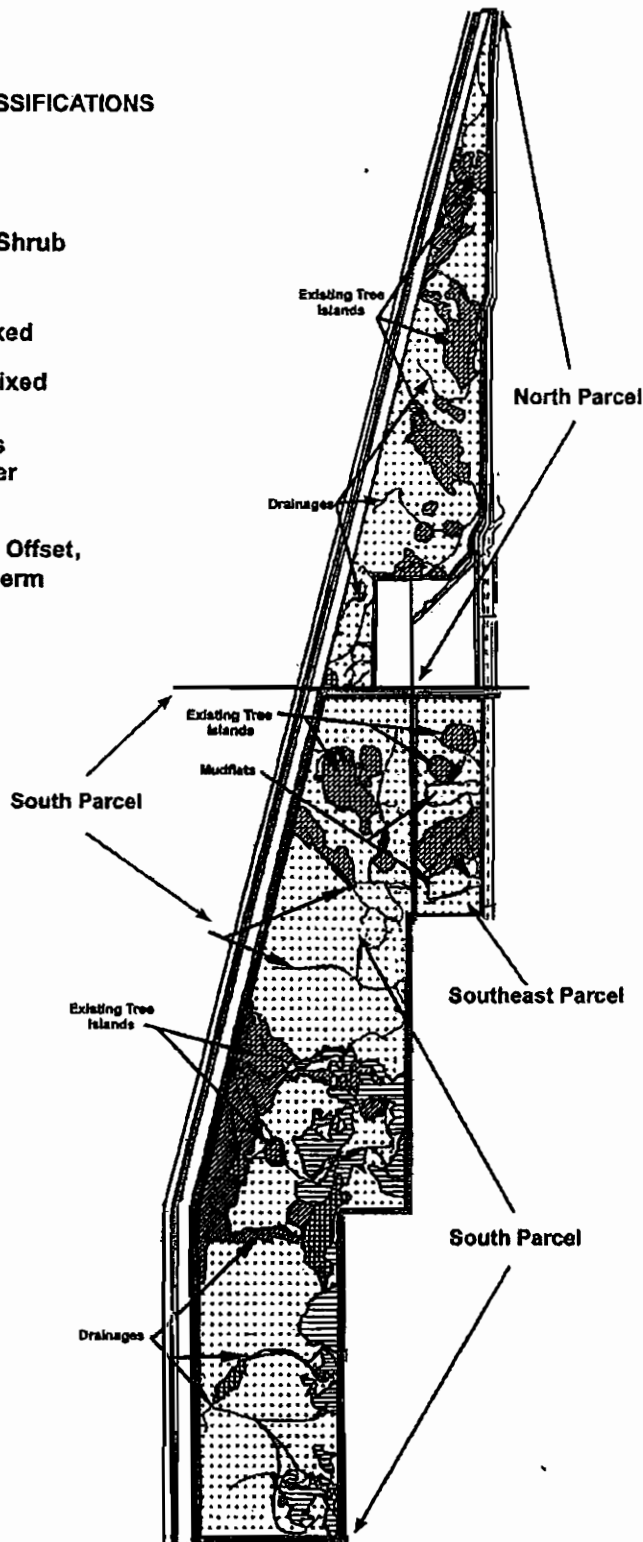
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**LAND COVER CLASSIFICATIONS  
AND ACREAGES**

-  Marsh
-  Willow - High Density Shrub
-  Cypress
-  Red Maple/Mixed
-  Pond Apple/Mixed
-  Canals/Ditches and Open Water
-  Access Roads, Offset, Containment Berm
- 



Source: Foster Wheeler Environmental Corporation  
759 South Federal Highway Suite 100  
Stuart, FL 34994

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2/9/00

February 2, 2000  
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**Loxahatchee Mitigation Bank  
PROPOSED MITIGATION PLAN  
FIGURE 3**



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# LAND COVER CLASSIFICATIONS

- Marsh
- Willow - High Density Shrub
- Cypress
- Red Maple/Mixed
- Pond Apple/Mixed

Drainages

## HYDROLOGIC FEATURES

Existing Berm

Proposed Berm

General Surface Flows

Control Structure

Emergency Discharge Structure



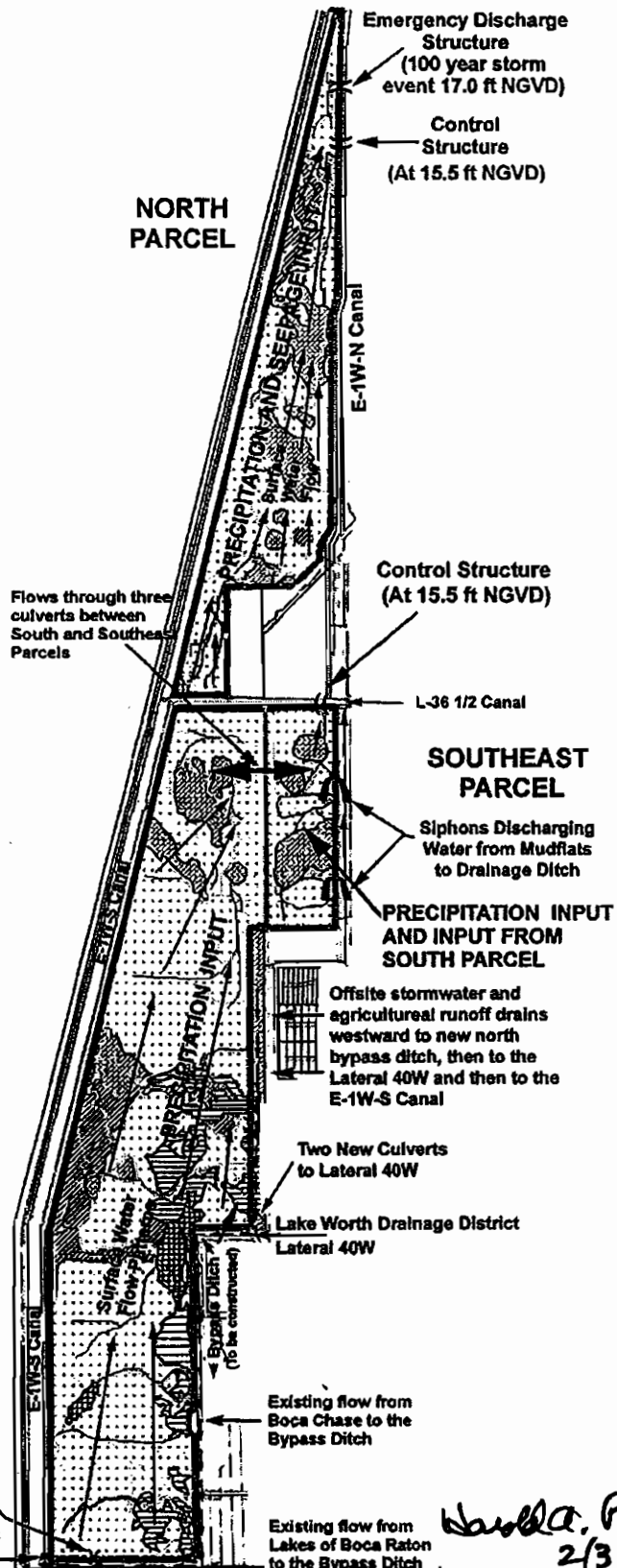
Note: Shallow meandering ditches will be created to facilitate surface drainage and to enhance wildlife habitat.

**SOUTH PARCEL**

**NORTH PARCEL**

Emergency Discharge Structure  
(100 year storm event  
at 17.0 ft NGVD)

Two New Culverts  
to E-1W-S



Source: Foster Wheeler Environmental Corporation  
769 South Federal Highway Suite 100  
Stuart, FL 34994

Loxahatchee Mitigation Bank  
HYDROLOGICAL CONTROL FEATURES AND FLOW STATE  
FIGURE 4




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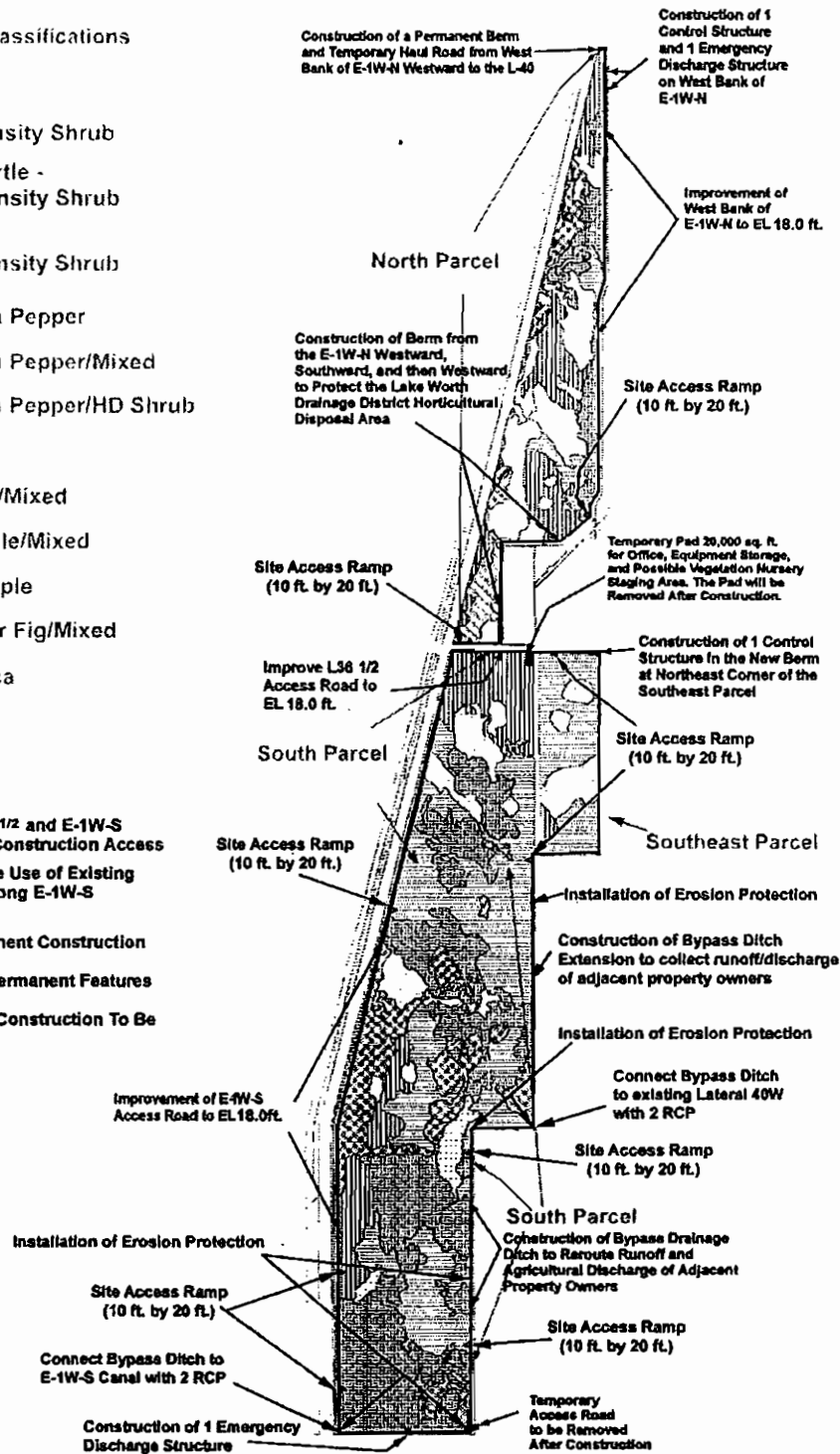


# Vegetative Classifications

-  Marsh
-  Low Density Shrub
-  Wax Myrtle - High Density Shrub
-  Willow - High Density Shrub
-  Brazilian Pepper
-  Brazilian Pepper/Mixed
-  Brazilian Pepper/HD Shrub
-  Cypress
-  Cypress/Mixed
-  Red Maple/Mixed
-  Pond Apple
-  Strangler Fig/Mixed
-  Melaleuca

\*NOTES:  
Use of L-36 1/2 and E-1W-S Roads for Construction Access  
Discontinue Use of Existing Culverts Along E-1W-S

-  New Permanent Construction
-  Improved Permanent Features
-  Temporary Construction To Be Removed



Source: Foster Wheeler Environmental Corp.  
759 South Federal Highway Suite 100  
Stuart, FL 34994

February 2, 2000  
Perm5rev.tif

## Loxahatchee Mitigation Bank TEMPORARY AND PERMANENT CONSTRUCTION ACTIVITIES AT THE BANK FIGURE 5



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Page

1. Title Page

2. Introduction

3. Objectives

4. Methodology

5. Results

6. Discussion

7. Conclusion

8. References

9. Appendix

10. Glossary

11. Index

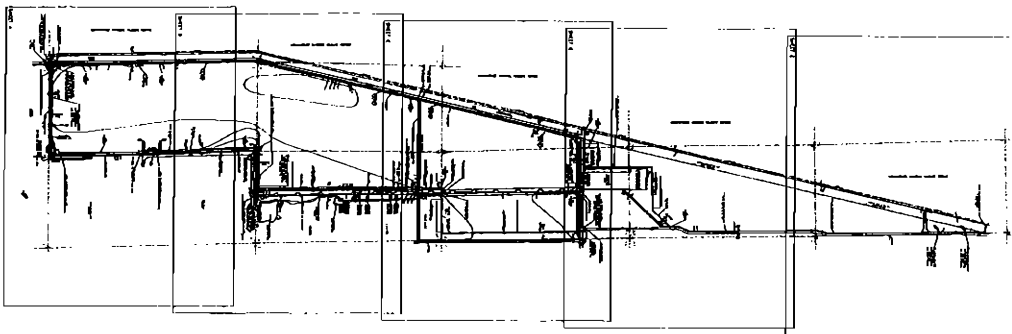
**NOTES**

1. The data were collected from the field and are subject to the usual errors of observation and measurement.

2. The data were analyzed using the methods described in the methodology section.

3. The results are presented in the results section and are subject to the usual errors of analysis and interpretation.

4. The discussion and conclusion are based on the results and are subject to the usual errors of judgment and opinion.



Item	Description	Quantity	Unit
1	Steel beam	1	ft
2	Steel column	1	ft
3	Steel plate	1	ft
4	Steel bolt	1	ft
5	Steel nut	1	ft
6	Steel washer	1	ft
7	Steel angle	1	ft
8	Steel channel	1	ft
9	Steel pipe	1	ft
10	Steel rod	1	ft

**PRELIMINARY**  
NOT TO BE USED  
FOR CONSTRUCTION

**FIGURE 6**  
**KEYMAP**

Item	Description	Quantity	Unit
1	Steel beam	1	ft
2	Steel column	1	ft
3	Steel plate	1	ft
4	Steel bolt	1	ft
5	Steel nut	1	ft
6	Steel washer	1	ft
7	Steel angle	1	ft
8	Steel channel	1	ft
9	Steel pipe	1	ft
10	Steel rod	1	ft



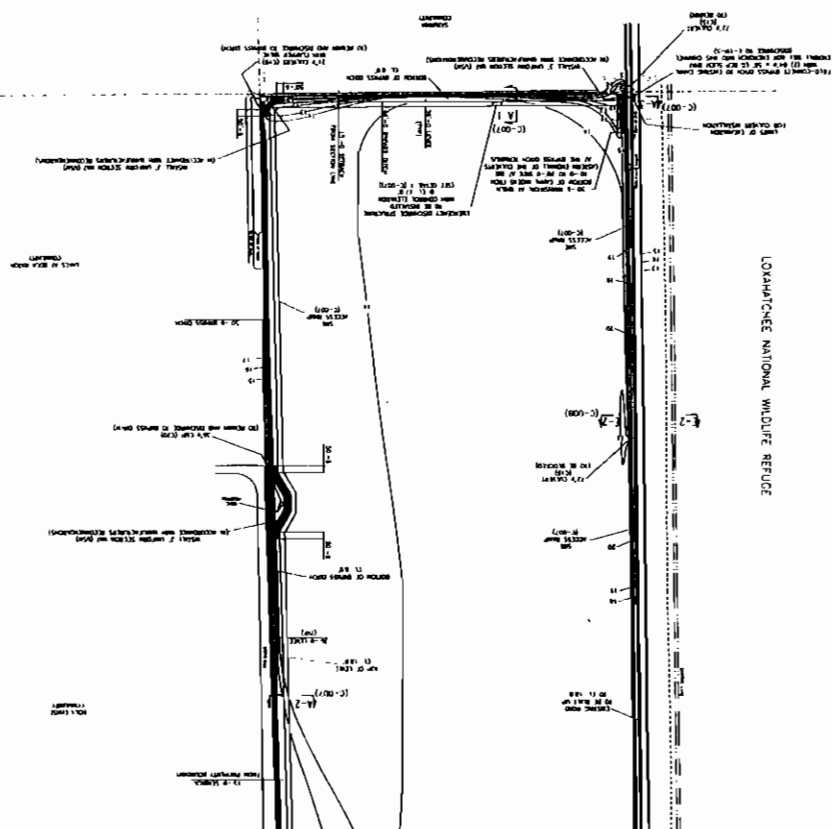
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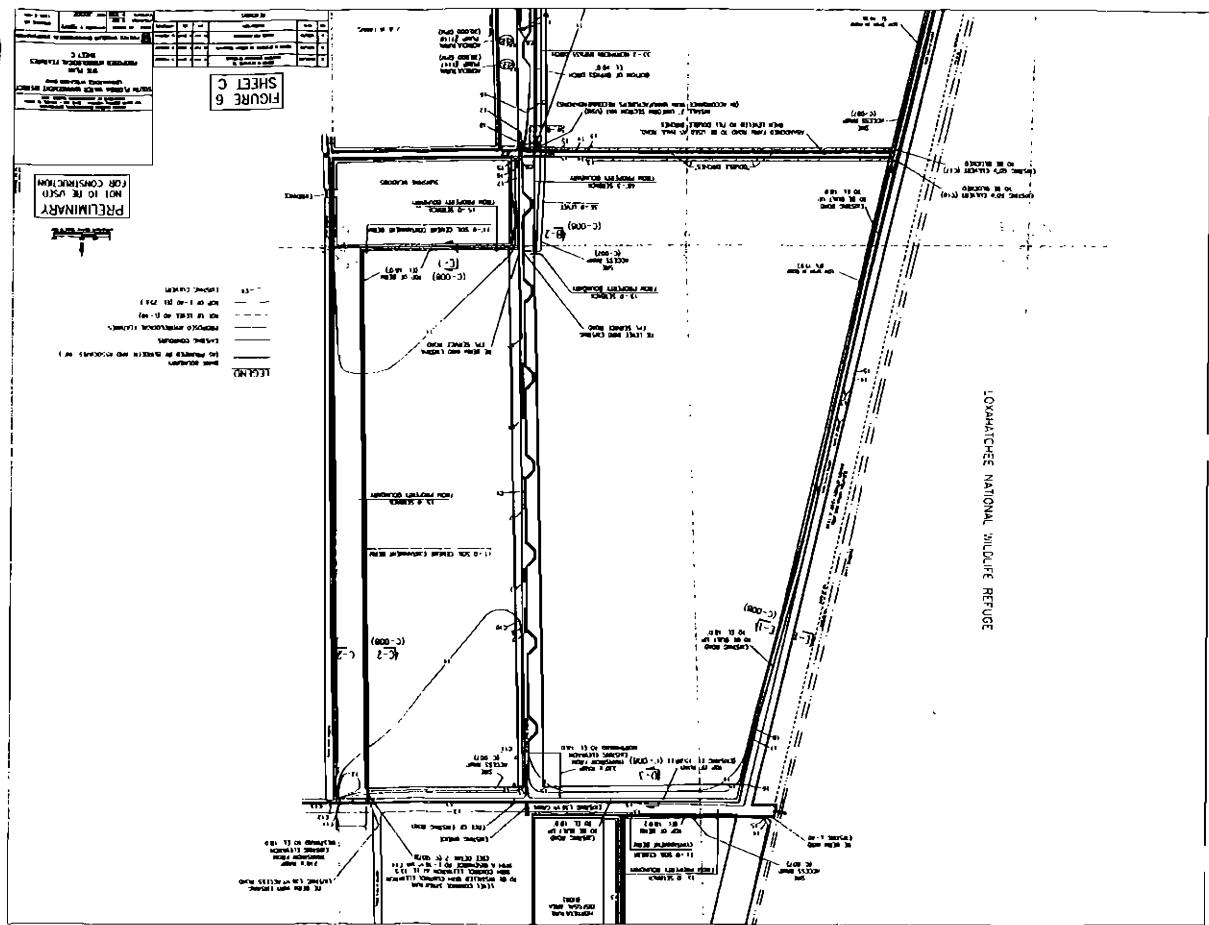
2/4/00  
K. A. Friedman

[illegible]FIGURE 6  
SHEET A

PRELIMINARY  
NOT TO BE USED  
OR FOR CONSTRUCTION

[illegible]

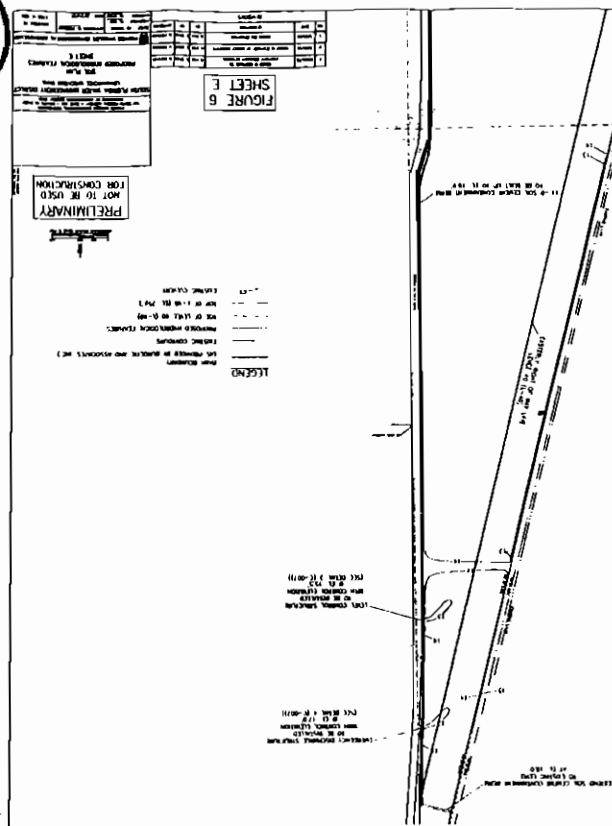








Ward A. Robinson, Jr.  
2/14/00





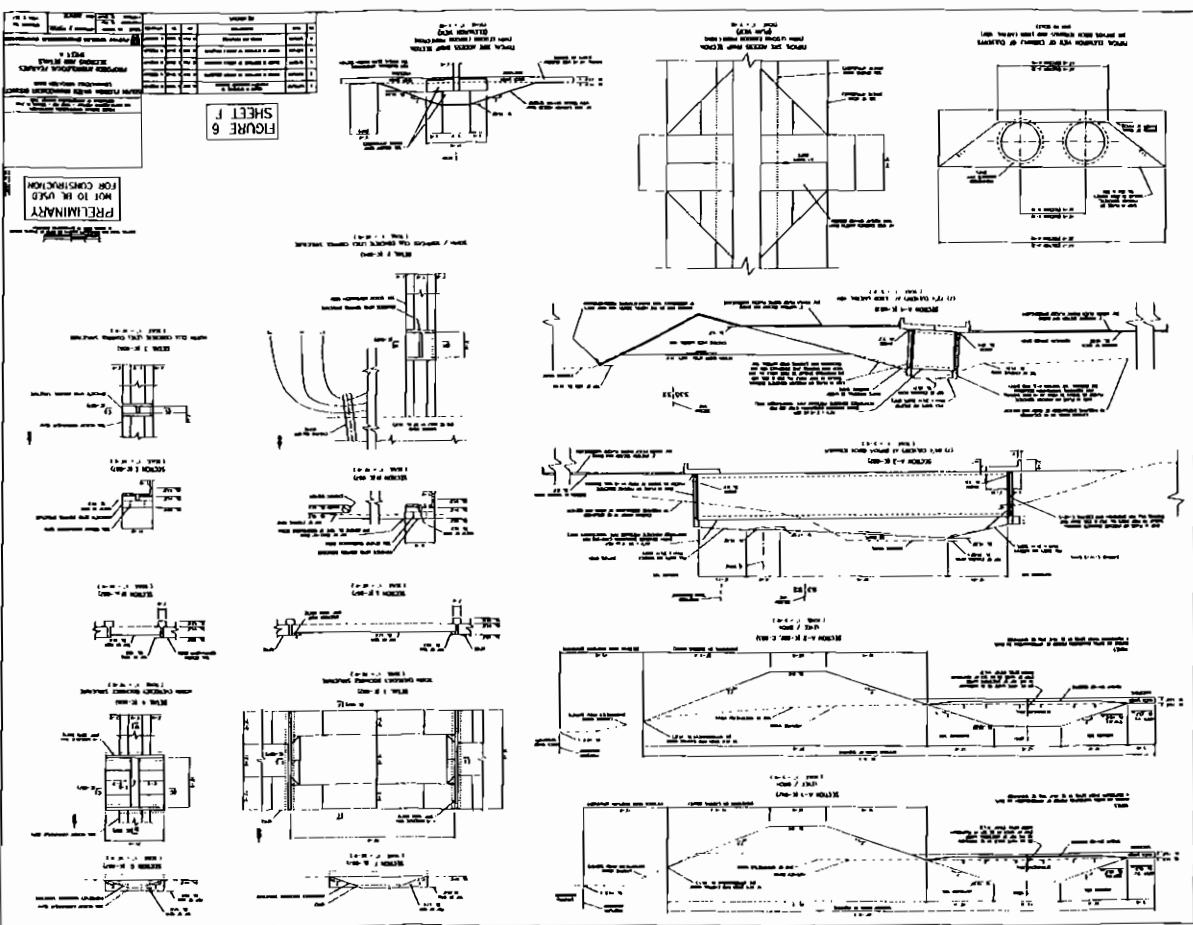


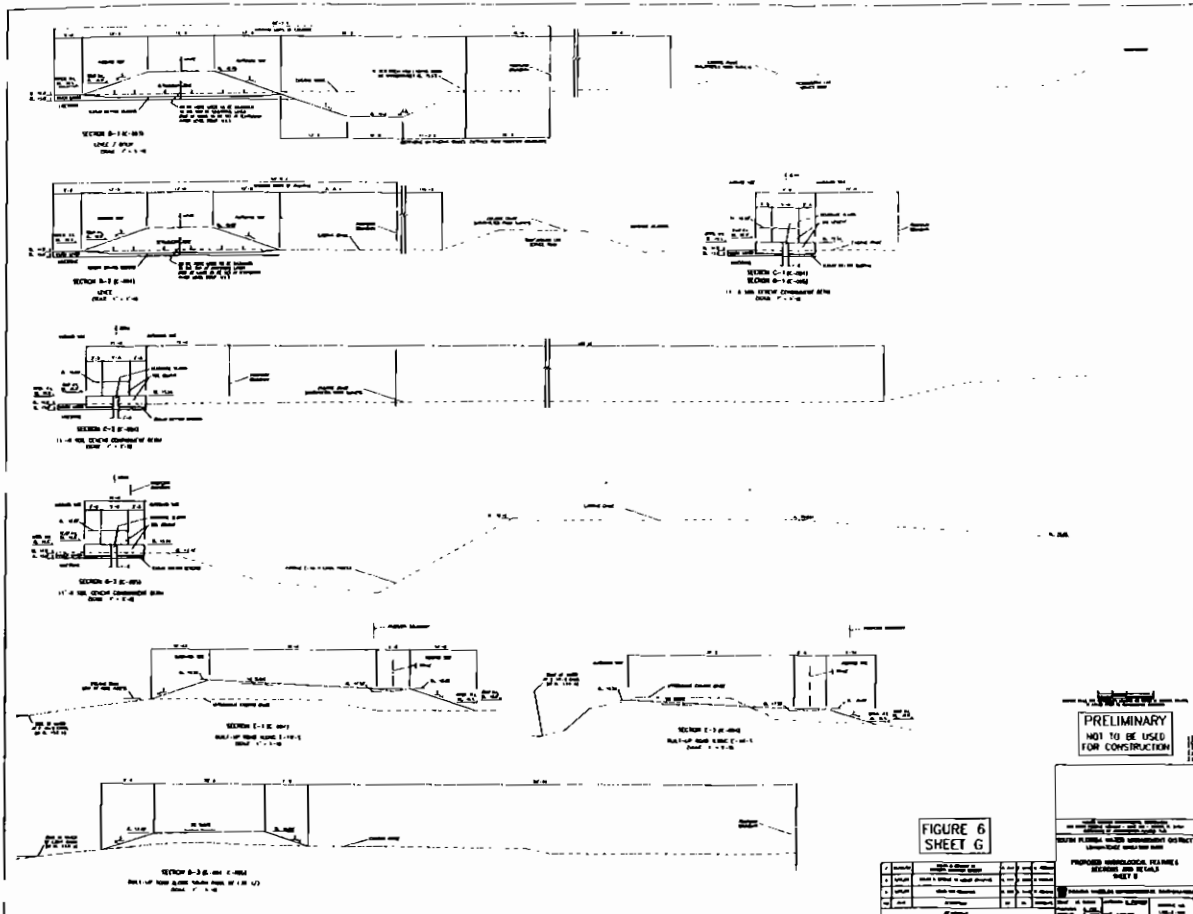
2/4/00  
Harold Freeman, Jr.

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27	NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36	NO. 37	NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45	NO. 46	NO. 47	NO. 48	NO. 49	NO. 50	NO. 51	NO. 52	NO. 53	NO. 54	NO. 55	NO. 56	NO. 57	NO. 58	NO. 59	NO. 60	NO. 61	NO. 62	NO. 63	NO. 64	NO. 65	NO. 66	NO. 67	NO. 68	NO. 69	NO. 70	NO. 71	NO. 72	NO. 73	NO. 74	NO. 75	NO. 76	NO. 77	NO. 78	NO. 79	NO. 80	NO. 81	NO. 82	NO. 83	NO. 84	NO. 85	NO. 86	NO. 87	NO. 88	NO. 89	NO. 90	NO. 91	NO. 92	NO. 93	NO. 94	NO. 95	NO. 96	NO. 97	NO. 98	NO. 99	NO. 100
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FIGURE 6  
SHEET 6

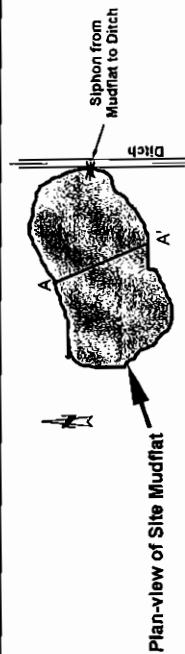
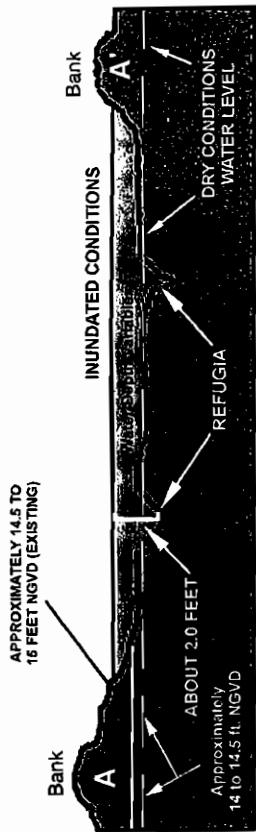
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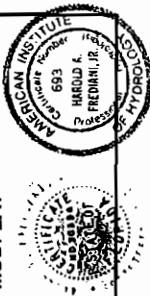
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2/3/00

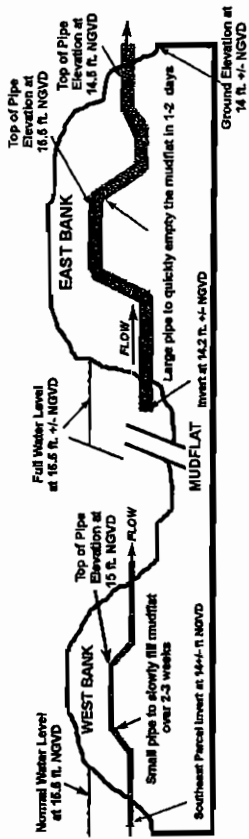
Loxahatchee Mitigation Bank

TYPICAL CROSS-SECTION OF A CONSTRUCTED MUDFLAT  
FIGURE 7

Source: Foster Wheeler Environmental Corp.  
Suite 100  
758 South Federal Highway  
Stuart, FL 34994

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Plan-view of Site Mudflat

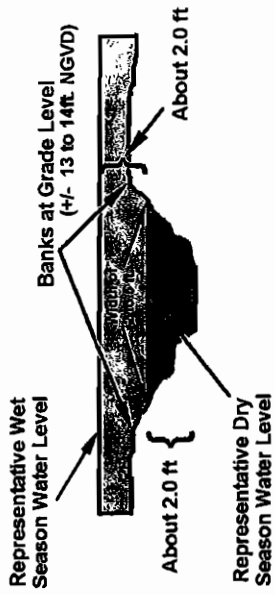
January 28, 2000  
 Permit No. 11  
 Harold A. Fredman, Jr.  
 2/3/00

Loxahatchee Mitigation Bank  
 DESCRIPTION OF THE MINNESOTA SIPHON  
 TO BE USED IN THE MUDFLATS  
 FIGURE 8

Source: Foster Wheeler Environmental Corporation  
 Suite 102, 799 South Industrial Highway  
 Stuart, FL 34986

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Source: Foster Wheeler Environmental Corp.  
759 South Federal Highway Suite 100  
Stuart, FL 34494

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PermBrav6.ar

Loxahatchee Mitigation Bank

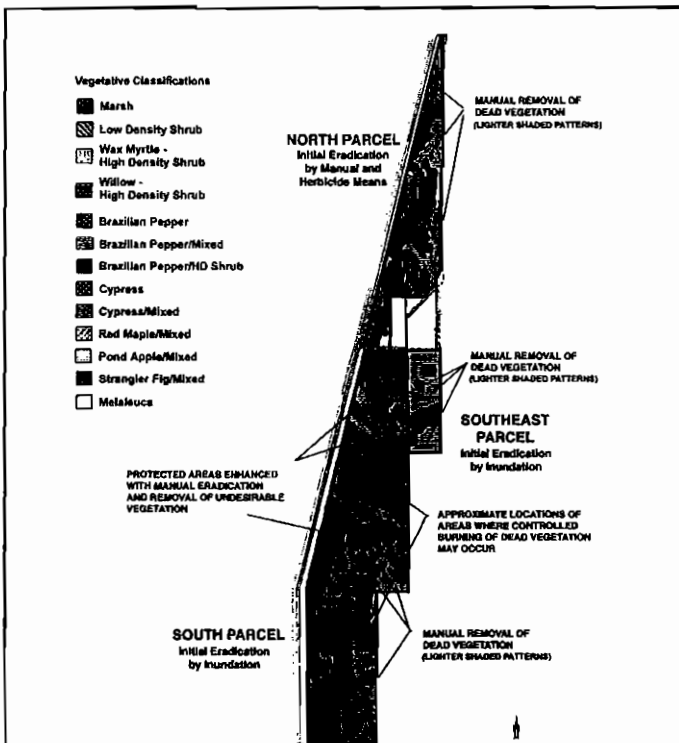
*Harold A. Friedman Jr.*  
2/3/00

### TYPICAL DRAINAGE CROSS-SECTION

FIGURE 9

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Source: Foster Wheeler Environmental Corp.  
758 South Federal Highway Suite 100  
Orlando, FL 32804

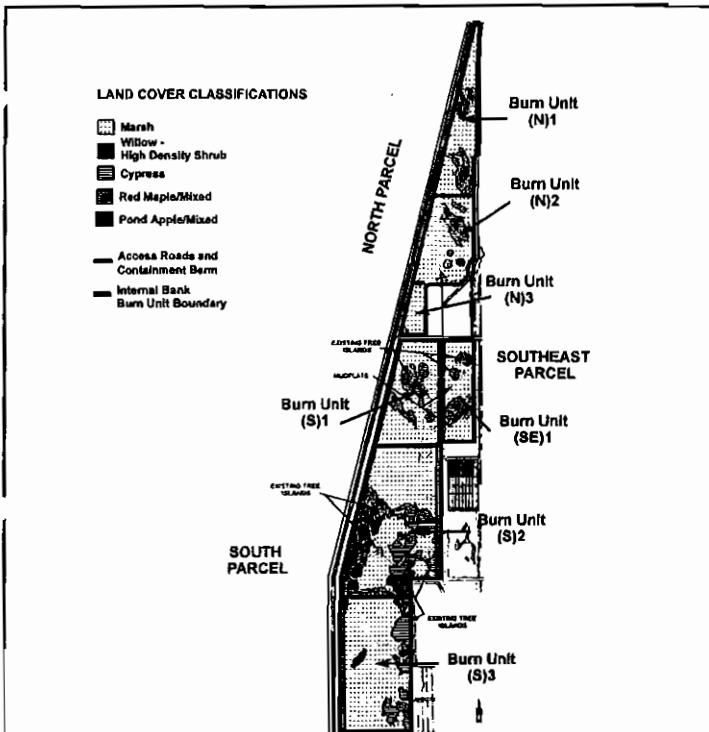
January 28, 2000  
Perm 1000/B.tif

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2/3/00

**Loxahatchee Mitigation Bank  
INITIAL VEGETATION CONTROL  
FIGURE 10**



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Source: Collier Hearing  
Foster Wheeler Environmental Corp.  
789 South Federal Highway Suite 100  
Beverly, FL 34404

January 28, 2000  
Permit11rev8.tif

Loxahatchee Mitigation Bank  
PROPOSED MAINTENANCE BURN PROGRAM  
FIGURE 11



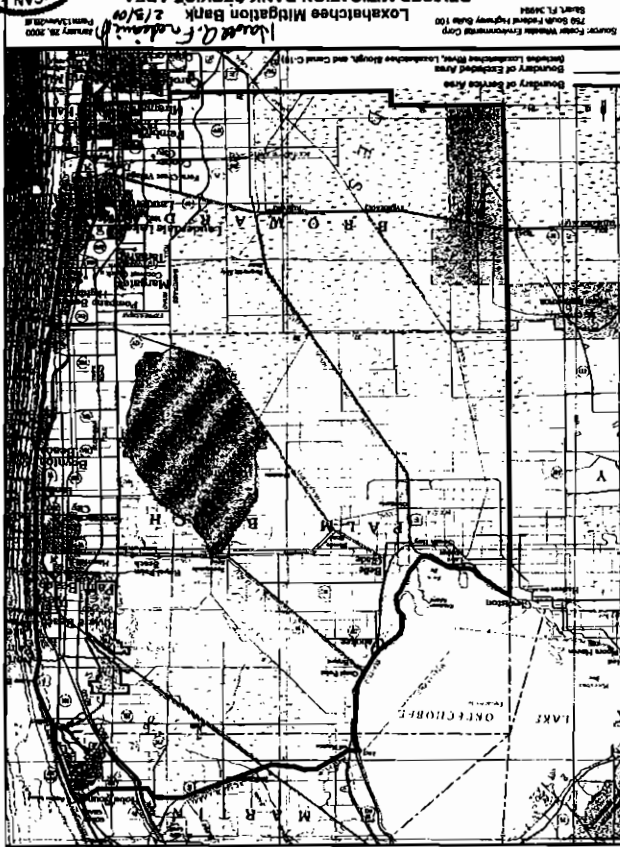
Engineering Certificate  
of Authorization No. 7130



FIGURE 13  
REVISED MITIGATION BANK SERVICE AREA

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of Authorization No. 1130

Noted and described on Figure 13.0

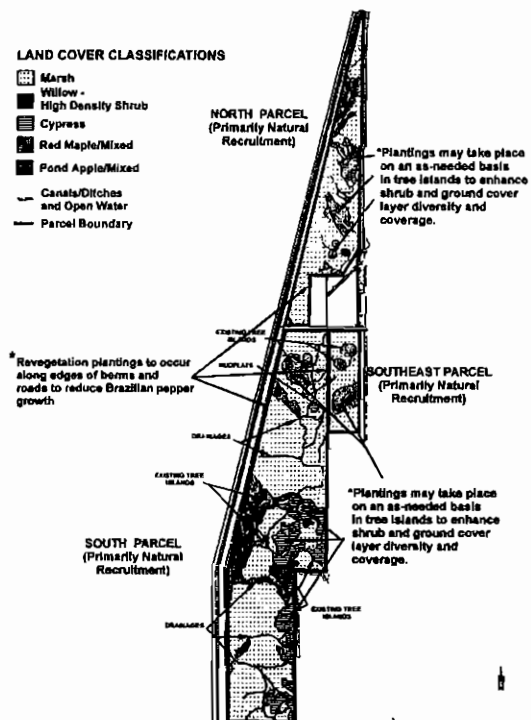


Source: Corps Wetlands Environmental Corp.  
750 South Federal Highway, Suite 100  
Boca Raton, FL 33432  
January 28, 2000  
FWS-1300-00-000



# LAND COVER CLASSIFICATIONS

- Marsh
- Willow
- High Density Shrub
- Cypress
- Red Maple/Mixed
- Pond Apple/Mixed
- Canals/Ditches and Open Water
- Parcel Boundary



Source: Florida Wildlife Research Center  
July 1999  
100 South Federal Highway  
Boca Raton, FL 33433

January 28, 2000

Handwritten: *Harold A. Friedman*  
Stamp: *Permit 2 rev 8, 1/28/00*



Loxahatchee Mitigation Bank  
PRELIMINARY REVEGETATION PLAN  
FIGURE 12

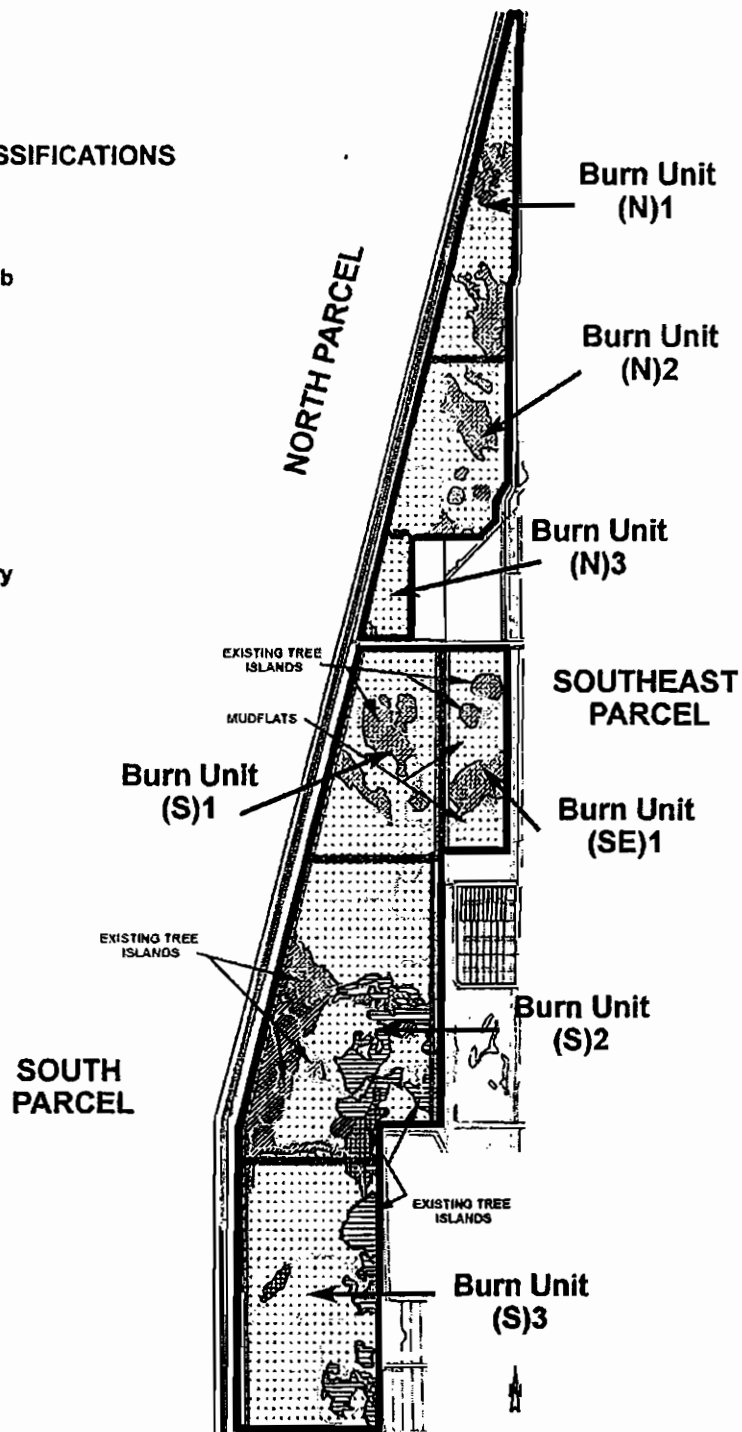


Engineering Certificate  
of Authorization No. 7130

# LAND COVER CLASSIFICATIONS

-  Marsh
-  Willow - High Density Shrub
-  Cypress
-  Red Maple/Mixed
-  Pond Apple/Mixed

-  Access Roads and Containment Berm
-  Internal Bank Burn Unit Boundary



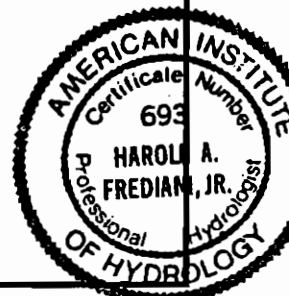
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Stuart, FL 34994

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2/3/00

## Loxahatchee Mitigation Bank PROPOSED MAINTENANCE BURN PROGRAM FIGURE 11



Engineering Certificate  
of Authorization No. 7130

# LAND COVER CLASSIFICATIONS

-  Marsh
-  Willow - High Density Shrub
-  Cypress
-  Red Maple/Mixed
-  Pond Apple/Mixed
-  Canals/Ditches and Open Water
-  Parcel Boundary

\*Revegetation plantings to occur along edges of berms and roads to reduce Brazilian pepper growth

SOUTH PARCEL  
(Primarily Natural Recruitment)

NORTH PARCEL  
(Primarily Natural Recruitment)

SOUTHEAST PARCEL  
(Primarily Natural Recruitment)

\*Plantings may take place on an as-needed basis in tree islands to enhance shrub and ground cover layer diversity and coverage.

\*Plantings may take place on an as-needed basis in tree islands to enhance shrub and ground cover layer diversity and coverage.

EXISTING TREE ISLANDS

EXISTING TREE ISLANDS

MUDFLATS

DRAINAGES

EXISTING TREE ISLANDS

DRAINAGES

Source: Foster Wheeler Environmental Corp.  
Suite 100  
789 South Federal Highway  
Stuart, FL 34994

January 28, 2000  
Perm12revB.tif

*Harold A. Frediani, Jr.*  
2/3/00

## Loxahatchee Mitigation Bank PRELIMINARY REVEGETATION PLAN FIGURE 12

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