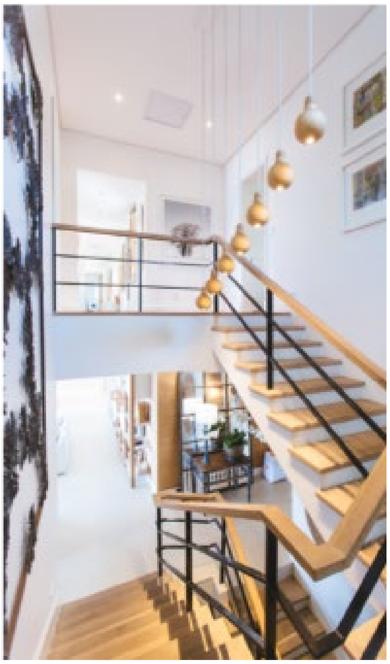
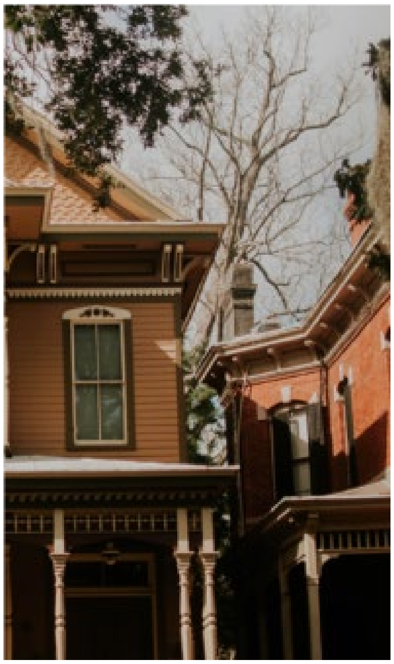
AGENDA

REGULAR MEETING





JANUARY 16, 2020

FLOW WAY
COMMUNITY DEVELOPMENT DISTRICT

January 7, 2020

Board of Supervisors
Flow Way Community Development District

Dear Board Members:

The Regular Meeting of the Board of Supervisors of the Flow Way Community Development District will be held on **Thursday, January 16, 2020 at 1:00 p.m.** at the **offices of Coleman, Yovanovich & Koester, P.A., 4001 Tamiami Trail North, Suite 300, Naples, Florida 34103.**

1. Call to Order & Roll Call.
2. Public Comments. (Full procedure follows the Agenda Index)
   I. The Public comment period is for items NOT listed on the Agenda, and individuals are limited to three (3) minutes per person, assignment of speaking time is not permitted, however the Presiding Officer may extend or reduce the time for the public comment period consistent with Section 286.0114, Florida Statutes.

   II. Individuals are permitted to speak on items on the Agenda in accordance with the procedure in I above.
3. Consideration of Minutes.
   I. August 22, 2019 Regular Meeting Minutes
4. Staff Reports
   a) District Attorney
   b) District Engineer
   c) District Manager
      I. Financial Statements November 30, 2019 (Unaudited)
5. Supervisor's Requests
   I. Supervisor Ron Miller:
      a) FY 2020 – Meeting Schedule
      b) Preserve – Permit Obligations
      c) Army Corps – Permit Modification for Preserves
      d) District Expenses for Mitigation Maintenance
      e) Request of Board to Approve request for Counsel to draft letter regarding various preserve items.
6. Adjournment

www.flowwaycdd.org

James P. Ward
District Manager

2900 NORTHEAST 12TH TERRACE, SUITE 1
OAKLAND PARK, FLORIDA 33334
PHONE (954) 658-4900
E-MAIL JimWard@JPWardAssociates.com

The Agenda is standard in nature and I look forward to seeing you at the meeting, and if you have any questions and/or comments, please do not hesitate to contact me directly at (954) 658-4900.

Flow Way Community Development District

James P. Ward
District Manager

Flow Way Community Development District
Opportunity to be Heard for Board Meetings

PUBLIC COMMENT PERIODS. The Chair, his or her designee, or such other person conducting a District Meeting ("Presiding Officer"), shall ensure that there is at least one period of time ("Public Comment Period") in the meeting agenda whereby the public has an opportunity to be heard on propositions before the Board, as follows:

a. The Public Comment Period shall be provided at the start of each District Meeting before consideration of items scheduled on the Agenda for consideration. In the event there is an item that comes before the Board that is not listed on the agenda, the Presiding Officer shall announce a Public Comment Period on such item prior to voting on the proposition.

b. Speakers shall be permitted to address any agenda item or non-agenda matter(s) of concern to the District, during the Public Comment Period.

c. To the extent the agenda for the District Meeting includes a specific public hearing that is required by Florida law, all public comments on the agenda item that is the subject to the public hearing will be taken following the opening of the public hearing for said agenda item.

d. Individuals wishing to make a public comment are limited to three (3) minutes per person. A potential speaker may not assign his/her three (3) minutes to extend another speaker's time.

e. The Presiding Officer may extend or reduce the time periods set forth herein in order to facilitate orderly and efficient District business; provided, however, that a reasonable opportunity for public comment shall be provided consistent with the requirements of Section 286.0114, Florida Statutes. The Presiding Officer may also elect to set and announce additional Public Comment Periods if he or she deems it appropriate.

DESIGNATING A PROCEDURE TO IDENTIFY INDIVIDUALS SEEKING TO BE HEARD. Unless otherwise directed and declared by the Presiding Officer, individuals seeking to be heard on propositions before the Board at a District Meeting shall identify themselves at the beginning of each Public Comment Period in the manner announced by the Presiding Officer. In the event that public attendance is high and/or if otherwise deemed necessary in order to facilitate efficient and orderly District business, the Presiding Officer may require individuals to complete speaker cards which will request the following information: (a) the individual's name, address and telephone number; (b) the proposition on which the person desires to be heard; (c) the individual's position on the proposition (i.e., "for," "against," or "undecided"); and (d) if appropriate, to indicate the designation of a representative to speak for the individual or the individual's group. In the event large groups of individuals desire to speak, the Presiding Officer may require each group to designate a representative to speak on behalf of such group.

PUBLIC DECORUM. The following policies govern public decorum at District Meetings:

a. Each person addressing the Board shall proceed to the place designated assigned for speaking, if any, and should state his or her name and address in an audible tone of voice for the public record.

b. All remarks shall be addressed to the Board as a body and not to any member thereof or to any staff member. No person other than a member of the Board or a District staff member shall be permitted to enter into any discussion with an individual speaker while he or she has the floor, without the permission of the Presiding Officer.

c. Nothing herein shall be construed to prohibit the Presiding Officer from maintaining orderly conduct and proper decorum in a public meeting. Speakers shall refrain from disruptive behavior, and from making vulgar or threatening remarks. Speakers shall refrain from launching personal attacks against any member of the Board, District staff member, or member of the public. The Presiding Officer shall have the discretion to remove any speaker who disregards these policies from the meeting.

d. In the case that any person is declared out of order by the Presiding Officer and ordered expelled, and does not immediately leave the meeting facilities, the following steps may be taken:

1. The Presiding Officer may declare a recess.
2. The Presiding Officer may contact the local law enforcement authority.
3. In the event a person does not remove himself or herself from the meeting, the Presiding Officer may request that he or she be placed under arrest by local law enforcement authorities for violation of Section 871.01, Florida Statutes, or other applicable law.

EXCEPTIONS.

a. The Board recognizes, and the Board or may apply, all applicable exceptions to Section 286.0114, including those set forth in Section 286.0114(3), Florida Statutes and other applicable law. Additionally, the Presiding Officer may alter the procedures set forth in this Public Comment Policy for public hearings and other special proceedings that may require a different procedure under Florida law.

b. This Resolution is being adopted in accordance with Section 286.0114, Florida Statutes existing as of the date of this Resolution. After this Resolution becomes effective, it may be repealed or amended only by subsequent resolution of the Board. Notwithstanding the foregoing, the District may immediately suspend the application of this Resolution, in whole or in part, if the District determines that the Resolution conflicts with Florida law. In the event that the Resolution conflicts with Florida law and its application has not been suspended by the District, this Resolution should be interpreted in the manner that best effectuates the intent of the Resolution while also complying with Florida law. If the intent of the Resolution absolutely cannot be effectuated while complying with Florida law, the Resolution shall be automatically suspended.

MINUTES OF MEETING
FLOW WAY
COMMUNITY DEVELOPMENT DISTRICT

The Regular Meeting of the Board of Directors of the Flow Way Community Development District was held on Thursday, August 22, 2019 at 3:00 p.m. at the Esplanade Golf and Country Club Naples, 8918 Torre Vista Lane, Naples, Florida 34119.

Present and constituting a quorum:

Drew Miller	Chairperson
John Wollard	Vice Chairperson
Tim Martin	Assistant Secretary
Ronald Miller (phone)	Assistant Secretary
Tom Kleck	Assistant Secretary

Also present were:

James P. Ward	District Manager
Greg Urbancic	District Counsel
Jeremy Fireline	District Engineer

Audience:

Ed Staley
Martin Winters
David Mahaney
David Boguslawski (ph)

All resident's names were not included with the minutes. If a resident did not identify themselves or the audio file did not pick up the name, the name was not recorded in these minutes.

FIRST ORDER OF BUSINESS **Call to Order**

District Manager James P. Ward called the meeting to order at approximately 3:00 p.m. and all members of the Board were present at roll call.

SECOND ORDER OF BUSINESS **Consideration of Minutes**

a) July 18, 2019 Regular Meeting Minutes

Mr. Ward asked if there were any additions, corrections or deletions for the July 18, 2019 Regular Meeting Minutes. Mr. Ronald Miller reported he felt there were some corrections required regarding motions he made during the meeting. Discussion ensued regarding the motions which were made and seconded; no corrections were required.

On MOTION made by Mr. John Wollard, seconded by Mr. Tim Martin, and with all in favor, the July 18, 2019 Regular Meeting Minutes were approved.

b) July 25, 2019 Regular Meeting Minutes

Mr. Ward asked if there were any additions, corrections or deletions for the July 25, 2019 Regular Meeting Minutes. Hearing none, he called for a motion.

On MOTION made by Mr. John Wollard, seconded by Mr. Tim Martin, and with all in favor, the July 25, 2019 Regular Meeting Minutes were approved.

THIRD ORDER OF BUSINESS Public Hearing

Mr. Ward stated the primary purpose of today's meeting was to hold two Public Hearings, the first related to the FY-2020 Budget and the second related to assessments.

a) FISCAL YEAR 2020 BUDGET

I. Public Comment and Testimony.

Mr. Ward called for a motion to open the Public Hearing.

On MOTION made by Mr. John Wollard, seconded by Mr. Tom Kleck, and with all in favor, the Public Hearing was opened.

Mr. Ward stated he had received no written or oral communications with respect to consideration of adoption of the FY-2020 Budget. He asked if there were any public comments or questions regarding the FY-2020 Budget.

Mr. Ronald Miller noted it would be good to request the names of any audience members who might have called into the Meeting. Mr. Ward asked if any audience members had called in; there were none. Mr. Ward asked if there were any public comments or questions from those present.

Mr. Martin Winters noted it was very difficult to hear Mr. Ronald Miller. Mr. Ward agreed. He stated unfortunately the room had poor acoustics. He invited Mr. Winters to move closer. Discussion ensued regarding possible solutions to the poor acoustics in the future.

Mr. Ward asked if there any questions regarding the Budget; hearing none, he called for a motion to close the Public Hearing.

On MOTION made by Mr. John Wollard, seconded by Mr. Tim Martin, and with all in favor, the Public Hearing was closed.

II. Board Comment and Consideration.

Mr. Ward asked if there were any Board comments or questions regarding the FY 2020 Budget.

Mr. Ronald Miller stated he was opposed to having anything in the Budget related to preserve maintenance expenses.

III. Consideration of Resolution 2019-22 adopting the annual appropriation and Budget for Fiscal Year 2020.

Mr. Ward called for a motion to approve Resolution 2019-22 which adopted the proposed Budget for Fiscal Year 2020.

On MOTION made by Mr. John Wollard, seconded by Mr. Drew Miller, and with three in favor and two opposed, Resolution 2019-22 was adopted and the Chair was authorized to sign.

Mr. John Wollard, Mr. Drew Miller and Mr. Tim Martin voted in favor of the motion; Mr. Ronald Miller and Mr. Tom Kleck opposed the motion. The motion carried.

b) FISCAL YEAR 2020 IMPOSING SPECIAL ASSESSMENTS; ADOPTING AN ASSESSMENT ROLL, AND APPROVING THE GENERAL FUND SPECIAL ASSESSMENT METHODOLOGY

Mr. Ward noted the second Public Hearing was related to the imposition of assessments, adoption of the assessment role and approved the methodology for levying the assessments for the General Fund.

I. Public Comment and Testimony

Mr. Ward called for a motion to open the Public Hearing.

On MOTION made by Mr. John Wollard, seconded by Mr. Tim Martin, and with all in favor, the Public Hearing was opened.

Mr. Ward stated he had received no written or oral communications with respect to imposition of the assessments, adoption of the assessment roll, and approval of methodology. He asked if there was any public comment; hearing none, he called for a motion to close the Public Hearing.

On MOTION made by Mr. Tim Martin, seconded by Mr. John Wollard, and with all in favor, the Public Hearing was closed.

II. Board Comment and Consideration

Mr. Ward asked if there were any Board comments or questions.

Mr. Ronald Miller stated he objected to the CDD paying any preserve expenses whatsoever.

III. Consideration of Resolution 2019-23 imposing special assessments, adopting an assessment roll and approving the general fund special assessment methodology

Mr. Ward explained Resolution 2019-23 imposed the special assessments, certified the assessment roll and approved the general fund special assessment methodology for the District for FY-2020.

On MOTION made by Mr. John Wollard, seconded by Mr. Tim Martin, and with three in favor and two opposed, Resolution 2019-23 was adopted and the Chair was authorized to sign.

Mr. John Wollard, Mr. Drew Miller and Mr. Tim Martin voted in favor of the motion; Mr. Ronald Miller and Mr. Tom Kleck opposed the motion. The motion carried.

FOURTH ORDER OF BUSINESS Consideration of Resolution 2019-24

Consideration of Resolution 2019-24 designating the dates, time and location for the Regular Meetings of the Board of Supervisors for Fiscal Year 2020

Mr. Ward reported Statute indicated, if the Board adopted a regular board meeting date, time and location, it be done through Resolution. He explained he would advertise the dates, times and location of the meetings once prior to the beginning of the Fiscal Year and post the dates on the website. He stated the adoption of Resolution 2019-24 did not bind the Board to the dates, times and locations; these may be changed as the Board deemed appropriate. Mr. Ward stated he spoke with the Esplanade Golf and Country Club facility; however, the facility could not confirm a specific date, time and room for CDD Meetings for the entire fiscal year. He asked the Board for its thoughts. Discussion ensued regarding holding meetings at the offices of Coleman, Yovanovich & Koester on the third Thursday of every month at 1:00 p.m. Mr. Ronald Miller stated he felt holding the meetings at the offices of Coleman, Yovanovich & Koester discouraged residents from participating in meetings. He stated he felt it would be better to meet at the local facility in an effort to encourage residents to attend. He stated he was disappointed the Esplanade facility manager could not accommodate the CDD. Discussion ensued regarding the location of board meetings; it was decided to hold meetings at the offices of Coleman, Yovanovich & Koester on the third Thursday of every month at 1:00 p.m.

On MOTION made by Mr. Tom Kleck, seconded by Mr. Tim Martin, and with four in favor and one opposed, Resolution 2019-24 was adopted and the Chair was authorized to sign.

Mr. Tom Kleck, Mr. Tim Martin, Mr. Drew Miller, and Mr. John Wollard voted in favor of the motion; Mr. Ronald Miller voted in opposition of the motion. The motion carried.

FIFTH ORDER OF BUSINESS **Consideration of Proposals**

Consideration of proposals for providing Audit Services to the District for the Fiscal Years 2019-2023

Mr. Ward reported State Statute required the District to have its books and records audited annually by a CPA firm. He stated he typically arranged five year contracts with auditors to enable consistency in the audits. He reported he prepared an RFP (request for proposal) which was advertised and the CDD received two proposals, one from Grau and Associates for $22,500 dollars and one from Berger Toombs for $20,695 dollars. He stated the process required the CDD to rank the auditing firms. He reported his accountant recommended ranking Grau as number one and Berger Toombs as number two. He stated both firms were eminently qualified to perform the audit and both had performed audits for him over the years. He noted Grau was a bit easier to work with than the Berger firm; however, either firm was an acceptable choice.

On MOTION made by Mr. Tim Martin, seconded by Mr. Drew Miller, and with all in favor, Grau & Associates was ranked number one.

SIXTH ORDER OF BUSINESS **Staff Reports**

Staff Reports

a) District Attorney

District Attorney Greg Urbancic stated if and when the CDD met at the Esplanade Golf and Country Club the guard gate should be made aware of the necessity of granting access to the facility for those who wish to attend the CDD meeting. He stated he did not wish for FEMA to claim the CDD was not meeting on public property and as such not grant funds when needed to the CDD. Mr. Ward concurred and noted it was important for all who wished to attend meetings to have access. Discussion ensued regarding the hesitancy of the gate guard to allow entrance to the CDD Board Members.

b) District Engineer

There was no Report from the District Engineer.

c) District Manager

I. Financial Statements July 31, 2019 (Unaudited)

Mr. Ward stated he had no report unless there were questions; there were none.

SEVENTH ORDER OF BUSINESS **Supervisor's Requests and Audience Comments**

Mr. Drew Miller reported it was Taylor Morrison's intent to transfer the preserves to the CDD in perpetuity and protect the Community and CDD from any outside acquisition. He stated Taylor Morrison was working to modify the language within the permits to clearly identify the CDD as the responsible party for the preserves in perpetuity. He stated as such he needed to be appointed as Chairperson of the CDD to work with Taylor Morrison and sign any necessary documents or permits. He stated the CDD was required to be co-applicant on the permit modification application.

Mr. Tom Kleck stated Mr. Robert Kirby indicated in an email "it is not appropriate for the HOA or the CDD to maintain in perpetuity the preserves." He asked, if Mr. Robert Kirby was against the CDD maintaining the preserves, why the CDD was proceeding along this path. Mr. Drew Miller responded Mr. Kirby was one person with one opinion and there were others who disagreed. He explained when the permitting was being obtained for this community CDDs were not well understood; however, the Districts have come to understand what types of services a CDD could provide. He noted previously it was felt the only method for preserve maintenance was through an entity such as CREW; however, as time progressed this changed and CDDs were considered acceptable entities to handle preserve maintenance. Mr. Tom Kleck stated Mr. Robert Kirby was in the Regulatory Division of the US Corp of Army Engineers and should be considered a reliable source. He stated he worried about not heeding Mr. Kirby's advice.

Mr. Drew Miller stated Taylor Morrison would assume all permit costs, fees, attorney fees, and any costs associated with modification of the permits; however, the CDD was required to be a co-applicant for both the ongoing perpetual maintenance and the permit modification.

Mr. Ronald Miller reminded Mr. Drew Miller he had a fiduciary obligation to work in the best interests of the CDD, not in the best interests of Taylor Morrison. He asked why Mr. Drew Miller felt it was in the best interests of the CDD to pay for the perpetual maintenance of the reserves rather than Taylor Morrison.

Mr. Drew Miller responded he believed keeping the preserves under control of the CDD was the right decision. Mr. Ronald Miller stated currently Taylor Morrison was obligated to pay for the expenses of the preserve maintenance. He asked how the CDD taking on a financial burden which belonged to Taylor Morrison could be in the best interests of the CDD. Mr. Drew Miller explained he was working to shift the perpetual ownership and maintenance of the preserves from a third party entity to the Community which lived in the preserves and would best maintain the preserves. He stated morally and financially he believed it was in the best interests of the CDD to own and maintain the preserves. He stated he believed the CDD was better suited to maintain the preserves than any third party entity.

Mr. Tom Kleck stated Mr. Robert Kirby's memo stated "the Corp of Engineers reiterates that we expect the permittee will transfer the property as proposed to CREW or another appropriate entity such as National Fish and Wildlife Foundation." Mr. Kleck stated these third party entities were trained to deal with these types of environments and were better equipped than the CDD to handle preserve maintenance. He asked why the CDD should take on the risk of preserve maintenance when the CDD was not equipped to handle, and did not have the funds to handle the care of the preserves, especially when an entity such as Fish and Wildlife was commissioned to do so.

Mr. Drew Miller stated the Fish and Wildlife Foundation was not necessarily better equipped to handle preserve maintenance. He stated it was clear the CDD had the authority and the ability to maintain the preserves, as the CDD had been maintaining the preserves successfully thus far. He indicated he had full confidence in the ability of the CDD to maintain the preserves. He stated he believed the residents would be better served to have the CDD own and maintain the preserves.

Mr. Ward asked if there were any public comments or questions. Mr. Martin Winters stated he read the Legal Opinion and he noted the CDD's Counsel indicated the transfer of the preserves to the CDD was premature and was done without the Army Corp of Engineer's approval. He stated he believed this would end up in litigation.

Mr. Ed Staley stated the eventual goal was perpetual care of the preserves once the success criteria were met. He discussed the intermediate goals and asked at what stage the preserves were in regarding intermediate goals. He indicated until the preserves had met the success criteria, the preserves could not be transferred to the CDD legally.

Mr. Drew Miller responded each preserve area was at a different point and on a different timeline regarding the intermediate goals. He noted Mr. Tim Hall had provided a memo with this information. He stated he did not agree the ownership of the preserves could not be transferred until success criteria had been met.

Discussion ensued regarding the intermediate goals, Tim Hall's memo and Tim Hall's statement "long term maintenance cannot occur until the preserves meet success criteria and are signed off on by State and Federal regulatory agencies. It is premature to offer them now." Mr. Drew Miller stated this meant it was premature to offer the preserves to CREW or other third party entity, but it did not preclude transfer of the preserves to the CDD. Mr. Staley stated he strongly disagreed.

Mr. Ronald Miller stated the documents specifically discussed mitigation activities as being the responsibility of the permittee and applicant, which was Taylor Morrison. He stated there was specific language in the definition of success criteria which indicated a minimum of 80% coverage of native vegetation, with less than 4% exotic and nuisance vegetation, for a period of three consecutive years was required for success criteria to be met. He stated during the mitigation period, until the success criteria was met, the CDD should not incur any expense. He stated during the monitoring and maintenance period there was a possibility of turning the preserves over to the CDD; however, technically this turnover could not happen until the development project was turned over to the residents, which had not yet happened. He explained this meant nothing could be turned over until Taylor Morrison reached the 90% level, and yet the preserves had been turned over to the CDD. He stated documents indicated if Taylor Morrison reached 90% and the preserves had not yet met the success criteria, the preserves could temporarily transferred to the CDD until such time as the success criteria was met and the preserves could be offered to CREW or other like entity. He stated the outside Legal Opinion concurred. He discussed Mr. Tim Hall's and Mr. Robert Kirby's memos. He noted Mr. Hall indicated the preserve success criteria had not yet been met. He asked for Mr. Greg Urbancic's opinion.

Mr. Greg Urbancic stated Clay Brooker opined the transfer of the preserves to the CDD may have been premature, but then Mr. Brooker stated he was unsure if the transfer was premature and was unsure if it made a difference. He noted Mr. Brooker used language which indicated it would be the responsibility of the CDD or the HOA to maintain the preserves. He stated he believed clarification from the Corp would be a good idea and this clarification could be made through the permit modification.

Discussion ensued regarding the Legal Opinion by Clay Brooker and the language in the Legal Opinion. Mr. Urbancic noted often clubhouse features, amenity features, etc., were transitioned to resident control or HOA ownership prior to the time of development turnover to residents. He stated the original declaration indicated the preserves would ultimately be owned by the CDD or the HOA and was disclosed as an expense. He recommended trying to find language clarification regarding ultimate responsibility. Discussion ensued regarding obtaining clarification from the Army Corp of Engineers regarding this language, Taylor Morrison turnover, success criteria, and Mr. Kirby's email.

Mr. David Boguslawski stated he was a member of the HOA. He stated he wondered why District Counsel did not have a clear opinion regarding this matter. He asked about District Counsel's role in the CDD. Mr. Drew Miller explained a third party attorney was hired to form an opinion regarding this matter to prevent any residents from feeling there was a conflict of interest. He stated Mr. Boguslawski was welcome to read this Legal Opinion. Mr. Boguslawski stated he was not attempting to badger the CDD attorney; however, he believed when there were complicated matters on the table at some point the Board needed to be able to lean on the advice of CDD Counsel. Mr. Drew Miller indicated many legal opinions had been gathered and given regarding this issue and he felt it was time to vote regarding his motion in an effort to move forward with this matter.

Mr. Ed Staley discussed turnover and success criteria and noted he agreed with Mr. Ron Miller's statements.

On MOTION made by Mr. Drew Miller, seconded by Mr. John Wollard, with three in favor and two opposed, Mr. Drew Miller was nominated as CDD Chairperson to cooperate with Taylor Morrison and sign any documents or permits with regard to amending the Army Corp or South Florida Water Management District permits.

Mr. John Wollard, Mr. Drew Miller and Mr. Tim Martin voted in favor of the motion; Mr. Ronald Miller and Mr. Tom Kleck opposed the motion. The motion carried.

Mr. Ward asked if there were any other comments. Mr. Drew Miller stated public comments would be limited to three minutes per person.

Mr. Ronald Miller discussed the motions made at the previous Board Meeting as he felt there was some confusion. He discussed comments made by himself and Drew Miller at the previous Board Meeting. He discussed the HOA Declaration, and the definition of both golf property and club property. He stated he believed the CDD should recuperate preserve maintenance costs from Taylor Morrison. Discussion ensued regarding recuperation of funds from Taylor Morrison and Taylor Morrison's intent that the CDD or the HOA take ownership of the preserves.

MOTION made by Mr. Ronald Miller, seconded by Mr. Tom Kleck, for the Board to take whatever action necessary to obtain reimbursement of CDD expenses related to the preserves, both external and internal, failed to pass by a vote of 2 in favor and 3 opposed.

Mr. Ronald Miller and Mr. Tom Kleck voted in favor of the motion; Mr. John Wollard, Mr. Drew Miller and Mr. Tim Martin opposed the motion. The motion failed.

MOTION made by Mr. Ronald Miller, seconded by Mr. Tom Kleck, for the Board to immediately discontinue to pay any future reserve expenses, failed to pass by a vote of 2 in favor and 3 opposed.

Mr. Ronald Miller and Mr. Tom Kleck voted in favor of the motion; Mr. John Wollard, Mr. Drew Miller and Mr. Tim Martin opposed the motion. The motion failed.

Mr. Ronald Miller stated (indecipherable 1:10:00). He discussed the preserves, Taylor Morrison, the preserve conveyance of western preserve B in 2015, and $414,000 dollars being reimbursed to Taylor Morrison for mitigation expenses. He noted he could not find any CDD Board resolution approving acquisition of this preserve property in 2015. He asked Mr. Ward and Mr. Urbancic to look into this matter.

Mr. Drew Miller stated when going through a bond requisition process, one of the documents approved in connection with bond financing was an acquisition agreement. He explained the acquisition agreement defined the terms between the developer and the District in terms of how assets were acquired. He stated assets and improvements were acquired, or purchased, through the acquisition agreement. He further explained the function of the acquisition agreement.

Mr. Ronald Miller stated he would like to see the Board resolution which indicated the Board accepted ownership of western preserve B. Mr. Ward stated there was no specific Board motion to accept transfer of ownership of western preserve B. Mr. Ronald Miller stated he did not believe western preserve B could be transferred via a form of requisition, but only by Board acceptance. Mr. Drew Miller stated the Board authorized and approved the acquisition agreement; the acquisition agreement contemplated transfer of western preserve B. Mr. Ronald Miller stated he questioned the validity of the transfer of western preserve B to the CDD. Mr. Drew Miller stated if the validity of the preserve transfer was questioned, then so also would the transfer of the lakes and other such assets which were transferred through the acquisition agreement. He noted an acquisition agreement was considered typical process. Mr. Ronald Miller stated all lakes and other such assets transferred through the acquisition agreement were within the boundaries of the CDD; however, the western preserves were external to the CDD boundaries. Discussion ensued regarding whether the Board actually owned the western preserves.

Mr. Ward stated he would find the resolution which approved the acquisition agreement which contemplated the facilities being acquired by requisition; however, the acquisition agreement would not specifically list the western preserves or any specific assets. Mr. Ronald Miller asked if Mr. Urbancic felt there was a possibility the Board did not actually own the western preserves as the Board never approved transfer of ownership. Mr. Urbancic responded in the negative. He stated transfer of ownership of the western reserves was approved through the requisition process.

Mr. Ronald Miller stated Mr. Tim Hall (under contract with the CDD) had worked with Taylor Morrison's attorney to amend the permit and he felt this was a conflict of interest. He asked for Mr. Hall's contract with the CDD to be terminated immediately.

Mr. Drew Miller stated a motion was just approved which enabled the CDD to work in conjunction with Taylor Morrison to amend the permit; therefore, he did not feel there was a conflict of interest.

MOTION made by Mr. Ron Miller, seconded by Mr. Tom Kleck, for the Board to immediately terminate the contract with Mr. Tim Hall due to a conflict of interest, failed to pass by a vote of 2 in favor and 3 opposed.

Mr. Ronald Miller and Mr. Tom Kleck voted in favor of the motion; Mr. John Wollard, Mr. Drew Miller and Mr. Tim Martin opposed the motion. The motion failed.

EIGHTH ORDER OF BUSINESS **Adjournment**

Mr. Ward adjourned the meeting at approximately 4:25 p.m.

On MOTION made by Mr. Tim Martin, seconded by Mr. John Wollard, and with all in favor, the Meeting was adjourned.

Flow Way Community Development District

_______________________________ _________________________________
James P. Ward, Secretary Drew Miller, Chairperson

Flow Way Community Development District

Financial Statements

November 30, 2019

Prepared by:

JPWARD AND ASSOCIATES LLC

2900 NE 12th TERRACE

Suite 1

OAKLAND PARK, FLORIDA 33334

Flow Way Community Development District

Table of Contents

JPWard & Associates, LLC
2900 NE 12th Terrace
Suite 1
Oakland Park, Florida 33334

Flowway Community Develoment District
Balance Sheet
for the Period Ending November 30, 2019

	Governmental Funds											
		Debt Service Funds						Capital Projects Fund			Account Groups	
	General Fund	Series 2013	Series 2015 (Phase 3)	Series 2015 (Phase 4)	Series 2016 (Phase 5)	Series 2017 (Phase 6)	Series 2019 (Phase 7 8 Hatcher)	Series 2016 (Phase 5)	Series 2017 (Phase 6)	Series 2019 (Phase 7 8 Hatcher)	General Long Term Debt	Totals (Memorandum Only)
Assets												
Cash and Investments												
General Fund - Invested Cash	$ 876,576	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 876,576
Debt Service Fund												
Interest Account	-	-	-	-	-	-	-	-	-	-	-	-
Sinking Account	-	-	-	-	-	-	-	-	-	-	-	-
Reserve Account	-	539,000	246,188	161,930	174,589	118,375	289,387	-	-	-	-	1,529,468
Revenue	-	78,831	65,190	21,482	27,507	7,322	327	-	-	-	-	200,659
Prepayment Account	-	-	0	-	-	-	-	-	-	-	-	0
General Redemption Account	-	-	-	2,470	-	-	-	-	-	-	-	2,470
Retainage Account	-	-	-	-	-	-	1,033,346	-	-	-	-	1,033,346
Construction	-	-	-	-	-	-	-	16,034	10,322	940	-	27,297
Cost of Issuance	-	-	-	-	-	-	-	-	-	31,147	-	31,147
Due from Other Funds												
General Fund	-	143,758	68,187	57,619	93,305	63,120	148,107	-	-	-	-	574,096
Debt Service Fund(s)		-	-	-	-	-	-	-	-	-	-	-
Capital Projects Fund(s)			-	-	-	-	-					-
Market Valuation Adjustments	-	-	-	-	-	-	-				-	-
Accrued Interest Receivable	-	-	-	-	-	-	-	-	-	-	-	-
Assessments Receivable/Deposits	-	-	-	-	-	-	-	-	-	-	-	-
Amount Available in Debt Service Funds	-	-	-	-	-	-	-	-	-	-	3,151,222	3,151,222
Amount to be Provided by Debt Service Funds	-	-	-	-	-	-	-	-	-	-	18,503,778	18,503,778
Investment in General Fixed Assets (net of depreciation)	-	-	-	-	-	-	-	-	-	-	-	-
Total Assets	**$ 876,576**	**$ 761,589**	**$ 379,565**	**$ 243,500**	**$ 295,401**	**$ 188,817**	**$ 1,471,167**	**$ 16,034**	**$ 10,322**	**$ 32,087**	**$ 21,655,000**	**$ 25,930,059**

Flowway Community Develoment District
Balance Sheet
for the Period Ending November 30, 2019

	Governmental Funds											
		Debt Service Funds						Capital Projects Fund			Account Groups	
	General Fund	Series 2013	Series 2015 (Phase 3)	Series 2015 (Phase 4)	Series 2016 (Phase 5)	Series 2017 (Phase 6)	Series 2019 (Phase 7 8 Hatcher)	Series 2016 (Phase 5)	Series 2017 (Phase 6)	Series 2019 (Phase 7 8 Hatcher)	General Long Term Debt	Totals (Memorandum Only)
Liabilities												
Accounts Payable & Payroll Liabilities	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Due to Other Funds												
General Fund	-	-	-	-	-	-	-	-	-	-	-	-
Debt Service Fund(s)	574,096	-	-	-	-	-	-	-	-	-	-	574,096
Capital Projects Fund(s)												-
Bonds Payable												-
Current Portion	-	-	-	-	-	-	-	-	-	-	(395,000)	(395,000)
Long Term											22,050,000	22,050,000
Unamortized Prem/Disc on Bds Pybl	-	-	-	-	-	-	-	-	176,123	(30,916)		145,207
Total Liabilities	**$ 574,096**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 176,123**	**$ (30,916)**	**$ 21,655,000**	**$ 22,374,304**
Fund Equity and Other Credits												
Investment in General Fixed Assets	-	-	-	-	-	-	-	-	-	-	-	-
Fund Balance												
Restricted												
Beginning: October 1, 2018 (Audited)	-	934,631	466,536	318,860	420,515	188,817	1,421,578	14,378	(166,922)	62,355	-	3,660,749
Results from Current Operations	-	(173,042)	(86,971)	(75,360)	(125,114)	-	49,589	1,656	1,122	647	-	(407,474)
Unassigned												
Beginning: October 1, 2018 (Audited)	196,047	-	-	-	-	-	-	-	-	-	-	196,047
Results from Current Operations	106,432	-									-	106,432
Total Fund Equity and Other Credits	**$ 302,479**	**$ 761,589**	**$ 379,565**	**$ 243,500**	**$ 295,401**	**$ 188,817**	**$ 1,471,167**	**$ 16,034**	**$ (165,800)**	**$ 63,002**	**$ -**	**$ 3,555,755**
Total Liabilities, Fund Equity and Other Credits	**$ 876,576**	**$ 761,589**	**$ 379,565**	**$ 243,500**	**$ 295,401**	**$ 188,817**	**$ 1,471,167**	**$ 16,034**	**$ 10,322**	**$ 32,087**	**$ 21,655,000**	**$ 25,930,059**

Flowway Community Development District
General Fund
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward	$ -	$ -	-		
Interest					
Interest - General Checking	-	-	-	-	N/A
Special Assessment Revenue					
Special Assessments - On-Roll	1,190	143,612	144,803	538,391	27%
Special Assessments - Off-Roll	-	-	-	-	N/A
Contributions Private Sources	-		-		N/A
Intragovernmental Transfer In	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 1,190**	**$ 143,612**	**144,803**	**$ 538,391**	**27%**
Expenditures and Other Uses					
Legislative					
Board of Supervisor's Fees	-	-	-	2,400	0%
Executive					
Professional Management	3,333	3,333	6,667	40,000	17%
Financial and Administrative					
Audit Services	-	-	-	4,400	0%
Accounting Services	1,000	1,000	2,000	16,000	13%
Assessment Roll Services	667	-	667	16,000	4%
Arbitrage Rebate Services	-	-	-	3,000	0%
Other Contractual Services					
Recording and Transcription	-	-	-	-	N/A
Legal Advertising	-	672	672	7,500	9%
Trustee Services	-	-	-	21,400	0%
Dissemination Agent Services	5,500	667	6,167	17,000	36%
Property Appraiser Fees	-	15,610	15,610	4,000	390%

Flowway Community Development District
General Fund
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Bank Services	-	2	2	400	0%
Travel and Per Diem	-	-	-	-	N/A
Communications & Freight Services					
Postage, Freight & Messenger	46	-	46	600	8%
Rentals & Leases					
Meeting Room Rental	-	-	-	-	N/A
Computer Services - Website Development	50	50	100	3,000	3%
Insurance	-	6,193	6,193	6,100	102%
Printing & Binding	73	-	73	750	10%
Office Supplies	-	-	-	-	N/A
Subscription & Memberships	175	-	175	175	100%
Legal Services					
Legal - General Counsel	-	-	-	10,000	0%
Legal - Series 2013 Bonds	-	-	-	-	N/A
Boundary Expansion	-	-	-	-	N/A
Legal - Series 2016(Phase 5)	-	-	-	-	N/A
Legal - Series 2017(Phase 6)	-	-	-	-	N/A
Requisitions	-	-	-	-	N/A
Special Counsel - Preserves	-	-	-	-	N/A
Other General Government Services					
Engineering Services - General Fund	-	-	-	2,000	0%
Environmental Preserves - Engineering	-	-	-		N/A
Task 1 - Bid Documents	-	-	-	-	N/A
Task 2 - Monthly site visits	-	-	-	13,350	0%
Task 3 - Reporting to Regulatory Agencies	-	-	-	8,000	0%
Task 4 - Fish Sampling to US Fish & Wildlife	-	-	-	10,350	0%
Task 5 - Attendance at Board Meeting	-	-	-	-	N/A
Clearing Downed Trees/Cleanup	-	-	-	1,000	0%

Flowway Community Development District
General Fund
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Code Enforcement for Incursion into Preserve	-	-	-	2,000	0%
Contingencies	-	-	-	3,000	0%
Capital Outlay	-	-	-	-	N/A
Stormwater Management Services					
Environmental Engineering-Mitigation Area	-	-	-	-	N/A
Preserve Area Maintenance					
Wading Bird Foraging Areas	-	-	-	1,523	0%
Internal Preserves	-	-	-	6,598	0%
Western Preserve	-	-	-	33,215	0%
Northern Preserve Area 1	-	-	-	64,560	0%
Northern Preserve Area 2	-	-	-	113,120	0%
Clearing Downed Trees/Cleanup	-	-	-	5,000	0%
Code Enforcement for Incursion into Preserve	-	-	-	2,500	0%
Reserves for Future Operations					
Future Operations/Restorations	-	-	-	119,450	0%
Intragovernmental Transfer Out	-	-	-	-	N/A
Sub-Total:	**10,844**	**27,527**	**38,371**	**538,391**	**7%**
Total Expenditures and Other Uses:	**$ 10,844**	**$ 27,527**	**$ 38,371**	**$ 538,391**	**7%**
Net Increase/ (Decrease) in Fund Balance	(9,654)	116,086	106,432	-	
Fund Balance - Beginning	196,047	186,394	196,047	-	
Fund Balance - Ending	**$ 186,394**	**$ 302,479**	**302,479**	**$ -**	

Flowway Community Development District
Debt Service Fund - Series 2013
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward	$ -	$ -	-	$ -	N/A
Interest Income					
Interest Account	-	6	6	8	73%
Sinking Fund	-	3	3	-	N/A
Reserve Account	83	4,940	5,023	1,600	314%
Prepayment Account	-	-	-	-	N/A
Revenue Account	413	376	789	975	81%
Special Assessment Revenue					
Special Assessments - On-Roll	1,192	143,758	144,950	539,344	27%
Special Assessments - Off-Roll	-	-	-	-	N/A
Intragovernmental Transfer In	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 1,687**	**$ 149,083**	**150,770**	**$ 541,927**	**N/A**
Expenditures and Other Uses					
Debt Service					
Principal Debt Service - Mandatory					
Series 2013 Bonds	$ -	$ 110,000	110,000	$ 110,000	100%
Principal Debt Service - Early Redemptions					
Series 2013 Bonds	-	-	-	-	N/A
Interest Expense					
Series 2013 Bonds	-	213,813	213,813	424,325	50%
Operating Transfers Out (To Other Funds)	-	-	-	-	N/A
Total Expenditures and Other Uses:	**$ -**	**$ 323,813**	**323,813**	**$ 534,325**	**N/A**
Net Increase/ (Decrease) in Fund Balance	1,687	(174,730)	(173,042)	7,602	
Fund Balance - Beginning	934,631	936,319	934,631		
Fund Balance - Ending	**$ 936,319**	**$ 761,589**	**761,589**	**$ 7,602**	

Flowway Community Development District
Debt Service Fund - Series 2015 (Phase 3)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward	$ -	$ -	-	$ -	N/A
Interest Income					
Interest Account	-	2	2	-	N/A
Sinking Fund	-	2	2	-	N/A
Reserve Account	38	2,256	2,294	550	417%
Prepayment Account	-	-	-	-	N/A
Revenue Account	230	210	440	300	147%
Special Assessment Revenue					
Special Assessments - On-Roll	565	68,187	68,753	255,873	27%
Special Assessments - Off-Roll	-	-	-	-	N/A
Special Assessments - Prepayment	-	-	-	-	N/A
Intragovernmental Transfers In	-	-	-		
Debt Proceeds	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 833**	**$ 70,658**	**71,491**	**$ 256,723**	**N/A**
Expenditures and Other Uses					
Debt Service					
Principal Debt Service - Mandatory					
Series 2015 Bonds (Phase 3)	$ -	$ 70,000	70,000	$ 70,000	100%
Principal Debt Service - Early Redemptions					
Series 2015 Bonds (Phase 3)	-	-	-	-	N/A
Interest Expense					
Series 2015 Bonds (Phase 3)	-	88,463	88,463	175,438	50%
Operating Transfers Out (To Other Funds)	-	-	-	-	N/A
Total Expenditures and Other Uses:	**$ -**	**$ 158,463**	**158,463**	**$ 245,438**	**N/A**
Net Increase/ (Decrease) in Fund Balance	833	(87,804)	(86,971)	11,285	
Fund Balance - Beginning	466,536	467,369	466,536	-	
Fund Balance - Ending	**$ 467,369**	**$ 379,565**	**379,565**	**$ 11,285**	

Flowway Community Development District
Debt Service Fund - Series 2015 (Phase 4)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward	$ -	$ -	-	$ -	N/A
Interest Income					
Interest Account	-	2	2	-	N/A
Sinking Fund	-	2	2	-	N/A
Reserve Account	25	1,484	1,509	500	302%
Prepayment Account	-	-	-	-	N/A
Revenue Account	161	147	308	400	77%
General Redemption Account	0	0	1	-	N/A
Special Assessment Revenue					
Special Assessments - On-Roll	478	57,619	58,097	216,250	27%
Special Assessments - Off-Roll	-	-	-	-	N/A
Operating Transfers In (To Other Funds)	-	-	-	-	N/A
Debt Proceeds	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 664**	**$ 59,254**	**59,918**	**$ 217,150**	**N/A**
Expenditures and Other Uses					
Debt Service					
Principal Debt Service - Mandatory					
Series 2015 Bonds (Phase 4)	$ -	$ 55,000	55,000	$ 55,000	100%
Principal Debt Service - Early Redemptions					
Series 2015 Bonds (Phase 4)	-	-	-	-	N/A
Interest Expense					
Series 2015 Bonds (Phase 4)	-	80,278	80,278	159,456	50%
Operating Transfers Out (To Other Funds)	-	-	-	-	N/A
Total Expenditures and Other Uses:	**$ -**	**$ 135,278**	**135,278**	**$ 214,456**	**N/A**
Net Increase/ (Decrease) in Fund Balance	664	(76,024)	(75,360)	2,694	
Fund Balance - Beginning	318,860	319,525	318,860		
Fund Balance - Ending	**$ 319,525**	**$ 243,500**	**243,500**	**$ 2,694**	

Flowway Community Development District
Debt Service Fund - Series 2016 (Phase 5)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward	$ -	$ -	-	$ -	N/A
Interest Income					
Interest Account	-	3	3	2	171%
Sinking Fund	-	3	3	-	N/A
Reserve Account	27	1,600	1,627	345	472%
Prepayment Account	-	-	-	-	N/A
Revenue Account	257	233	490	220	223%
Special Assessment Revenue					
Special Assessments - On-Roll	773	93,305	94,079	350,060	27%
Special Assessments - Off-Roll	-	-	-	-	N/A
Debt Proceeds		-	-		
Operating Transfers In (To Other Funds)	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 1,057**	**$ 95,145**	**96,202**	**$ 350,627**	**N/A**
Expenditures and Other Uses					
Debt Service					
Principal Debt Service - Mandatory					
Series 2016 Bonds (Phase 5)	$ -	$ 95,000	95,000	$ 95,000	100%
Principal Debt Service - Early Redemptions					
Series 2016 Bonds (Phase 5)	-	-	-	-	N/A
Interest Expense					
Series 2016 Bonds (Phase 5)	-	124,689	124,689	247,763	50%
Operating Transfers Out (To Other Funds)	27	1,600	1,627	-	N/A
Total Expenditures and Other Uses:	**$ 27**	**$ 221,289**	**221,316**	**$ 342,763**	**N/A**
Net Increase/ (Decrease) in Fund Balance	1,030	(126,144)	(125,114)	7,864	
Fund Balance - Beginning	420,515	421,545	420,515		
Fund Balance - Ending	**$ 421,545**	**$ 295,401**	**295,401**	**$ 7,864**	

Flowway Community Development District
Debt Service Fund - Series 2017 (Phase 6)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward	$ -	$ -	-	$ -	N/A
Interest Income					
Interest Account	-	2	2	-	N/A
Sinking Fund	-	2	2	-	N/A
Reserve Account	18	1,085	1,103	-	N/A
Prepayment Account	-	-	-	-	N/A
Revenue Account	163	148	312	-	N/A
Special Assessment Revenue					
Special Assessments - On-Roll	523	63,120	63,643	236,750	27%
Special Assessments - Off-Roll	-	-	-	-	N/A
Debt Proceeds	-	-	-		
Operating Transfers In (To Other Funds)	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 705**	**$ 64,357**	**65,062**	**$ 236,750**	**N/A**
Expenditures and Other Uses					
Debt Service					
Principal Debt Service - Mandatory					
Series 2017 Bonds (Phase 6)	$ -	$ 65,000	65,000	$ 65,000	100%
Principal Debt Service - Early Redemptions					
Series 2017 Bonds (Phase 6)	-		-	-	N/A
Interest Expense					
Series 2017 Bonds (Phase 6)	-	84,988	84,988	168,838	50%
Debt Service-Other Costs	-	-	-	-	N/A
Operating Transfers Out (To Other Funds)	18	1,085	1,103	-	N/A
Total Expenditures and Other Uses:	**$ 18**	**$ 151,072**	**151,091**	**$ 233,838**	**N/A**
Net Increase/ (Decrease) in Fund Balance	687	(86,715)	(86,028)	2,912	
Fund Balance - Beginning	274,845	275,532	274,845		
Fund Balance - Ending	**$ 275,532**	**$ 188,817**	**188,817**	**$ 2,912**	

Flowway Community Development District
Debt Service Fund - Series 2019 (Phase 7, Phase 8 and Hatcher)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget	% of Budget
Revenue and Other Sources					
Carryforward - Capitalized Interest	$ -	$ -	-	$ 100,801	0%
Interest Income					
Interest Account	105	98	203	-	N/A
Sinking Account	-		-	-	N/A
Reserve Account	302	281	584	-	N/A
Prepayment Account	-	-	-	-	N/A
Revenue Account	0	0	0	-	N/A
Retainage Account	1,076	1,004	2,080	-	N/A
Special Assessment Revenue					
Special Assessments - On-Roll	-	148,107	148,107	578,774	26%
Special Assessments - Off-Roll	-	-	-	-	N/A
Debt Proceeds	-	-	-		
Operating Transfers In (To Other Funds)	-	-	-	-	N/A
Total Revenue and Other Sources:	**$ 1,484**	**$ 149,490**	**150,974**	**$ 679,575**	**N/A**
Expenditures and Other Uses					
Debt Service					
Principal Debt Service - Mandatory					
Series 2019 Bonds (Phase 7,8,Hatcher)	$ -	$ -	-	$ 65,000	0%
Principal Debt Service - Early Redemptions					
Series 2019 Bonds (Phase 7,8,Hatcher)	-		-	-	N/A
Interest Expense					
Series 2019 Bonds (Phase 7,8,Hatcher)	-	100,801	100,801	300,188	34%
Debt Service-Other Costs	-	-	-	-	N/A
Operating Transfers Out (To Other Funds)	302	281	584	-	N/A
Total Expenditures and Other Uses:	**$ 302**	**$ 101,083**	**101,385**	**$ 365,188**	**N/A**
Net Increase/ (Decrease) in Fund Balance	1,182	48,408	49,589	314,387	
Fund Balance - Beginning	1,421,578	1,422,759	1,421,578		
Fund Balance - Ending	**$ 1,422,759**	**$ 1,471,167**	**1,471,167**	**$ 314,387**	

Flowway Community Development District
Capital Project Fund - Series 2016 (Phase 5)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget
Revenue and Other Sources				
Carryforward	$ -	$ -	-	$ -
Interest Income				
Construction Account	15	14	29	-
Cost of Issuance	-	-	-	-
Debt Proceeds		-	$ -	-
Operating Transfers In (From Other Funds)	27	1,600	1,627	-
Total Revenue and Other Sources:	**$ 42**	**$ 1,614**	**$ 1,656**	**$ -**
Expenditures and Other Uses				
Executive				
Professional Management	-	-	$ -	$ -
Other Contractual Services				
Trustee Services	-	-	$ -	$ -
Printing & Binding	-	-	$ -	$ -
Legal Services				
Legal - Series 2016 Bonds (Phase 5)	-	-	$ -	-
Other General Government Services				
Stormwater Mgmt-Construction	-	-	$ -	$ -
Capital Outlay				
Construction in Progress	-	-	$ -	-
Cost of Issuance				
Series 2016 Bonds (Phase 5)	-	-	-	$ -
Underwriter's Discount	-	-	$ -	-
Operating Transfers Out (To Other Funds)	$ -	$ -	$ -	-
Total Expenditures and Other Uses:	**$ -**	**$ -**	**$ -**	**$ -**
Net Increase/ (Decrease) in Fund Balance	42	1,614	$ 1,656	-
Fund Balance - Beginning	14,378	14,420	14,378	-
Fund Balance - Ending	**$ 14,420**	**$ 16,034**	**$ 16,034**	**$ -**

Flowway Community Development District
Capital Project Fund - Series 2017 (Phase 6)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget
Revenue and Other Sources				
Carryforward	$ -	$ -	-	$ -
Interest Income				
Construction Account	10	9	19	-
Cost of Issuance	-	-	-	-
Debt Proceeds		-	-	-
Operating Transfers In (From Other Funds)	18	1,085	1,103	-
Total Revenue and Other Sources:	**$ 28**	**$ 1,094**	**$ 1,122**	**$ -**
Expenditures and Other Uses				
Executive				
Professional Management	-	-	$ -	$ -
Other Contractual Services				
Trustee Services	-	-	$ -	$ -
Printing & Binding	-	-	$ -	$ -
Legal Services				
Legal - Series 2016 Bonds (Phase 5)	-	-	$ -	-
Capital Outlay				
Water-Sewer Combination-Construction	-	-	$ -	$ -
Stormwater Mgmt-Construction	-	-	$ -	$ -
Off-Site Improvements-CR 951 Extension	-	-	$ -	$ -
Construction in Progress	-	-	$ -	-
Cost of Issuance				
Series 2017 Bonds (Phase 6)	-	-	-	$ -
Underwriter's Discount	-	-	$ -	-
Operating Transfers Out (To Other Funds)	$ -	$ -	$ -	-
Total Expenditures and Other Uses:	**$ -**	**$ -**	**$ -**	**$ -**
Net Increase/ (Decrease) in Fund Balance	28	1,094	$ 1,122	-
Fund Balance - Beginning	(166,922)	(166,894)	(166,922)	-
Fund Balance - Ending	**$ (166,894)**	**$ (165,800)**	**$ (165,800)**	**$ -**

Flowway Community Development District
Capital Project Fund - Series 2019 (Phase 7, Phase 8 and Hatcher)
Statement of Revenues, Expenditures and Changes in Fund Balance
Through November 30, 2019

Description	October	November	Year to Date	Total Annual Budget
Revenue and Other Sources				
Carryforward	$ -	$ -	-	$ -
Interest Income				
Construction Account	0	1	1	-
Cost of Issuance	32	30	63	-
Debt Proceeds		-	-	-
Contributions from Private Sources		-	-	-
Operating Transfers In (From Other Funds)	302	281	584	-
Total Revenue and Other Sources:	**$ 335**	**$ 312**	**$ 647**	**$ -**
Expenditures and Other Uses				
Executive				
Professional Management	-	-	$ -	$ -
Other Contractual Services				
Trustee Services	-	-	$ -	$ -
Printing & Binding	-	-	$ -	$ -
Legal Services				
Legal - Series 2019 Bonds (Ph 7, Ph 8 & Hatcher)	-	-	$ -	-
Capital Outlay				
Water-Sewer Combination-Construction	-	-	$ -	$ -
Stormwater Mgmt-Construction	-	-	$ -	$ -
Off-Site Improvements-CR 951 Extension	-	-	$ -	$ -
Construction in Progress	-	-	$ -	-
Cost of Issuance				
Series 2016 Bonds (Phase 5)	-	-	-	$ -
Underwriter's Discount	-	-	$ -	-
Operating Transfers Out (To Other Funds)	$ -	$ -	$ -	-
Total Expenditures and Other Uses:	**$ -**	**$ -**	**$ -**	**$ -**
Net Increase/ (Decrease) in Fund Balance	$ 335	$ 312	$ 647	-
Fund Balance - Beginning	62,355	62,690	62,355	-
Fund Balance - Ending	**$ 62,690**	**$ 63,002**	**$ 63,002**	**$ -**

From: Ron Miller
To: Jim Ward
Subject: Board Meetings
Date: Thursday, November 14, 2019 5:44:58 PM

Met with our General Manager to work out meetings at our facility. There is some flexibility. Tuesdays are available. All days are available up to 1:00 PM. Assuming meetings last a maximum of one hour, all mornings are available up to 11:00 AM. This would allow some run over time.

Suggestion for some call in house rules - this assumes compliance with Florida rules. Call in could be restricted to Board members. The Administrator, Counsel, Engineer and all public audience members, must be in attendance, no call ins.

Think about this, could run this by the Board in the next meeting.

From:	Ron Miller
To:	Kirby, Robert J CIV USARMY CESAJ (US)
Cc:	Jim Ward; Martinn Winters
Subject:	Esplanade Preserves
Date:	Sunday, November 24, 2019 9:11:40 AM
Attachments:	2007-10-11 Department of the Army Permit SAJ-2000-1926 (exec.pdf 20150623_ENV supplement.pdf Copy of Possible Value of Non-Wasting Preserve Escrow Fund.xlsx

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This message is in furtherance of much previous correspondence. We are now in receipt of a massive amount of information provided via Mr. Winters FOIA request. More FOIA information may be forthcoming. I am copying Mr. Winters because he made the FOIA request. I am also copying Mr. Ward, the Administrator of the Flow Way CDD. Florida Sunshine rules prohibit me from corresponding with other Board members outside of public Board meetings. However, with receipt of this message, Mr. Ward can disseminate this message to other Board members.

The information in the Corps files provide clear evidence of Taylor Morrison's obligations under their permit. I am attaching several of the Corps files to evidence the Taylor Morrison requirements. The Corps has had consistent requirements from the very beginning regarding the permittee requirements to mitigate the preserves at the permittee's expense and ultimately deed the preserves over to CREW or other another land conservation agency with an appropriate non wasting escrow fund to provide permanent maintenance.

Taylor Morrison is currently in violation of their permit. Their employees on the CDD Board have forced ownership of the preserves onto the CDD. They have required the CDD to pay for their mitigation expenses and have not provided the CDD with an equivalent escrow fund as would be required to CREW or other agency. All of this has been done without the required approval of the Corps. Taylor Morrison has now come before the Corps asking for a waiver of both their preserve mitigation expenses and permanent escrow fund requirements. Such waiver should be denied.

As evidence of consistent permit requirements, attached is a 2007 file, a permit to a predecessor permittee, J D Nicewonder Jr. with such requirements. After much litigation, the US District Court in 2009 allowed the development proceed relying heavily on the Corps permit requirements. To waive such requirements for the benefit of Taylor Morrison would not only be totally inappropriate but essentially in contravention to the US District Court ruling.

As further evidence, I wish to call to your attention the matter of the DiLillo addition to the development. In 2014, Taylor Morrison added approximately 20 acres to the development and built an additional 47 homes. This required an amendment to the permit which the Corps granted. Attached is the 6/23/15 Taylor Morrison environmental update for that addition which the Corps granted in which Taylor Morrison stipulated it's requirements to obtain the modification. The acknowledged requirements included their mitigation and escrow obligations. When Taylor Morrison needs the Corps permission they promise, after receiving the Corps permission they want a waiver.

As further evidence, I am attaching an analysis of the amount of the escrow fund requirement. I do not know who requested or prepared this analysis. The actual CDD 2020 budget for preserve maintenance is $219.918. Based upon this actual budget, as approved by the Taylor Morrison employees, the amount of the required escrow fund per this analysis, using the highest interest rate which produces the lowest amount is in the range of $7.7 million to $9.7 million. This matter is far too important to simply grant Taylor Morrison a waiver.

In conclusion, I urge the Corps to reject Taylor Morrison's permit modification request. The Flow Way CDD is not charted for such an endeavor, has no interest in such an endeavor, has no expertise, and no funding.

Should we receive more information from the Corps we may provide more input.

I did not find, or perhaps recognize, the decision document you previously mentioned.

As always, thank you for your attention to this matter.

DEPARTMENT OF THE ARMY PERMIT

Permittee: J.D. Nicewonder, Jr.
148-B Bristol East Road
Bristol, Virginia 24201

OCT 11 2007

Permit No: SAJ-2000-1926-(IP-HWB)

Issuing Office: US Army Engineer District, Jacksonville

NOTE: The term "you" and its derivatives, as used in this permit, mean the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the US Army Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Authorization for the construction of a residential development, a thirty-six (36) hole golf course and storm water management system on a 1713.45-acre site for the project known as "Mirasol". The project will require the discharge approximately 2,100,000 cubic yards of fill material into 518.67 acres of wetlands and the excavation of approximately 1,800,000 cubic yards of fill material from 126.68 acres of wetlands. The project also includes contouring the north bank of the Cocohatchee Canal. All work is to be completed in accordance with the attached plans numbered SAJ-2000-1926 (IP-HWB), 23 pages dated 12 December 2006. These drawings can be found in Attachment A, which is attached to, and becomes part of, this permit.

Project Location: The proposed project site involves freshwater-forested wetlands within the Cocohatchee watershed and is located north of Immokalee Road and east of Interstate 75 in Sections 10, 11, 15, and 22, Township 48 South, Range 26 East, Collier County, Florida.

Latitude 26°17'37" N, Longitude 81°41'51" W

Permittee: J.D. Nicewonder, Jr.
Permit No: SAJ-2000-1926 (IP-HWB)

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **October 5, 2012**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature and mailing address of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached (see Attachment B).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Permittee: J.D. Nicewonder, Jr.
Permit No: SAJ-2000-1926 (IP-HWB)

Special Conditions:

1. The permittee shall notify the Corps in writing at least 48 hours prior to commencement of the work authorized by this permit and shall provide a written status report every six months until the authorized work has been completed. This commencement notification, status reports, monitoring reports, and all other reports regarding this permit shall be submitted to the U.S. Army Corps of Engineers, Regulatory Division, Enforcement Section, P.O. Box 4970, Jacksonville, Florida 32232-0019 and shall reference the permit number. Status reports can be included with monitoring reports.

2. Interior to the development, the permittee shall preserve and enhance 54.52 acres of wetlands and 2.24 acres of uplands. This 56.76 acres of interior preserves are identified as Wetland Preserves A - F and consists of the following:

Internal Preserve	Wetlands	Uplands	Total Acreage
A	11.46 acres	0.00 acres	11.46 acres
B	8.34 acres	0.15 acres	8.49 acres
C	9.67 acres	0.0 acres	9.67 acres
D	2.74 acres	0.0 acres	2.74 acres
E	13.79 acres	0.0 acres	13.79 acres
F	8.52 acres	2.09 acres	10.61 acres

3. The permittee shall enhance, manage, maintain and preserve the 56.76 acres of interior preserves in accordance with the Interior Mitigation and Monitoring Plan (Attachment C) unless otherwise specifically stated in the Special Conditions of this permit. The 56.76 acres of interior preserves shall remain in a natural state in perpetuity and shall not be disturbed by any dredging, filling, land clearing, agricultural activities, planting, or other construction work whatsoever unless authorized in Attachment C or by the Corps of Engineers. Any additional work in the interior preserves shall require Department of the Army authorization, either as a modification to any permit issued or a separate authorization, and may require additional mitigation.

4. The permittee shall prepare a legally sufficient conservation easement for the 56.76 - acre internal preserves in accordance with Attachment D. The South Florida Water Management District (SFWMD) shall be the grantee for the conservation easement with enforcement rights to the Corps of Engineers.

5. In addition to the 56.76-acre interior preserves, the permittee shall enhance and preserve 776.83 acres of wetlands and 106.88 acres of uplands identified as the main preserve. The permittee shall enhance, manage, maintain and preserve the 883.71-main preserve in accordance with the Main Preserve Mitigation and Monitoring Plan (Attachment E) unless otherwise specifically stated in the Special Conditions of this permit. The 883.71-acre main preserve shall remain in a natural state in perpetuity and shall not be disturbed by any dredging, filling, land clearing, agricultural activities, planting, or other construction work whatsoever unless authorized in Attachment E or by the Corps of Engineers. Any additional work in the main preserve shall require Department of the Army authorization, either as a modification to any permit issued or a separate authorization, and may require additional mitigation.

6. The permittee shall prepare a legally sufficient conservation easement for the 883.71-acre main preserve (minus 1.2 acre access easement) in accordance with Attachment D. The South Florida Water Management District (SFWMD) shall be the grantee for the conservation easement with enforcement rights to the Corps of Engineers.

7. The permittee shall monitor the 56.76-acre interior preserves and the 883.71-acre main preserve. Monitoring should consist of baseline monitoring (prior to mitigation construction), time-zero monitoring (within 30 days following completion of the mitigation work), and annual monitoring reports thereafter. Each monitoring report will include data collected on vegetation, wildlife, rainfall, and wetland water levels, and other information as described in the mitigation and monitoring plans (Attachments C and E), and must also include the following items:

- the Department of the Army Permit number,
- the sequence number of the report being submitted,
- the date the next report is expected to be submitted, and
- a brief summary of the status of the mitigation including any problems encountered and the remedial actions taken.

8. The permittee shall monitor the 56.76-acre internal preserves for a minimum of five (5) years or until the success criteria has been met for three (3) consecutive years. Success criteria are described in Attachment C and include that all internal preserves have a self-sustaining vegetation community with a minimum of 90 percent aerial coverage and less than 4 percent nuisance or exotic vegetation. A request for a final inspection shall be submitted to the Corps of Engineers and the Corps of Engineers shall make the success determination.

9. The permittee shall monitor the 883.71-acre main preserve for a minimum of five (5) years or until the success criteria has been met for three (3) consecutive years. Success criteria are described in Attachment E. A request for a final inspection shall be submitted to the Corps of Engineers and the Corps of Engineers shall make the success determination.

10. The 56.76-acre interior preserves and the 883.71-acre main preserve shall be enhanced and managed in perpetuity for the control of invasive exotic vegetation, such as defined by the Florida Exotic Pest Plant Council's 2005 List of Invasive Species (Category 1 & 2)(Attachment F). There shall be no invasive exotic vegetation or nuisance plant species of seed bearing size in the mitigation area. Plants over three feet in height are considered to be seed bearing size. At no time shall the density of invasive exotic vegetation or nuisance plant species smaller than seed bearing size exceed 2% of the aerial cover in any individual stratum at any sampling point. At no time shall the total density of invasive exotic vegetation or nuisance plant species smaller than seed bearing size exceed a total of 4% for all strata at any sampling point.

11. The applicant will complete all mitigation, except for ongoing monitoring and adjustments to the mitigation authorized by the Corps, within two years of project commencement.

12. The permittee shall maintain and monitor the 883.71-acre main preserve in accordance with this permit until such time that the permittee transfers the ownership of the parcel to the Corkscrew Regional Ecosystem Watershed (CREW) Land Trust. The transfer of ownership shall include an endowment fund to ensure the perpetual maintenance and management of the main preserve as a natural area. Upon transfer of ownership, the permittee shall provide documentation to the Corps of Engineers to include a statement from CREW that, the parcel has been transferred and that an endowment fund has been provided to ensure perpetual maintenance and management of said parcel, and that CREW now assumes full responsibility for the perpetual maintenance and management of the parcel as described in these special conditions.

13. The cost per acre and total amount of the endowment fund is to be determined by CREW at the time of land transfer.

14. Prior to initiating any clearing or construction activities authorized by this permit, the permittee shall provide documentation to the Corps of Engineers that 27.38-wetland credits have been purchased from Panther Island Mitigation Bank.

15. This Corps of Engineers permit does not authorize you to take an endangered species, in particular the wood storks (*Mycteria americana*) and the Florida panther (*Puma concolor coryi*). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (e.g., an ESA Section 10 permit, or a Biological Opinion (BO) under Section 7, with "incidental take" provisions with which you must comply). The enclosed US Fish and Wildlife (FWS) Biological Opinion (Attachment G) contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps of Engineers permit is conditional upon

your compliance with all of the mandatory terms and conditions associated with incidental take of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps of Engineers permit. The FWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

16. The permittee shall follow the *Standard Protection Measures for the Eastern Indigo Snake* during construction (Attachment H).

17. Within 60 days of completion of the work authorized and mitigation, the permittee shall provide to the US Army Corps of Engineers as-built drawings of the authorized work, including mitigation, and a completed As-Built Certification Form (Attachment I).

18. The Corps of Engineers reserves the right to require remedial measures to be taken by the permittee if monitoring or other information demonstrates that adverse impacts to on-site or off-site wetlands, uplands, conservation areas or buffers, or other surface waters have occurred due to project related activities.

19. Within the 883.71-acre main preserve is a 1.2-acre access easement. The 1.2-acre access easement will not be placed under a conservation easement but will be restored and maintained in accordance with the main preserve. Department of the Army authorization will be required for any work conducted within this easement except as stated in this permit.

Permittee: J.D. Nicewonder, Jr.
Permit No: SAJ-2000-1926 (IP-HWB)

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, and local authorization required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces, which this office did not consider in reaching the original public interest, decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Permittee: J.D. Nicewonder, Jr.
Permit No: SAJ-2000-1926 (IP-HWB)

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

J D Nicewonder Jr.
(PERMITTEE)

10/09/07
(DATE)

J.D. NICEWONDER, JR. OWNER
(TYPE OR PRINT PERMITTEE NAME AND TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(DISTRICT ENGINEER)
For PAUL L. GROSSKRUGER
Colonel, U.S. Army

10-11-07
(DATE)

THIS PERMIT CONTAINS 9 ATTACHMENTS, TOTALING 215 PAGES

Attachment A – Development Plans (24 pages dated 12 December 2006)
Attachment B – ERP Special Conditions (SFWMD ERP Modification No 11-02031-P issued 12 October 2006 (6 pages)
Attachment C – Mitigation and Monitoring: Internal Preserves (14 Pages)
Attachment D – Conservation Easement (1 page)
Attachment E – Mitigation and Monitoring: Main Preserve (12 Pages)
Attachment F – Florida Exotic Pest Plant Council's 2005 List of Invasive Species (6 pages)
Attachment G – FWS Biological Opinion dated 3 May 2007 (147 pages)
Attachment H – Standard Protection Measures for the Eastern Indigo Snake (2 pages)
Attachment I – As-Built Certification (3 Pages)

Permittee: J.D. Nicewonder, Jr.
Permit No: SAJ-2000-1926 (IP-HWB)

Permit Transfer: When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_______________________________   ____________________
(PERMITTEE – SIGNATURE AND TITLE)   (DATE)

J.D. Nicewonder, Jr.
148-B Bristol East Road
Bristol, Virginia 24201

PERMIT NUMBER: SAJ-2000-1926 (IP-HWB)

LOCATION & AUTHORIZED WORK:

This permit authorizes the construction of a residential and golf course development known as "Mirasol" and is located on a 1713.45-acre parcel in Sections 10, 11, 15, and 22, Township 48 South, Range 26 East, Collier County, Florida.
Latitude 26°17'37" N, Longitude 81°41'51"W

_______________________________   ____________________
(TRANSFEREE - SIGNATURE)   (DATE)

____
(NAME AND TITLE - PRINTED/TYPED)

____
(NAME AND ADDRESS (CITY, STATE, AND ZIP CODE) - PRINTED/TYPED)

____
(TELEPHONE NUMBER)

The above transfer agreement should be completed and mailed to the local Corps of Engineers Regulatory Office or to:

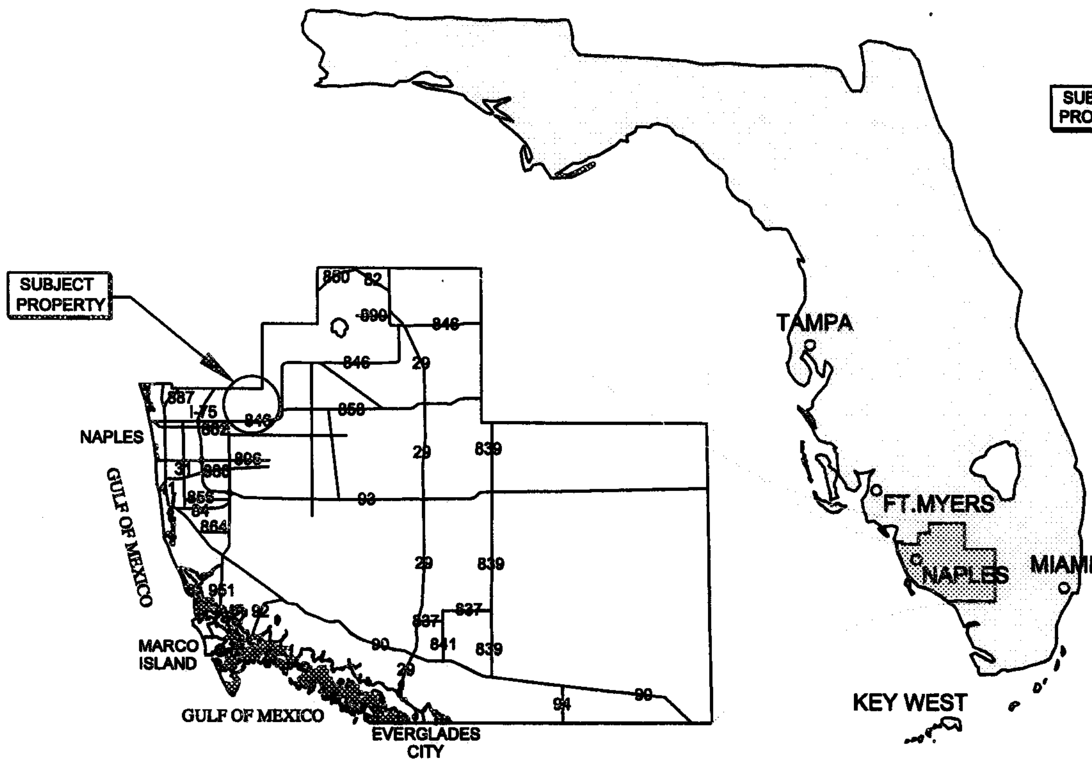
U.S. Army Corps of Engineers, Jacksonville District
ATTN: Regulatory Division, Enforcement Section
P.O. Box 4970
Jacksonville, Florida 32232-0019

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

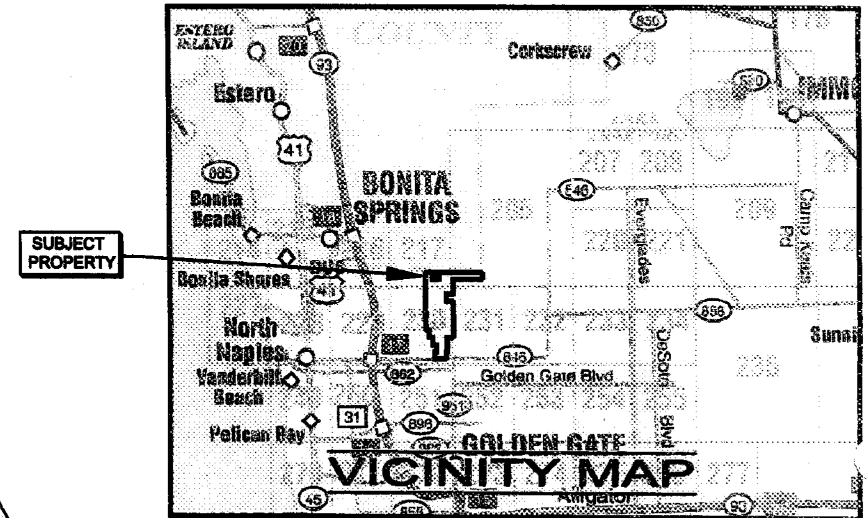
ATTACHMENT A
DEVELOPMENT PLANS

24 pages dated 12 December 2006

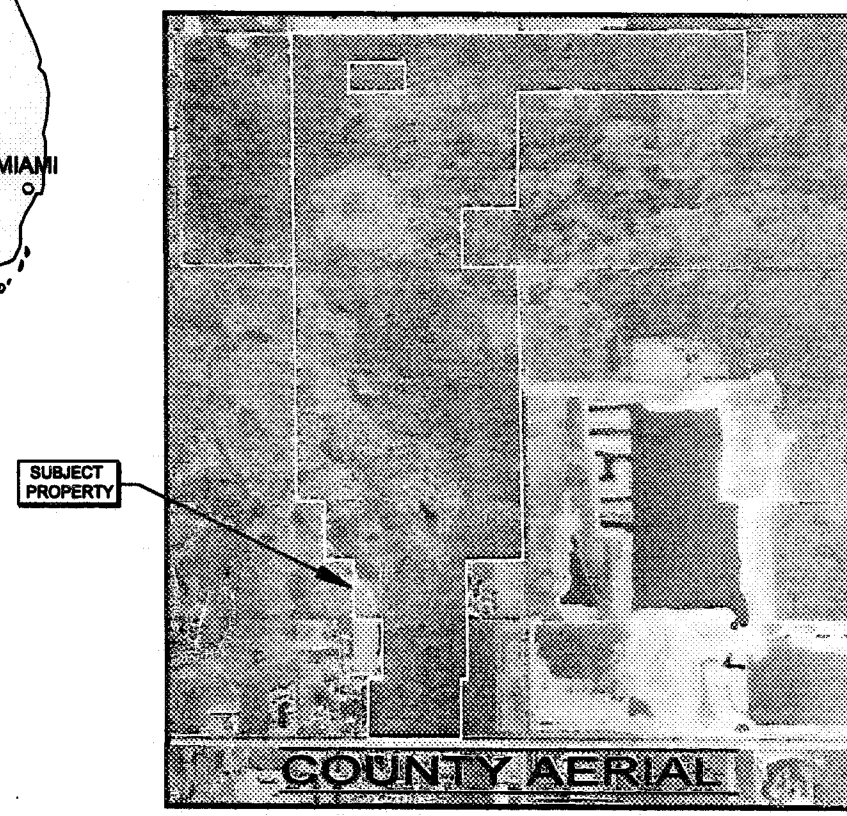
STATE OF FLORIDA



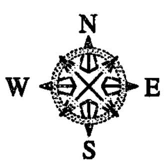
COLLIER COUNTY



VICINITY MAP



COUNTY AERIAL



NOTES:
<> THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.

ATTACHMENT A
Mirasol (Revised) (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 1 of 24

Inc.
sulting
04-3732
43-6632

MIRASOL

SITE LOCATION MAP

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Location
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=600'
JOB NO.:	9418	N/A		
SECTION- 22		TOWNSHIP- 48 S	RANGE- 26 E	

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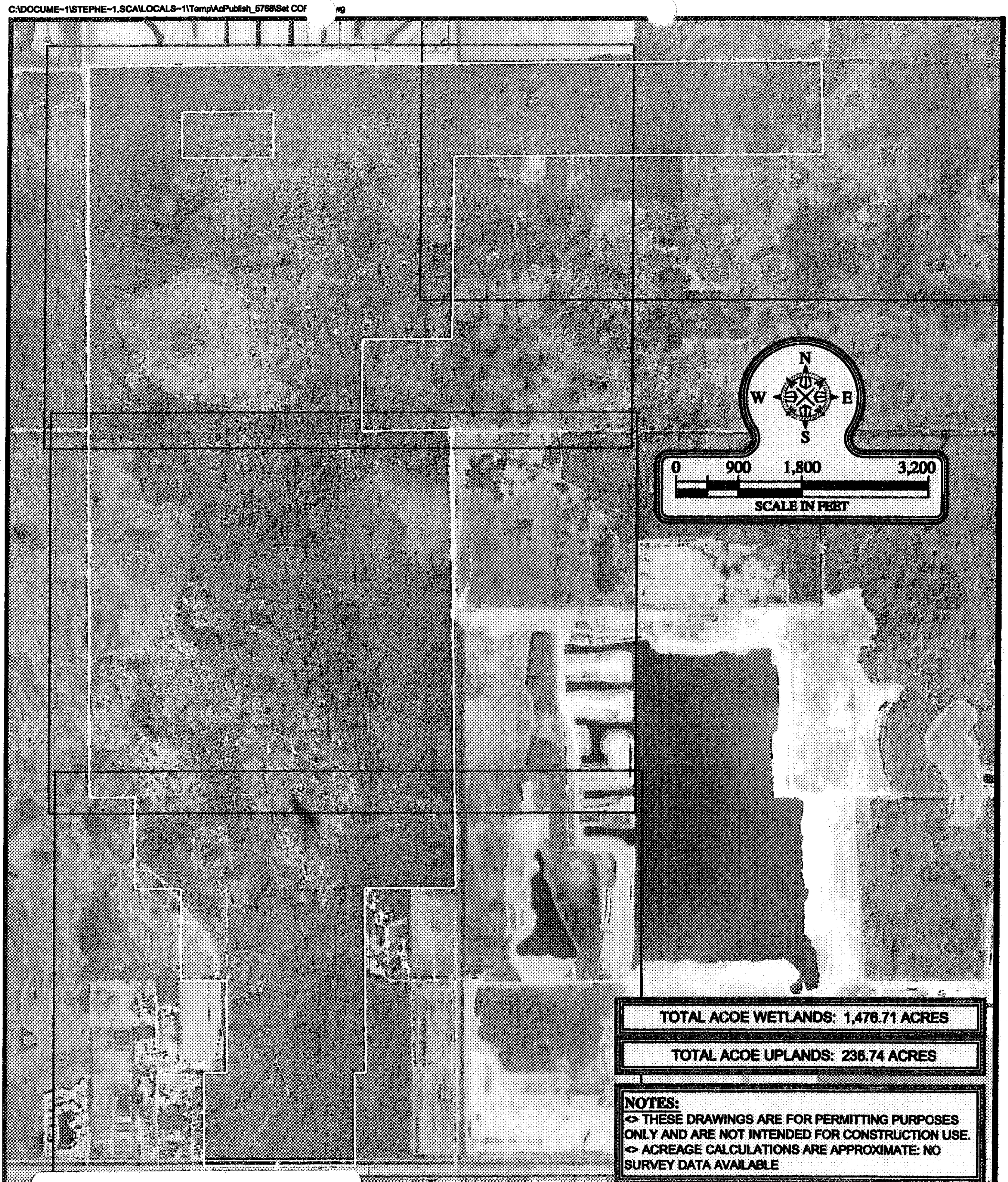

TOTAL ACOE WETLANDS: 1,476.71 ACRES

TOTAL ACOE UPLANDS: 236.74 ACRES

NOTES:
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<> ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 2 of 24

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MIRASOL

2005 SITE AERIAL

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Aerial
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,800'
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E

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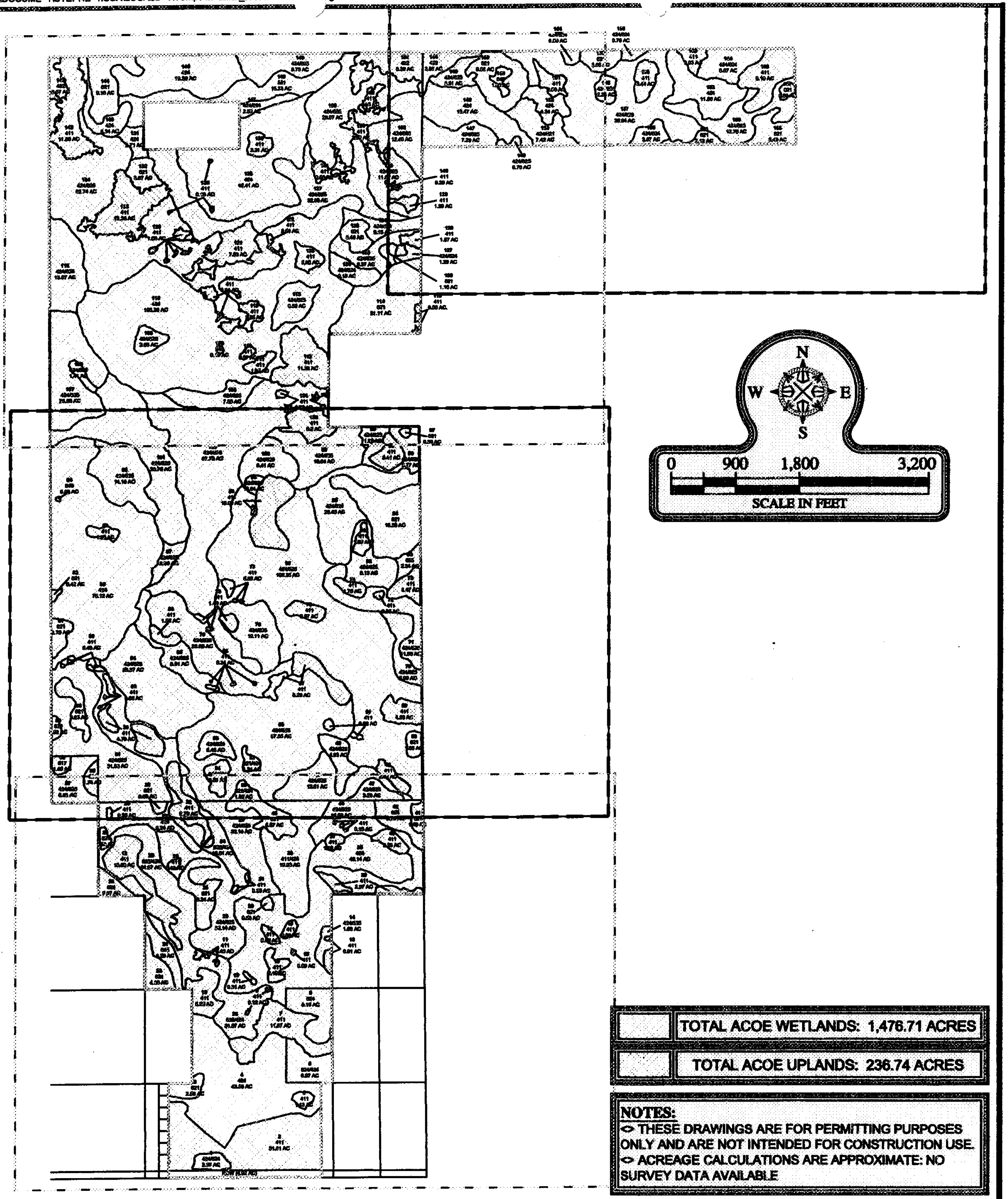

ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 3 of 24

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MIRASOL

ACOE FLUCFCS MAP (ALL)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Flucfcs All
DRAWN BY:	SS	N/A	SHEET:	
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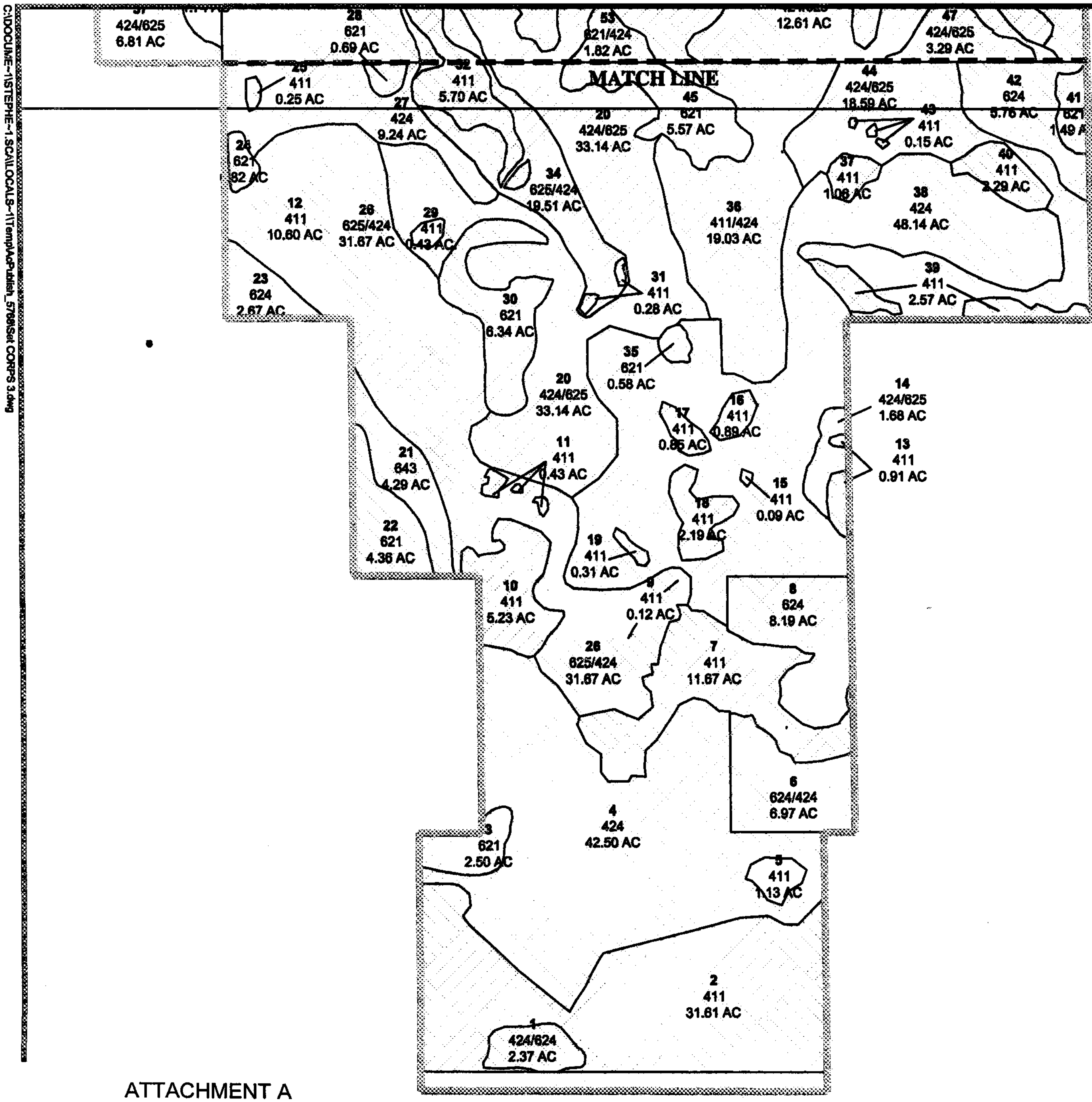
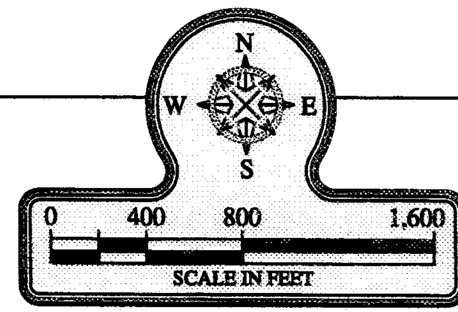
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E





	TOTAL ACOE WETLANDS: 1,476.71 ACRES
	TOTAL ACOE UPLANDS: 236.74 ACRES

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ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 4 of 24

ates, Inc.
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FL 34104-3732
: (239) 643-6632

MIRASOL

FLUCFCS MAP (SECTION 22)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Flucfcs 22
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=800'
JOB NO.:	9418	N/A		

SECTION-22 TOWNSHIP-48 S RANGE-26 E

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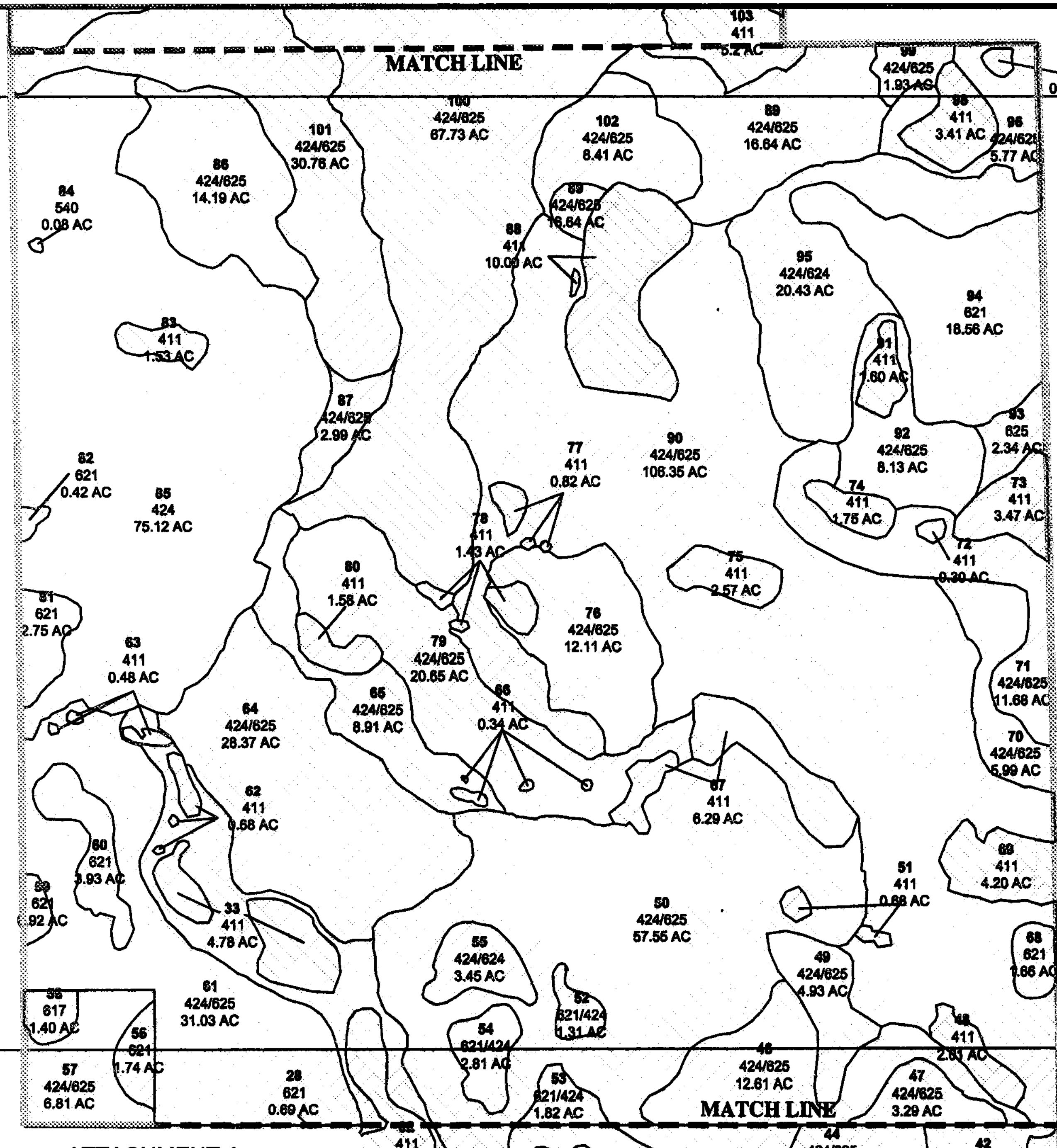

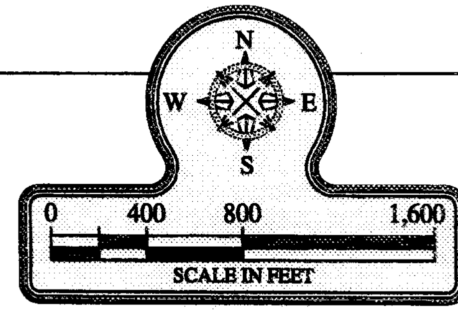

TOTAL ACOE WETLANDS: 1,476.71 ACRES

TOTAL ACOE UPLANDS: 236.74 ACRES

NOTES:

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ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 5 of 24

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643-6632

MIRASOL

FLUCFCS MAP (SECTION 15)

DESIGNED:	T.T.T.	REVISION:		TAB NAME:	Flucfcs 15
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=800'
JOB NO.:	9418	N/A			

SECTION- 15 TOWNSHIP- 48 S RANGE- 26 E

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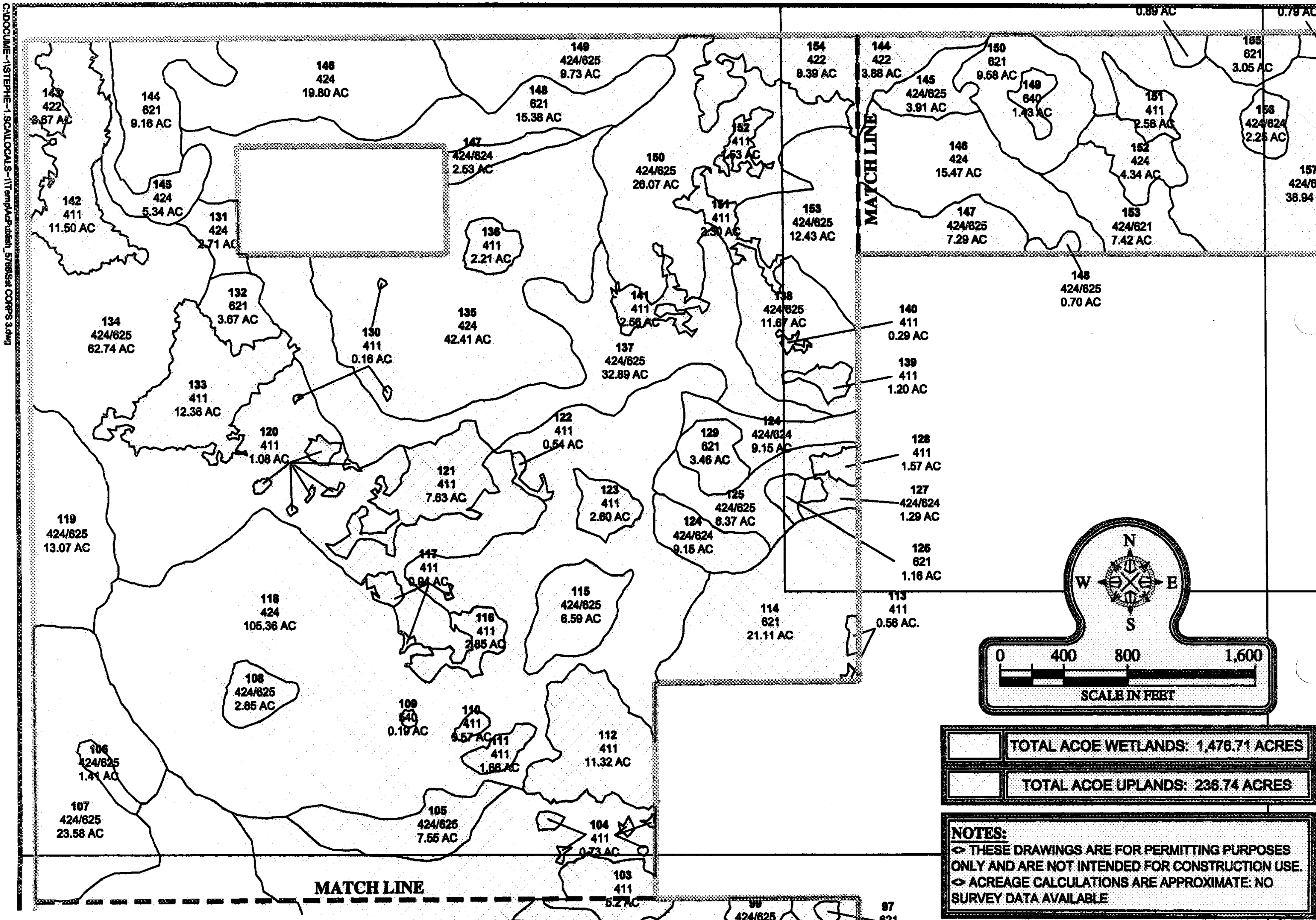

TOTAL ACOE WETLANDS: 1,476.71 ACRES

TOTAL ACOE UPLANDS: 236.74 ACRES

NOTES:
<> THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.
<> ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 6 of 24

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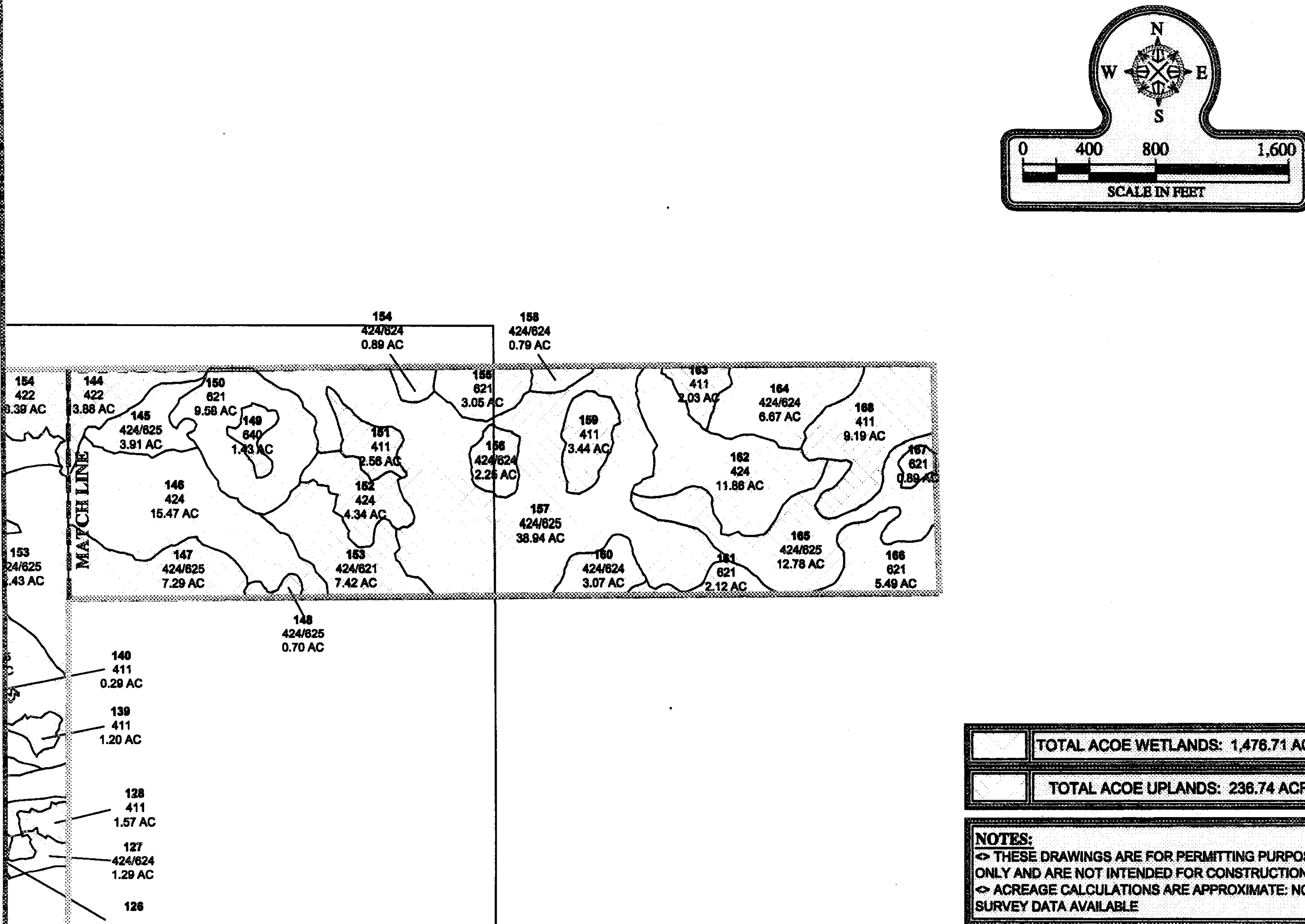
l Consulting
FL 34104-3732
(239) 643-6632

MIRASOL

FLUCFCS MAP (SECTION 10)

DESIGNED:	T.T.T.	REVISION:		TAB NAME:	Flucfcs 10
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=800'
JOB NO.:	9418	N/A			
SECTION-15		TOWNSHIP-48 S		RANGE-26 E	

C:\DOCUME~1\STEPHE~1.SCA\LOCALS~1\Temp\AcPublish_5768\Sst CORPS 3.dwg



	TOTAL ACOE WETLANDS: 1,476.71 ACRES
	TOTAL ACOE UPLANDS: 236.74 ACRES

NOTES:
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<> ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

Email: tuna@turrell-as

ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
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MIRASOL

FLUCFCS MAP (SECTION 11)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Flucfcs 11
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=800'
JOB NO.:	9418	N/A		
SECTION-15		TOWNSHIP-48 S	RANGE-26 E	

C:\DOCUME~1\STEPHE~1.SCA\LOCALS~1\Temp\AcPublish_5768\Set CORPS 3.dwg

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Upland Acreage	ACOE Wetland Acreage	Internal Wetland Preserve	Internal Upland Preserve	Main Wetland Preserve	Main Upland Preserve	Wetland Dredge Impacts	Wetland Fill Impacts	Total Wetland Impacts
1	424/624	Melaleuca(>75%) / Cypress / Pine		2.37					0.40	1.97	2.37
2	411	Pine Flatwoods	31.61								
3	621	Cypress		2.50					0.98	1.52	2.50
4	424	Melaleuca		42.50					10.38	32.12	42.50
5	411	Pine Flatwoods	1.13								
6	624/424	Pine / Cypress / Melaleuca (>50%)		6.97					1.17	5.80	6.97
7	411	Pine Flatwoods	11.67								
8	624	Pine / Cypress		8.19					0.64	7.55	8.19
9	411	Pine Flatwoods	0.12								
10	411	Pine Flatwoods	5.23								
11	411	Pine Flatwoods	0.43								
12	411	Pine Flatwoods	10.60			0.15					
13	411	Pine Flatwoods	0.91								
14	625/424	Pine Flatwoods / Melaleuca (>50%)		1.68					0.28	1.40	1.68
15	411	Pine Flatwoods	0.09								
16	411	Pine Flatwoods	0.89								
17	411	Pine Flatwoods	0.85								
18	411	Pine Flatwoods	2.19								
19	411	Pine Flatwoods	0.31								
20	424/625	Melaleuca(>50%) / Pine Flatwoods		33.14	3.43				8.88	20.83	29.71
21	643	Disturbed Wet Prairie		4.29	0.85				0.53	2.91	3.44
22	621	Cypress		4.36	4.36						
23	624	Pine / Cypress		2.67	2.67						
24	621	Cypress		0.82						0.82	0.82
25	411	Pine Flatwoods	0.25								
26	625/424	Pine Flatwoods / Melaleuca (>25%)		31.67	0.96				6.19	24.52	30.71
27	424	Melaleuca		9.24					2.06	7.18	9.24
28	621	Cypress		0.69						0.69	0.69
29	411	Pine Flatwoods	0.43								
30	621	Cypress		6.34	6.34						
31	411	Pine Flatwoods	0.28								
32	411	Pine Flatwoods	5.70								
33	411	Pine Flatwoods	4.78								
34	625/424	Pine Flatwoods / Melaleuca (>25%)		19.51					7.24	12.27	19.51
35	621	Cypress		0.58	0.55					0.03	0.03
36	625/424	Pine Flatwoods / Melaleuca (>25%)		19.02	2.72				0.89	15.41	16.30
37	411	Pine Flatwoods	1.06								
38	424	Melaleuca		48.14	1.39				7.88	38.87	46.75
39	411	Pine Flatwoods	2.57								
40	411	Pine Flatwoods	2.29								
41	621	Cypress		1.49	1.27					0.22	0.22
42	624	Pine / Cypress		5.76	0.88				1.93	2.95	4.88
43	411	Pine Flatwoods	0.15								
44	424/625	Melaleuca(>50%) / Pine Flatwoods		18.60	0.16				3.17	15.27	18.44
45	621	Cypress		5.57	4.87					0.70	0.70
46	424/625	Melaleuca(>50%) / Pine Flatwoods		12.61	0.02				0.74	11.85	12.59
47	424/625	Melaleuca / Pine Flatwoods		3.29						3.29	3.29
48	411	Pine Flatwoods	2.01								
49	411	Pine Flatwoods	4.93								
50	424/625	Melaleuca(>75%) / Pine Flatwoods		57.55	3.17				12.81	41.57	54.38
51	411	Pine Flatwoods	0.68								
52	621	Cypress		1.31					0.48	0.83	1.31
53	621	Cypress		1.82	1.82						
54	621	Cypress		2.81	1.31				1.03	0.47	1.50
55	424/624	Melaleuca(>50%)/Cypress/Pine		3.45	0.09				0.83	2.53	3.36
56	424/621	Melaleuca(>50%)/Cypress		1.75					0.36	1.39	1.75
57	424/624	Melaleuca(>50%)/Cypress/Pine		6.80	0.53				1.79	4.48	6.27
58	617	Mixed Wetland Hardwoods		1.39	0.14					1.25	1.25
59	621	Cypress		0.88	0.88						
60	621	Cypress		3.93	3.93						
61	424/625	Melaleuca(>75%) / Pine Flatwoods		30.91	2.00				5.70	23.21	28.91
62	411	Pine Flatwoods	0.68								
63	411	Pine Flatwoods	0.48								
64	424/625	Melaleuca(>75%) / Pine Flatwoods		28.37					5.81	22.56	28.37
65	424/625	Melaleuca(>75%) / Pine Flatwoods		8.91					0.76	8.15	8.91
66	411	Pine Flatwoods	0.34								
67	411	Pine Flatwoods	6.29								
68	621	Cypress		1.66	0.64				0.02	1.00	1.02
69	411	Pine Flatwoods	4.20			0.63					
70	424/625	Melaleuca(>50%) / Pine Flatwoods		5.99	0.42				0.95	4.62	5.57

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Upland Acreage	ACOE Wetland Acreage	Internal Wetland Preserve	Internal Upland Preserve	Main Wetland Preserve	Main Upland Preserve	Wetland Dredge Impacts	Wetland Fill Impacts	Total Wetland Impacts
71	424/625	Melaleuca(>25%) / Pine Flatwoods		11.68	1.96		0.87		0.86	7.99	8.85
72	411	Pine Flatwoods	0.30								
73	411	Pine Flatwoods	3.48			1.46					
74	411	Pine Flatwoods	1.75								
75	411	Pine Flatwoods	2.57								
76	424/625	Melaleuca(>50%) / Pine Flatwoods		12.11					1.08	11.03	12.11
77	411	Pine Flatwoods	0.82								
78	411	Pine Flatwoods	1.43								
79	424/625	Melaleuca(>75%) / Pine Flatwoods		20.65					3.23	17.42	20.65
80	411	Pine Flatwoods	1.58								
81	621	Melaleuca(>50%)/Cypress		2.60	2.60						
82	621	Melaleuca(>50%)/Cypress		0.37	0.13					0.24	0.24
83	411	Pine Flatwoods	1.53								
84	540	Cattle Pond		0.08			0.08				
85	424	Melaleuca		74.08	1.25		17.28		10.88	44.67	55.55
86	424/625	Melaleuca(>75%) / Pine Flatwoods		14.19			10.35		1.09	2.75	3.84
87	424/625	Melaleuca(>25%) / Pine Flatwoods		2.99					0.64	2.35	2.99
88	411	Pine Flatwoods	10.00					1.67			
89	424/625	Melaleuca(>50%) / Pine Flatwoods		16.65			15.91			0.74	0.74
90	424/625	Melaleuca(>75%) / Pine Flatwoods		106.33	2.43		5.30		18.54	80.06	98.60
91	411	Pine Flatwoods	1.60					1.60			
92	424/625	Melaleuca(>25%) / Pine Flatwoods		8.13	0.13		5.78			2.22	2.22
93	625	Hydric Pine Flatwoods		2.35	0.62		1.72				
94	621	Cypress		18.57			18.57				
95	424/624	Melaleuca(>25%)/Cypress/Pine		20.43			20.43				
96	424/625	Melaleuca(>25%) / Pine Flatwoods		5.77			5.77				
97	621	Cypress		0.39			0.39				
98	411	Pine Flatwoods	3.41					3.41			
99	424/625	Melaleuca(>50%) / Pine Flatwoods		1.93			1.93				
100	424/625	Melaleuca(>50%) / Pine Flatwoods		67.73			40.24		4.33	23.16	27.49
101	424/625	Melaleuca(>50%) / Pine Flatwoods		30.64			22.84		2.13	5.67	7.80
102	424/625	Melaleuca(>75%) / Pine Flatwoods		8.41			8.27			0.14	0.14
103	411	Pine Flatwoods	5.21					5.21			
104	411	Pine Flatwoods	0.73					0.73			
105	424/625	Melaleuca(>75%) / Pine Flatwoods		7.55			7.55				
106	424/625	Melaleuca(>25%) / Pine Flatwoods		1.41			1.41				
107	424/625	Melaleuca(>50%) / Pine Flatwoods		21.33			21.33				
108	424/625	Melaleuca(>75%) / Pine Flatwoods		2.85			2.85				
109	540	Cattle Pond		0.19			0.19				
110	411	Pine Flatwoods	0.57					0.57			
111	411	Pine Flatwoods	1.66					1.66			
112	411	Pine Flatwoods	11.32					11.32			
113	411	Pine Flatwoods	0.56					0.56			
114	621	Cypress		21.11			21.11				
115	424/625	Melaleuca(>75%) / Pine Flatwoods		6.59			6.59				
116	411	Pine Flatwoods	2.85					2.85			
117	411	Pine Flatwoods	0.94					0.94			
118	424	Melaleuca		107.97			107.97				
119	424/625	Melaleuca(>25%) / Pine Flatwoods		12.63			12.63				
120	411	Pine Flatwoods	1.08					1.08			
121	411	Pine Flatwoods	7.63					7.63			
122	411	Pine Flatwoods	0.54					0.54			
123	411	Pine Flatwoods	2.60					2.60			
124	424/624	Melaleuca(>50%)/Cypress/Pine		9.14			9.14				
125	424/625	Melaleuca(>50%)/ Pine Flatwoods		6.37			6.37				
126	621	Cypress		1.16			1.16				
127	424/624	Melaleuca(>50%)/Cypress/Pine		1.29			1.29				
128	411	Pine Flatwoods	1.57					1.57			
129	424/621	Melaleuca(>25%)/Cypress		3.46			3.46				
130	411	Pine Flatwoods	0.16					0.16			
131	424	Melaleuca		2.71			2.71				
132	424/621	Melaleuca(>25%)/Cypress		3.67			3.67				
133	411	Pine Flatwoods	12.36					12.36			
134	424/625	Melaleuca(>75%) / Pine Flatwoods		62.54			62.54				
135	424	Melaleuca		42.41			42.41				
136	411	Pine Flatwoods	2.21					2.21			
137	424/625	Melaleuca(>75%) / Pine Flatwoods		32.88			32.88				
138	424/625	Melaleuca(>50%)/ Pine Flatwoods		11.67			11.67				
139	411	Pine Flatwoods	1.20					1.20			
140	411	Pine Flatwoods	0.29					0.29			

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Upland Acreage	ACOE Wetland Acreage	.Internal Wetland Preserve	Internal Upland Preserve	Main Wetland Preserve	Main Upland Preserve	Wetland Dredge Impacts	Wetland Fill Impacts	Total Wetland Impacts
141	411	Pine Flatwoods	2.56					2.56			
142	411	Pine Flatwoods	11.49					11.49			
143	422	Brazilian Pepper		3.59			3.59				
144	621	Cypress		9.11			9.11				
145	424	Melaleuca		5.34			5.34				
146	424	Melaleuca		19.58			19.58				
147	424/624	Melaleuca(>50%)/ Pine / Cypress		2.53			2.53				
148	424/621	Melaleuca(>25%)/Cypress		15.38			15.38				
149	424/625	Melaleuca(>25%) / Pine Flatwoods		9.28			9.28				
150	424/625	Melaleuca(>75%) / Pine Flatwoods		25.99			25.99				
151	411	Pine Flatwoods	2.29					2.29			
152	411	Pine Flatwoods	1.53					1.53			
153	424/625	Melaleuca(>50%)/ Pine Flatwoods		12.43			12.43				
154	411	Pine Flatwoods	8.02					8.02			
155	411	Pine Flatwoods	3.88					3.88			
156	424/625	Melaleuca(>50%)/ Pine Flatwoods		3.91			3.91				
157	424	Melaleuca		15.47			15.47				
158	424/625	Melaleuca(>50%)/ Pine Flatwoods		7.29			7.29				
159	424/625	Melaleuca(>25%) / Pine Flatwoods		0.70			0.70				
160	621	Cypress		9.58			9.58				
161	640	Flag Pond		1.43			1.43				
162	424/621	Melaleuca(>50%)/Cypress/Pine		7.42			7.42				
163	424	Melaleuca		4.34			4.34				
164	411	Pine Flatwoods	2.56					2.56			
165	424/624	Melaleuca(>50%)/Cypress/Pine		0.89			0.89				
166	621	Cypress		3.05			3.05				
167	424/624	Melaleuca(>50%)/Cypress/Pine		2.25			2.25				
168	424/625	Melaleuca(>75%)/Cypress/Pine		38.94			38.94				
169	424/624	Melaleuca(>50%)/Cypress/Pine		3.07			3.07				
170	424/624	Melaleuca(>50%)/Cypress/Pine		0.79			0.79				
171	411	Pine Flatwoods	3.44					3.44			
172	621	Cypress		2.12			2.12				
173	411	Pine Flatwoods	1.76					1.76			
174	424	Melaleuca		11.86			11.86				
175	424/624	Melaleuca(>25%)/Cypress/Pine		6.67			6.67				
176	411	Pine Flatwoods	9.19					9.19			
177	621	Cypress		5.49			5.49				
178	621	Cypress		0.89			0.89				
179	625	Hydric Pine Flatwoods		12.78			12.78				
ROW	ROW	Road Right of Way	4.92								
		TOTALS	**236.74**	**1476.71**	**54.52**	**2.24**	**776.83**	**106.88**	**126.68**	**518.67**	**645.35**

ATTACHMENT A
Mirasol (Revised)
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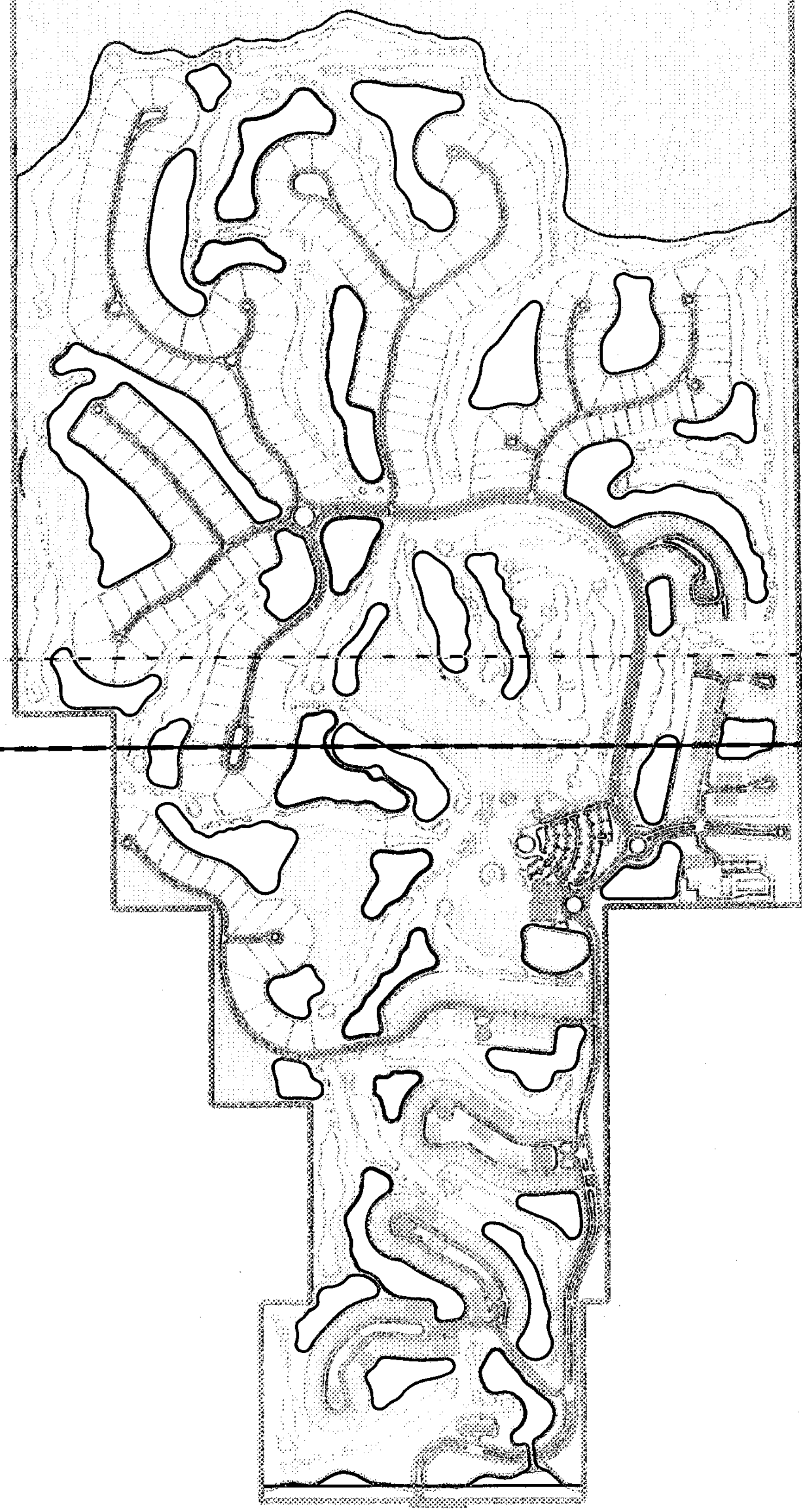

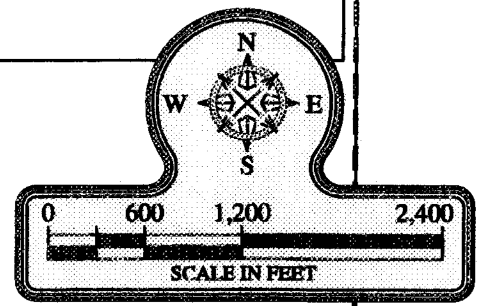

HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	TOTAL	940.47

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:
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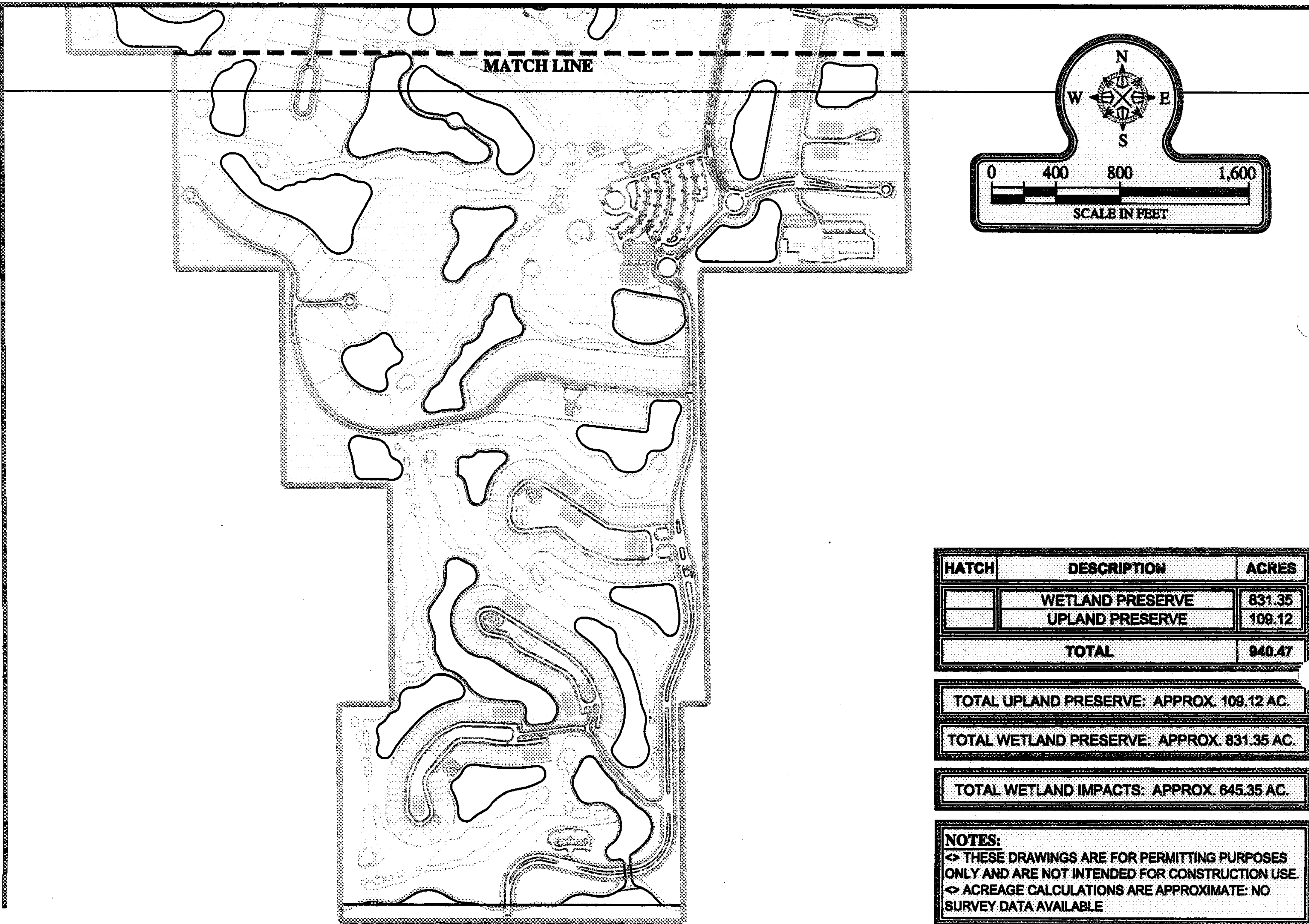
4-3732
3-6632

MIRASOL

SITE DEPELOPMENT PLAN (ALL)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	SDP All
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,600'
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E



HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	TOTAL	940.47

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:
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ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
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tal Consulting
s, FL 34104-3732
x: (239) 643-6632

MIRASOL

SITE DEVELOPMENT PLAN (SECTION 22)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	SDP 22
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=800'
JOB NO.:	9418	N/A		

SECTION-22 TOWNSHIP-48 S RANGE-26 E

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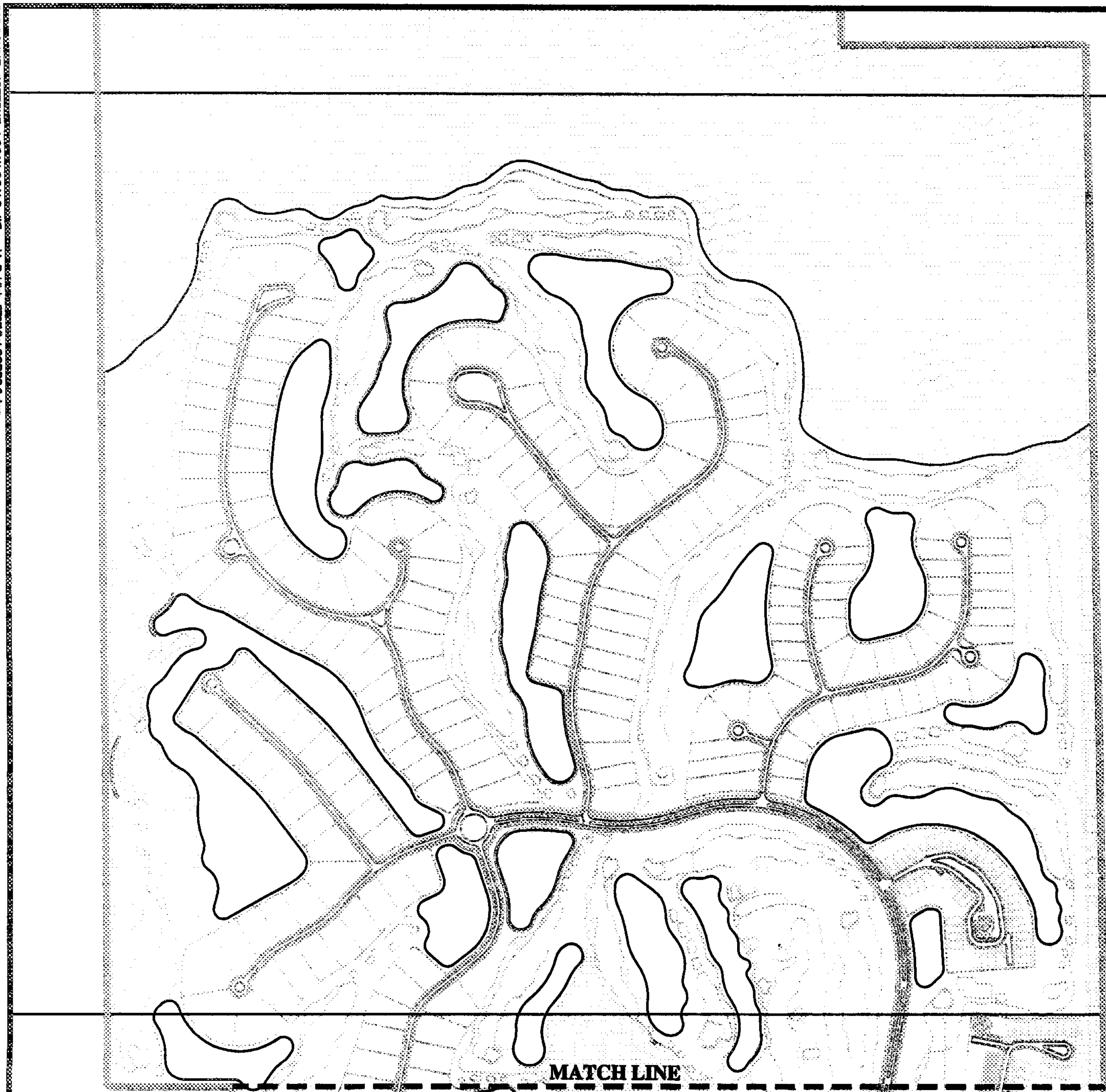

HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	TOTAL	940.47

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:

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ATTACHMENT A
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MIRASOL

SITE DEVELOPMENT PLAN (SECTION 15)

DESIGNED:	T.T.T.	REVISION:		TAB NAME:	SDP 15
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=800'
JOB NO.:	9418	N/A			
SECTION-15		TOWNSHIP-48 S		RANGE-26 E	

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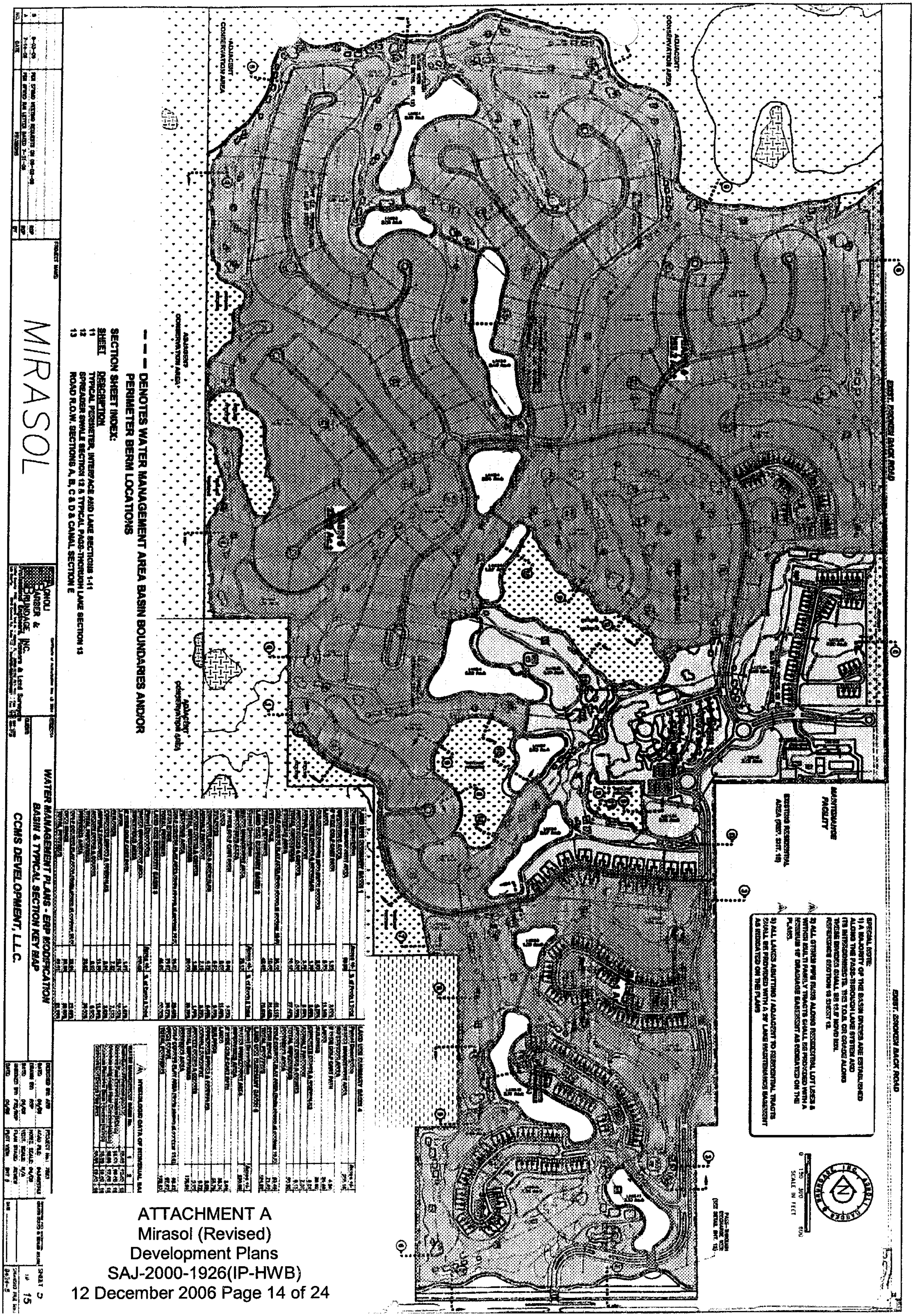

ATTACHMENT A
Mirasol (Revised)
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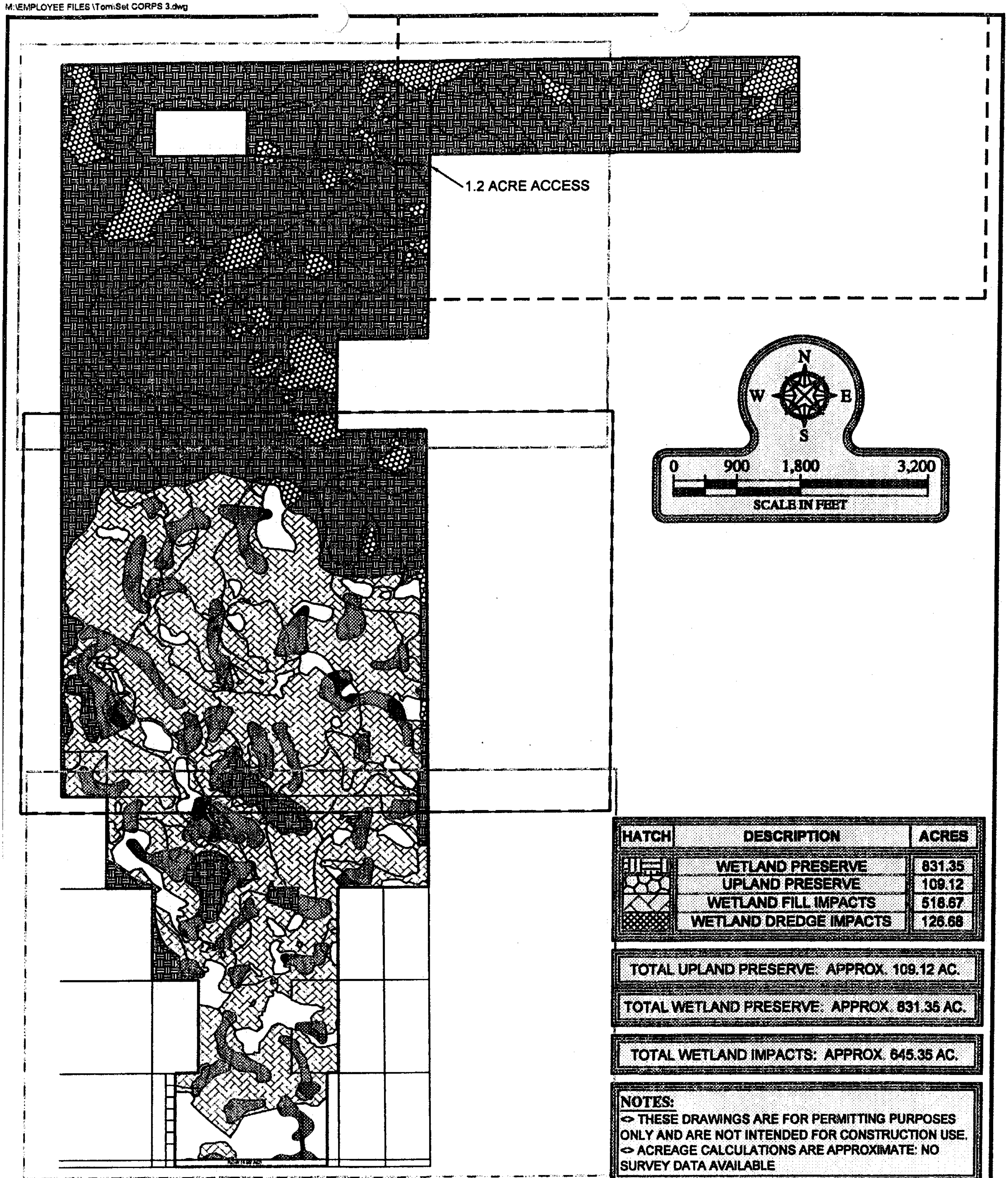

HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	WETLAND FILL IMPACTS	518.67
	WETLAND DREDGE IMPACTS	126.68

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:

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ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
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Email:

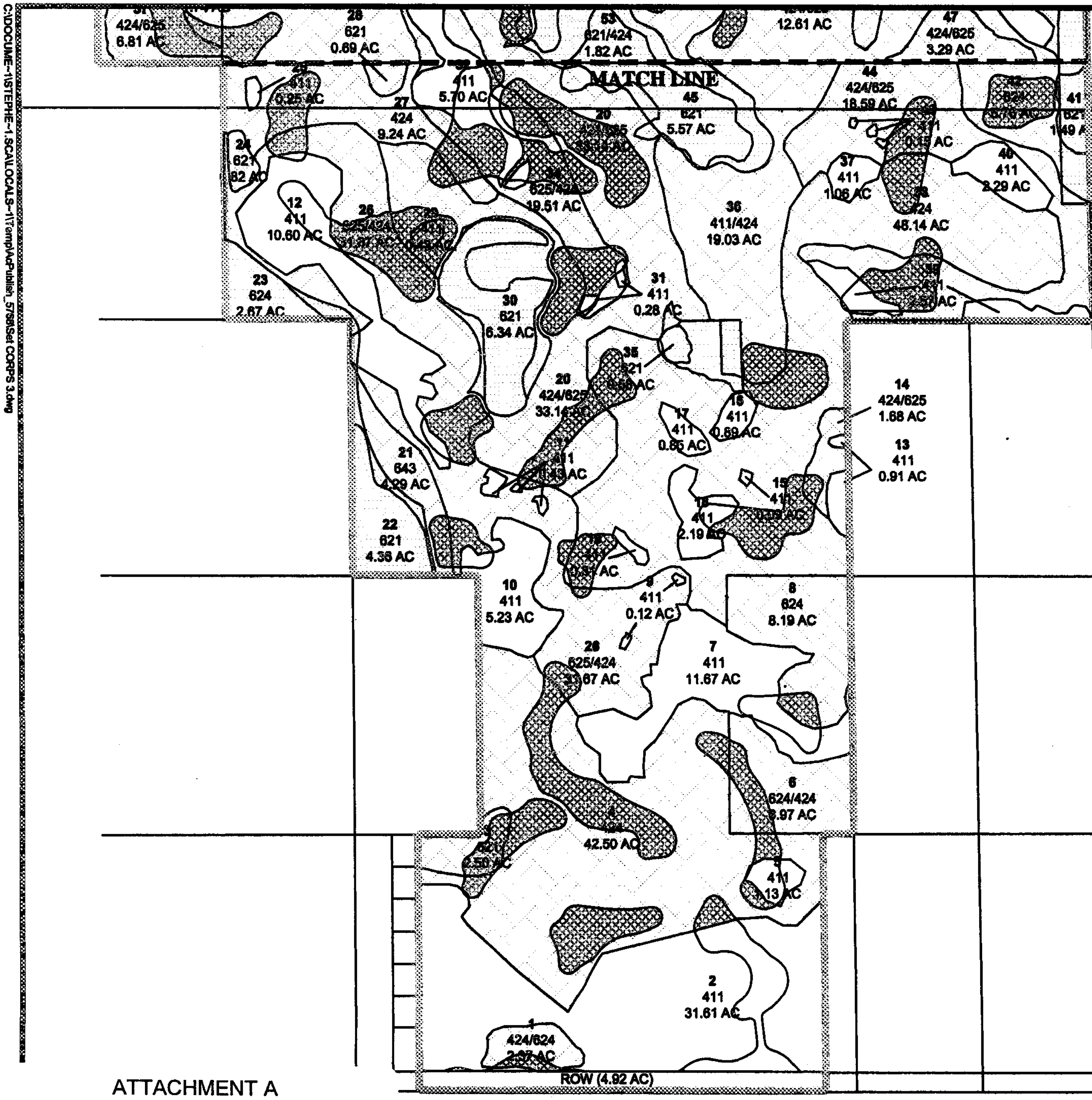
c.
ng
732
532

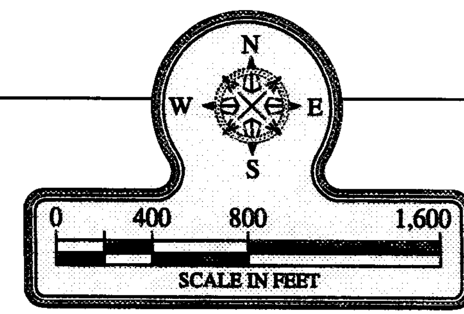
MIRASOL

IMPACTS & PRESERVES (ALL)

DESIGNED:	T.T.T.	REVISION:		TAB NAME:	Imp & Pre All
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=1,800'
JOB NO.:	9418	N/A			

SECTION- TOWNSHIP- 48 S RANGE- 26 E





HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	WETLAND FILL IMPACTS	518.67
	WETLAND DREDGE IMPACTS	126.68

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:
<> THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.
<> ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

ATTACHMENT A
Mirasol (Revised)
Development Plans
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 16 of 24

ates, Inc.
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, FL 34104-3732
x: (239) 643-6632

MIRASOL

IMPACT & PRESERVES (SECTION 22)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Imp & Pre 22
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-08	N/A	SCALE:	1"=800'
JOB NO.:	9418	N/A		

SECTION-22 TOWNSHIP-48 S RANGE-26 E

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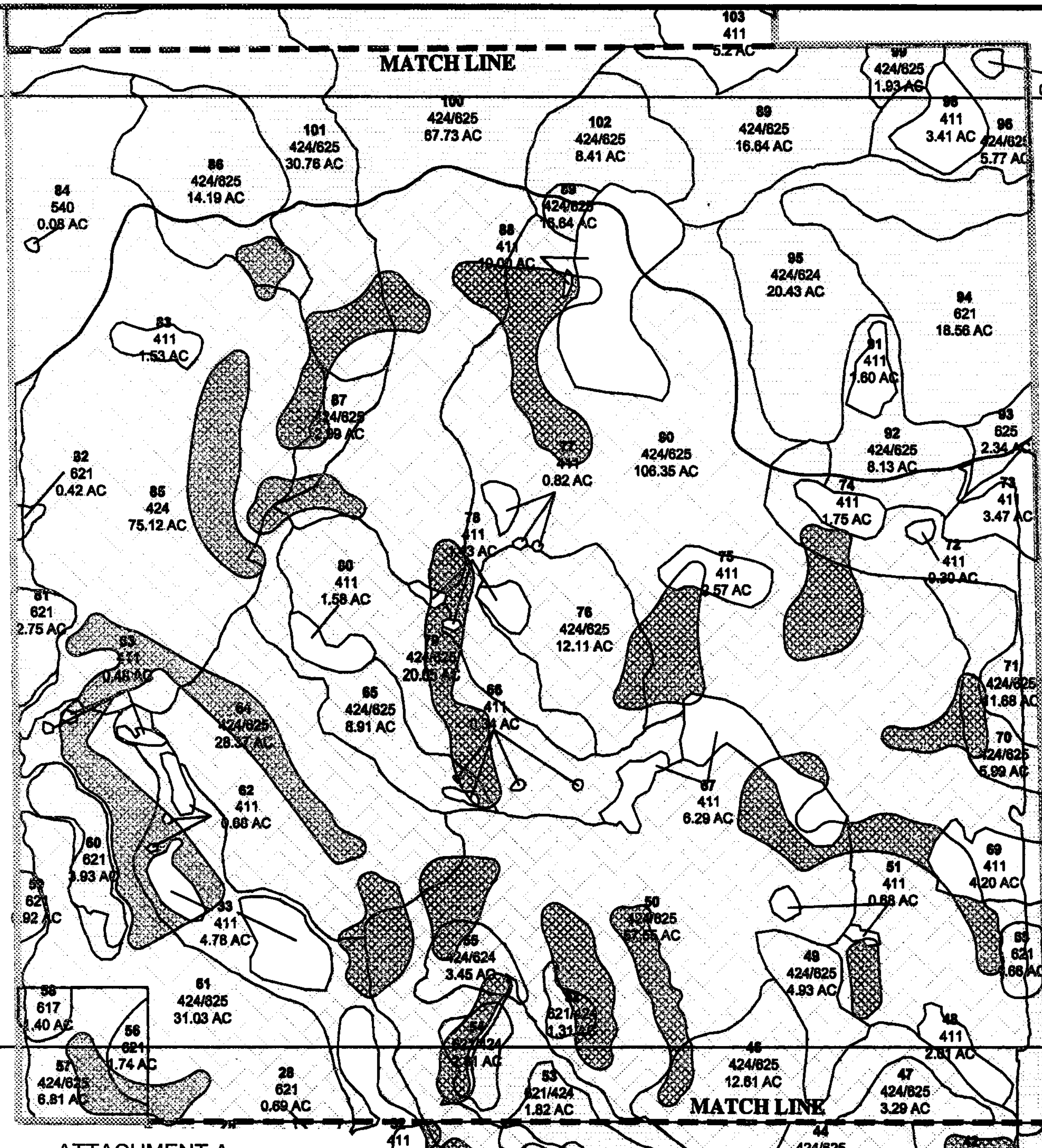

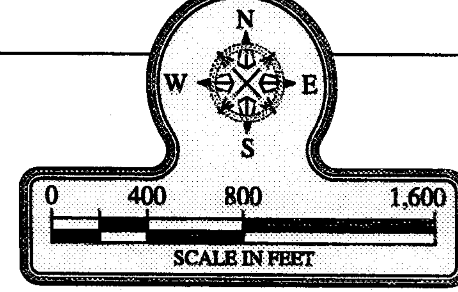

HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	WETLAND FILL IMPACTS	518.67
	WETLAND DREDGE IMPACTS	126.68

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:
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ATTACHMENT A
Mirasol (Revised)
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MIRASOL

IMPACT & PRESERVES (SECTION 15)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Imp & Pre 15
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=600'
JOB NO.:	9418	N/A		

SECTION-15 TOWNSHIP-48 S RANGE-26 E

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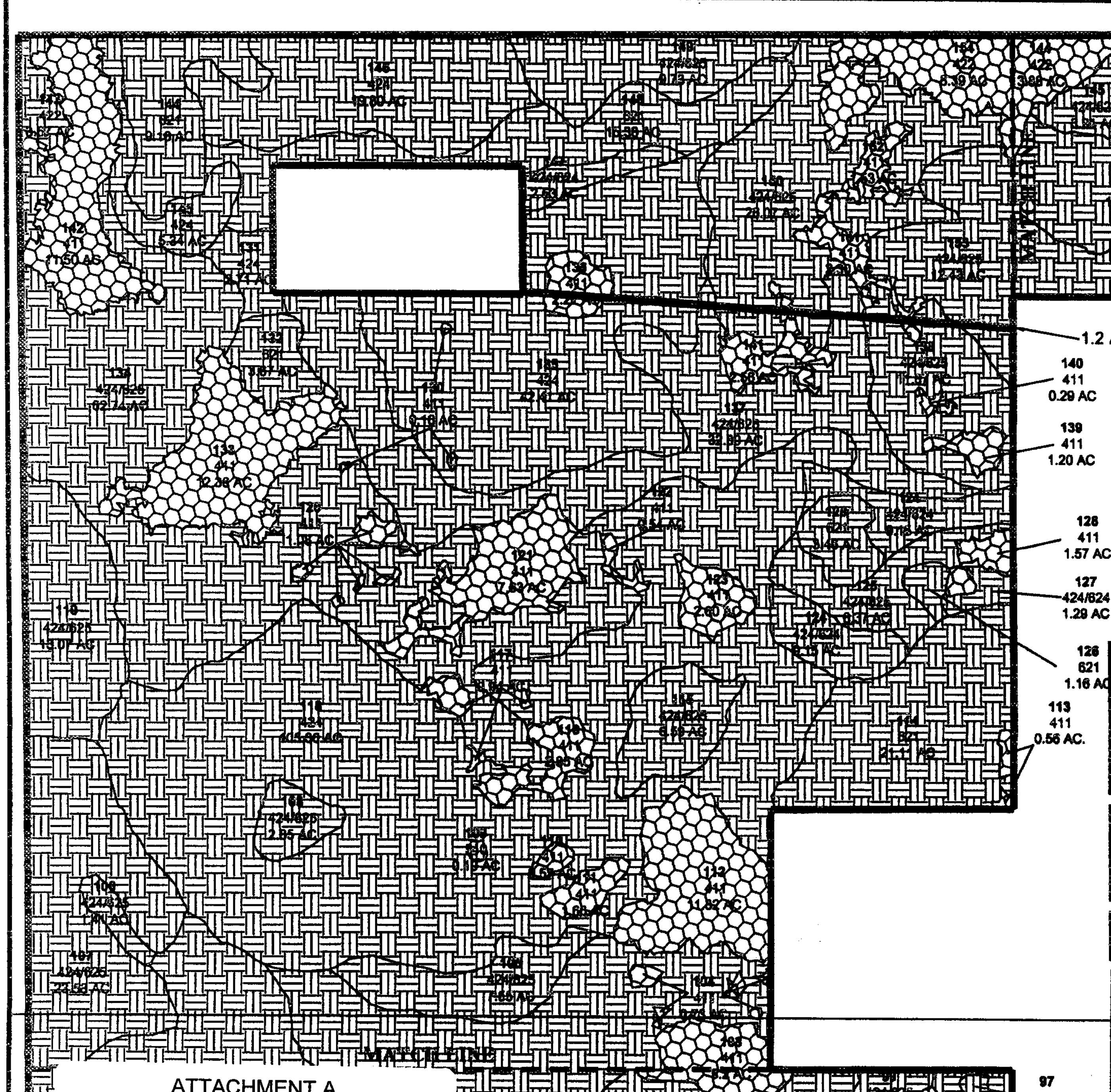

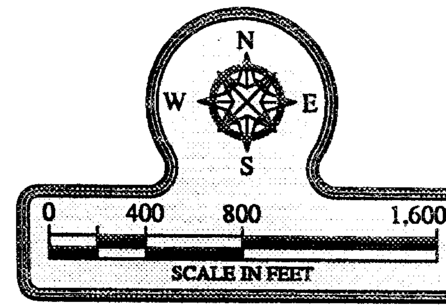

HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	WETLAND FILL IMPACTS	518.67
	WETLAND DREDGE IMPACTS	126.68

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:

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ATTACHMENT A
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MIRASOL

IMPACT & PRESERVES (SECTION 10)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Imp & Pre 10
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=800'
JOB NO.:	9418	N/A		

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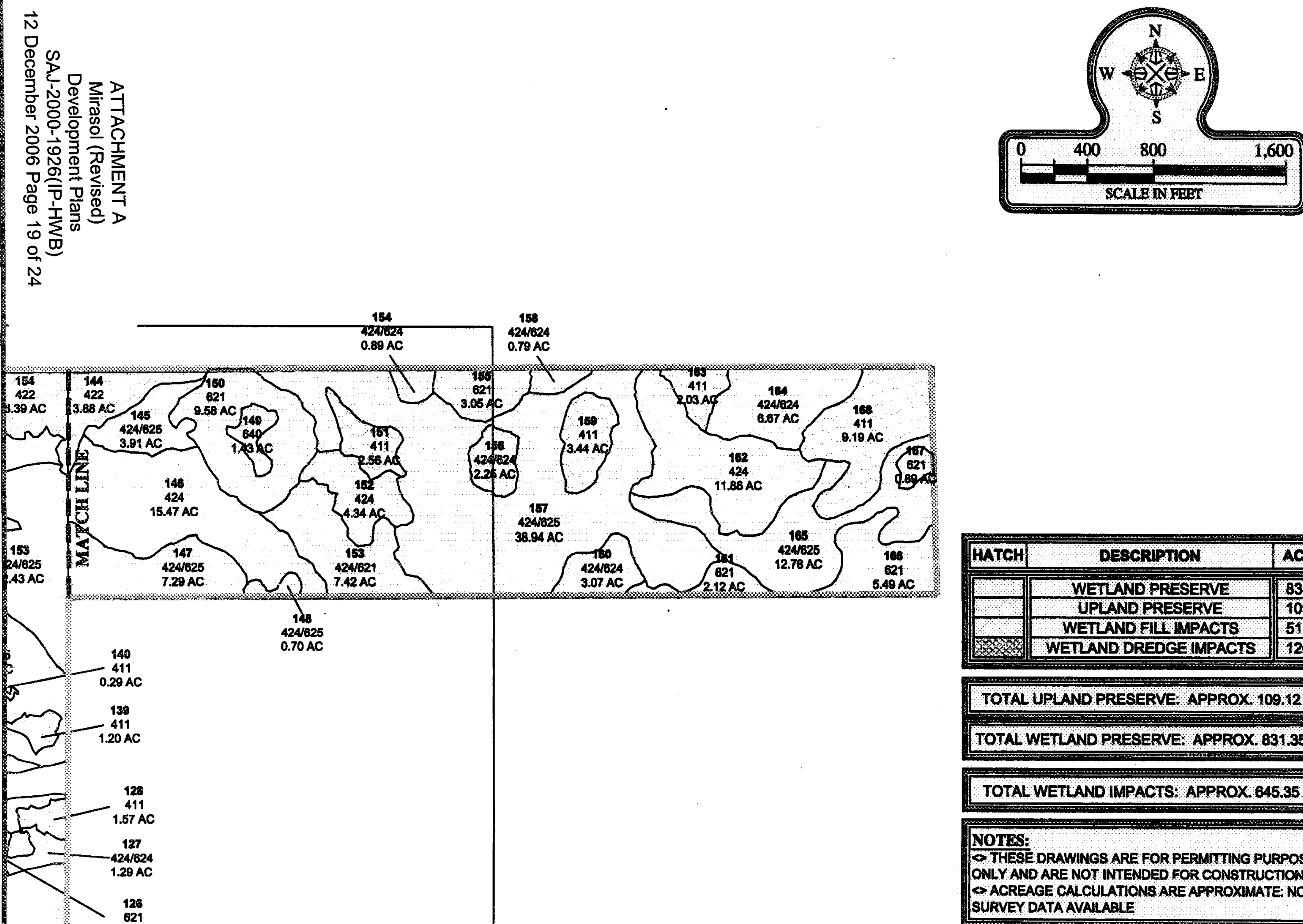

HATCH	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	WETLAND FILL IMPACTS	518.67
	WETLAND DREDGE IMPACTS	126.68

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

TOTAL WETLAND IMPACTS: APPROX. 645.35 AC.

NOTES:
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Turrell & Associates, Inc.
Marine & Environmental Consulting
3584 Exchange Ave. Suite B. Naples, FL 34104-3732
Email: tuna@turrell-associates.com Phone: (239) 643-0166 Fax: (239) 643-6632

MIRASOL

IMPACT & PRESERVES (SECTION 11)

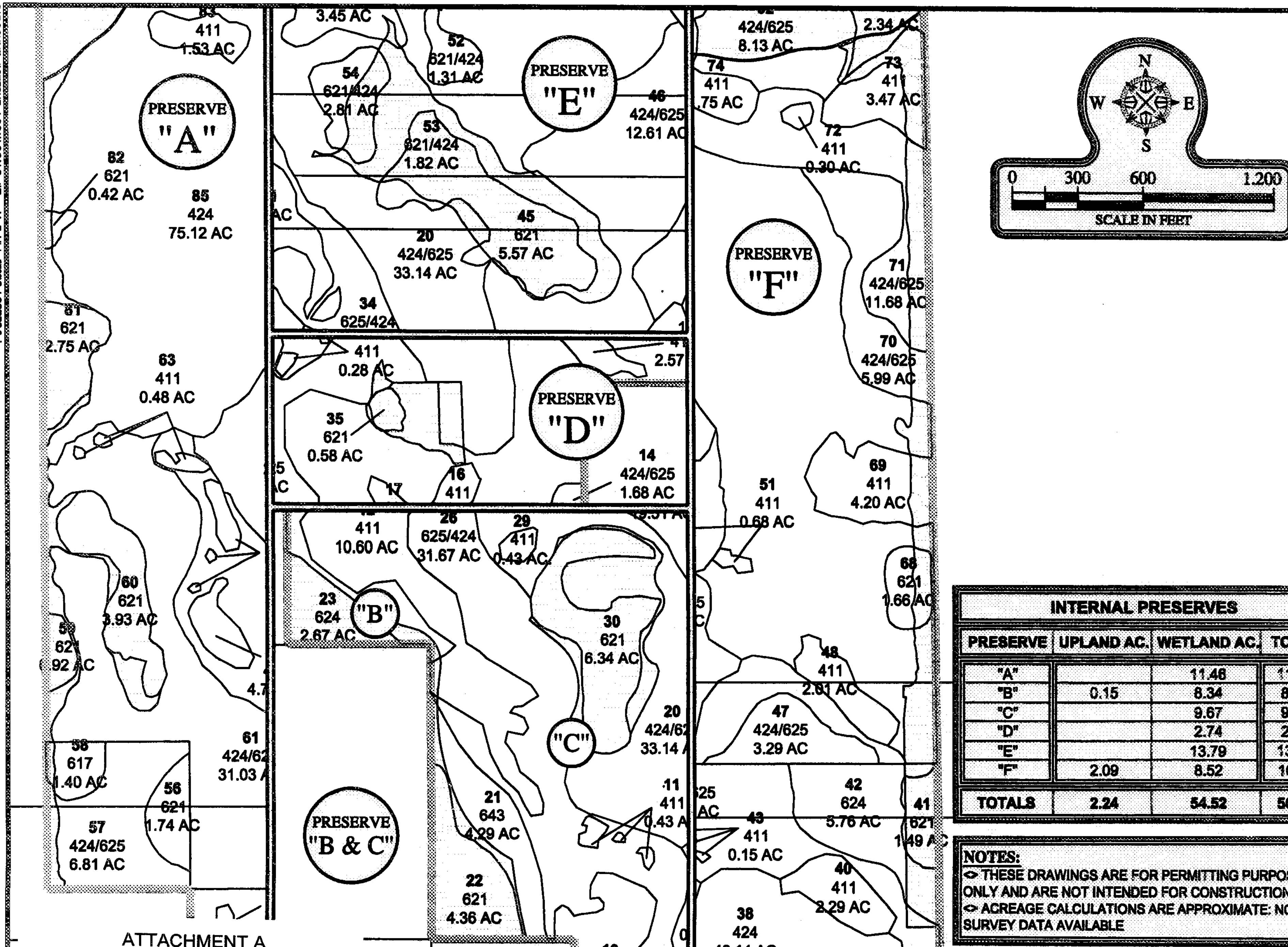
DESIGNED:	T.T.T.	REVISION:		TAB NAME:	Imp & Pre 11
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=800'
JOB NO.:	9418	N/A			
SECTION- 15		TOWNSHIP- 48 S		RANGE- 26 E	

TABLE 3

MIRASOL DEVELOPMENT AREA
ACOE FLUCFCS INFORMATION

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Upland Acreage	ACOE Wetland Acreage	Internal Wetland Preserve	Internal Upland Preserve	Wetland Dredge Impacts	Wetland Fill Impacts
1	424/624	Melaleuca(>75%) / Cypress / Pine		2.37			0.40	1.97
2	411	Pine Flatwoods	31.61					
3	621	Cypress		2.50			0.98	1.52
4	424	Melaleuca		42.50			10.38	32.12
5	411	Pine Flatwoods	1.13					
6	624/424	Pine / Cypress / Melaleuca (>50%)		6.97			1.17	5.80
7	411	Pine Flatwoods	11.67					
8	624	Pine / Cypress		8.19			0.64	7.55
9	411	Pine Flatwoods	0.12					
10	411	Pine Flatwoods	5.23			0.15		
11	411	Pine Flatwoods	0.43					
12	411	Pine Flatwoods	10.60					
13	411	Pine Flatwoods	0.91					
14	625/424	Pine Flatwoods / Melaleuca (>50%)		1.68			0.28	1.40
15	411	Pine Flatwoods	0.09					
16	411	Pine Flatwoods	0.89					
17	411	Pine Flatwoods	0.85					
18	411	Pine Flatwoods	2.19					
19	411	Pine Flatwoods	0.31					
20	424/625	Melaleuca(>50%) / Pine Flatwoods		33.14	3.43		8.88	20.83
21	643	Disturbed Wet Prairie		4.29	0.85		0.53	2.91
22	621	Cypress		4.36	4.36			
23	624	Pine / Cypress		2.67	2.67			
24	621	Cypress		0.82				0.82
25	411	Pine Flatwoods	0.25					
26	625/424	Pine Flatwoods / Melaleuca (>25%)		31.67	0:96		6.19	24.52
27	424	Melaleuca		9.24			2.06	7.18
28	621	Cypress		0.69				0.69
29	411	Pine Flatwoods	0.43					
30	621	Cypress		6.34	6.34			
31	411	Pine Flatwoods	0.28					
32	411	Pine Flatwoods	5.70					
33	411	Pine Flatwoods	4.78					
34	625/424	Pine Flatwoods / Melaleuca (>25%)		19.51			7.24	12.27
35	621	Cypress		0.58	0.55			0.03
36	625/424	Pine Flatwoods / Melaleuca (>25%)		19.02	2.72		0.89	15.41
37	411	Pine Flatwoods	1.06					
38	424	Melaleuca		48.14	1.39		7.88	38.87
39	411	Pine Flatwoods	2.57					
40	411	Pine Flatwoods	2.29					
41	621	Cypress		1.49	1.27			0.22
42	624	Pine / Cypress		5.76	0.88		1.93	2.95
43	411	Pine Flatwoods	0.15					
44	424/625	Melaleuca(>50%) / Pine Flatwoods		18.60	0.16		3.17	15.27
45	621	Cypress		5.57	4.87			0.70
46	424/625	Melaleuca(>50%) / Pine Flatwoods		12.61	0.02		0.74	11.85
47	424/625	Melaleuca / Pine Flatwoods		3.29				3.29
48	411	Pine Flatwoods	2.01					
49	411	Pine Flatwoods						
50	424/625	Melaleuca(>75%) / Pine Flatwoods		57.55	3.17		12.81	41.57
51	411	Pine Flatwoods	0.68					
52	621	Cypress		1.31			0.48	0.83
53	621	Cypress		1.82	1.82			
54	621	Cypress		2.81	1.31		1.03	0.47
55	424/624	Melaleuca(>50%)/Cypress/Pine		3.45	0.09		0.83	2.53
56	424/621	Melaleuca(>50%)/Cypress		1.75			0.36	1.39

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Upland Acreage	ACOE Wetland Acreage	Internal Wetland Preserve	Internal Upland Preserve	Wetland Dredge Impacts	Wetland Fill Impacts
57	424/624	Melaleuca(>50%)/Cypress/Pine		6.80	0.53		1.79	4.48
58	617	Mixed Wetland Hardwoods		1.39	0.14			1.25
59	621	Cypress		0.88	0.88			
60	621	Cypress		3.93	3.93			
61	424/625	Melaleuca(>75%) / Pine Flatwoods		30.91	2.00		5.70	23.21
62	411	Pine Flatwoods	0.68					
63	411	Pine Flatwoods	0.48					
64	424/625	Melaleuca(>75%) / Pine Flatwoods		28.37			5.81	22.56
65	424/625	Melaleuca(>75%) / Pine Flatwoods		8.91			0.76	8.15
66	411	Pine Flatwoods	0.34					
67	411	Pine Flatwoods	6.29					
68	621	Cypress		1.66	0.64		0.02	1.00
69	411	Pine Flatwoods	3.57			0.63		
70	424/625	Melaleuca(>50%) / Pine Flatwoods		5.99	0.42		0.95	4.62
71	424/625	Melaleuca(>25%) / Pine Flatwoods		10.81	1.96		0.86	7.99
72	411	Pine Flatwoods	0.30					
73	411	Pine Flatwoods	2.02			1.46		
74	411	Pine Flatwoods	1.75					
75	411	Pine Flatwoods	2.57					
76	424/625	Melaleuca(>50%) / Pine Flatwoods		12.11			1.08	11.03
77	411	Pine Flatwoods	0.82					
78	411	Pine Flatwoods	1.43					
79	424/625	Melaleuca(>75%) / Pine Flatwoods		20.65			3.23	17.42
80	411	Pine Flatwoods	1.58					
81	621	Melaleuca(>50%)/Cypress		2.60	2.60			
82	621	Melaleuca(>50%)/Cypress		0.37	0.13			0.24
83	411	Pine Flatwoods	1.53					
85	424	Melaleuca		56.80	1.25		10.88	44.67
86	424/625	Melaleuca(>75%) / Pine Flatwoods		3.84			1.09	2.75
87	424/625	Melaleuca(>25%) / Pine Flatwoods		2.99			0.64	2.35
88	411	Pine Flatwoods	8.33					
89	424/625	Melaleuca(>50%) / Pine Flatwoods		0.74				0.74
90	424/625	Melaleuca(>75%) / Pine Flatwoods		101.03	2.43		18.54	80.06
92	424/625	Melaleuca(>25%) / Pine Flatwoods		2.35	0.13			2.22
93	625	Hydric Pine Flatwoods		0.62	0.62			
100	424/625	Melaleuca(>50%) / Pine Flatwoods		27.49			4.33	23.16
101	424/625	Melaleuca(>50%) / Pine Flatwoods		7.80			2.13	5.67
102	424/625	Melaleuca(>75%) / Pine Flatwoods		0.14				0.14
			5.90					
		TOTALS	**123.82**	**699.87**	**54.52**	**2.24**	**126.68**	**518.67**



INTERNAL PRESERVES

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"A"		11.46	11.46
"B"	0.15	8.34	8.49
"C"		9.67	9.67
"D"		2.74	2.74
"E"		13.79	13.79
"F"	2.09	8.52	10.61
TOTALS	2.24	54.52	56.76

NOTES:
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ATTACHMENT A
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MIRASOL

INTERNAL PRESERVES (DETAILED)

DESIGNED:	T.T.T.	REVISION:		TAB NAME:	Internal
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=600'
JOB NO.:	9418	N/A			

SECTION- 15 TOWNSHIP- 48 S RANGE- 26 E

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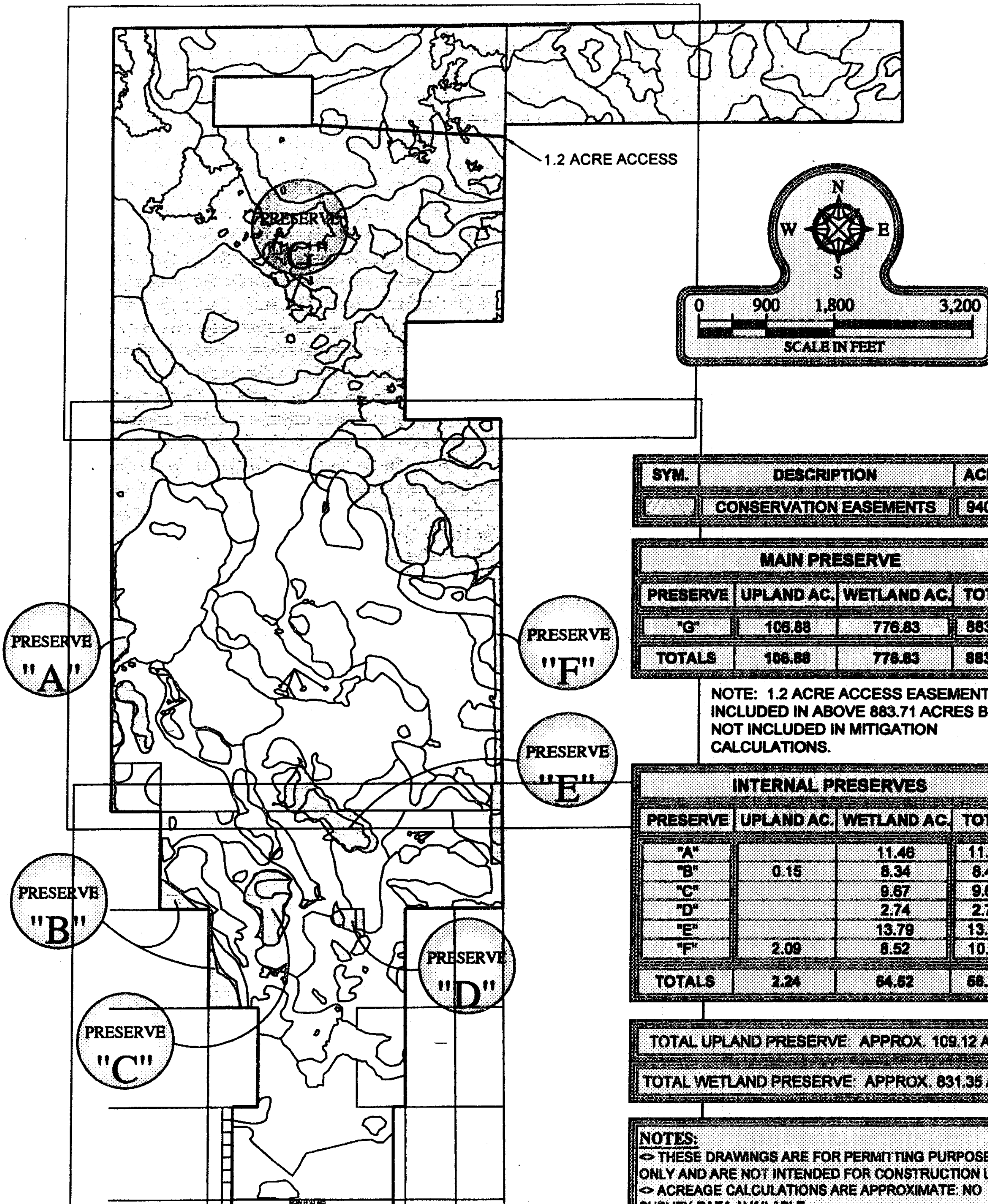

SYM.	DESCRIPTION	ACRES
	CONSERVATION EASEMENTS	940.47

MAIN PRESERVE

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"G"	106.88	776.83	883.71
TOTALS	106.88	776.83	883.71

NOTE: 1.2 ACRE ACCESS EASEMENT IS INCLUDED IN ABOVE 883.71 ACRES BUT IS NOT INCLUDED IN MITIGATION CALCULATIONS.

INTERNAL PRESERVES

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"A"		11.46	11.46
"B"	0.15	8.34	8.49
"C"		9.67	9.67
"D"		2.74	2.74
"E"		13.79	13.79
"F"	2.09	8.52	10.61
TOTALS	2.24	54.52	58.76

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

NOTES:
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ATTACHMENT A
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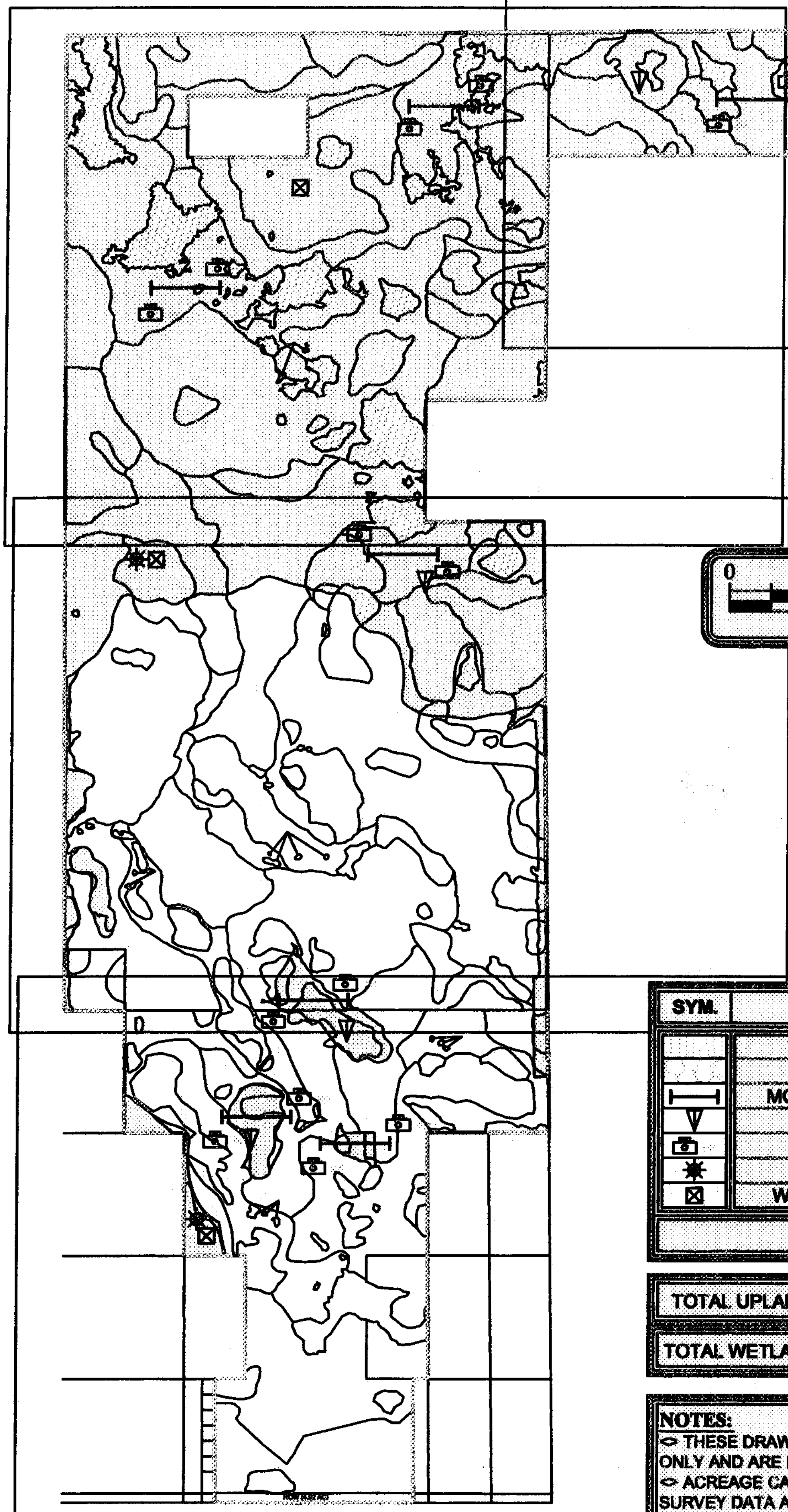
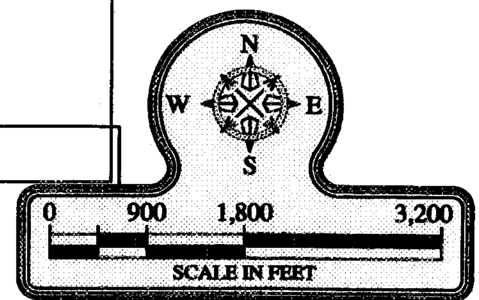
MIRASOL

CONSERVATION MAP

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Conservation
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,800'
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E





SYM.	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	MONITORING TRANSECTS	N/A
	STAFF GUAGES	N/A
	PHOTO POINTS	N/A
	RAIN GUAGES	N/A
⊠	WATER LEVEL LOGGERS	N/A
	TOTAL	940.47

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

NOTES:
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543-6632

MIRASOL

MONITORING MAP

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Monitoring
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,800'
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

ATTACHMENT B:
ERP SPECIAL CONDITIONS

South Florida Water Management District Environmental Resources Permit
Modification No. 11-02031-P
Issued 13 September 2007
33 Special Conditions on 6 pages

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
ENVIRONMENTAL RESOURCE
PERMIT MODIFICATION NO. 11-02031-P
DATE ISSUED: SEPTEMBER 13, 2007

FORM #0157
Rev. 08/95

PERMITTEE: I.M. COLLIER J.V.
(MIRASOL)
6074 LONE OAK BLVD.
NAPLES , FL 34109

ORIGINAL PERMIT ISSUED: FEBRUARY 14, 2002

ORIGINAL PROJECT DESCRIPTION: AN ENVIRONMENTAL RESOURCE PERMIT TO AUTHORIZE THE CONSTRUCTION AND OPERATION OF A SURFACE WATER MANAGEMENT SYSTEM WHICH SERVES A 1713.7 ACRE RESIDENTIAL AND GOLF COURSE DEVELOPMENT AND THE CONSTRUCTION OF A 52.76 ACRE CONVEYANCE CHANNEL WHICH EXTENDS OFF-SITE THROUGH THE ADJACENT WILDEWOOD LAKES AND OLDE CYPRESS DEVELOPMENTS. THE SYSTEM DISCHARGES TO THE COCOHATCHEE CANAL.

APPROVED MODIFICATION : MODIFICATION OF ENVIRONMENTAL RESOURCE PERMIT 11-02031-P TO AUTHORIZE A SURFACE WATER MANAGEMENT SYSTEM SERVING A 1,713.45 ACRE RESIDENTIAL AND GOLF COURSE DEVELOPMENT KNOWN AS MIRASOL, WITH DISCHARGE INTO THE COCOHATCHEE CANAL.

PROJECT LOCATION: COLLIER COUNTY , SECTION 10,15,22 TWP 48S RGE 26E

PERMIT DURATION: See Special Condition No.1. See attached Rule 40E-4.321, Florida Administrative Code.

This Permit Modification is approved pursuant to Application No. 060524-2, dated May 24, 2006. Permittee agrees to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims or liabilities which may arise by reason of the construction, operation, maintenance or use of any activities authorized by this Permit. This Permit is issued under the provisions of Chapter 373, Part IV Florida Statutes(F.S.), and the Operating Agreement Concerning Regulation Under Part IV, Chapter 373 F.S. between South Florida Water Management District and the Department of Environmental Protection. Issuance of this Permit constitutes certification of compliance with state water quality standards where necessary pursuant to Section 401, Public Law 92-500, 33 USC Section 1341, unless this Permit is issued pursuant to the net improvement provisions of Subsections 373.414(1)(b), F.S., or as otherwise stated herein.

This Permit Modification may be revoked, suspended, or modified at any time pursuant to the appropriate provisions of Chapter 373, F.S., and Sections 40E-4.351(1), (2), and (4), Florida Administrative Code (F.A.C.). This Permit Modification may be transferred pursuant to the appropriate provisions of Chapter 373, F.S., and Sections 40E-1.6107(1) and (2), and 40E-4.351(1), (2), and (4), F.A.C.

All specifications and special and limiting/general conditions attendant to the original Permit,unless specifically rescinded by this or previous modifications, remain in effect.

This Permit Modification shall be subject to the Environmental Resource Permit set forth in Rule 40E-4.381, F.A.C., unless waived or modified by the Governing Board. The Application, and Environmental Resource Permit Staff Review Summary of the Application, including all conditions, and all plans and specifications incorporated by reference, are a part of this Permit Modification. All activities authorized by this Permit Modification shall be implemented as set forth in the plans, specifications, and performance criteria as set forth and incorporated in the Environmental Resource Permit Staff Review Summary. Within 30 days after completion of construction of the permitting activity, the Permittee shall submit a written statement of completion and certification by a registered professional engineer or other appropriate individual, pursuant to the appropriate provisions of Chapter 373, F.S. and Sections 40E-4.361 and 40E-4.381, F.A.C.

In the event the property is sold or otherwise conveyed, the Permittee will remain liable for compliance with this Permit until transfer is approved by the District pursuant to Rule 40E-1.6107, F.A.C.

SPECIAL AND GENERAL CONDITIONS ARE AS FOLLOWS:

SEE PAGES 2 - 6 OF 9 (33 SPECIAL CONDITIONS).
SEE PAGES 7 - 9 OF 9 (19 GENERAL CONDITIONS).

PERMIT MODIFICATION APPROVED BY THE GOVERNING BOARD OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ON ORIGINAL SIGNED BY:
BY JACKI MCGORTY
DEPUTY CLERK

SPECIAL CONDITIONS

1. The construction phase of this permit shall expire on September 13, 2012.

2. Operation of the surface water management system shall be the responsibility of Flow Way Community Development District, established by Ordinance 2002-09, passed and adopted by the Board of County Commissioners of Collier County, on February 26, 2002 (submitted with the application and retained in the permit file as an exhibit to this permit by reference). Within one year of permit issuance or concurrent with the engineering certification of construction completion, whichever comes first, the permittee shall submit a dedication from the property owner to the CDD.

3. Discharge Facilities:
Basin: Basin 1
Structure: WCS-01
1-.62' dia. CIRCULAR ORIFICE with invert at elev. 13.4' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.2' NGVD.
Receiving body : Lake 10 (pass-through system)
Control elev : 13.4 feet NGVD.

Structure: WCS-10
1-.25' dia. CIRCULAR ORIFICE with invert at elev. 14' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 15.45' NGVD.
Receiving body : Lake 22 (Basin 1)
Control elev : 13.4 feet NGVD.

Basin: Basin 2
Structure: WCS-02
1-.69' dia. CIRCULAR ORIFICE with invert at elev. 13.4' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.4' NGVD.
Receiving body : Lake 11 (pass-through system)
Control elev : 13.4 feet NGVD.

Basin: Basin 3
Structure: WCS-03
1-1.1' W X .5' H RECTANGULAR ORIFICE with invert at elev. 13.5' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.1' NGVD.
Receiving body : Lake 6 (pass-through system)
Control elev : 13.5 feet NGVD.

Structure: WCS-06
1-.25' dia. CIRCULAR ORIFICE with invert at elev. 14.2' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.25' NGVD.
Receiving body : Lake 32 (Basin 3)
Control elev : 13.5 feet NGVD.

Structure: WCS-07
1-.25' dia. CIRCULAR ORIFICE with invert at elev. 14.25' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.2' NGVD.
Receiving body : Lake 31 (Basin 3)
Control elev : 13.5 feet NGVD.

Structure: WCS-08
1-.25' dia. CIRCULAR ORIFICE with invert at elev. 14.25' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.2' NGVD.
Receiving body : Lake 35 (Basin 3)
Control elev : 13.5 feet NGVD.

Basin: Basin 4
Structure: WCS-04
1-2.7' W X .5' H RECTANGULAR ORIFICE with invert at elev. 13.5' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.45' NGVD.
Receiving body : Lake 5 (pass-through system)
Control elev : 13.5 feet NGVD.

Basin: Basin 5
Structure: WCS-05
1-2.45' W X .5' H RECTANGULAR ORIFICE with invert at elev. 13.5' NGVD.
1-3.08' W X 2' L drop inlet with crest at elev. 16.3' NGVD.
Receiving body : Lake 4 (pass-through system)
Control elev : 13.5 feet NGVD.

4. The permittee shall be responsible for the correction of any erosion, shoaling or water quality problems that result from the construction or operation of the surface water management system.

5. Measures shall be taken during construction to insure that sedimentation and/or turbidity violations do not occur in the receiving water.

6. The District reserves the right to require that additional water quality treatment methods be incorporated into the drainage system if such measures are shown to be necessary due to the ongoing water quality monitoring.

7. Lake side slopes shall be no steeper than 4:1 (horizontal:vertical) to a depth of two feet below the control elevation. Side slopes shall be nurtured or planted from 2 feet below to 1 foot above control elevation to insure vegetative growth, unless shown on the plans.

8. Facilities other than those stated herein shall not be constructed without an approved modification of this permit.

9. A stable, permanent and accessible elevation reference shall be established on or within one hundred (100) feet of all permitted discharge structures no later than the submission of the certification report. The location of the elevation reference must be noted on or with the certification report.

10. The permittee shall provide routine maintenance of all of the components of the surface water management system in order to remove all trapped sediments/debris. All materials shall be properly disposed of as required by law. Failure to properly maintain the system may result in adverse flooding conditions.

11. This permit is issued based on the applicant's submitted information which reasonably demonstrates that adverse water resource related impacts will not be caused by the completed permit activity. Should any adverse impacts caused by the completed surface water management system occur, the District will require the permittee to provide appropriate mitigation to the District or other impacted party. The District will require the permittee to modify the surface water management system, if necessary, to eliminate the cause of the adverse impacts.

12. Minimum building floor elevation:
BASIN: Basin 1 - 16.85 feet NGVD.
BASIN: Basin 2 - 17.05 feet NGVD.
BASIN: Basin 3 - 16.75 feet NGVD.
BASIN: Basin 4 - 17.20 feet NGVD.
BASIN: Basin 5 - 17.20 feet NGVD.

13. Minimum road crown elevation:
Basin: Basin 1 - 16.20 feet NGVD.
Basin: Basin 2 - 16.40 feet NGVD.
Basin: Basin 3 - 16.10 feet NGVD.

Basin: Basin 4 - 16.45 feet NGVD.
Basin: Basin 5 - 16.40 feet NGVD.

14. The Permittee shall utilize the criteria contained in the Construction Pollution Prevention Plan (Exhibit Nos. 4.0-4.9) and on the applicable approved construction drawings for the duration of the projects construction activities.

15. The Permittee shall utilize the criteria contained in the Urban Stormwater Management Program (Exhibit Nos. 5.0-5.4) for post construction activities.

16. A Water Use Permit must be obtained prior to dewatering activities.

17. Construction of the pass-thorugh system, including Lakes 1 through 11, lake interconnections, the intake weir for Lake 1 and the outfall weir from Lake 11, shall be constructed prior to constructing the remainder of the proposed development.

18. The External and Internal Preserve Areas (designated as wetland preserves and conservation preserve areas on Exhibits 2.2 and 3.2) may in no way be altered from their natural or permitted state. Activities prohibited within the External and Internal Preserve Areas include, but are not limited to: construction or placing of buildings on or above the ground; dumping or placing soil or other substances such as trash; removal or destruction of trees, shrubs, or other vegetation - with the exception of exotic vegetation removal; excavation, dredging, or removal of soil materials; diking or fencing; and any other activities detrimental to drainage, flood control, water conservation, erosion control, or fish and wildlife habitat conservation or preservation.

19. External and Internal Preserve Areas (designated as wetland preserves and conservation preserve areas on Exhibits 2.2 and 3.2) shall be dedicated as conservation and common areas in the deed restrictions as well as on the plat if the project will be platted. Restrictions for use of the conservation/ common areas shall stipulate:

    The External and Internal Preserve Areas (designated as wetland preserves and conservation preserve areas on Exhibits 2.2 and 3.2) are hereby dedicated as conservation and common areas. The conservation/common areas shall be the perpetual responsibility of the Flow Way Community Development District and may in no way be altered from their natural or permitted state as documented in South Florida Water Management District Permit No. 11-02031-P with the exception of permitted restoration activities. Activities prohibited within the conservation areas include, but are not limited to: construction or placing soil or other substances such as trash; removal or destruction of trees, shrubs, or other vegetation - with the exception of exotic/nuisance vegetation removal; excavation, dredging, or removal of soil material; diking or fencing; and any other activities detrimental to drainage, flood control, water conservation, erosion control, or fish and wildlife habitat conservation or preservation.

    Copies of recorded documents shall be submitted to the District's Environmental Resource Compliance staff in the Lower West Coast Service Center concurrently with engineering certification of construction completion.

20. Endangered species, threatened species and/or species of special concern have been observed onsite and/or the project contains suitable habitat for these species. It shall be the permittee's responsibility to coordinate with the Florida Fish and Wildlife Conservation Commission and/or the U.S. Fish and Wildlife Service for appropriate guidance, recommendations and/or necessary permits to avoid impacts to listed species.

21. Prior to the commencement of construction and in conformance with the work schedule in Exhibit 3.6, the permittee shall provide an original letter of credit in the amount of $4,687,100 and supplemental original letter of credit in the amount of $73,700 to ensure the permittee's financial ability and commitment to complete the proposed mitigation, monitoring and maintenance plan as shown on Exhibit No. 2.2, 3.2, 3.5 and 3.6. The letter of credit shall utilize the form attached as Exhibit No. 3.7. The letter of credit shall remain in effect for the entire period of the mitigation and monitoring program. Notification of the District by the financial institution that the letter of credit will not be renewed or is no longer in effect shall constitute non-compliance with the permit.

22. A monitoring program shall be implemented in accordance with Exhibit Nos. 3.5 and 3.6. The monitoring program shall extend for a period of 5 years with annual reports submitted to District staff. At the end of the first monitoring period the

Internal and External preserve areas shall contain an 80% survival of planted vegetation. The 80% survival rate shall be maintained throughout the remainder of the monitoring program, with replanting as necessary. If native wetland, transitional, and upland species do not achieve an 80% coverage within the initial two years of the monitoring program, native species shall be planted in accordance with the maintenance program. At the end of the 5 year monitoring program the entire mitigation area shall contain an 80% survival of planted vegetation and an 80% coverage of desirable obligate and facultative wetland species. In addition, the monitoring program for the External Preserve area includes a plan to install three water level data loggers and two logging type rain gauges with the External Preserve boundaries. The water level data will be collected in accordance with the Mitigation, Monitoring and Maintenance Plan (Exhibit 3.5) and submitted in the annual monitoring report to the District.

23. The areas to be temporarily disturbed by the installation of control structures in wetlands will be backfilled and replanted within 30 days of installation. Monitoring of temporary impact areas shall be done concurrently with other required monitoring for the Mirasol development.

24. A mitigation program for Mirasol shall be implemented in accordance with Exhibit Nos. 2.2, 3.2 and 3.5. The permittee shall preserve and enhance a total of 830.89 acres of wetlands and 109.58 acres of uplands.

25. A maintenance program shall be implemented in accordance with Exhibit No. 3.5 for the preserved and enhanced wetlands and uplands on a regular basis to ensure the integrity and viability of those areas as permitted. Maintenance shall be conducted in perpetuity to ensure that the conservation areas are maintained free from Category I and II exotic vegetation (as defined by the Florida Exotic Pest Plant Council at the time of permit issuance) immediately following a maintenance activity. Maintenance in perpetuity shall also insure that conservation areas, including buffers, maintain the species and coverage of native, desirable vegetation specified in the permit. Coverage of exotic and nuisance plant species shall not exceed 2% of areal coverage of any one stratum or 4% areal coverage of all strata between maintenance activities. In addition, the permittee shall manage the conservation areas such that exotic/nuisance plant species do not dominate any one section of those areas.

26. The District reserves the right to require remedial measures to be taken by the permittee if monitoring or other information demonstrates that adverse impacts to onsite or offsite wetlands, upland conservation areas or buffers, or other surface waters have occurred due to project related activities.

27. Silt screens, hay bales, turbidity screens/barriers or other such sediment control measures shall be utilized during construction. The selected sediment control measure shall be installed landward of the upland buffer zones around all protected wetlands and shall be properly "trenched" etc, in accordance with Exhibit 2 and construction best management practices. All areas shall be stabilized and vegetated immediately after construction to prevent erosion into the wetlands and upland buffer zones.

28. Activities associated with the implementation of the mitigation, monitoring and maintenance plan(s) shall be completed in accordance with the work schedule attached as Exhibit No. 3.6. Any deviation from these time frames will require prior approval from the District's Environmental Resource Compliance staff. Such requests must be made in writing and shall include (1) reason for the change, (2) proposed start/finish and/or completion dates; and (3) progress report on the status of the project development or mitigation effort.

29. A time zero monitoring report for Mirasol shall be conducted in accordance with Exhibit No. 3.5 and 3.6 for all enhanced wetlands. The plan shall include a survey of the areal extent, acreage and cross-sectional elevations of the enhanced areas and panoramic photographs for each habitat type. The report shall also include a description of planted species, sizes, total number and densities of each plant species within each habitat type as well as mulching methodology.

30. A) Prior to the commencement of construction and in accordance with the work schedule shown as Exhibit 3.6, the permittee shall submit for review and approval, two (2) copies of the following:

   1. Project map identifying conservation areas
   2. Legal description of conservation areas
   3. Signed conservation easements

4. Sealed boundary survey of conservation area(s) by professional Land surveyor
5. Title insurance commitment for conservation easement naming District as beneficiary using approved valuation.
6. Formatting in accordance with paragraph F (below) if available.

The above information shall be submitted to the Environmental Compliance Enforcement staff in the District service center where the application was submitted.

B) The real estate information referenced in paragraph (a) above shall be reviewed by the District in accordance with the District's real estate review requirements. The easement shall not be recorded until such approval is received.

C) The permittee shall record the conservation easement(s) over the real property designated as a conservation/preservation areas (identified as External and Internal Preserve Areas in this staff report) on attached Exhibits 2.2 and 3.2. The easements shall be granted free of encumbrances or interests which the District determines are contrary to the intent of the easement. The conservation easements shall be granted to the District using the forms attached as Exhibits 3.3 and 3.4. Any proposed modifications to the approved forms must receive prior written consent from the district.

D) The permittee shall record the conservation easements in the public records of Collier County within 14 days of receiving the District's approval of the real estate information. Upon recordation, the permittee shall submit two certified copies of the recorded conservation easements for the External and Internal Preserve Areas, and title insurance policy, to the Environmental Resource Compliance staff in the District service center where the application was submitted.

E) In the event the conservation easement real estate information reveals encumbrances or interests in the easement which the District determines are contrary to the intent of the easement, the permittee shall be required to provide release or subordination of such encumbrances or interests. If such are not obtained, permittee shall be required to apply for a modification to the permit for alternative acceptable mitigation.

F) The permittee shall submit two certified copies of each of the recorded conservation easements for the External and Internal Preserve Areas. The data should also be supplied in a digital CAD (.dxf) or GIS (ESRI Coverage) format. The files should be in the Florida State Plane coordinate system, East Zone (3601) with a data datum of NAD83, HARN with the map units in feet.

G) The permittee shall submit two certified copies of each of the recorded conservation easements (Internal Preserve Area and External Preserve Area). The data shall be supplied in a digital ESRI Geodatabase (mdb), ESRI Shapefile (shp) or AutoCAD Drawing Interchange (dxf) file format using Florida State Plane coordinate system, East Zone (3601), Datum NAD83, HARN with the map units in feet. This data shall be submitted as a paper map depicting the Conservation Easement over the best available satellite or aerial imagery. This data shall also reside on a CD or floppy disk and be submitted to the District's Environmental Resource Compliance Division in the service area office where the application was submitted.

31. No work shall occur within the Cocohatchee Canal right-of-way until all necessary right-of-way occupancy permits are obtained authorizing the proposed work in the District's right-of-way.

32. Prior to to commencement of construction in wetlands and in accordance with the work schedule in Exhibit No. 3.6, the permittee shall submit documentation that 11.36 freshwater forested credits have been deducted from the ledger for Panther Island Mitigation Bank.

33. The permittee shall implement the Mirasol Water Qualtiy Monitoring Plan, attached as Exhibit 6. Any deviation from these testing and monitoring procedures will require prior approval from the District Environmental Compliance Staff. Such requests must be made in writing and shall include (1) reason for the change and (2) an outline of the proposed change.

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

ATTACHMENT C: MITIGATION AND MONITORING: Internal Preserves

(14 pages dated 12 December 2006)

I. INTRODUCTION:

The purpose of this report is to document the proposed mitigation activities for preserves internal to the development project known as ***Mirasol***. A Mitigation and Monitoring Plan for the large preserve that is proposed outside of the development footprint is presented in its own, independent document.

The proposed project encompasses a total of approximately 1,713 acres (1,713.45) in four sections of northern Collier County north of CR 846 and east of Interstate 75. A residential and golf course community is planned, with access to be provided from Immokalee Road (CR 846) along the southern property boundary. Most of the southern two sections were historically mowed and these two Sections (15 & 22) in addition to the northern Section (10) were used as cattle pasture. Altered sheet flows from further north and east currently flow across the property and because of constricted and limited outfall, the property is abnormally flooded (to increased depths) on an annual basis.

The historic use of the property as cattle pasture coupled with the annual flooding now occurring has contributed to unchecked proliferation of melaleuca across the entire property. A majority of the site has melaleuca densities of greater than 50% coverage. This infestation in conjunction with the flooding has led to a degradation of the uplands and severely depressed the functional values for the entire area. Native vegetation, wildlife forage value, and actual wildlife utilization have all suffered drastic reductions due to the existing conditions of the site.

To characterize surrounding land use, active farm fields exist to the north of the property while lands to the east consist of undeveloped parcels, a mitigation parcel, and several single-family home-sites. The properties to the west of the subject parcel consist of the proposed Parklands (north) and Terafina (central) developments, and the existing Olde Cypress (south) development. The southern property boundary abuts the drainage easement and Cocohatchee canal alongside of Immokalee Road (CR 846).

The development site plan proposes to directly impact approximately 645 acres of jurisdictional wetlands. The plan also proposes to preserve approximately 777 acres of wetlands and 107 acres of uplands to the north of the development area. Within the development area the project proposes to preserve 55 acres of wetlands and 2 acres of uplands.

II. EXISTING CONDITIONS:

The project site consists of 1713 acres located in four sections of northern Collier County north of CR 846 and east of Interstate 75. There are limited upland (236.74 acres) and substantial wetland (1476.71 acres) communities present on the site, which have all been heavily impacted by melaleuca infestation and altered hydrology.

Habitat Descriptions:

The following paragraphs outline the basic composition of species assemblages found on-site. While many more species are present than presented in this report, the following gives a brief description of the vegetative communities.

411 - Pine Flatwoods

This is the predominant upland habitat present on the property. The canopy component of this area consists of mature slash pines (*Pinus elliottii*) and melaleuca *(Melaleuca quinquenervia)*. Melaleuca concentrations vary in these upland areas but some areas exhibit densities approaching 70%. Wax myrtle *(Myrica cerifera)* and small melaleuca form the midstory. These uplands exist as remnant islands throughout the site, most likely due to the altered, elevated water levels present. Understory species include saw palmetto *(Serenoa repens)*, gallberry *(Ilex glabra)* and wild grape vine (*Vitis rotundifolia*).

422 - Brazilian Pepper

These two small areas are present in the northeast and northwest corners of the property. There are both upland and wetland areas present. Brazilian pepper (*Schinus terebinthifolius)* dominates this vegetative community.

617 - Disturbed Mixed Hydric Hardwoods

This small community in the southwestern corner of Section 15 is the only example of this community on the site. The dominant plant species are bald cypress *(Taxodium distichum*), melaleuca, wax myrtle, swamp bay *(Persea palustris)*, saltbush *(Baccharris halimifolia)*, and live oak *(Quercus virginiana)*. A few cabbage palms (*Sabal palmetto*) are also present. Herbaceous understory vegetation consists of sawgrass *(Cladium jamaicense)* and swamp fern *(Blechnum serrulatum)*.

621 - Cypress Swamp

This habitat contains predominately bald cypress with scattered dahoon holly (*Ilex cassine)*, wax myrtle, and rare swamp bays. Ground covers are sparse but consist mainly of swamp fern.

424 - Hydric Melaleuca

These areas are dominated by melaleuca *(Melaleuca quinquenervia)* with minimal groundcover of swampfern, sawgrass and several grasses. Melaleuca concentrations are 90 to 100 % of the canopy cover.

624 – Cypress / Pine / Cabbage palm

This habitat contains predominately bald cypress with scattered slash pine, wax myrtle, and rare cabbage palms. Ground covers are limited but consist mainly of swamp fern and assorted grasses and sedges.

643 - Disturbed Wet Prairie

This community appears as a disturbed area alongside a road in western Section 22 and in the northeast corner of Section 10. Little to no canopy is present and groundcovers include red root (*Lachnocaulon caroliniana*), Crinum lily (*Crinum americanum),* Broomsedge (*Andropogon spp.),* Pipeworts (*Eriocaulon spp*), Hat pins (*Eriocaulon spp.*), Yellow-eyed grass (*Xyris spp.*), dog fennel (*Eupatorium leptophyllum*), etc.

640 - Flag Pond

This community appears in only one small area within the 160-acre adjacent mitigation parcel in Section 11. No canopy is present and the area is dominated by emergent vegetation, mostly alligator flag (*Thalia geniculata*).

424 / 411 – Mixed Melaleuca / Pine flatwoods

These areas contain vegetation from both communities as listed above. Areas are differentiated by the concentration of melaleuca found in each. The majority of the site contains melaleuca concentrations close to or over 50 % of canopy cover. Concentrations of individual areas are shown on the FLUCCS map that areis a part of the permit submittal.

621(624) / 424 – Cypress or Cypress / Pine and Melaleuca

As above, these areas are a mix of the different communities differentiated by Melaleuca concentration.

534 – Ponds

These are small areas excavated as watering holes for the cattle kept on-site.

WETLAND IMPACT AREAS:

Please reference the attached wetland impact table and map for these values. As can be seen, the development plan proposes to directly impact approximately 645 acres and preserve within the development about 55 acres of ACOE jurisdictional wetlands. The aerial extent of impacts is high but the vast majority of wetlands impacted are highly disturbed, and in some cases, newly created by the elevated water levels now occurring on-site.

III. MITIGATION ACTIVITIES

Conservation areas within the project site are identified with two (2) different labels; Development preserves, and the Main preserve. This distinction was made in order to outline the proposed mitigation activities for each individual preserve. This report details the activities planned for the development preserves while the mitigation and monitoring activities planned for the Main preserve is presented under separate cover.

The development preserves are identified as six distinct areas on the attached map. The management activities associated with these preserve areas are outlined within this document and will be a requirement for the project.

All of the preserves shall be placed into conservation easements with the South Florida Water Management District, and enforcement rights shall be granted to the South Florida Water Management District and the US Army Corps of Engineers. Because of the difficulties associated with surveying the irregular lines around the preserves and the inevitable give and take associated with the clearing and filling development activities, the conservation easement for these areas will be filed and recorded after the initial development activities are completed.

As stated above, there are six areas included within the development as preserves. These areas combined are approximately 57 acres in size and are identified individually on the attached map.

Preserve A

This preserve is located linearly along the western boundary of Section 15. The preserve is 11.46 acres in size and is composed entirely of wetlands. The wetlands are a mix of cypress and hydric pine with widely varying melaleuca concentrations. This preserve is outside of the water management berm and will be hydrated from the wetlands adjacent to the west of the property. Because of the narrow shape of this preserve, there was some concern that secondary impacts to the wetlands adjacent to the property could be a possibility. In order to minimize the potential for this, golf course holes have been located between the preserve and the proposed residences. The golf course will act as a buffer for the preserve and minimize potential secondary impacts.

As with all the preserves areas, all exotic vegetation will be removed from the preserve area and the boundary will be clearly delineated as a preserve.

Preserve B

This is the southernmost internal preserve. It is located in two corners along the western boundary of Section 22. It is 8.48 acres in size and is composed of 8.33 acres of wetlands and 0.15 acres of uplands. This preserve lies between an internal roadway and the property boundary. It is composed primarily of cypress and prairie wetlands with some melaleuca infestation. The prairie area has limited vegetation present most likely due to the super-elevated water levels that occur during the wet season. The preserve is located outside of the stormwater management berm and will continue to be hydrated from the adjacent off-site wetlands. All exotic vegetation will be cut by hand and the debris removed from the preserve area. The boundary will be clearly delineated as a preserve.

Preserve C

This is a predominately cypress preserve located in the north central portion of Section 22. It is 9.67 acres in size all of which are wetlands. This preserve contains some hydric pine flatwoods around the central cypress area that have been heavily infested by melaleuca. All of the exotic vegetation will be cut by hand and removed from the preserve area. The hydrology will be maintained by a direct connection to the adjacent lake. Water from the lake will be able to enter the preserve as the water level rises but only after it has undergone treatment within the lake. The boundary will be clearly delineated as a preserve.

Preserve D

This is a small preserve located immediately east of Preserve C in the central portion of Section 22. It is 2.74 acres in size all of which are wetlands. This preserve also contains hydric pine flatwoods around the central cypress dome that have been heavily infested by melaleuca. All of the exotic vegetation will be cut by hand and removed from the preserve area. The hydrology will be maintained by a direct connection to the adjacent lake. Water from the lake will be able to enter the preserve as the water level rises but only after it has undergone treatment within the lake. The boundary will be clearly delineated as a preserve.

Preserve E

This is the largest preserve area within the development footprint. It is 13.79 acres in size all of which are wetlands. This preserve is located along the border of Sections 22 and 15. It is composed of two cypress areas surrounded by hydric pine flatwoods. Melaleuca has extensively infested this preserve area. All of the exotic vegetation will be cut and removed from the preserve. Because of the density of melaleuca, a portion of this preserve area may be mechanically cleared. If it is mechanically cleared, the cleared portion will be immediately planted according to the planting plan outlined below in this report. Like Preserves C and D, this preserve will have a direct connection to the lake system and will receive water from the lakes once it has been treated. Since this is the largest internal preserve it offers the best opportunity to help educate the residents about the preserves and about wetlands in general. The owner will explore the possibility of constructing an elevated, hand-railed boardwalk into this preserve to facilitate this. Any such proposal would be presented to and coordinated with the South Florida Water

Management District and the Corps of Engineers prior to implementation. The boundary will be clearly delineated as a preserve.

Preserve F

This preserve is similar to preserve A except that it is located linearly along the eastern boundary of Section 15. The preserve is 10.61 acres in size and is composed of 8.52 acres of wetlands and 2.09 acres of uplands. The wetlands are a mix of cypress and hydric pine with widely varying melaleuca concentrations. All exotic vegetation will be removed from the preserve area and the boundary will be clearly delineated as a preserve.

Exotic Vegetation Eradication

Melaleuca infestation is rampant throughout the site and an extensive eradication program will be implemented to eliminate this noxious plant from all preserve spaces. This program will include predominately hand clearing within all the preserves internal to the development. All hand cleared debris will be removed from the preserves.

Mechanical clearing is currently proposed in an attempt to remove exotics where no existing native vegetation is present in the most economical and efficient manner possible. Ground elevations will be determined prior to any mechanical clearing activities. This will allow for restoration of current elevations before replanting is undertaken.

Quarterly maintenance inspections and treatments will be necessary to eliminate the melaleuca that has already gained a stranglehold on the property. Once the removal efforts have been successful, annual maintenance treatments should be sufficient to control future exotic growth. The preserve areas will be exotic free immediately following a maintenance activity. At no time shall the density of exotic and nuisance plant species exceed 5% of the total aerial cover.

Replanting Plans

Most areas will be left to regenerate naturally for at least a year before deciding if replanting is necessary. In areas that are more that 75% melaleuca or that are mechanically cleared, replanting will be done immediately following the exotic eradication activities. No immediate seed sources are available in these areas so immediate replanting helps to re-establish the denuded areas more rapidly. Appropriate plant palettes will be applied for the affected areas that will be dependant on existing ground elevations, anticipated high water elevations, and historic vegetative cover. Also, all areas disturbed as part of the construction or mitigation activities will be replanted according to South Florida Water Management District guidelines.

Cypress : Cypress areas will be planted with sapling cypress, dahoon holly and scattered red maple trees with minimum heights of 4 feet. Depending on the size of the area being planting and the density of the adjacent vegetation, planting will be done on 10 foot or 15 foot centers. It is anticipated that adjacent ground cover vegetation will rapidly colonize the areas so no ground cover planting will be done until a full growing season has passed. If ground cover colonization has not occurred, sawgrass, broomsedge, and other appropriate, available vegetation will be planted in those areas. These plantings will be done on 3 foot centers.

Flatwoods : Pine flatwood areas will be planted with sapling slash pine on 15 foot centers. Trees will be from 4' to 6' in height. In very hydric areas, a few cypress saplings may also be used. No midstory plantings are proposed because of the future management plan for the areas as potential fox squirrel habitat. As above, no ground cover plantings will be done for a full growing season. Wiregrass, cordgrass, broomsedge, and other appropriate vegetation will be used if no regeneration is seen within the first year. These will be planted on 3 foot centers to fill in open areas.

All planting will be coordinated with the wet season so that expected rains will serve to keep the new plantings hydrated and no outside irrigation source will be needed.

Educational Displays

The applicant has contracted with a local artist to create two (2) wildlife displays for the proposed preserve areas. They will feature 'Cypress Domes of Southwest Florida' and 'Pine Flatwoods of Southwest Florida' along with their associated flora and fauna. They briefly describe the uniqueness of these communities, while highlighting plant and animal species which are typical of these habitats. Several 3' x 4' displays will be installed in prominent locations throughout the development. Additional 8.5" x 11" copies will also be available in the club house.

The proposed mitigation activities shall offset unavoidable, adverse wetland impacts and achieve mitigation success by providing viable and sustainable ecological and hydrological functions.

MITIGATION CALCULATIONS:

Pre and post development WRAP analysis were conducted. The proposed development consists of 645 acres of wetland impacts. The functional assessment depicting the mitigation credits and deficits associated with the preserve areas has been provided as part of the permit application.

IV. MONITORING / MAINTENANCE / MANAGEMENT:

The goals and objectives of this monitoring plan will be to provide for ongoing progress and ultimate success of preserved and enhanced areas in a series of scheduled monitoring reports. The reports will quantify and describe conditions within the managed areas, comparing observations with the proposed standards and offering advice for corrective actions if needed.

In areas of heavy vegetation, a visual inspection for exotic plant invasion will be made and all exotic vegetation found will be flagged, mapped and reported for treatment. Meandering transects will be followed in the preserve areas for vegetative inventory and observation of wildlife during regular monitoring. Photo points will be established along with plot sampling stations to determine percent survival and percent coverage of planted and recruited plant species. Transect and plot sampling station locations will be determined at time zero, after exotic eradication and plantings are installed. The mitigation efforts shall be deemed successful when the area contains a minimum of 80% coverage of native vegetation, with less than 5% exotic and nuisance vegetation for a period of 2 years. The preserve areas will be maintained in this exotic-free state in perpetuity. Once restoration and enhancement activities are deemed successful, the internal preserve areas will continue to be maintained in perpetuity and the homeowner's association or the Community Development District will be responsible for this perpetual maintenance.

A Baseline Monitoring Report will describe the existing conditions of the conservation areas prior to exotic eradication and supplemental planting. The Time Zero Monitoring Report will describe the aerial extent of exotic removal and other mitigation work, i.e. revegetation, photographs from referenced locations, qualitative observations of wildlife usage and other information such as climatic and hydrological conditions and health of existing vegetation. Annual Monitoring reports shall document changes from the baseline conditions the success of the exotic eradication and identifies ways to maintain or improve these conditions.

<u>Baseline, Time Zero and Annual Reports will include the following:</u>

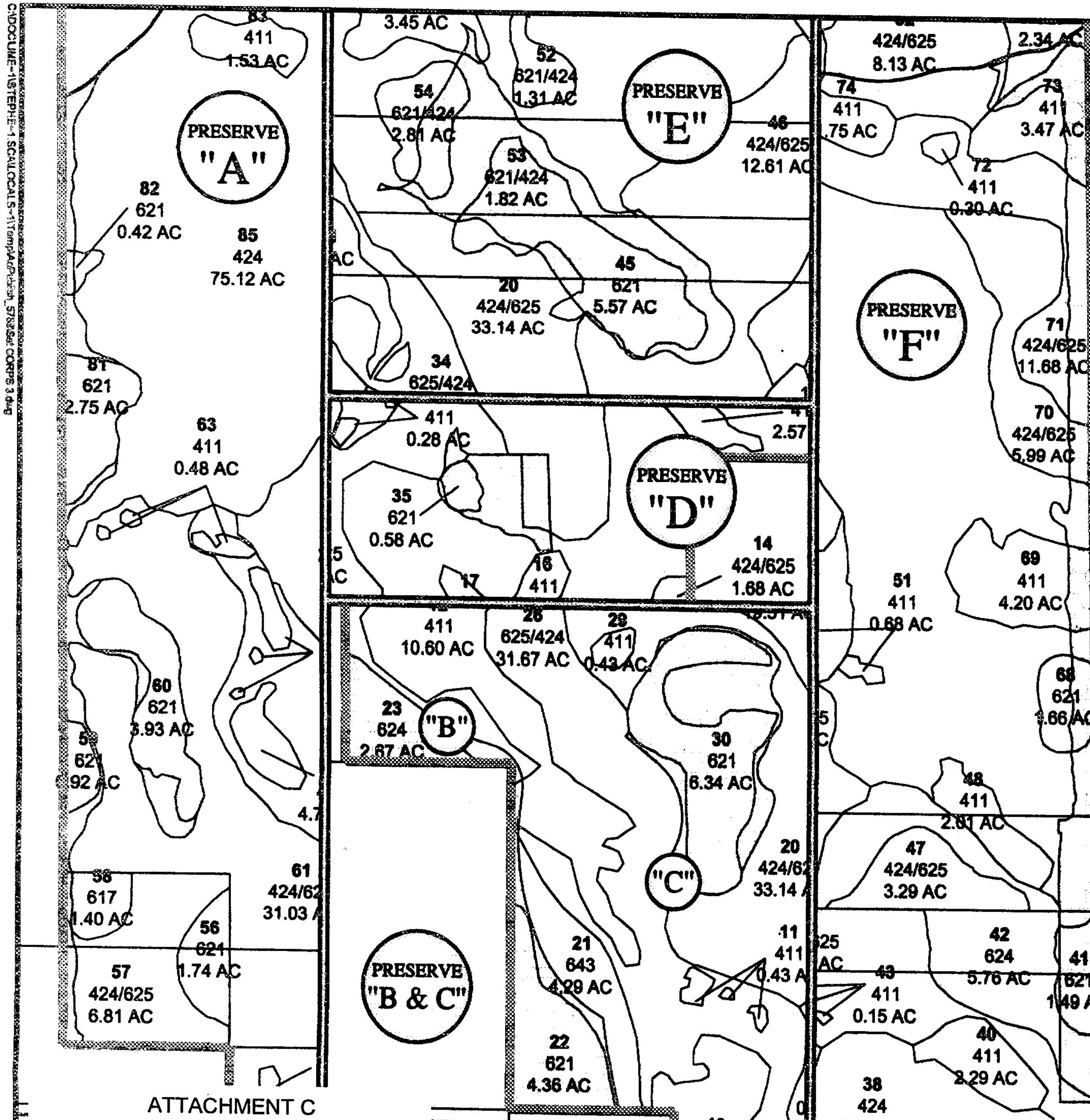
- quantification of any revegetation of exotic species and recommendations for remedial actions.
- quantification of revegetation of cleared areas by native species including dominant species and % cover by species.
- percent coverage, open space and water depths as appropriate.
- direct and indirect wildlife observations.
- site hydrological characteristics.
- photographs from a referenced location and panoramic photographs. A photo point station will be identified with a PVC labeled stake.
- A staff gauge or constant monitoring groundwater logger will be installed with monthly readings provided in each annual monitoring report.

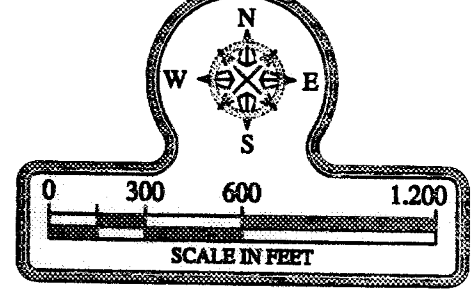
The maintenance and management of the preserve areas will be the responsibility of the owner/developer in perpetuity. When the property owners association or CDD acquires ownership of the property, maintenance and management responsibilities will transfer to that entity as well. At this time the said associations shall assume responsibility for the perpetual maintenance and management of the preserve and retained areas. Association documents will indicate the responsibilities, restrictions and limitations associated with the conservation areas.

The conservation areas for ***Mirasol*** will require regular maintenance. The maintenance activities may include, but are not limited to the following.

- maintenance, repair and/or replacement of staff gauges,
- follow-up eradication of exotic vegetation,
- supplemental herbicidal treatment of trees/stumps to prevent re-growth after initial treatment.

The maintenance activities will be performed on a quarterly basis for the first year, then biannually for the remaining four (4) years of the monitoring period. Perpetual maintenance after the monitoring period will be on an annual basis.





INTERNAL PRESERVES			
PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"A"		11.46	11.46
"B"	0.15	8.34	8.49
"C"		9.67	9.67
"D"		2.74	2.74
"E"		13.79	13.79
"F"	2.09	8.52	10.61
TOTALS	2.24	54.52	56.76

NOTES:
- THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.
- ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

, Inc.
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MIRASOL

INTERNAL PRESERVES (DETAILED)

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Internal
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-26-06	N/A	SCALE:	1"=600'
JOB NO.:	9418	N/A		

SECTION- 15 TOWNSHIP- 48 S RANGE- 26 E

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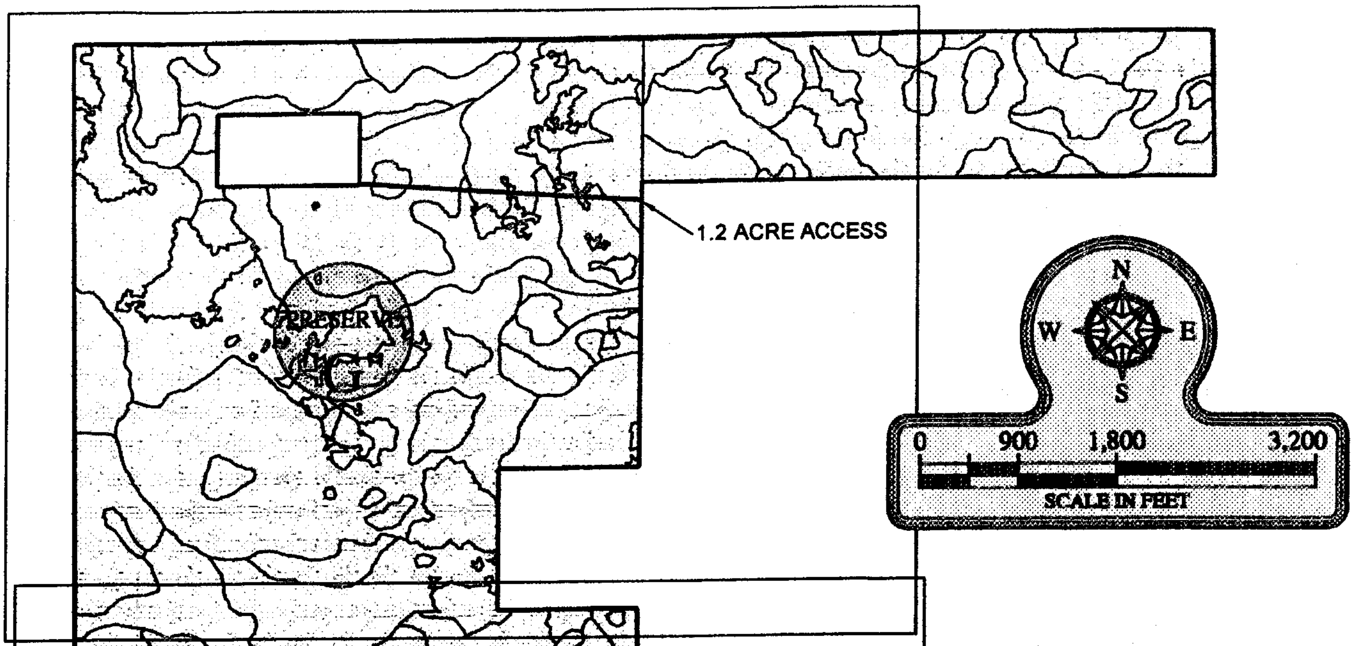

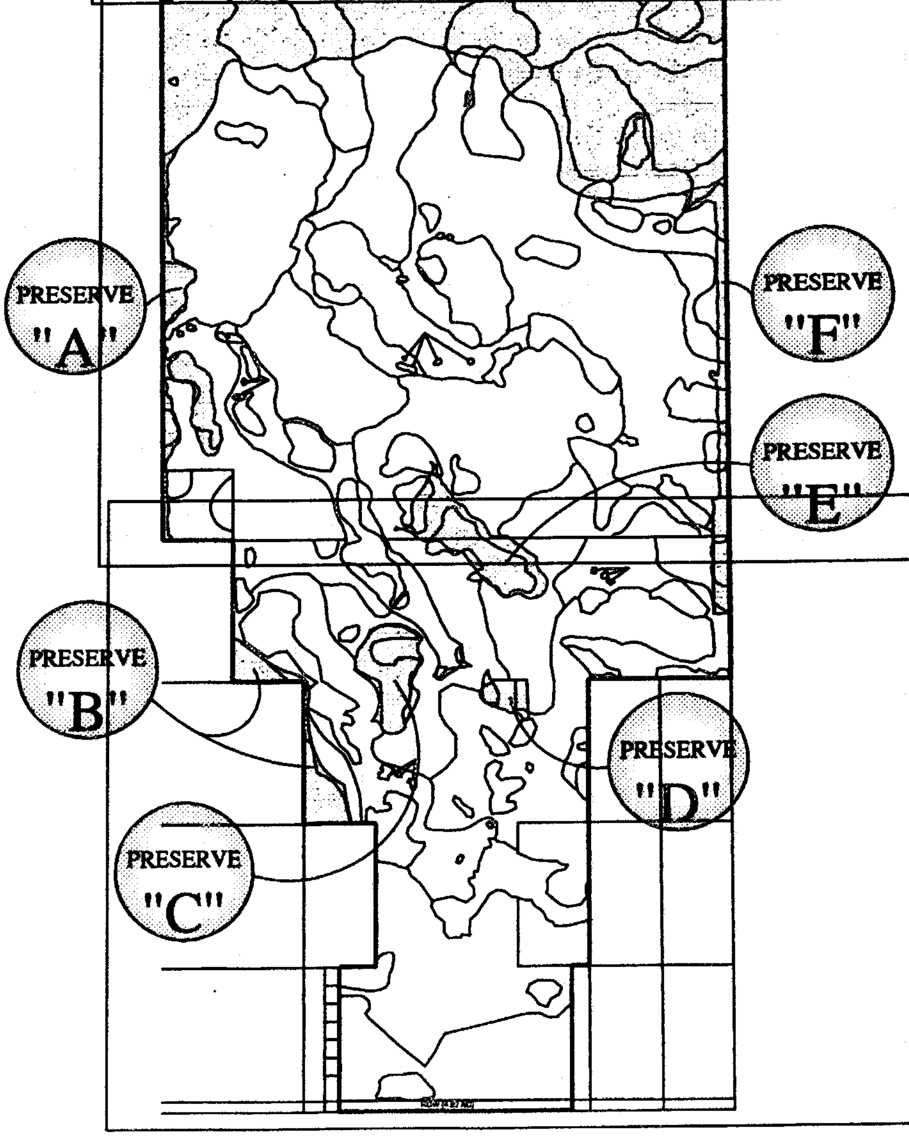

SYM.	DESCRIPTION	ACRES
	CONSERVATION EASEMENTS	940.47

MAIN PRESERVE

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"G"	106.88	776.83	883.71
TOTALS	106.88	776.83	883.71

NOTE: 1.2 ACRE ACCESS EASEMENT IS INCLUDED IN ABOVE 883.71 ACRES BUT IS NOT INCLUDED IN MITIGATION CALCULATIONS.

INTERNAL PRESERVES

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"A"		11.46	11.46
"B"	0.15	8.34	8.49
"C"		9.67	9.67
"D"		2.74	2.74
"E"		13.79	13.79
"F"	2.09	8.52	10.61
TOTALS	2.24	54.52	56.76

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

NOTES:
<> THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.
<> ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

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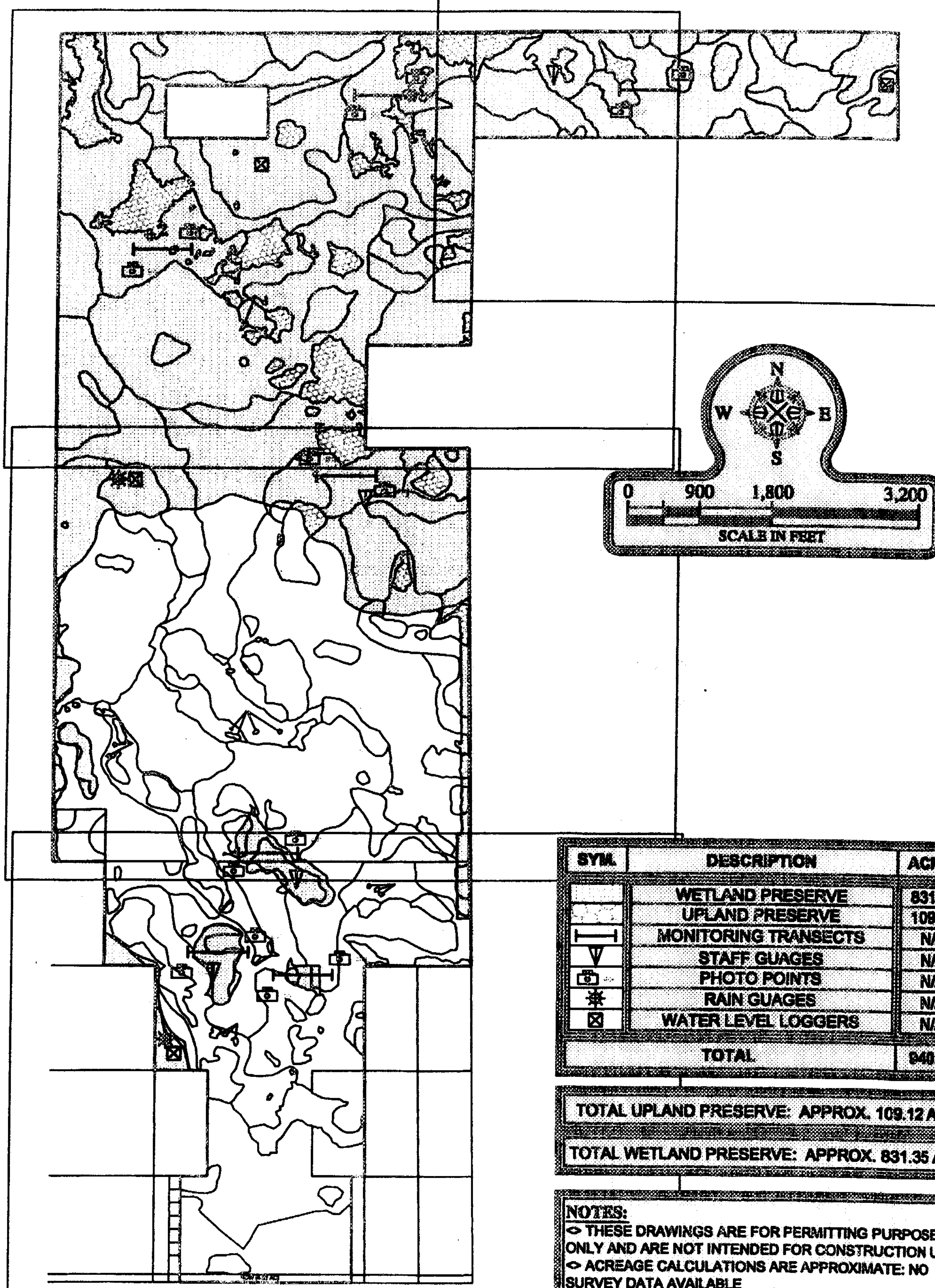
MIRASOL

CONSERVATION MAP

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Conservation
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,800'
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E



SYM.	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	MONITORING TRANSECTS	N/A
	STAFF GUAGES	N/A
	PHOTO POINTS	N/A
	RAIN GUAGES	N/A
	WATER LEVEL LOGGERS	N/A
	TOTAL	940.47

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

NOTES:
- THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.
- ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

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MIRASOL

MONITORING MAP

DESIGNED:	T.T.T.	REVISION:		TAB NAME:	Monitoring
DRAWN BY:	SS	N/A		SHEET:	
CREATED:	04-25-06	N/A		SCALE:	1"=1,800'
JOB NO.:	9418	N/A			

SECTION- TOWNSHIP- 48 S RANGE- 26 E

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Wetland Acreage	Wildlife	Canopy	Ground Cover	Buffer	Hydrology	W.Q.	SCORE	FUNCTIONAL SCORE
1	424/624	Melaleuca(>75%) / Cypress / Pine	2.37	0.5	0.5	0.5	1.0	1.0	3.00	0.361	0.86
3	621	Cypress	2.50	1.0	2.0	2.0	0.5	2.0	2.75	0.569	1.42
4	424	Melaleuca	42.50	0.5	0.5	0.5	1.5	1.0	3.00	0.389	16.53
6	624/424	Pine / Cypress / Melaleuca (>50%)	6.97	1.5	1.0	1.5	1.5	1.0	3.00	0.528	3.68
8	624	Pine / Cypress	8.19	2.0	2.0	2.0	1.5	1.5	3.00	0.667	5.46
14	411/424	Pine Flatwoods / Melaleuca (>50%)	1.68	1.5	1.0	1.5	1.5	1.0	3.00	0.528	0.89
20	424/625	Melaleuca(>50%) / Pine Flatwoods	33.14	1.0	1.0	1.5	1.5	1.0	3.00	0.500	16.57
21	643	Disturbed Wet Prairie	4.29	1.0	0.5	1.5	1.5	1.0	3.00	0.472	2.03
22	621	Cypress	4.36	1.5	2.0	2.0	1.5	2.5	3.00	0.694	3.03
23	624	Pine / Cypress	2.67	2.0	2.0	2.0	1.5	1.5	3.00	0.667	1.78
24	621	Cypress	0.82	1.5	2.0	2.0	1.5	2.5	3.00	0.694	0.57
26	411/424	Pine Flatwoods / Melaleuca (>25%)	31.67	1.5	1.5	2.0	1.5	1.0	3.00	0.583	18.47
27	424	Melaleuca	9.24	0.5	0.5	0.5	1.5	1.0	3.00	0.389	3.59
28	621	Cypress	0.69	1.5	2.0	2.0	1.5	2.5	3.00	0.694	0.48
30	621	Cypress	6.34	1.5	2.0	2.0	1.5	2.5	3.00	0.694	4.40
34	411/424	Pine Flatwoods / Melaleuca (>25%)	19.51	1.5	1.5	2.0	1.5	1.0	3.00	0.583	11.38
35	621	Cypress	0.58	1.5	2.0	2.0	1.5	2.5	3.00	0.694	0.40
36	411/424	Pine Flatwoods / Melaleuca (>25%)	19.02	1.5	1.5	2.0	1.5	1.0	3.00	0.583	11.10
38	424	Melaleuca	48.14	0.5	0.5	0.5	1.5	1.0	2.90	0.383	18.45
41	621	Cypress	1.49	1.5	2.0	2.0	1.5	2.5	3.00	0.694	1.03
42	624	Pine / Cypress	5.76	2.0	2.0	2.0	1.5	1.5	3.00	0.667	3.84
44	424/625	Melaleuca(>50%) / Pine Flatwoods	18.60	1.5	1.0	1.5	1.5	1.0	3.00	0.528	9.82
45	621	Cypress	5.57	1.5	2.0	2.0	1.5	2.5	3.00	0.694	3.87
46	424/625	Melaleuca(>50%) / Pine Flatwoods	12.61	1.5	1.5	2.0	1.5	2.5	3.00	0.667	8.41
47	424/625	Melaleuca (>50%)/ Pine Flatwoods	3.29	1.5	1.5	2.0	1.5	2.5	3.00	0.667	2.19
49	424/625	Melaleuca(>25%) / Pine Flatwoods	0.00	1.5	2.0	2.0	1.5	2.5	3.00	0.694	0.00
50	424/625	Melaleuca(>75%) / Pine Flatwoods	57.55	0.5	0.5	0.5	1.5	1.0	3.00	0.389	22.38
52	621	Cypress	1.31	1.5	2.0	2.0	1.5	2.5	3.00	0.694	0.91
53	621	Cypress	1.82	1.0	1.0	0.5	1.5	1.0	3.00	0.444	0.81
54	621	Cypress	2.81	2.0	1.5	1.5	1.5	2.0	3.00	0.639	1.80
55	424/624	Melaleuca(>50%)/Cypress/Pine	3.45	1.0	1.0	1.0	1.5	1.5	3.00	0.500	1.73
56	424/621	Melaleuca(>50%)/Cypress	1.75	1.5	1.5	1.5	1.5	2.0	3.00	0.611	1.07
57	424/624	Melaleuca(>50%)/Cypress/Pine	6.80	1.5	1.5	1.0	1.5	1.5	3.00	0.556	3.78
58	617	Mixed Wetland Hardwoods	1.39	1.5	1.5	1.5	1.5	1.5	3.00	0.583	0.81
59	621	Cypress	0.88	1.5	2.0	2.5	1.5	2.5	3.00	0.722	0.64
60	621	Cypress	3.93	2.0	1.0	1.5	1.5	2.0	3.00	0.611	2.40
61	424/625	Melaleuca(>75%) / Pine Flatwoods	30.91	0.5	0.5	0.5	1.5	1.0	3.00	0.389	12.02
64	424/625	Melaleuca(>75%) / Pine Flatwoods	28.37	1.0	0.5	1.5	1.0	1.0	3.00	0.444	12.61
65	424/625	Melaleuca(>75%) / Pine Flatwoods	8.91	1.0	1.0	1.0	1.5	1.0	3.00	0.472	4.21
68	621	Cypress	1.66	2.0	2.0	2.0	1.5	2.0	3.00	0.694	1.15
70	424/625	Melaleuca(>50%) / Pine Flatwoods	5.99	1.0	1.5	1.5	2.0	1.0	3.00	0.556	3.33
71	424/625	Melaleuca(>25%) / Pine Flatwoods	10.81	1.5	2.0	2.0	2.0	1.5	3.00	0.667	7.21
76	424/625	Melaleuca(>50%) / Pine Flatwoods	12.11	1.0	1.5	1.5	2.0	1.0	3.00	0.556	6.73
79	424/625	Melaleuca(>75%) / Pine Flatwoods	20.65	1.0	1.0	1.5	1.5	1.0	3.00	0.500	10.33
81	621	Melaleuca(>50%)/Cypress	2.60	1.0	1.0	1.0	1.5	2.0	3.00	0.528	1.37
82	621	Melaleuca(>50%)/Cypress	0.37	1.0	1.5	1.0	1.5	2.0	3.00	0.556	0.21
85	424	Melaleuca	56.80	0.5	0.0	0.5	1.0	1.0	3.00	0.333	18.93
86	424/625	Melaleuca(>75%) / Pine Flatwoods	3.84	0.5	1.0	1.0	1.0	1.0	3.00	0.417	1.60
87	424/625	Melaleuca(>25%) / Pine Flatwoods	2.99	1.5	2.0	2.0	1.5	1.5	3.00	0.639	1.91
89	424/625	Melaleuca(>50%) / Pine Flatwoods	0.74	1.5	1.5	1.5	1.5	1.5	3.00	0.583	0.43
90	424/625	Melaleuca(>75%) / Pine Flatwoods	101.03	0.5	1.0	1.0	1.5	1.0	3.00	0.444	44.90
92	424/625	Melaleuca(>25%) / Pine Flatwoods	2.35	2.0	2.0	2.0	2.0	1.5	3.00	0.694	1.63
93	625	Hydric Pine Flatwoods	0.62	2.0	2.0	2.0	2.0	2.0	3.00	0.722	0.45
100	424/625	Melaleuca(>75%) / Pine Flatwoods	27.49	1.0	0.5	1.0	1.0	1.0	3.00	0.417	11.45
101	424/625	Melaleuca(>50%) / Pine Flatwoods	7.80	1.0	1.0	1.0	1.0	1.0	3.00	0.444	3.47
102	424/625	Melaleuca(>75%) / Pine Flatwoods	0.14	0.5	1.0	1.0	1.5	1.0	3.00	0.444	0.06
		TOTALS	699.87								330.56

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ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Preserve Acreage	Preserve Area	Wildlife	Canopy	Ground Cover	Buffer	Hydrology	W.Q.	SCORE	FUNCTIONAL SCORE
20	424/625	Melaleuca(>50%) / Pine Flatwoods	2.84	C	0.5	2.0	2.5	0.5	2.0	2.25	0.542	1.54
20	424/625	Melaleuca(>50%) / Pine Flatwoods	0.17	D	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.09
20	424/625	Melaleuca(>50%) / Pine Flatwoods	0.42	E	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.23
21	643	Disturbed Wet Prairie	0.85	B	1.0		2.5	0.5	1.0	2.50	0.417	0.35
22	621	Cypress	4.36	B	1.5	2.5	2.5	1.5	2.5	2.50	0.722	3.15
23	624	Pine / Cypress	2.67	B	1.5	2.5	2.5	1.5	1.5	2.50	0.667	1.78
26	625/424	Pine Flatwoods / Melaleuca (>25%)	0.47	B	1.0	2.5	2.5	0.5	1.0	2.50	0.556	0.26
26	625/424	Pine Flatwoods / Melaleuca (>25%)	0.49	C	0.5	2.5	2.5	0.5	2.0	2.25	0.569	0.28
30	621	Cypress	6.34	C	1.0	2.5	2.5	1.0	2.0	2.25	0.625	3.96
35	621	Cypress	0.55	D	1.0	2.5	2.5	0.5	2.0	2.25	0.597	0.33
36	625/424	Pine Flatwoods / Melaleuca (>25%)	0.63	D	0.5	2.5	2.5	0.5	2.0	2.25	0.569	0.36
36	625/424	Pine Flatwoods / Melaleuca (>25%)	2.09	E	1.0	2.5	2.5	0.5	2.0	2.25	0.597	1.25
38	424	Melaleuca	1.39	D	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.75
41	621	Cypress	1.27	F	0.5	2.5	2.5	0.5	2.0	2.25	0.569	0.72
42	624	Pine / Cypress	0.88	F	0.5	2.5	2.5	0.5	2.0	2.25	0.569	0.50
44	424/625	Melaleuca(>50%) / Pine Flatwoods	0.16	F	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.09
45	621	Cypress	4.87	E	1.0	2.5	2.5	1.0	2.0	2.25	0.625	3.04
46	424/625	Melaleuca(>50%) / Pine Flatwoods	0.02	E	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.01
50	424/625	Melaleuca(>75%) / Pine Flatwoods	3.17	E	0.5	2.0	2.5	0.5	2.0	2.25	0.542	1.72
53	621	Cypress	1.82	E	1.0	2.5	2.5	1.0	2.0	2.25	0.625	1.14
54	621	Cypress	1.31	E	1.0	2.5	2.5	1.0	2.0	2.25	0.625	0.82
55	424/624	Melaleuca(>50%)/Cypress/Pine	0.09	E	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.05
57	424/624	Melaleuca(>50%)/Cypress/Pine	0.53	A	1.5	2.0	2.5	2.0	1.5	2.50	0.667	0.35
58	617	Mixed Wetland Hardwoods	0.14	A	1.5	2.5	2.5	2.0	1.5	2.50	0.694	0.10
59	621	Cypress	0.88	A	1.5	2.5	2.5	2.0	2.5	2.50	0.750	0.66
60	621	Cypress	3.93	A	1.5	2.5	2.5	2.0	2.0	2.50	0.722	2.84
61	424/625	Melaleuca(>75%) / Pine Flatwoods	2.00	A	1.5	2.0	2.5	2.0	1.0	2.50	0.639	1.28
68	621	Cypress	0.64	F	0.5	2.5	2.5	0.5	2.0	2.25	0.569	0.36
70	424/625	Melaleuca(>50%) / Pine Flatwoods	0.42	F	0.5	2.0	2.5	0.5	2.0	2.25	0.542	0.23
71	424/625	Melaleuca(>25%) / Pine Flatwoods	1.96	F	0.5	2.5	2.5	0.5	2.0	2.25	0.569	1.12
81	621	Melaleuca(>50%)/Cypress	2.60	A	1.5	2.0	2.5	2.0	2.0	2.50	0.694	1.81
82	621	Melaleuca(>50%)/Cypress	0.13	A	1.5	2.0	2.5	2.0	2.0	2.50	0.694	0.09
85	424	Melaleuca	1.25	A	1.5	2.0	2.5	2.0	1.0	2.50	0.639	0.80
90	424/625	Melaleuca(>75%) / Pine Flatwoods	2.43	F	0.5	2.0	2.5	0.5	2.0	2.25	0.542	1.32
92	424/625	Melaleuca(>25%) / Pine Flatwoods	0.14	F	0.5	2.5	2.5	0.5	1.5	2.25	0.542	0.08
93	625	Hydric Pine Flatwoods	0.62	F	0.5	2.5	2.5	0.5	2.0	2.25	0.569	0.35
		TOTALS	54.53									33.79

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Mirasol (revised)

ATTACHMENT D: CONSERVATION EASEMENT

1 page

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Mirasol (revised)

1. Within 60 days of permit issuance the permittee shall submit a draft conservation easement for the subject preserve in accordance with the following:

a) The permittee shall prepare the proposed conservation easement, including a legal description, state-certified survey and scaled drawings, with a reference drawing indicating the location of each conservation easement within the project boundary or offsite area, and furnish the same to the Jacksonville District Office, Regulatory Division, Enforcement Section, Post Office Box 4970, Jacksonville, Florida 32232-0019, for legal review and approval.

b) The following paragraph must be incorporated into the CE language: <u>Rights of U.S. Army Corps of Engineers (Corps)</u>. The Corps shall have all the rights of Grantee under this easement. The Corps shall be a party to any modification, alteration, release, or revocation of the conservation easement, and shall review and approve as necessary any additional structures or activities that require approval by Grantee.

c) The conservation easement must cite the Corps of Engineers permit number and reference the prohibitions set forth in F.S. §704.06, (a) through (h).

2. The permittee shall record the easement and the DOA permit in the public records of Collier County, Florida. A certified copy of the recorded document, plat, and verification of acceptance from the grantee will be forwarded to the Jacksonville District Office. The recordation and notification to the Jacksonville District Office must occur within one (1) year from the date of permit issuance.

3. The permittee must show that it has clear title to the real property and can legally place it under a conservation easement. Along with the submittal of the draft conservation commitment, the permittee shall submit a title insurance commitment, in favor of the grantee, for the property, which is being offered for preservation. Any existing liens or encumbrances on the property must be subordinated to the conservation easement. At the time of recordation of the conservation easement, a title insurance policy must be provided to the Corps of Engineers in an amount equal to the current market value of the property.

4. The permittee agrees, in the event the permit is transferred, proof of delivery of a copy of the recorded conservation easement to the subsequent permittee or permittees must be submitted to the Corps of Engineers together with the notification of permit transfer.

5. The grantee shall not assign its rights or obligations under this conservation easement except to another organization qualified to hold such interests under the applicable state and federal laws, including § 704.06 Florida Statutes, and committed to holding this conservation easement exclusively for conservation purposes. The Corps of Engineers shall be notified in writing of any intention to reassign the conservation easement to a new grantee and must approve the selection of the grantee. The new grantee must accept the assignment in writing and a copy of this acceptance delivered to the Corps of Engineers, Jacksonville District, Enforcement Section. The conservation easement must then be re-recorded and indexed in the same manner as any other instrument affecting title to real property and a copy of the recorded conservation easement furnished to the Corps of Engineers.

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ATTACHMENT E:
MITIGATION AND MONITORING:
Main Preserve

(12 pages dated 12 December 2006)

I. INTRODUCTION:

The purpose of this report is to document the proposed mitigation activities for preserves external to the development project known as ***Mirasol.***

II. EXISTING CONDITIONS:

The project site consists of 1,713.45 acres located in four sections of northern Collier County north of CR 846 and east of Interstate 75. There are limited upland (236.74 acres) and substantial wetland (1,476.71 acres) communities present on the site, which have all been heavily impacted by melaleuca infestation and altered hydrology.

The Main preserve is 883.71 acres in size and is composed of 776.83 acres of wetlands and 106.88 acres of uplands. There are no currently proposed impact areas within the main preserve but there is an access easement that has to be provided to the privately owned out parcel located in the center of Section 10. The access area is approximately 1.2 acres in size. Two other potential easements also must be provided within this preserve area. The first would be used by Collier County if CR 951 is ever extended to the north and the other is for the South Florida Water Management District if they ever contemplate the permitting and construction of the flow-way project that is no longer associated with this proposal. All of these easement areas will be enhanced as a result of this mitigation proposal and the entities utilizing the easement (if they are ever used) will be responsible for mitigating for any impacts within the easements caused by the respective projects.

III. MITIGATION ACTIVITIES

This preserve is the main preserve on the site and it is from activities conducted within this area that the majority of mitigation credit for the development impacts is achieved. Vegetation communities within the preserve include cypress swamp, hydric and mesic pine flatwoods, and wet prairie.

Exotic Vegetation Eradication

Melaleuca infestation is rampant throughout the site and an extensive eradication program will be implemented to eliminate this noxious plant from all preserve spaces. This program will include mechanical, hand clearing, and kill-in-place methods within the preserve. All hand cleared debris will be removed form the preserve where feasible. In areas where removal would cause additional, unwanted damage, the trees will be killed in place, or stacked in piles. If stacked in piles, the trunks will be cut into 3 to 6 foot sections and stacked "teepee" or "log cabin" style and the piles will be placed no closer than 100 feet from each other.

Mechanical clearing is currently proposed in an attempt to remove exotics from those areas where no existing native vegetation is present in the most economical and efficient manner possible. Ground elevations will be determined prior to any mechanical clearing activities. This will allow for restoration of current elevations before replanting is undertaken. The areas to be mechanically cleared have not been field verified or surveyed due to the extended review process associated with the project's permitting. The areas proposed to be mechanically cleared will be field located, and delineated with surveyor tape or other appropriate marking technique so that they can be reviewed and approved by the appropriate agency personnel prior to the clearing.

In addition to melaleuca, Brazilian pepper and several other exotics are also present on the property. All Category I and Category II exotics, as defined by the Florida Pest Plant Council, are included in this eradication program.

Quarterly maintenance inspections and treatments will be necessary to eliminate the melaleuca that has already gained a stranglehold on the property. All category I and II exotic vegetation will be brought under control before any re-planting or species management techniques (i.e. fire) are employed. Once the removal efforts have been successful, annual maintenance treatments should be sufficient to control future exotic growth. The preserve areas will be exotic free immediately following a maintenance activity. At no time shall the density of exotic and nuisance plant species exceed 2% aerial coverage in any vegetative strata or 4% of the total aerial coverage in all strata.

Replanting Plans

Most hand cleared areas will be left to regenerate naturally for at least a year before deciding if complete replanting is necessary. In areas that are more than 75% melaleuca or that are mechanically cleared, replanting will be done immediately following the exotic eradication activities. No immediate seed sources are available in these areas so immediate replanting helps to re-establish the denuded areas more rapidly and contributes to the restoration of canopy components more efficiently. Appropriate plant palettes will be applied for the affected areas that will be dependant on existing ground elevations, anticipated high water elevations, and historic vegetative cover. Also, all areas disturbed as part of the construction or mitigation activities will be replanted according to South Florida Water Management District guidelines and as outlined below:

Cypress: Cypress areas will be planted with sapling cypress, dahoon holly and scattered red maple trees with minimum heights of 4 feet. Depending on the size of the area being planted and the density of the adjacent vegetation, planting will be done on 10 foot or 15 foot centers. It is anticipated that adjacent ground cover vegetation will rapidly colonize the areas so no ground cover planting will be done until a full growing season has passed. If ground cover colonization has not occurred, sawgrass, cordgrass, and other appropriate, available vegetation will be planted in those areas. These plantings will be done on 3 foot centers.

The following table shows some of the representative species that can be considered for planting and restoration of the preserve areas.

CYPRESS PLANTING AREAS		
Canopy	Mid-story	Ground Cover
Cypress *(Taxodium distichum)*	Button Bush *(Cephalanthus occidentals)*	Sawgrass *(Cladium jamaicense)*
Red Maple *(Acer rubrum)*	Marlberry *(Ardisia escallonioides)*	Cinnamon Fern *(Osmunda cinnamomea)*
Dahoon Holly *(Ilex cassine)*	Pond Apple *(Annona glabra)*	Swamp Fern *(Blechnum serrulatum)*
Laurel Oak *(Quercus laurifolia)*	Cocoplum *(Chrysobalanus icaco)*	Alligator Flag *(Thalia geniculata)*
Slash Pine *(Pinus elliottii)*	Wax Myrtle *(Myrica cerifera)*	Crinum Lily *(Crinum americanum)*
		Yellow-eyed Grass *(Xyris spp.*

These lists are not all inclusive and alternative appropriate native vegetation may be used.

Flatwoods: Pine flatwood areas will be planted with sapling slash pine on 15 foot centers. Trees will be from 4' to 6' in height. In very hydric areas, a few cypress saplings may also be used. Few midstory plantings are proposed because of the future management plan for the areas as potential fox squirrel and red-cockaded woodpecker habitat. As above, no ground cover plantings will be done for a full growing season unless no existing vegetation is present. Wiregrass, cordgrass, broomsedge, and other appropriate native vegetation will be used if no regeneration is seen within the first year. These will be planted on 3-foot centers to fill in open areas.

PINE FLATWOOD PLANTING AREAS		
Canopy	Mid-story	Ground Cover
Slash Pine *(Pinus elliottii)*	Wax Myrtle *(Myrica cerifera)*	Wiregrass *(Aristida spp.)*
Cypress *(Taxodium distichum)*	St. John's Wort *(Hypericum spp.)*	Swamp Fern *(Blechnum serrulatum)*
Cabbage Palm *(Sabal palmetto)*		Sand Cordgrass *(Spartina alterniflora)*
		Yellow-eyed Grass *(Xyris spp.)*

These lists are not all inclusive and alternative appropriate native vegetation may be used.

All plantings will be coordinated with the wet season so that expected rains will serve to keep the new plantings hydrated and no outside irrigation source will be needed.

Prescribed Burning

The predominate long-term management technique proposed is the use of periodic burning to control vegetation growth and promote the native pine flatwood communities desired as the result of the restoration activities. Home-owners will be made aware as part of their purchase agreements that prescribed burning will be undertaken on the preserve. Controlled burning will only be proposed for those areas where exotic vegetation has been successfully removed. These will be amended as the details are coordinated with the relevant agencies. The proposed burning will be done in coordination with the land managers of the CREW Trust preserve, Division of Forestry, and the Corkscrew Swamp Sanctuary preserve.

The CREW General Management Plan 2001-2006 (Sec. 6.3.3.1 pgs 47-51) outlines the general prescribed burn guidelines followed by CREW. It generally states that since each habitat has its own optimum fire frequency ranging from one or two years, to several decades, the systems will be monitored and prescribed burns will be conducted when it is felt that the burn would best help the target and adjacent communities. Also, the burns will be conducted when prevailing winds are in the right direction to minimize smoke impacts on the adjacent residential communities and roadways. CREW does not have any restriction for burning adjacent to residences but wind and humidity are taken into account to insure that smoke and ash side effects are minimized on adjacent developments. CREW staff have been contacted regarding this project and prescribed burns will be a management tool used on the property as needed to maintain viable healthy habitats. Following the initial exotic removal activities and prior to the transfer of the property to CREW, the owner will consult with CREW land managers regarding the need to burn all or part of the property prior to the transfer.

Homeowner Education

In addition to the prescribed burning information mentioned above, all homeowners will be given informational pamphlets regarding south Florida ecosystems and local wildlife. Preserve related information will also be included in the home-owners documents for the development so that residents are well informed that fire management techniques will be used on the property and pet controls will be required throughout the property.

Long-Term Protection

The 777 acres of wetlands and 107 acres of uplands composing the Main Preserve shall be placed into conservation easements, and enforcement right shall be granted to the South Florida Water Management District and the US Army Corps of Engineers. The conservation easement for this area will be filed and recorded within a year after the initial clearing activities associated with the project are started.

Once the exotic vegetation has been removed and the native vegetation restored, the preserve will be donated to CREW or another appropriate public entity for perpetual preservation. In addition to the donation of the property, the applicant will also establish an escrow fund in the amount of $253.00 per acre for the long-term maintenance of the preserve. It is felt that the donation of the preserve to a public entity specifically charged with property maintenance and preservation, in lieu of perpetual management by a homeowners association that may not be fully equipped or experienced in preservation techniques, will be more appropriate for a preserve of this size. It is important to note that the applicant will be responsible for reaching the success criteria outlined below before donation of the preserve occurs.

Success Criteria

The restoration, enhancement, and preservation activities proposed for the preserve will generate mitigation credit that is being applied towards the project's impacts. In order to adequately gauge the appropriateness and eventual success of the mitigation, certain benchmarks must be set to compare against over time.

Vegetation

The base planting and vegetation restoration efforts shall be deemed, in part, successful when the area contains a minimum of 80% coverage of native vegetation, with less than 4% exotic and nuisance vegetation for a period of 3 years. The preserve areas will be maintained in this exotic-free state in perpetuity.

Ground cover diversity has been severely limited by the altered hydrology and exotic infestation throughout the site. It is expected that species diversity will increase as the exotic vegetation is removed. The restoration of a prescribed burning regimen will also help to restore a more natural native habitat. Monitoring of the preserves will include species composition and diversity monitoring of identified plots to document this increase.

Offsite Compensation

The proposed mitigation activities will provide mitigation credit for the proposed project. According to the calculation provided in the WRAP summary tables, the project will still be in a functional unit deficit after the mitigation activities are completed. This deficit will be compensated through the purchase of wetland mitigation credits from an approved, in-basin, mitigation bank. Proof will be provided that the credit purchase has been made prior to the start of any clearing activities.

IV. MONITORING / MAINTENANCE / MANAGEMENT:

The goals and objectives of this monitoring plan will be to provide for ongoing progress and ultimate success of preserved and enhanced areas in a series of scheduled monitoring reports. The reports will quantify and describe conditions within the managed areas, comparing observations with the proposed standards and offering advice for corrective actions if needed.

In areas of heavy vegetation, a visual inspection for exotic plant invasion will be made and all exotic vegetation found will be flagged, mapped and reported for treatment. Meandering transects will be followed in the preserve areas for vegetative inventory and observation of wildlife during regular monitoring. Photo points will be established along with plot sampling stations to determine percent survival and percent coverage of planted and recruited plant species. Transect and plot sampling station locations will be determined at time zero, after exotic eradication and plantings are installed. The mitigation efforts shall be deemed successful when the area contains a minimum of 80% coverage of native vegetation, with less than 4% exotic and nuisance vegetation for a period of 3 years as well as meeting the other success criteria outlined above. The preserve areas will be maintained in this exotic-free state in perpetuity. Once restoration and enhancement activities are deemed successful, the preserve will be donated to CREW and an escrow fund in the amount of $253.00 per acre will be established for the long-term maintenance of the preserve.

Water Levels and Rainfall

In order to document that hydrological impacts do not occur as a result of the project, the project will place three water level data loggers (Global Water Instrumentation WL 15 or similar) and two logging type rain gauges within the preserve boundaries. The water level loggers will be placed inside of two (2) inch PVC pipe wells and sunk to a depth of six (6) to eight (8) feet below ground level. This will place the loggers below the water table and will allow for continuous monitoring of the water levels, above and below ground, experienced on the site. The rain gauges will be set to collect and record rainfall events on a daily basis so that comparisons can be made with the on-site rainfall and water levels experienced. Locations for the loggers, both rainfall and water level, are shown on the enclosed Exhibit.

The surface water levels and rainfall data will be included in a report that will be given to the Corps of Engineers and to the SFWMD on an annual basis. This monitoring will be done in conjunction with the vegetative and exotic removal monitoring conducted within the forested preserves for the project. The reports will be produced annually for five years after the completion of the initial exotic removal.

Wood Stork Activity

The National Audubon Society Corkscrew Sanctuary staff currently monitors the productivity of the Corkscrew wood stork colony in the form of the number of nests constructed as well as the number of young fledged.

The project will also document the utilization of the preserve areas by wood storks. This information will be useful in conjunction with the available productivity and hydrological data to determine if the project design serves to increase or decrease foraging opportunities. Since the FWS estimated potential incidental take based on forage production the project will implement a monitoring program to estimate the forage fish production on the project site.

Forage Fish Monitoring

Sampling sites will be established along transects that will incorporate the different wetland communities on the site. The four main habitats to be sampled are hydric pine flatwoods, pine/cypress flatwoods, hypericum prairie, and cypress. The sampling devices will consist of, 1m² throw traps, seines, and acrylic Breder traps. All fish caught will be identified and counted. Results will be presented in the annual report to the agencies.

Reports

A Baseline Monitoring Report will describe the existing conditions of the conservation areas prior to exotic eradication and supplemental planting. The Time Zero Monitoring Report will describe the aerial extent of exotic removal and other mitigation work, i.e. revegetation, photographs from referenced locations, qualitative observations of wildlife usage and other information such as climatic and hydrological conditions and health of existing vegetation. The Time Zero Report will be completed within 30 days of the completion of the initial exotic removal work. Annual Monitoring reports shall document changes form the baseline conditions the success of exotic eradication and identifies ways to maintain or improve these conditions.

<u>Baseline, Time Zero and Annual Reports will include the following:</u>

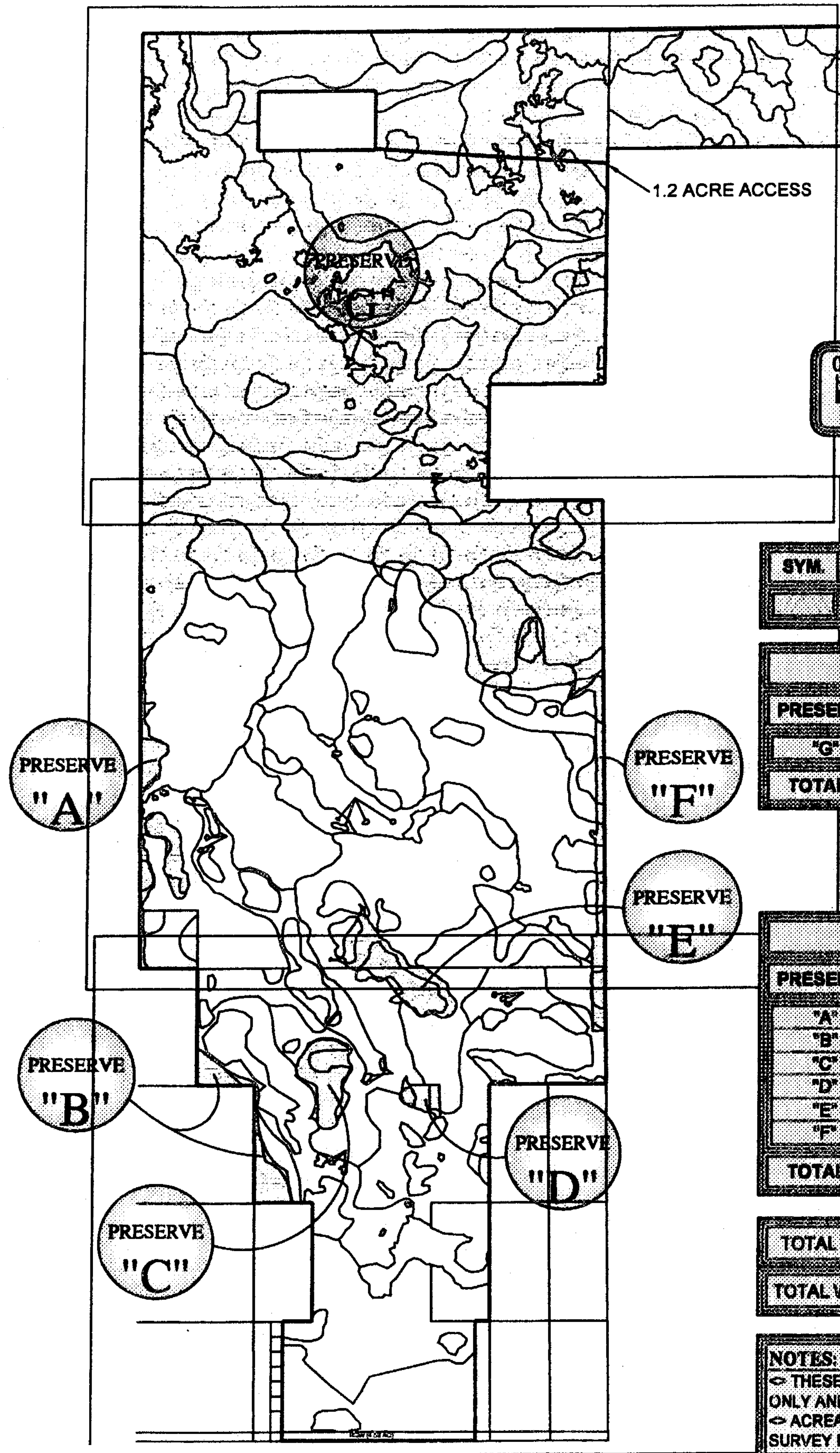
- Quantification of any re-growth of exotic species and recommendations for remedial actions.
- Quantification of restoration of cleared areas by native species including dominant species and % cover by species.
- Percent coverage, open space and diversity as appropriate of restored vegetation.

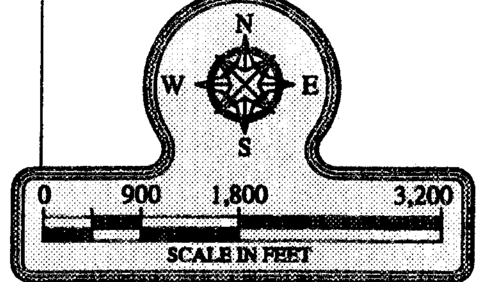
- Direct and indirect wildlife observations.
- Photographs from a referenced location and panoramic photographs. A photo point station will be identified with a PVC labeled stake.
- The current status of the construction of the project as well as any construction phases or milestones that have been completed.
- A summary of the rainfall data collected on-site as well as data from the other agency rainfall monitoring stations identified in the report.
- A summary of the on-site water level data as well as the off-site data available from the other agency monitoring stations.
- Current status of the plantings and exotic removal as well as regeneration of the native vegetation throughout the preserve area.
- Ongoing results of the forage fish sampling including species diversity and densities broken down by habitat types and water depths.
- Any observed on-site foraging by wood storks. Included in this information will be, number of storks observed, habitat or general area observed, number of days or duration of observation, and estimated foraging efficiency.

The maintenance and management of the preserve areas will be the responsibility of the owner/developer in perpetuity. The responsibility for the preserve maintenance can be transferred to the property owners association or CDD once the project is "turned-over" to the appropriate association. The transfer will include all documentation associated with the restoration and enhancement activities as well as the long term responsibilities associated with the preserves. The Corps of Engineers must be notified in writing if or when any transfer of the preserve responsibilities occurs.

This may entail the property owner's association or CDD acquiring ownership of the preserve prior to the CREW transfer. The maintenance and management responsibilities for the preserves will transfer to that entity. At this time the said associations shall assume responsibility for the perpetual maintenance and management of the preserve and retained areas. Association documents will indicate the responsibilities, restrictions and limitations associated with the conservation areas. Once the restoration activities have met the success criteria, the Preserve will be turned over to CREW (or another suitable public entity) along with the escrow funds to perpetually maintain the preserve.

The maintenance activities will be performed on a quarterly basis for the first year, then biannually or annually as needed for the remaining five (5) years of the monitoring period. Monitoring may continue past the 5 year time period if additional time is needed to meet the success criteria for the preserve. The Corps of Engineers will release the annual monitoring requirement once the success criteria have been met for a period of three consecutive years. Perpetual maintenance after the monitoring period will be on an annual or as needed basis.





SYM.	DESCRIPTION	ACRES
	CONSERVATION EASEMENTS	940.47

MAIN PRESERVE

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"G"	106.88	776.83	883.71
TOTALS	106.88	776.83	883.71

NOTE: 1.2 ACRE ACCESS EASEMENT IS INCLUDED IN ABOVE 883.71 ACRES BUT IS NOT INCLUDED IN MITIGATION CALCULATIONS.

INTERNAL PRESERVES

PRESERVE	UPLAND AC.	WETLAND AC.	TOTAL
"A"		11.46	11.46
"B"	0.15	8.34	8.49
"C"		9.67	9.67
"D"		2.74	2.74
"E"		13.79	13.79
"F"	2.09	8.52	10.61
TOTALS	2.24	54.52	56.76

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

NOTES:
<> THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.
<> ACREAGE CALCULATIONS ARE APPROXIMATE. NO SURVEY DATA AVAILABLE

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MIRASOL

CONSERVATION MAP

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Conservation
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,800'
JOB NO.:	9418	N/A		
SECTION-	TOWNSHIP- 48 S	RANGE- 26 E		

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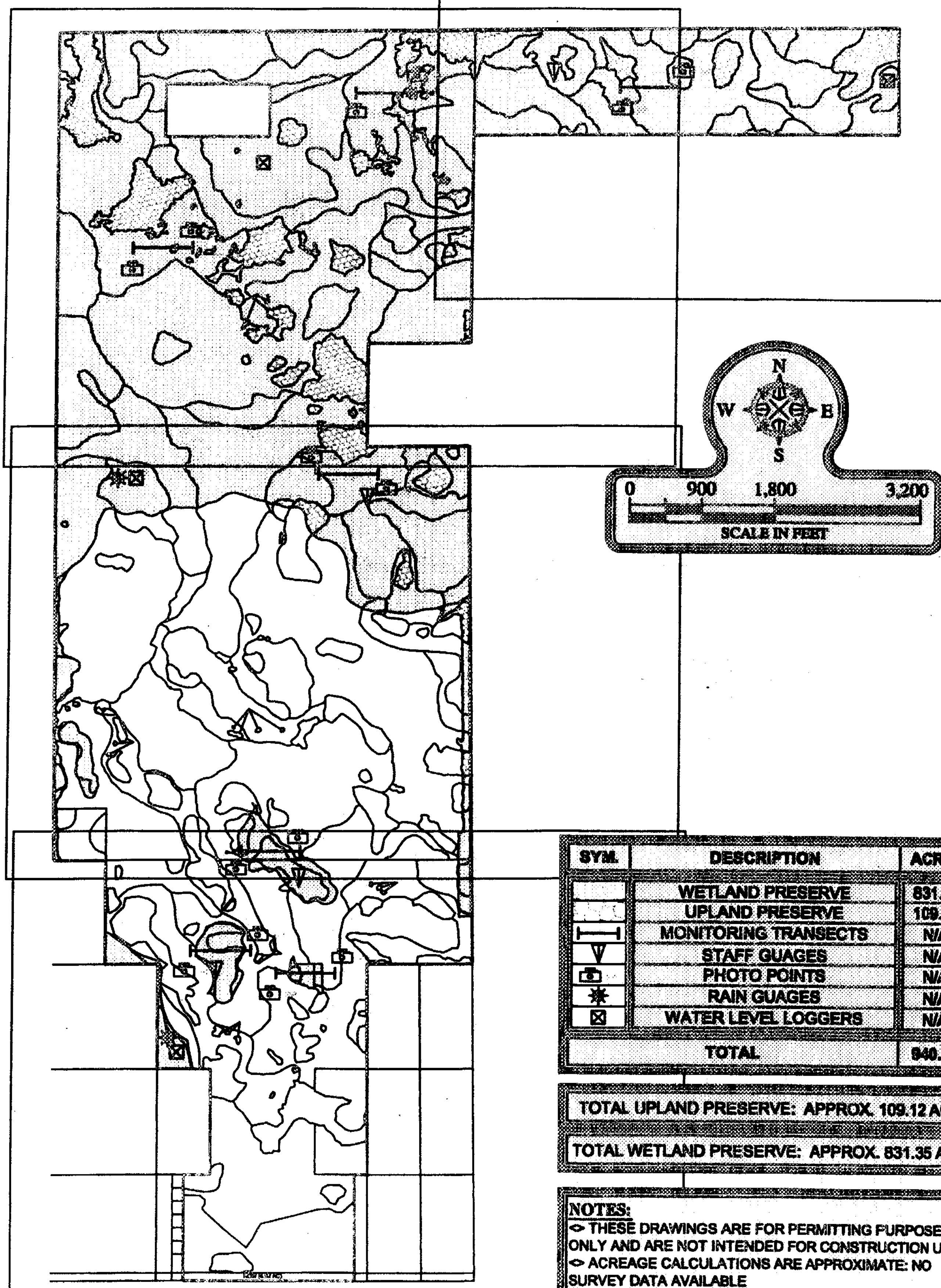


SYM.	DESCRIPTION	ACRES
	WETLAND PRESERVE	831.35
	UPLAND PRESERVE	109.12
	MONITORING TRANSECTS	N/A
	STAFF GUAGES	N/A
	PHOTO POINTS	N/A
	RAIN GUAGES	N/A
	WATER LEVEL LOGGERS	N/A
	TOTAL	940.47

TOTAL UPLAND PRESERVE: APPROX. 109.12 AC.

TOTAL WETLAND PRESERVE: APPROX. 831.35 AC.

NOTES:

<> THESE DRAWINGS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION USE.

<> ACREAGE CALCULATIONS ARE APPROXIMATE: NO SURVEY DATA AVAILABLE

ATTACHMENT E
Mirasol (Revised)
Mitigation and Monitoring Main
SAJ-2000-1926(IP-HWB)
12 December 2006 Page 10 of 12

Inc.
sulting
04-3732
43-6632

MIRASOL

MONITORING MAP

DESIGNED:	T.T.T.	REVISION:	TAB NAME:	Monitoring
DRAWN BY:	SS	N/A	SHEET:	
CREATED:	04-25-06	N/A	SCALE:	1"=1,800'
JOB NO.:	9418	N/A		

SECTION- TOWNSHIP- 48 S RANGE- 26 E

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Wetland Acreage	Wildlife	Canopy	Ground Cover	Buffer	Hydrology	W.Q.	SCORE	FUNCTIONAL SCORE
71	424/625	Melaleuca(>25%) / Pine Flatwoods	0.87	1.5	2.0	2.0	2.0	1.5	3.00	0.667	0.58
84	540	Cattle Pond	0.08	0.0	0.0	0.0	0.0	0.0	0.00	0.000	0.00
85	424	Melaleuca	17.28	0.5	0.0	0.5	1.0	1.0	3.00	0.333	5.76
86	424/625	Melaleuca(>75%) / Pine Flatwoods	10.35	0.5	1.0	1.0	1.0	1.0	3.00	0.417	4.31
89	424/625	Melaleuca(>50%) / Pine Flatwoods	15.91	1.5	1.5	1.5	1.5	1.5	3.00	0.583	9.28
90	424/625	Melaleuca(>75%) / Pine Flatwoods	5.30	0.5	1.0	1.0	1.5	1.0	3.00	0.444	2.36
92	424/625	Melaleuca(>25%) / Pine Flatwoods	5.78	2.0	2.0	2.0	2.0	1.5	3.00	0.694	4.01
93	625	Hydric Pine Flatwoods	1.72	2.0	2.0	2.5	1.5	2.0	3.00	0.722	1.24
94	621	Cypress	18.57	2.0	2.5	2.5	1.5	2.5	3.00	0.778	14.44
95	424/624	Melaleuca(>25%)/Cypress/Pine	20.43	2.0	2.0	2.0	2.0	2.0	3.00	0.722	14.76
96	424/625	Melaleuca(>25%) / Pine Flatwoods	5.77	2.0	2.0	1.5	1.5	1.5	3.00	0.639	3.69
97	621	Cypress	0.39	2.0	2.0	2.0	2.0	2.5	3.00	0.750	0.29
99	424/625	Melaleuca(>50%) / Pine Flatwoods	1.93	1.5	1.5	1.5	1.5	1.5	3.00	0.583	1.13
100	424/625	Melaleuca(>75%) / Pine Flatwoods	40.24	1.0	0.5	1.0	1.0	1.0	3.00	0.417	16.77
101	424/625	Melaleuca(>50%) / Pine Flatwoods	22.84	1.0	1.0	1.0	1.0	1.0	3.00	0.444	10.15
102	424/625	Melaleuca(>75%) / Pine Flatwoods	8.27	0.5	1.0	1.0	1.5	1.0	3.00	0.444	3.68
105	424/625	Melaleuca(>75%) / Pine Flatwoods	7.55	0.5	1.0	1.0	1.5	1.0	3.00	0.444	3.36
106	424/625	Melaleuca(>25%) / Pine Flatwoods	1.41	2.0	1.5	1.5	1.5	1.5	3.00	0.611	0.86
107	424/625	Melaleuca(>50%) / Pine Flatwoods	21.33	1.0	1.5	1.5	1.5	1.0	3.00	0.528	11.26
108	424/625	Melaleuca(>75%) / Pine Flatwoods	2.85	1.0	1.0	1.0	1.5	1.0	3.00	0.472	1.35
109	540	Cattle Pond	0.19	0.0	0.0	0.0	0.0	0.0	0.00	0.000	0.00
114	621	Cypress	21.11	2.0	2.0	2.0	1.0	2.5	3.00	0.694	14.66
115	424/625	Melaleuca(>75%) / Pine Flatwoods	6.59	1.0	1.0	1.0	1.5	1.0	3.00	0.472	3.11
118	424	Melaleuca	107.97	0.5	0.0	0.5	1.5	1.0	3.00	0.361	38.99
119	424/625	Melaleuca(>25%) / Pine Flatwoods	12.63	1.5	2.0	2.0	1.5	1.5	2.75	0.625	7.89
124	424/624	Melaleuca(>50%)/Cypress/Pine	9.14	1.5	1.5	1.5	2.0	2.0	3.00	0.639	5.84
125	424/625	Melaleuca(>50%)/ Pine Flatwoods	6.37	2.0	1.5	2.0	2.0	2.0	3.00	0.694	4.42
126	621	Cypress	1.16	2.0	2.5	2.0	2.0	2.5	3.00	0.778	0.90
127	424/624	Melaleuca(>50%)/Cypress/Pine	1.29	2.0	1.5	2.0	2.0	2.0	3.00	0.694	0.90
129	424/621	Melaleuca(>25%)/Cypress	3.46	2.0	2.0	2.0	2.0	2.5	3.00	0.750	2.60
131	424	Melaleuca	2.71	0.5	0.0	0.5	1.5	1.0	3.00	0.361	0.98
132	424/621	Melaleuca(>25%)/Cypress	3.67	2.0	2.0	2.0	1.5	2.5	3.00	0.722	2.65
134	424/625	Melaleuca(>75%) / Pine Flatwoods	62.54	1.0	0.5	1.0	1.0	1.0	2.75	0.403	25.19
135	424	Melaleuca	42.41	0.5	0.5	1.0	1.5	1.0	3.00	0.417	17.67
137	424/625	Melaleuca(>75%) / Pine Flatwoods	32.88	1.0	1.0	1.0	1.5	1.0	3.00	0.472	15.53
138	424/625	Melaleuca(>50%)/ Pine Flatwoods	11.67	1.5	1.5	1.5	1.5	1.0	3.00	0.556	6.48
143	422	Brazilian Pepper	3.59	0.5	0.5	0.5	1.5	1.0	2.00	0.333	1.20
144	621	Cypress	9.11	1.5	2.0	2.0	1.0	2.5	2.75	0.653	5.95
145	424	Melaleuca	5.34	0.5	0.0	0.5	2.0	1.0	2.90	0.383	2.05
146	424	Melaleuca	19.58	0.5	0.5	0.5	1.0	1.0	2.00	0.306	5.98
147	424/624	Melaleuca(>50%)/ Pine / Cypress	2.53	1.5	1.5	1.5	2.0	1.5	3.00	0.611	1.55
148	424/621	Melaleuca(>25%)/Cypress	15.38	1.0	1.5	1.5	1.0	2.0	2.90	0.550	8.46
149	424/625	Melaleuca(>25%) / Pine Flatwoods	9.28	2.0	2.0	2.0	1.0	1.5	2.00	0.583	5.41
150	424/625	Melaleuca(>75%) / Pine Flatwoods	25.99	1.0	1.0	1.5	1.5	1.0	2.50	0.472	12.27
153	424/625	Melaleuca(>50%)/ Pine Flatwoods	12.43	1.5	1.5	1.0	1.5	1.0	2.75	0.514	6.39
156	424/625	Melaleuca(>50%)/ Pine Flatwoods	3.91	1.5	1.5	1.5	1.5	1.0	3.00	0.556	2.17
157	424	Melaleuca	15.47	0.5	0.5	0.5	2.0	1.0	3.00	0.417	6.45
158	424/625	Melaleuca(>50%)/ Pine Flatwoods	7.29	1.5	1.5	1.5	1.5	1.0	3.00	0.556	4.05
159	424/625	Melaleuca(>25%) / Pine Flatwoods	0.70	2.0	1.5	2.0	2.0	1.5	3.00	0.667	0.47
160	621	Cypress	9.58	2.0	2.5	2.0	1.0	2.5	2.75	0.708	6.79
161	640	Flag Pond	1.43	2.0	n/a	2.5	2.5	3.0	3.00	0.722	1.03
162	424/621	Melaleuca(>50%)/Cypress/Pine	7.42	1.5	1.5	1.5	2.0	1.5	3.00	0.611	4.53
163	424	Melaleuca	4.34	1.0	0.5	0.5	2.0	1.0	3.00	0.444	1.93
165	424/624	Melaleuca(>50%)/Cypress/Pine	0.89	1.5	2.0	1.5	1.0	1.5	2.50	0.556	0.49
166	621	Cypress	3.05	2.0	2.5	1.5	1.5	2.5	2.00	0.667	2.03
167	424/624	Melaleuca(>50%)/Cypress/Pine	2.25	2.0	1.5	1.5	2.0	1.5	3.00	0.639	1.44
168	424/625	Melaleuca(>75%)/Cypress/Pine	38.94	1.0	0.5	0.5	1.5	1.0	2.75	0.403	15.68
169	424/624	Melaleuca(>50%)/Cypress/Pine	3.07	1.5	1.5	1.5	2.0	1.5	3.00	0.611	1.88
170	424/624	Melaleuca(>50%)/Cypress/Pine	0.79	1.5	1.5	1.5	2.0	1.5	2.50	0.583	0.46
172	621	Cypress	2.12	2.5	2.5	2.0	2.5	2.5	2.50	0.806	1.71
174	424	Melaleuca	11.86	1.0	0.5	0.5	1.5	1.0	3.00	0.417	4.94
175	424/624	Melaleuca(>25%)/Cypress/Pine	6.67	2.0	2.0	2.0	1.5	2.0	2.50	0.667	4.45
177	621	Cypress	5.49	2.5	2.5	2.0	2.0	2.5	3.00	0.806	4.42
178	621	Cypress	0.89	2.5	2.5	2.0	2.0	2.5	3.00	0.806	0.72
179	625	Hydric Pine Flatwoods	12.78	2.5	2.5	2.0	2.0	2.0	3.00	0.778	9.94
		TOTALS	776.83								381.90

ACOE AREA	FLUCCS CODE	DESCRIPTION	ACOE Wetland Acreage	Wildlife	Canopy	Ground Cover	Buffer	Hydrology	W.Q.	SCORE	FUNCTIONAL SCORE
71	424/625	Melaleuca(>25%) / Pine Flatwoods	0.87	2.5	2.5	2.5	3.0	1.5	3.00	0.833	0.73
84	540	Cattle Pond	0.08	2.5	2.0	2.5	3.0	3.0	3.00	0.889	0.07
85	424	Melaleuca	17.28	2.0	2.0	2.5	2.5	1.0	3.00	0.722	12.48
86	424/625	Melaleuca(>75%) / Pine Flatwoods	10.35	2.0	2.0	2.5	3.0	1.0	3.00	0.750	7.76
89	424/625	Melaleuca(>50%) / Pine Flatwoods	15.91	2.5	2.5	2.5	3.0	1.5	3.00	0.833	13.26
90	424/625	Melaleuca(>75%) / Pine Flatwoods	5.30	2.0	2.0	2.5	2.5	1.0	3.00	0.722	3.83
92	424/625	Melaleuca(>25%) / Pine Flatwoods	5.78	2.5	2.5	2.5	3.0	1.5	3.00	0.833	4.82
93	625	Hydric Pine Flatwoods	1.72	2.0	2.5	2.5	2.0	2.0	3.00	0.778	1.34
94	621	Cypress	18.57	2.5	2.5	2.5	2.5	2.5	3.00	0.861	15.99
95	424/624	Melaleuca(>25%)/Cypress/Pine	20.43	2.5	2.5	2.5	3.0	2.0	3.00	0.861	17.59
96	424/625	Melaleuca(>25%) / Pine Flatwoods	5.77	2.5	2.5	2.5	2.5	1.5	3.00	0.806	4.65
97	621	Cypress	0.39	2.5	2.5	2.5	2.5	2.5	3.00	0.861	0.34
99	424/625	Melaleuca(>50%) / Pine Flatwoods	1.93	2.5	2.5	2.5	3.0	1.5	3.00	0.833	1.61
100	424/625	Melaleuca(>75%) / Pine Flatwoods	40.24	2.5	2.5	2.5	3.0	1.0	3.00	0.806	32.42
101	424/625	Melaleuca(>50%) / Pine Flatwoods	22.84	2.5	2.5	2.5	3.0	1.0	3.00	0.806	18.40
102	424/625	Melaleuca(>75%) / Pine Flatwoods	8.27	2.5	2.0	2.5	3.0	1.0	3.00	0.778	6.43
105	424/625	Melaleuca(>75%) / Pine Flatwoods	7.55	2.5	2.0	2.5	3.0	1.0	3.00	0.778	5.87
106	424/625	Melaleuca(>25%) / Pine Flatwoods	1.41	2.5	2.5	2.5	3.0	1.5	3.00	0.833	1.18
107	424/625	Melaleuca(>50%) / Pine Flatwoods	21.33	2.5	2.5	2.5	3.0	1.0	3.00	0.806	17.18
108	424/625	Melaleuca(>75%) / Pine Flatwoods	2.85	2.5	2.0	2.5	3.0	1.0	3.00	0.778	2.22
109	540	Cattle Pond	0.19	2.5	2.5	2.5	3.0	3.0	3.00	0.917	0.17
114	621	Cypress	21.11	2.5	2.5	2.5	3.0	2.5	3.00	0.889	18.76
115	424/625	Melaleuca(>75%) / Pine Flatwoods	6.59	2.5	2.0	2.5	3.0	1.0	3.00	0.778	5.13
118	424	Melaleuca	107.97	2.5	2.0	2.5	3.0	1.0	3.00	0.778	83.98
119	424/625	Melaleuca(>25%) / Pine Flatwoods	12.63	2.0	2.5	2.5	2.5	1.5	2.75	0.764	9.65
124	424/624	Melaleuca(>50%)/Cypress/Pine	9.14	2.5	2.5	2.5	3.0	2.0	3.00	0.861	7.87
125	424/625	Melaleuca(>50%)/ Pine Flatwoods	6.37	2.5	2.5	2.5	3.0	2.0	3.00	0.861	5.49
126	621	Cypress	1.16	2.5	2.5	2.5	3.0	2.5	3.00	0.889	1.03
127	424/624	Melaleuca(>50%)/Cypress/Pine	1.29	2.5	2.5	2.5	2.5	2.0	3.00	0.833	1.08
129	424/621	Melaleuca(>25%)/Cypress	3.46	2.5	2.5	2.5	2.5	2.5	3.00	0.861	2.98
131	424	Melaleuca	2.71	2.5	2.0	2.5	2.5	1.0	3.00	0.750	2.03
132	424/621	Melaleuca(>25%)/Cypress	3.67	2.5	2.5	2.5	3.0	2.5	3.00	0.889	3.26
134	424/625	Melaleuca(>75%) / Pine Flatwoods	62.54	2.5	2.0	2.5	3.0	1.0	2.75	0.764	47.77
135	424	Melaleuca	42.41	2.5	2.0	2.5	2.5	1.0	3.00	0.750	31.81
137	424/625	Melaleuca(>75%) / Pine Flatwoods	32.88	2.5	2.0	2.5	2.5	1.0	3.00	0.750	24.66
138	424/625	Melaleuca(>50%)/ Pine Flatwoods	11.67	2.5	2.5	2.5	3.0	1.0	3.00	0.806	9.40
143	422	Brazilian Pepper	3.59	2.0	2.0	2.5	2.5	1.0	2.00	0.667	2.39
144	621	Cypress	9.11	2.0	2.5	2.5	2.0	2.5	2.75	0.792	7.21
145	424	Melaleuca	5.34	2.5	2.0	2.5	3.0	1.0	2.90	0.772	4.12
146	424	Melaleuca	19.58	2.0	2.0	2.5	2.0	1.0	2.00	0.639	12.51
147	424/624	Melaleuca(>50%)/ Pine / Cypress	2.53	2.0	2.0	2.5	2.0	1.0	3.00	0.694	1.76
148	424/621	Melaleuca(>25%)/Cypress	15.38	2.5	2.5	2.5	2.0	2.0	2.90	0.800	12.30
149	424/625	Melaleuca(>25%) / Pine Flatwoods	9.28	2.0	2.5	2.5	2.0	1.5	2.00	0.694	6.44
150	424/625	Melaleuca(>75%) / Pine Flatwoods	25.99	2.5	2.0	2.5	3.0	1.0	2.50	0.750	19.49
153	424/625	Melaleuca(>50%)/ Pine Flatwoods	12.43	2.5	2.5	2.5	2.5	1.0	2.75	0.764	9.50
156	424/625	Melaleuca(>50%)/ Pine Flatwoods	3.91	2.5	2.5	2.5	3.0	1.0	3.00	0.806	3.15
157	424	Melaleuca	15.47	2.5	2.0	2.5	2.5	1.0	3.00	0.750	11.60
158	424/625	Melaleuca(>50%)/ Pine Flatwoods	7.29	2.5	2.5	2.5	2.5	1.0	3.00	0.778	5.67
159	424/625	Melaleuca(>25%) / Pine Flatwoods	0.70	2.5	2.5	2.5	2.5	1.5	3.00	0.806	0.56
160	621	Cypress	9.58	2.0	2.5	2.5	2.0	2.5	2.75	0.792	7.58
161	640	Flag Pond	1.43	2.0	2.5	2.5	3.0	3.0	3.00	0.889	1.27
162	424/621	Melaleuca(>50%)/Cypress/Pine	7.42	2.5	2.5	2.5	2.5	1.5	3.00	0.806	5.98
163	424	Melaleuca	4.34	2.5	2.0	2.5	3.0	1.0	3.00	0.778	3.38
165	424/624	Melaleuca(>50%)/Cypress/Pine	0.89	2.0	2.5	2.5	2.0	1.5	2.50	0.722	0.64
166	621	Cypress	3.05	2.5	2.5	2.5	2.5	2.5	2.00	0.806	2.46
167	424/624	Melaleuca(>50%)/Cypress/Pine	2.25	2.5	2.5	2.5	3.0	1.5	3.00	0.833	1.88
168	424/625	Melaleuca(>75%)/Cypress/Pine	38.94	2.5	2.0	2.5	2.5	1.0	2.75	0.736	28.66
169	424/624	Melaleuca(>50%)/Cypress/Pine	3.07	2.5	2.5	2.5	2.5	1.5	3.00	0.806	2.47
170	424/624	Melaleuca(>50%)/Cypress/Pine	0.79	2.0	2.5	2.5	2.5	1.5	2.50	0.750	0.59
172	621	Cypress	2.12	2.5	2.5	2.5	3.0	2.5	2.50	0.861	1.83
174	424	Melaleuca	11.86	2.5	2.0	2.5	3.0	1.0	3.00	0.778	9.22
175	424/624	Melaleuca(>25%)/Cypress/Pine	6.67	2.0	2.5	2.5	2.5	2.0	2.50	0.778	5.19
177	621	Cypress	5.49	2.5	2.5	2.5	3.0	2.5	3.00	0.889	4.88
178	621	Cypress	0.89	2.5	2.5	2.5	2.5	2.5	3.00	0.861	0.77
179	625	Hydric Pine Flatwoods	12.78	2.5	2.5	2.5	3.0	2.0	3.00	0.861	11.01
		TOTALS	776.83								607.73

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

ATTACHMENT F

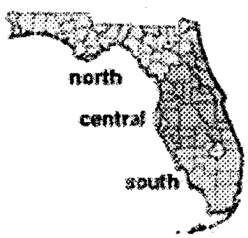
Florida Exotic Pest Plant Council's 2005 List of Invasive Species

(6 pages)

Florida Exotic Pest Plant Council's
2005
List of Invasive Species

Purpose of the List: *To focus attention on --*

- the adverse effects exotic pest plants have on Florida's biodiversity and plant communities,
- the habitat losses from exotic pest plant infestations,
- the impacts on endangered species via habitat loss and alteration,
- the need to prevent habitat losses through pest-plant management,
- the socio-economic impacts of these plants (e.g., increased wildfires in certain areas),
- changes in the seriousness of different pest plants over time,
- the need to provide information that helps managers set priorities for control programs.



DEFINITIONS: *Exotic*—a species introduced to Florida, purposefully or accidentally, from a natural range outside of Florida. *Native*—a species whose natural range included Florida at the time of European contact (1500 AD). *Naturalized exotic*—an exotic that sustains itself outside cultivation (it is still exotic; it has not "become" native). *Invasive exotic*—an exotic that not only has naturalized but is expanding on its own in Florida plant communities.

Abbreviations used:

for "Gov. list": **P** = Prohibited by Fla. Dept. of Environmental Protection, **N** = Noxious weed listed by Fla. Dept. of Agriculture & Consumer Services, **U** = Noxious weed listed by U.S. Department of Agriculture.
for "Reg. Dis.": **N** = north, **C** = central, **S** = south, referring to each species' current distribution in general regions of Florida (not its potential range in the state). See following map.

For additional information on distributions of particular species by county, visit the University of South Florida's Atlas of Florida Vascular Plants web site, www.plantatlas.usf.edu. **Many of those species entries also have habit and close-up pictures of the species.**
Additional images for some species may be found at the "Introduced Species" page on the Univ. of Florida Herbarium **website, at Fairchild Tropical Garden's** Virtual Herbarium, and the Godfrey Herbarium database, **Florida State University.**
For other additional information on plants included in this list, see related links and pages at this web site on the home page **menu.**

Category I - Invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. *This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.*

Scientific Name	Common Name	EPPC Cat.	Gov. list	Reg. Dist.
Abrus precatorius	rosary pea	I		C, S
Acacia auriculiformis	earleaf acacia	I		S
Albizia julibrissin	mimosa, silk tree	I		N, C
Albizia lebbeck	woman's tongue	I		C, S
Ardisia crenata (= *A. crenulata*)	coral ardisia	I		N, C
Ardisia elliptica (=*A. humilis)*	shoebutton ardisia	I		S
Asparagus aethiopicus (= *A. sprengeri; A. densiflorus* misapplied)	asparagus-fern	I		C, S
Bauhinia variegata	orchid tree	I		C, S
Bischofia javanica	bischofia	I		C, S
Calophyllum antillanum (=*C. calaba; C. inophyllum* misapplied)	santa maria (names "mast wood," "Alexandrian laurel" used in cultivation)	I		S
Casuarina equisetifolia	Australian pine	I	**P**	N,C,S
Casuarina glauca	suckering Australian pine	I	**P**	C, S
Cinnamomum camphora	camphor-tree	I		N,C,S
Colocasia esculenta	wild taro	I		N,C,S
Colubrina asiatica	lather leaf	I		S
Cupaniopsis anacardioides	carrotwood	I	**N**	C, S
Dioscorea alata	winged yam	I	**N**	N,C,S
Dioscorea bulbifera	air-potato	I	**N**	N,C,S
Eichhornia crassipes	water-hyacinth	I	**P**	N,C,S
Eugenia uniflora	Surinam cherry	I		C, S
Ficus microcarpa (*F. nitida* and *F. retusa* var. *nitida* misapplied)	laurel fig	I		C, S
Hydrilla verticillata	hydrilla	I	**P, U**	N,C,S
Hygrophila polysperma	green hygro	I	**P, U**	N,C,S
Hymenachne amplexicaulis	West Indian marsh grass	I		C, S
Imperata cylindrica (*I. brasiliensis* misapplied)	cogon grass	I	**N, U**	N, C, S
Ipomoea aquatica	waterspinach	I	**P, U**	C
Jasminum dichotomum	Gold Coast jasmine	I		C, S
Jasminum fluminense	Brazilian jasmine	I		C, S
Lantana camara	lantana, shrub verbena	I		N,C,S
Ligustrum lucidum	glossy privet	I		N, C

Ligustrum sinense	Chinese privet, hedge privet	I		N,C,S
Lonicera japonica	Japanese honeysuckle	I		N,C,S
Lygodium japonicum	Japanese climbing fern	I	**N**	N,C, S
Lygodium microphyllum	Old World climbing fern	I	**N**	C, S
Macfadyena unguis-cati	cat's claw vine	I		N,C, S
Manilkara zapota	sapodilla	I		S
Melaleuca quinquenervia	melaleuca, paper bark	I	**P, N, U**	C, S
Mimosa pigra	catclaw mimosa	I	**P, N, U**	C, S
Nandina domestica	nandina, heavenly bamboo	I		N, C
Nephrolepis cordifolia	sword fern	I		N,C,S
Nephrolepis multiflora	Asian sword fern	I		C, S
Neyraudia reynaudiana	Burma reed, cane grass	I	**N**	S
Paederia cruddasiana	sewer vine, onion vine	I	**N**	S
Paederia foetida	skunk vine	I	**N**	N,C
Panicum repens	torpedo grass	I		N,C,S
Pennisetum purpureum	Napier grass	I		C, S
Pistia stratiotes	waterlettuce	I	**P**	N,C,S
Psidium cattleianum (=P. littorale)	strawberry guava	I		C, S
Psidium guajava	guava	I		C, S
Pueraria montana var. *lobata (=P. lobata)*	kudzu	I	**N, U**	N,C, S
Rhodomyrtus tomentosa	downy rose-myrtle	I	**N**	C, S
Rhoeo spathacea **(see** *Tradescantia spathacea)*				
Rhynchelytrum repens	Natal grass	I		N, C, S
Ruellia tweediana (= *R. brittoniana)*	Mexican petunia	I		N, C, S
Sapium sebiferum (= *Triadeca sebifera)*	popcorn tree, Chinese tallow tree	I	**N**	N, C, S
Scaevola taccada (=Scaevola sericea, S. frutescens)	scaevola, half-flower, beach naupaka	I		C, S
Schefflera actinophylla (=Brassaia actinophylla)	schefflera, Queensland umbrella tree	I		C, S
Schinus terebinthifolius	Brazilian pepper	I	**P, N**	N, C, S
Senna pendula var. *glabrata (=Cassia coluteoides)*	climbing cassia, Christmas cassia, Christmas senna	I		C, S
Solanum tampicense (=S. houstonii)	wetland night shade, aquatic soda apple	I	**N, U**	C, S
Solanum viarum	tropical soda apple	I	**N, U**	N, C, S
Syngonium podophyllum	arrowhead vine	I		C, S
Syzygium cumini	jambolan, Java plum	I		C, S
Tectaria incisa	incised halberd fern	I		S

Thespesia populnea	seaside mahoe	I		C, S
Tradescantia fluminensis	white-flowered wandering jew	I		N, C
Tradescantia spathacea (= *Rhoeo spathacea, Rhoeo discolor*)	oyster plant	I		S
Urochloa mutica (= *Brachiaria mutica)*	Pará grass	I		C, S

Category II - Invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. *These species may become ranked Category I, if ecological damage is demonstrated.*

Scientific Name	Common Name	EPPC Cat.	Gov. list	Reg. Dist.
Adenanthera pavonina	red sandalwood	II		S
Agave sisalana	sisal hemp	II		C, S
Aleurites fordii (= *Vernicia fordii)*	tung oil tree	II		N, C
Alstonia macrophylla	devil-tree	II		S
Alternanthera philoxeroides	alligator weed	II	**P**	N, C, S
Antigonon leptopus	coral vine	II		N, C, S
Aristolochia littoralis	calico flower	II		N, C
Asystasia gangetica	Ganges primrose	II		C, S
Begonia cucullata	wax begonia	II		N, C
Blechum pyramidatum	green shrimp plant, Browne's blechum	II		N, C, S
Broussonetia papyrifera	paper mulberry	II		N, C
Callisia fragrans	inch plant, spironema	II		C, S
Casuarina cunninghamiana	Australian pine	II	**P**	C, S
Cecropia palmata	trumpet tree	II		S
Cestrum diurnum	day jessamine	II		C, S
Chamaedorea seifrizii	bamboo palm	II		S
Clematis terniflora	Japanese clematis	II		N, C
Cryptostegia madagascariensis	rubber vine	II		C, S
Cyperus involucratus (C. alternifolius misapplied)	umbrella plant	II		C, S
Cyperus prolifer	dwarf papyrus	II		C
Dalbergia sissoo	Indian rosewood, sissoo	II		C, S
Elaeagnus pungens	thorny eleagnus	II		N, C
Epipremnum pinnatum cv. Aureum	pothos	II		C, S

Ficus altissima	false banyan, council tree	II		S
Flacourtia indica	governor's plum	II		S
Hemarthria altissima	limpo grass	II		C, S
Hibiscus tiliaceus	mahoe, sea hibiscus	II		C, S
Ipomoea fistulosa (= *I. carnea* ssp. *fistulosa*)	shrub morning-glory	II	**P**	C, S
Jasminum sambac	Arabian jasmine	II		S
Kalanchoe pinnata	life plant	II		C, S
Koelreuteria elegans ssp. *formosana* (= *K. formosana; K. paniculata* misapplied)	flamegold tree	II		C, S
Leucaena leucocephala	lead tree	II		N, C, S
Limnophila sessiliflora	Asian marshweed	II	**P**	N, C, S
Livistona chinensis	Chinese fan palm	II		C, S
Melia azedarach	Chinaberry	II		N,C,S
Merremia tuberosa	wood-rose	II		S
Murraya paniculata	orange-jessamine	II		S
Myriophyllum spicatum	Eurasian water-milfoil	II	**P**	N, C, S
Nymphoides cristata	snowflake	II		C, S
Panicum maximum	Guinea grass	II		C, S
Passiflora biflora	two-flowered passion vine	II		S
Pennisetum setaceum	green fountain grass	II		S
Phoenix reclinata	Senegal date palm	II		C, S
Pittosporum pentandrum	Philippine pittosporum, Taiwanese cheesewood	II		S
Phyllostachys aurea	golden bamboo	II		N, C
Pteris vittata	Chinese brake fern	II		N, C, S
Ptychosperma elegans	solitary palm	II		S
Ricinus communis	castor bean	II		N, C, S
Sansevieria hyacinthoides	bowstring hemp	II		C, S
Scleria lacustris	Wright's nutrush	II		C, S
Sesbania punicea	purple sesban, rattlebox	II		N, C, S
Solanum diphyllum	Two-leaf nightshade	II		N, C, S
Solanum jamaicense	Jamiaca nightshade	II		C
Solanum torvum	susumber, turkey berry	II	**N, U**	N, C, S
Sphagneticola trilobata (= *Wedelia trilobata)*	wedelia	II		N, C, S
Stachytarpheta urticifolia (= *S. cayennensis)*	nettle-leaf porterweed	II		S
Syagrus romanzoffiana (= *Arecastrum romanzoffianum)*	queen palm	II		C, S
Syzygium jambos	rose-apple	II		C, S
Terminalia catappa	tropical almond	II		C, S

Terminalia muelleri	Australian almond	II		C, S
Tribulus cistoides	puncture vine, burr-nut	II		N, C, S
Urena lobata	Caesar's weed	II		N, C, S
Vitex trifolia	simple-leaf chaste tree	II		C, S
Washingtonia robusta	Washington fan palm	II		C, S
Wedelia **(see** *Sphagneticola* above)				
Wisteria sinensis	Chinese wisteria	II		N, C
Xanthosoma sagittifolium	malanga, elephant ear	II		N, C, S

Citation example:

FLEPPC. 2005. List of Florida's Invasive Species. Florida Exotic Pest Plant Council. Internet: http://www.fleppc.org/list/05list.htm

SAJ-2000-1926(IP-HWB)
Mirasol

ATTACHMENT G
U.S. FISH AND WILDLIFE SERVICE BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

May 3, 2007

Colonel Paul L. Grosskruger
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Federal Activity Code:	41420-2006-FA-1500
Service Consultation Code:	41420-2006-F-0674
Corps Application No.:	SAJ-2000-1926 (IP-HWB)(Revised)
Date Received:	July 21, 2004
Formal Consultation Initiation Date:	July 21, 2006
Biological Opinion Date:	March 1, 2007
Applicant:	J.D. Nicewonder, Jr.
Project:	Mirasol
County:	Collier

Dear Colonel Grosskruger:

This document transmits the Fish and Wildlife Service's (Service) amended biological opinion for the construction of the Mirasol development project and its effects on the endangered Florida panther (*Puma concolor coryi*) and endangered wood stork (*Mycteria americana*) in accordance with section 7 of the Endangered Species Act of 1973 as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The original biological opinion was issued on March 1, 2007. This amended biological opinion is being issued to clarify levels of incidental take associated with the endangered wood stork. This biological opinion also clarifies text associated with wet and dry fish biomass calculations, National Wetland Inventory and Florida Land Use Codes and Forms Classification Systems, and prey size selection of wood storks. The project site is located north of Immokalee Road and east of Interstate 75 (I-75) in Sections 10, 11, 15, and 22, Township 48 South, Range 26 East, Collier County, Florida (Figure 1).

This biological opinion is based on information provided by the U.S. Army Corps of Engineers (Corps) in their August 9, 2006, Public Notice, July 21, 2006, letter to the Service, information provided by Turrell & Associates, Incorporated (Turrell) dated February 5, 2007, and June 20, 2006; various meetings and phone conversations with Turrell; information provided by Agnolli Barber and Brundage (ABB); information provided by Johnson Engineering; information provided by WilsonMiller; and meetings, telephone conversations, electronic mail, and other sources of information. A complete administrative record of this consultation is on file at the Service's South Florida Ecological Services Office, Vero Beach, Florida.

In the Public Notice and letter to the Service, the Corps determined the Mirasol project "may affect" the endangered Florida panther and wood stork. The Corps also determined the project "may affect, but is not likely to adversely affect" the threatened eastern indigo snake (*Drymarchon corais couperi*) and the endangered red-cockaded woodpecker (RCW) (*Picoides borealis*). Based on the information provided by the applicant and the Corps, and the applicant's agreement to follow the draft *Standard Protection Measures for the Eastern Indigo Snake* (Service 2004), the Service concurs with the Corps' determinations for the eastern indigo snake and the RCW. The Service also concurs with the Corps' request to initiate formal consultation for project effects to the Florida panther and wood stork.

The Corps Public Notice represented an application for fill and excavation in 652 acres of wetlands and other surface waters and to alter 116.58 acres of uplands, impacting 769 acres. The project site is 1,714 acres and consists of 1,486 acres of jurisdictional wetlands and 228 acres of uplands. Subsequent information received from the applicant indicates that the project is actually for fill and excavation in 645 acres of wetlands and other surface waters and to alter 127.62 acres of uplands on the 1,714-acre site, for a total project impact of 773 acres. The purpose of the project is to construct a residential and golf course community in the northern Collier County vicinity.

The majority of the project site was historically used for cattle pasture. Land use and habitat cover types include 219.92 acres of pine (*Pinus* spp.) flatwoods uplands, 11.90 acres of Brazilian pepper (*Schinus terebinthifolius*) uplands, 4.92 acres of road right-of-way, 4.29 acres of wet prairie, 0.27 acre of cattle pond, 1.43 acres of flag (*Iris* sp.) pond, 3.59 acres of Brazilian pepper wetlands, 1.39 acres of mixed hardwood forest, 383.64 acres of melaleuca (*Melaleuca quinquernervia*), 819.01 acres of pine flatwood wetlands, 140.88 acres of cypress, and 122.21 acres of mixed cypress (*Taxodium distichum*) /pine flatwoods. The invasive exotic, melaleuca, has encroached into the entire project site, with large portions of the site supporting densities greater than 75 percent coverage. Over 85 percent of the project site has melaleuca densities of greater than 50 percent coverage.

The project is bounded on the north by a series of farms and agricultural fields and a recently permitted residential development known as Bonita Beach Road RPD and bounded on the west by two permitted proposed developments, Parklands and Terafina, and an existing development called Olde Cypress. The southern property boundary abuts the Cocohatchee or Immokalee Road Canal. The northeast property boundary is undeveloped while the southeast boundary is adjacent to numerous small farms and out-parcels. Immediately to the east of these out-parcels is a former rock and gravel mine known as Mule Pen Quarry that has been converted into a residential development known as Heritage Bay (Figure 2).

For the originally proposed project, the Corps determined, in the Public Notice dated May 25, 2001, the Mirasol project "may affect" the endangered Florida panther, the endangered wood stork, the endangered red-cockaded woodpecker, and the threatened eastern indigo snake. The Corps provided a listed species analysis completed by Turrell and a revised determination by letter dated March 11, 2002, that the project "may affect, but is not likely to adversely affect" the Florida panther, the wood stork, the red-cockaded woodpecker, and the eastern indigo snake. By email response to the Corps dated April 29, 2002, the Service did not concur with these determinations. After reviewing information received from the Corps and the applicant's agent, Turrell, the Service provided the Corps with a letter dated July 11, 2002, concurring with the

Corps' revised determination of "may affect, but is not likely to adversely affect" for the red-cockaded woodpecker and eastern indigo snake but not concurring with the Corps' revised determination of "may affect, but not likely to adversely affect" for the wood stork or the Florida panther. By letter dated January 22, 2003, the Service stated it had received all information necessary to initiate formal consultation on both the endangered Florida panther and the endangered wood stork and stated a biological opinion would be provided to the Corps. The Service reviewed the original proposal (4-1-01-F-607) and issued a biological opinion on February 21, 2003, which was later revised on March 9, 2005. The Corps denied the permit for the project on December 7, 2005.

The applicant has modified the project design and has reduced impacts by eliminating wetland alterations associated with the proposed construction of the external flow way. Secondary impacts have also been reduced by relocating golf holes so that they act as buffers between the development and adjacent wetlands. The Mirasol project revisions will result in less impact to habitat and more benefits in terms of compensation.

Total development footprint, including both wetlands and uplands, will be approximately 830 acres on the Mirasol development site, of which 773 acres are development and 57 are preserves. The 57 acres of preserves include 55 acres of wetlands and 2 acres of uplands. The project is within the boundaries of the Primary Zone (Kautz et al. 2006) (Figure 3). The project is within the Service's Panther Focus Area for the Florida panther (Figure 4) and provides habitat suitable for use for foraging and dispersal.

The applicant is proposing to preserve 941 acres, 831 acres are wetlands and 110 acres are uplands. About 55 acres of forested wetlands and 2 acres of forested uplands would be enhanced and preserved within the developed portions of the project. The remaining 884 acres, which are adjacent to the development acreage, will be preserved and form a contiguous preserve with adjacent preserved lands. The 884 acres include 776 acres of wetlands and 108 acres of uplands. These lands are situated to the south and west of the National Audubon Society Corkscrew Swamp Sanctuary (Corkscrew) and are connected through other preservation lands to the Corkscrew Regional Ecosystem Watershed (CREW) project (Figure 2). Restoration of wetlands and uplands in this preserve will consist of the removal of exotic vegetation, ranging from 5 to 100 percent coverage, averaging 65 to 70 percent and the restoration of more diverse and appropriate native communities and placed under a conservation easement granted to the South Florida Water Management District (District). The on-site preserve is currently a mixture of hydric and mesic pine and pine/cypress flatwoods, with extensive levels of infestation of the invasive exotic melaleuca. This preserve will be contiguous to preserves for other projects totaling more than 1,400 acres. Total project footprint is 1,714 acres with 941 acres of preservation and 773 acres of development.

The applicant is also proposing the purchase of 27.68 wetland credits from Panther Island Mitigation Bank (estimated at 82 acres) and 750 panther habitat units (estimated at 8 PHUs per acre or 94 acres) from a yet-to-be determined preservation-site in the Primary Zone of the Panther Focus Area (Figure 4). The location of the proposed off-site compensation-site will be determined and lands secured prior to any site clearing. The applicant's proposed preservation acreage is estimated at 1,117 acres, which consist of 941 acres on-site, 82 acres in Panther Island Mitigation Bank, and 94 acres in a location to be determined in the primary zone.

The proposed compensation plan provides habitat preservation and restoration in Collier County, and benefits the survival and recovery of the Florida panther as referenced in the draft Panther Recovery Plan (Service 2006) goal 1.1.1.2.3. This goal recommends habitat preservation and restoration within the Primary Zone be provided in situations where land use intensification can not be avoided. The applicant has proposed equivalent habitat protection and restoration, to compensate for both the quantity and functional value of the lost habitat.

The Use of Best Scientific and Commercial Information by the Service

The Service uses the most current and up-to-date scientific and commercial information available. The nature of the scientific process dictates that information is constantly changing and improving as new studies are completed. The scientific method is an iterative process that builds on previous information. As the Service becomes aware of new information, we will ensure it is fully considered in our decisions, evaluations, reviews, and analyses as it relates to the base of scientific knowledge and any publications cited in our documents.

Specifically, there is one such document cited in this biological opinion the Service acknowledges has been affected in its cited form by new scientific information. The Service has taken these new sources of information into account when using this document to help guide our analysis and decisions. This document is the South Florida Multi-Species Recovery Plan (MSRP) of 1999 (Service 1999). In addition, the Service has examined Kautz et al. (2006) for its scientific validity, specifically with regards to comments and recommendations by other reviewers.

South Florida Multi-Species Recovery Plan

The MSRP was designed to be a living document and it was designed to be flexible to accommodate the change identified through ongoing and planned research and would be compatible with adaptive management strategies. These principals are set forth in both the transmittal letter from the Secretary of the Interior and in the document itself. As predicted, this is what indeed occurred in the intervening years since the MSRP was published. The Service uses the MSRP in the context it still presents useful information when taken in conjunction with all the new scientific information developed subsequent to its publication.

Kautz et al. (2006)

The Florida Panther Subteam was charged with developing a landscape-level strategy for the conservation of the Florida panther population in south Florida. The Subteam produced the draft Landscape Conservation Strategy for the Florida Panther in South Florida in December 2002 and provided it to the Service. Upon receipt, the Service began to use the information in the draft Landscape Conservation Strategy in its decision making processes and documents since it was part of the best scientific information available to the Service at the time. Since then some portions of the science and findings in the draft Landscape Conservation Strategy have been challenged. Many, but not all, of the Subteam members have refined the methodology, further analyzed the data, and better defined the results of the Landscape Conservation Strategy into the publication, referred to here as Kautz et al. (2006). Therefore, Kautz et al. (2006) and the analyses contained therein, along with all other best scientific and commercial data available, is referred to in this document and will be used in our decision making process until or unless new information suggests revisions are necessary.

Consultation History

The previous project was circulated under a Public Notice on May 25, 2001. The proposal was to construct an upscale residential and golf course community with an external flow way, as required by the District, to convey excess flood waters from upstream, around the project, to the Cocohatchee Canal. The previous proposal was to impact 659 acres of wetlands which were heavily infested with exotics. During the permitting process the applicant offered on-site restoration, enhancement and preservation of 792 acres of wetlands and 105 acres of uplands as mitigation for the proposed impacts.

On July 11, 2002, the Service concurred with the Corps' determination that the proposed project "may affect, not likely to adversely affect" the red-cockaded woodpecker and eastern indigo snake.

The Service issued their biological opinion on project impacts to wood storks and panthers in February 2003.

After revisions to the panther assessment methodologies and the collection of more site-specific forage fish production data, the Corps reinitiated consultation with the Service and the Service issued their revised biological opinion for the project on March 9, 2005, in which the Service concluded the proposed project was not likely to jeopardize the survival and recovery of the Florida panther or the wood stork.

On December 8, 2005, the Corps denied a Department of the Army permit for the project.

The applicant modified the project purpose and further reduced wetland impacts by eliminating the external flow way, amending the development footprint, and relocating golf holes to be adjacent to the wetland preserve. Flood plain impacts will be mitigated by an internal pass-through system of lakes that maintains the upstream stage at predevelopment levels during a 25 year 3 day storm event. The modified project plan reduces wetland impacts and increases the size of the wetland preserves.

On August 9 and August 24, 2006, the Corps issued public notices for a residential community to be known as "Mirasol."

On February 5, 2007, the Service received a revised species and habitat analysis for the wood stork.

On March 1, 2007, the Service provided the Corps with a biological opinion evaluating project effects to the wood stork and Florida panther. Following issuance of the biological opinion, the Service noted that the levels of incidental take associated with the endangered wood stork need clarification. The Service also noted that text associated with wet and dry fish biomass calculations, National Wetland Inventory and Florida Land Use Codes and Forms Classification Systems, and prey size selection of wood storks also needed clarification. The Service is providing this clarification in this document.

The Corps has a made a determination the project "may affect, but is not likely to affect" the RCW, and the eastern indigo snake. After reviewing information received from the Corps and the applicant's agent, Turrell, the Service concurs with the Corps' determinations for the endangered RCW and the threatened eastern indigo snake. The Corps also determined the project "may affect" the Florida panther, and the wood stork and reinitiated formal consultation with the Service for these two species.

The Service has reviewed all information received pertinent to the Florida panther and the wood stork for the modified Mirasol project and concurs with the Corps' determination that this proposed project "may affect" the Florida panther and the wood stork. As of November 6, 2006, we received all information necessary for initiation of formal consultation on the Florida panther and the wood stork for this project as required in the regulations governing interagency consultations (50 CFR § 402.14). The Service is providing this biological opinion in conclusion of formal consultation.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Proposed Action

The applicant has modified its project design and has further reduced wetland impacts from the May 2005 project plan by eliminating the external flow-way, modifying the site development plan, and relocating golf holes to be adjacent to the wetland preserve as a buffer. Compensating storage for flood plain impacts will be addressed by an internal pass-through system of lakes that maintains the upstream stage at predevelopment levels during a 25 year 3 day storm event. The revised application proposes to construct an upscale residential and golf course community to be known as "Mirasol." The proposed development would consist of residential areas (234 acres), lakes (148 acres), road right of way (52 acres), clubhouse/maintenance/sales buildings (22 acres), 36-hole golf course and paths (222 acres), open space within the development (95 acres), and preserves (941 acres). The project site is 1,713.45 acres and consists of 1,476.71 acres of jurisdictional wetlands and 236.74 acres of uplands. Jurisdictional areas consist of melaleuca, disturbed hydric pine, pine-cypress, and cypress communities. The project includes the discharge of approximately 2,100,000 cubic yards of fill material into 519 acres of wetlands and the excavation of 1,800,000 cubic yards of material from 127 acres of wetlands. Over 85 percent of the project site has melaleuca densities of greater than 50 percent coverage.

The project is bounded on the north by a series of farms and agricultural fields and a recently permitted residential development known as Bonita Beach Road RPD, and on the west by two permitted proposed developments, Parklands and Terafina, and an existing development called Olde Cypress. The southern property boundary abuts the Cocohatchee or Immokalee Road Canal. The northeast property boundary is undeveloped while the southeast boundary is adjacent to numerous small farms and out-parcels. Immediately to the east of these out-parcels is a former rock and gravel mine known as Mule Pen Quarry that has been converted into a residential development known as Heritage Bay (Figure 2).

The project will result in the direct loss of 773 acres of habitat suitable for foraging and dispersal by the Florida panther (see discussion under Wildlife Assessment). The remaining 941 acres on the 1,713-acre will be enhanced and preserved. The habitat loss represents 3,756 PHUs with a recommended compensation of 7,512 PHUs (see discussion under Habitat Assessment Methodology). The project is within the Florida panther Primary Zone (Kautz et al. 2006)

(Figure 3) and within the Service's Panther Focus Area (Figure 4). The applicant proposes to provide on-site compensation for project effects to the panther through the restoration and preservation of 941 acres on the project site (57 acres within project development and 884 acres within adjacent onsite preserve). The applicant is also proposing to purchase and protect the equivalent of 750 PHUs (about 94 acres) within the panther Primary Zone, and the purchase of 27.68 credits (about 82 acres) at PIMB in Collier County (Figure 6). All compensation-sites are located in the panther Primary Zone and provide compensation for the loss of 773 acres of lower quality habitat for foraging and dispersal presently available to the Florida panther. The total compensation proposal through both on-site and off-site protection and restoration is about 1,117 acres of higher quality panther habitat in areas surrounded by higher quality panther habitat (941 acres on-site 82 acres in PIMB, and 94 acres in primary zone).

The proposed compensation plan provides habitat preservation and restoration within and near the project area, and benefits the survival and recovery of the Florida panther as referenced in the draft Panther Recovery Plan (Service 2006) goal 1.1.1.2.3. This goal recommends habitat preservation and restoration within the Primary Zone be provided in situations where land use intensification can not be avoided. The applicant has proposed equivalent habitat protection and restoration, to compensate for both the quantity and functional value of the lost habitat.

Action Area

The Service's Panther Focus Area for the Florida panther includes lands in Charlotte, Glades, Hendry, Lee, Collier, Palm Beach, Broward, Miami-Dade, and Monroe Counties, as well as the southern portion of Highlands County (Figure 4). Developed urban coastal areas in eastern Palm Beach, Broward, and Miami-Dade Counties, and in western Charlotte, Lee, and Collier Counties were excluded because they contain little or no panther habitat and it is unlikely that panthers would use such areas.

Movements of Florida panthers are much larger than the project site and, therefore, the Service's action area is larger than the proposed action area identified by the Corps' public notice. The action area, which is a subset of the current panther range, includes those lands where the Service believes panthers may experience direct and indirect effects from the proposed development. Maehr et al. (1990a) monitored five solitary panthers continuously for 130-hour periods seasonally from 1986 to 1989, rarely observing measurable shifts in location during the day, but nocturnal shifts in location exceeding 20.0 kilometers (km) (12.4 miles) were not unusual. Maehr et al. (2002a) in a later report documented a "mean maximum dispersal distance" of 68.1 km (42.3 miles) for subadult males and 20.3 km (12.6 miles) for subadult females. In the same report Maehr et al. (2002a) documented a "mean dispersal distance" of 37.3 km (23.1 miles) for subadult males. Comiskey et al. (2002) documented a "mean dispersal distance" for subadult male panthers as an average distance of 40.1 km (24.9 miles) from their natal range, which is similar to the dispersal distance referenced by Maehr et al. (2002a).

Therefore, for both direct and indirect effects, the Service defined the action area (Figure 7) as all lands within a 25-mile radius of the Mirasol project, which is slightly greater than the mean dispersal distance for subadult males. This action area does not include urban lands or lands west of I-75. This action area includes areas anticipated to sustain direct and indirect effects, such as roadways experiencing increased traffic, areas with increased human disturbance (project area and periphery of project), and areas in which habitat fragmentation and intraspecific aggression may be felt.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Florida Panther

Status - Panther Biology/Ecology

The Florida panther, is the last subspecies of *Puma* (also known as mountain lion, cougar, painter, or catamount) still surviving in the eastern U.S. Historically occurring throughout the southeastern U.S. (Young and Goldman 1946), today the panther is restricted to less than 5 percent of its historic range in one breeding population of less than 100 animals, located in south Florida.

When Europeans first came to this country, pumas roamed most all of North, Central, and South America. Early settlers attempted to eradicate pumas by every means possible. By 1899, it was felt that Florida panthers had been restricted to peninsular Florida (Bangs 1899). By the late 1920s to mid 1930s it was thought by many that the Florida panther had been completely eliminated (Tinsley 1970). In 1935, Dave Newell, a Florida sportsman, hired Vince and Ernest Lee, Arizona houndsmen, to hunt for panthers in Florida. They killed eight in the Big Cypress Swamp (Newell 1935). Every survey conducted since then has confirmed that a panther population occurs in southern Florida south of the Caloosahatchee River, and no survey since then has been able to confirm a panther population outside of southern Florida.

Attempts to eradicate panthers and a decline in panther prey (primarily white-tailed deer) resulted in a panther population threatened with extinction. Prior to 1949, panthers could be killed in Florida at any time of the year. In 1950, the Florida Game and Freshwater Fish Commission (now the Florida Fish and Wildlife Conservation Commission [FWC]) declared the panther a regulated game species due to concerns over declining numbers. The FWC removed panthers from the game animal list in 1958 and gave them complete legal protection. On March 11, 1967, the Service listed the panther as endangered (32 FR 4001) throughout its historic range, and these animals received Federal protection under the passage of the Act. Also, the Florida Panther Act (State Statute 372.671), a 1978 Florida State law, made killing a panther a felony. The Florida panther is listed as endangered by the States of Florida, Georgia, Louisiana, and Mississippi.

Since the panther was designated as an endangered species prior to enactment of the Act, there was no formal listing package identifying threats to the species as required by section 4(a)(1) of the Act. However, the technical/agency draft of the Florida Panther Recovery Plan, third revision, addressed the five factor threats analysis (Service 2006). No critical habitat has been designated for the panther.

Taxonomy

The Florida panther was first described by Charles B. Cory in 1896 as *Felis concolor floridana* (Cory 1896). The type specimen was collected in Sebastian, Florida. Bangs (1899), however, believed the Florida panther was restricted to peninsular Florida and could not intergrade with other *Felis* spp. Therefore, he assigned it full specific status and named it *Felis coryi* since *Felis floridana* had been used previously for a bobcat (*Lynx rufus*).

The taxonomic classification of the *Felis concolor* group was revised and described by Nelson and Goldman (1929) and Young and Goldman (1946). These authors differentiated 30 subspecies using geographic and morphometric (measurement of forms) criteria and reassigned the Florida panther to subspecific status as *Felis concolor coryi*. This designation also incorporated *F. arundivaga* which had been classified by Hollister (1911) from specimens collected in Louisiana into *F. c. coryi*. Nowell and Jackson (1996) reviewed the genus *Felis* and placed mountain lions, including the Florida panther, in the genus *Puma*.

Culver et al. (2000) examined genetic diversity within and among the described subspecies of *Puma concolor* using three groups of genetic markers and proposed a revision of the genus to include only six subspecies, one of which encompassed all puma in North America including the Florida panther. However, Culver et al. (2000) determined that the Florida panther was one of several smaller populations that had unique features, the number of polymorphic microsatellite loci and amount of variation were lower, and it was highly inbred (eight fixed loci). The degree to which the scientific community has accepted the results of Culver et al. (2000) and the proposed change in taxonomy is not resolved at this time. The Florida panther remains listed as a subspecies and continues to receive protection pursuant to the Act.

Species Description

An adult Florida panther is unspotted and typically rusty reddish-brown on the back, tawny on the sides, and pale gray underneath. There has never been a melanistic (black) puma documented in North America (Tinsley 1970, 1987). Adult males can reach a length of 7 feet (ft) (2.1 meters [m]) from their nose to the tip of their tail and may exceed 161 pounds (lbs) (73 kilograms [kg]) in weight; but, typically adult males average around 116 lbs (52.6 kg) and stand about 24-28 inches (in) (60-70 centimeters [cm]) at the shoulder (Roelke 1990). Female panthers are smaller with an average weight of 75 lbs (34 kg) and length of 6 ft (1.8 m) (Roelke 1990). The skull of the Florida panther is unique in that it has a broad, flat, frontal region, and broad, high-arched or upward-expanded nasal bones (Young and Goldman 1946).

Florida panther kittens are gray with dark brown or blackish spots and five bands around the tail. The spots gradually fade as the kittens grow older and are almost unnoticeable by the time they are 6 months old. At this age, their bright blue eyes slowly turn to the light-brown straw color of the adult (Belden 1988).

Three external characters—a right angle crook at the terminal end of the tail, a whorl of hair or cowlick in the middle of the back, and irregular, white flecking on the head, nape, and shoulders—not found in combination in other subspecies of *Puma* (Belden 1986), were commonly observed in Florida panthers through the mid-1990s. The kinked tail and cowlicks were considered manifestations of inbreeding (Seal 1994); whereas the white flecking was thought to be a result of scarring from tick bites (Maehr 1992, Wilkins et al. 1997). Four other abnormalities prevalent in the panther population prior to the mid-1990s included cryptorchidism (one or two undescended testicles), low sperm quality, atrial septal defects (the opening between two atria in the heart fails to close normally during fetal development), and immune deficiencies and were also suspected to be the result of low genetic variability (Roelke et al. 1993a).

A plan for genetic restoration and management of the Florida panther was developed in September 1994 (Seal 1994) and eight non-pregnant adult female Texas panthers (*Puma concolor stanleyana*) were released in five areas of south Florida from March to July 1995. Since this introgression, rates of genetic defects, including crooked tails and cowlicks, have dramatically decreased (Land et al. 2004). In addition, to date neither atrial septal defects nor cryptorchidism have been found in introgressed panthers (M. Cunningham, FWC, pers. comm. 2005). As of January 27, 2003, none of the eight female Texas panthers introduced in 1995 remain in the wild.

Population Trends and Distribution

The Florida panther once ranged throughout the southeastern U.S. from Arkansas and Louisiana eastward across Mississippi, Alabama, Georgia, Florida, and parts of South Carolina and Tennessee (Young and Goldman 1946). Historically, the panther intergraded to the north with *P. c. cougar*, to the west with *P. c. stanleyana*, and to the northwest with *P. c. hippolestes* (Young and Goldman 1946).

Although generally considered unreliable, sightings of panthers regularly occur throughout the Southeast. However, no populations of panthers have been found outside of south Florida for at least 30 years despite intensive searches (Belden et al. 1991, McBride et al. 1993, Clark et al. 2002). Survey reports and more than 70,000 locations of radio-collared panthers recorded between 1981 and 2004 clearly define the panther's current range. Reproduction is known only in the Big Cypress Swamp/Everglades physiographic region in Collier, Lee, Hendry, Miami-Dade, and Monroe Counties south of the Caloosahatchee River (Belden et al. 1991). Although the breeding segment of the panther population occurs only in south Florida, panthers have been documented north of the Caloosahatchee River over 125 times since February 1972. This has been confirmed through field sign (e.g., tracks, urine markers, scats), camera-trap photographs, seven highway mortalities, four radio-collared animals, two captured animals (one of which was radiocollared), and one skeleton. From 1972 through 2004, panthers have been confirmed in 11 counties (Flagler, Glades, Highlands, Hillsborough, Indian River, Okeechobee, Orange, Osceola, Polk, Sarasota, Volusia) north of the river (Belden et al. 1991, Belden and McBride 2005). However, no evidence of a female or reproduction has been documented north of the Caloosahatchee River since 1973 (Nowak and McBride 1974, Belden et al. 1991, Land and Taylor 1998, Land et al. 1999, Shindle et al. 2000, McBride 2002, Belden and McBride 2005).

Puma are wide ranging, secretive, and occur at low densities. However, their tracks, urine markers, and scats are readily found by trained observers, and resident populations are easily located. Van Dyke (1986a) determined that all resident puma, 78 percent of transient puma, and 57 percent of kittens could be detected by track searches in Utah. In south Florida, the Florida panther's limited range and low densities may make the population count derived from track searches more accurate than in Utah. During two month-long investigations – one late in 1972 and early 1973 and another in 1974 – funded by the World Wildlife Fund to determine if panthers still existed in Florida, McBride searched for signs of panthers in portions of south Florida. In 1972, McBride authenticated a road-killed male panther in Glades County and a female captured and released from a bobcat trap in Collier County (R. McBride, Livestock

Protection Company, pers. comm. 2005). In 1973, McBride captured one female in Glades County (Nowak and McBride 1974). Based on this preliminary evidence, Nowak and McBride (1974) estimated the "population from the Lake Okeechobee area southward to be about 20 or 30 individuals." In 1974, McBride found evidence of only two additional panthers in the Fakahatchee Strand and suggested that "there could be not more than ten individual panthers in the area around Lake Okeechobee and southward in the state" (Nowak and McBride 1975). This initial survey, while brief in nature, proved that panthers still existed in Florida and delineated areas where a more exhaustive search was warranted. After this initial investigation, more comprehensive surveys on both public and private lands were completed (Reeves 1978; Belden and McBride 1983a, b; Belden et al. 1991). Thirty individual panthers were identified during a wide-ranging survey in 1985 in south Florida (McBride 1985).

Maehr et al. (1991) provides the only published population estimate based on a substantial body of field data (Beier et al. 2003). Maehr et al. (1991) estimated a density of 1 panther/27,520 acres [11,137 hectares (ha)] based on 17 concurrently radiocollared and four uncollared panthers. They extrapolated this density to the area occupied (1,245,435 acres [504,012 ha]) by radio-collared panthers during the period 1985-1990 to achieve a population estimate of 46 adult panthers for southwest Florida (excluding Everglades National Park [ENP], eastern Big Cypress National Preserve [BCNP], and Glades and Highlands Counties). Beier et al. (2003), however, argued this estimate of density, although "reasonably rigorous," could not be extrapolated to other areas because it was not known whether densities were comparable in those areas.

More recently, McBride (2000, 2001, 2002, 2003) obtained minimum population counts (*i.e.*, number known alive) based on panthers treed with hounds, physical evidence (*e.g.*, tracks where radio-collared panthers were not known to occur), documentation by trail-camera photos, and sightings of uncollared panthers by a biologist or pilot from a monitoring plane or via ground telemetry. He counted adults and subadult panthers but not kittens at the den). The population estimate in 2000 was 62 panthers (McBride 2000), with estimates of 78 in 2001 (McBride 2001), 80 in 2002 (FWC 2002), 87 in 2003 (FWC 2003), 78 in 2004 (R. McBride, Personal Communication, 2006), 82 in 2005 (R. McBride, Personal Communication, 2006), and 96 in 2006 (R. McBride, Personal Communication, 2006).

Life History

Reproduction: Male Florida panthers are polygynous, maintaining large, overlapping home ranges containing several adult females and their dependent offspring. The first sexual encounters for males normally occur at about three years based on 26 radio-collared panthers of both sexes (Maehr et al. 1991). Based on genetics work, some males may become breeders as early as 17 months (W. Johnson, National Cancer Institute, pers. comm. 2005). Breeding activity peaks from December to March (Shindle et al. 2003). Litters (n = 82) are produced throughout the year, with 56-60 percent of births occurring between March and June (Jansen et al. 2005, Lotz et al. 2005). The greatest number of births occurs in May and June (Jansen et al. 2005, Lotz et al. 2005). Female panthers have bred as young as 18 months (Maehr et al. 1989) and successful reproduction has occurred up to 11 years old. Mean age of denning females is 4.6 ± 2.1 (standard deviation [sd]) years (Lotz et al. 2005). Age at first reproduction for 19 knownaged female panthers averaged 2.2 ± 0.246 (sd) years and ranged from 1.8-3.2 years. Average litter size is 2.4 ± 0.91 (sd) kittens. Seventy percent of litters are comprised of either two or three kittens. Mean birth intervals (elapsed time between successive litters) are 19.8 ± 9.0 (sd) months for female panthers (n = 56) (range 4.1-36.5 months) (Lotz et al. 2005). Females that lose their litters generally produce another more quickly; five of seven females whose kittens were brought into captivity successfully produced another litter an average of 10.4 months after the removal of the initial litter (Land 1994).

Den sites are usually located in dense, understory vegetation, typically saw palmetto (*Serenoa repens*) (Maehr 1990, Shindle et al. 2003). Den sites are used for up to two months by female panthers and their litters from birth to weaning. Independence and dispersal of young typically occurs at 18 months, but may occur as early as one year (Maehr 1992).

Survivorship and Causes of Mortality: Mortality records for uncollared panthers have been kept since February 13, 1972, and for radio-collared panthers since February 10, 1981. One-hundred eighty-nine mortalities have been documented through October 30, 2006, with 86 (46 percent) of known deaths occurring in the past 5 years (FWC 2006a, FWC unpublished data). Overall, documented mortality averaged 3.6 per year through June 2001, and 16.0 per year from July 2001 through June 2006. Of the 189 total mortalities, 100 were radio-collared panthers that have died since 1981 (FWC 2006a, FWC unpublished data). From 1990-2004, mean annual survivorship of radio-collared adult panthers was greater for females (0.894 ± 0.099 sd) than males (0.779 ± 0.125 sd) (Lotz et al. 2005). Except for intraspecific aggression, the causes of mortality were found to be independent of gender (Lotz et al. 2005).

Intraspecific aggression was the leading cause of death for radio-collared panthers, accounting for 42 percent (Jansen et al. 2005, Lotz et al. 2005). Most intraspecific aggression occurs between male panthers; but, aggressive encounters between males and females, resulting in the death of the female, have occurred. Defense of kittens and\or a kill is suspected in half (5 of 10) of the known instances through 2003 (Shindle et al. 2003).

Unknown causes and collisions with vehicles accounted for 24 and 19 percent of radio-collared panther mortalities, respectively. From February 13, 1972, through June 30, 2006, Florida panther vehicular trauma (n=96), averaged 2.8 per year for radio-collared and uncollared panthers (FWC 2006a). Ten of the collisions were not fatal. Three additional panthers were killed by vehicles from July 1, 2006, through November 30, 2006 (FWC, unpublished data), bringing the total to 99 panthers killed or injured by vehicles.

Female panthers are considered adult residents if they are older than 18 months, have established home ranges and bred (Maehr et al. 1991). Land et al. (2004) reported that 23 of 24 female panthers first captured as kittens survived to become residents and 18 (78.3 percent) produced litters; one female was too young to determine residency. Male panthers are considered adult residents if they are older than three years and have established a home range that overlaps with females. Thirty-one male panthers were captured as kittens and 12 (38.7 percent) of these cats survived to become residents (Jansen et al. 2005, Lotz et al. 2005). "Successful male recruitment appears to depend on the death or home-range shift of a resident adult male" (Maehr et al. 1991).

Turnover in the breeding population is low with documented mortality in radio-collared panthers being greatest in subadults and non-resident males (Maehr et al. 1991, Shindle et al. 2003).

Den sites of female panthers have been visited since 1992 and the number of kittens that survived to 6 months for 38 of these litters has been documented. Florida and introgressed panther kitten survival to six months were estimated to be 52 and 72 percent, respectively, but were not significantly different (P = 0.2776) (Lotz et al. 2005). Survival of kittens greater than six months old was determined by following the fates of 55 radio-collared dependent-aged kittens, including 17 introgressed panthers from 1985 - 2004. Only 1 of these 55 kittens died before reaching independence, resulting in a 98.2 percent survival rate (Lotz et al. 2005). The FWC and NPS are continuing to compile and analyze existing reproductive and kitten data.

Dispersal: Panther dispersal begins after a juvenile becomes independent from its mother and continues until it establishes a home range. Dispersal distances are greater for males (n = 18) than females (n = 9) (42.5 mi [68.4 km] vs. 12.6 mi [20.3 km], respectively) and the maximum dispersal distance recorded for a young male was 139.2 mi (224.1 km) over a seven-month period followed by a secondary dispersal of 145 mi (233 km) (Maehr et al. 2002a). Males disperse an average distance of 25 mi (40 km); females typically remain in or disperse short distances from their natal ranges (Comiskey et al. 2002). Female dispersers are considered philopatric because they usually establish home ranges less than one average home range width from their natal range (Maehr et al. 2002a). Maehr et al. (2002a) reported that all female dispersers (n = 9) were successful at establishing a home range whereas only 63 percent of males (n = 18) were successful. Young panthers become independent at 14 months on average for both sexes, but male dispersals are longer in duration than for females (9.6 months and 7.0 months, respectively) (Maehr et al. 2002a). Dispersing males usually go through a period as transient (non-resident) subadults, moving through the fringes of the resident population and often occupying suboptimal habitat until an established range becomes vacant (Maehr 1997).

Most panther dispersal occurs south of the Caloosahatchee River with only four radio-collared panthers crossing the river and continuing north since 1981 (Land and Taylor 1998, Land et al. 1999, Shindle et al. 2000, Maehr et al. 2002a, Belden and McBride 2005). Western subspecies of *Puma* have been documented crossing wide, swift-flowing rivers up to a mile in width (Seidensticker et al. 1973, Anderson 1983). The Caloosahatchee River, a narrow (295-328 ft [90-100 m]), channelized river, probably is not a significant barrier to panther movements, but the combination of the river, State Route (SR) 80, and land uses along the river seems to have restricted panther dispersal northward (Maehr et al. 2002a). Documented physical evidence of at least 15 other uncollared male panthers have been confirmed north of the river since 1972, but no female panthers nor reproduction have been documented in this area since 1973 (Belden and McBride 2005).

Home Range Dynamics and Movements: Panthers require large areas to meet their needs. Numerous factors influence panther home range size including habitat quality, prey density, and landscape configuration (Belden 1988, Comiskey et al. 2002). Home range sizes of 26 radio-collared panthers monitored between 1985 and 1990 averaged 128,000 acres (51,800 ha) for resident adult males and 48,000 acres (19,425 ha) for resident adult females; transient males had a home range of 153,599 acres (62,160 ha) (Maehr et al. 1991). Comiskey et al. (2002) examined the home range size for 50 adult panthers (residents greater than 1.5 years old) monitored in south Florida from 1981-2000 and found resident males had a mean home range of 160,639 acres (65,009 ha) and females had a mean home range of 97,920 acres (39,627 ha). Beier et al. (2003) found home range size estimates for panthers reported by Maehr et al. (1991) and Comiskey et al. (2002) to be reliable. Annual minimum convex polygon home range sizes of 52 adult radio-collared panthers monitored between 1998 and 2002 ranged from 15,360 – 293,759 acres (6,216 – 118,880 ha), averaging 89,600 acres (36,260 ha) for 20 resident adult males and 44,160 acres (17,871 ha) for 32 resident adult females (Land et al. 1999, Shindle et al. 2000, Shindle et al. 2001, Land et al. 2002). The most current estimate of home-range sizes (minimum convex polygon method) for established, non-dispersing, adult, radio-collared panthers averaged 29,056 acres (11,759 ha) for females ($n = 11$) and 62,528 acres (25,304 ha) for males ($n = 11$) (Lotz et al. 2005). The average home range was 35,089 acres (14,200 ha) for resident females ($n = 6$) and 137,143 acres (55,500 ha) ($n = 5$) for males located at BCNP (Jansen et al. 2005). Home ranges of resident adults tend to be stable unless influenced by the death of other residents; however, several males have shown significant home range shifts that may be related to aging (D. Jansen, National Park Service [NPS], pers. comm. 2005). Home-range overlap is extensive among resident females and limited among resident males (Maehr et al. 1991).

Activity levels for Florida panthers are greatest at night with peaks around sunrise and after sunset (Maehr et al. 1990a). The lowest activity levels occur during the middle of the day. Female panthers at natal dens follow a similar pattern with less difference between high and low activity periods.

Telemetry data indicate panthers typically do not return to the same resting site day after day, with the exception of females with dens or panthers remaining near kill sites for several days. The presence of physical evidence such as tracks, scats, and urine markers confirm that panthers move extensively within home ranges, visiting all parts of the range regularly in the course of hunting, breeding, and other activities (Maehr 1997, Comiskey et al. 2002). Males travel widely throughout their home ranges to maintain exclusive breeding rights to females. Females without kittens also move extensively within their ranges (Maehr 1997). Panthers are capable of moving large distances in short periods of time. Nightly panther movements of 12 mi (20 km) are not uncommon (Maehr et al. 1990a).

Intraspecific Interactions: Interactions between panthers occur indirectly through urine markers or directly through contact. Urine markers are made by piling ground litter using a backwards-pushing motion with the hind feet. This pile is then scent-marked with urine and occasionally feces. Both sexes make urine markers. Apparently males use them as a way to mark their territory and announce presence while females advertise their reproductive condition.

Adult females and their kittens interact more frequently than any other group of panthers. Interactions between adult male and female panthers last from one to seven days and usually result in pregnancy (Maehr et al. 1991). Aggressive interactions between males often result in serious injury or death. Independent subadult males have been known to associate with each other for several days and these interactions do not appear to be aggressive in nature.

Aggression between males is the most common cause of male mortality and an important determinant of male spatial and recruitment patterns based on radio-collared panthers (Maehr et al. 1991, Shindle et al. 2003). Aggressive encounters between radio-collared males and females also have been documented (Shindle et al. 2003, Jansen et al. 2005).

Food Habits: Primary panther preys are white-tailed deer (*Odocoileus virginianus*) and feral hog (*Sus scrofa*) (Maehr et al. 1990b, Dalrymple and Bass 1996). Generally, feral hogs constitute the greatest biomass consumed by panthers north of the Alligator Alley section of I-75, while white-tailed deer are the greatest biomass consumed to the south (Maehr et al. 1990b). Secondary prey includes raccoons (*Procyon lotor*), nine-banded armadillos (*Dasypus novemcinctus*), marsh rabbits (*Sylvilagus palustris*) (Maehr et al. 1990b) and alligators (*Alligator mississippiensis*) (Dalrymple and Bass 1996). No seasonal variation in diet has been detected. A resident adult male puma generally consumes one deer-sized prey every 8-11 days; this frequency would be 14-17 days for a resident female; and 3.3 days for a female with three 13-month-old kittens (Ackerman et al. 1986). Maehr et al. (1990b) documented domestic livestock infrequently in scats or kills, although cattle were readily available on their study area.

Infectious Diseases, Parasites, and Environmental Contaminants: *Viral Diseases*--Feline leukemia virus (FeLV) is common in domestic cats (*Felis catus*), but is quite rare in non-domestic felids. Routine testing for FeLV antigen (indicating active infection) in captured and necropsied panthers has been negative since testing began in 1978 to the fall of 2002. Between November 2002 and February 2003, however, two panthers tested FeLV antigen positive (Cunningham 2005). The following year, three more cases were diagnosed. All infected panthers had overlapping home ranges in the Okaloacoochee Slough ecosystem. Three panthers died due to suspected FeLV-related diseases (opportunistic bacterial infections and anemia) and the two others died from intraspecific aggression. Testing of serum samples collected from 1990-2005 for antibodies (indicating exposure) to FeLV indicated increasing exposure to FeLV beginning in the late 1990s and concentrated north of I-75. There was apparently minimal exposure to FeLV during this period south of I-75. Positive antibody titers in different areas at different times may indicate that multiple introductions of the virus into the panther population may have occurred. These smaller epizootics were apparently self-limiting and did not result in any known mortalities. Positive antibody titers, in the absence of an active infection (antigen positive), indicate panthers can be exposed and overcome the infection (Cunningham 2005). Management of the disease includes vaccination as well as removal of infected panthers to captivity for quarantine and supportive care. As of June 1, 2005, about one-third of the population had received at least one vaccination against FeLV (FWC and NPS, unpublished data). No new positive cases have been diagnosed since July 2004.

Pseudorabies virus (PRV) (Aujeszky's disease) causes respiratory and reproductive disorders in adult hogs and mortality in neonates, but is a rapidly fatal neurologic disease in carnivores. At least one panther died from PRV infection presumably through consumption of an infected feral hog (Glass et al. 1994). At least one panther has also died of rabies (Taylor et al. 2002). This panther was radiocollared but not vaccinated against the disease.

Feline immunodeficiency virus (FIV) is a retrovirus of felids that is endemic in the panther population. About 28 percent of Florida panthers were positive for antibodies to the puma lentivirus strain of FIV (Olmstead et al. 1992); however, the prevalence may be increasing. Between November 2004 and April 2005, 13 of 17 (76 percent) were positive (M. Cunningham, FWC, unpublished data). The cause of this increase is unknown but warrants continued monitoring and investigation. There is also evidence of exposure to Feline panleukopenia virus (PLV) in adult panthers (Roelke et al. 1993b) although no PLV-related mortalities are known to have occurred.

Serological evidence of other viral diseases in the panther population includes feline calicivirus, feline herpes virus, and West Nile virus (WNV). However these diseases are not believed to cause significant morbidity or mortality in the population. All panthers found dead due to unknown causes are tested for alphaviruses, flaviviruses (including WNV), and canine distemper virus. These viruses have not been detected in panthers by viral culture or polymerase chain reaction (FWC, unpublished data).

Other Infectious Diseases--Bacteria have played a role in free-ranging panther morbidity and mortality as opportunistic pathogens, taking advantage of pre-existing trauma or FeLV infections (FWC, unpublished data). Dermatophytosis (ringworm infection) has been diagnosed in several panthers and resulted in severe generalized infection in at least one (Rotstein et al. 1999). Severe infections may reflect an underlying immunocompromise, possibly resulting from inbreeding depression or immunosuppressive viral infections.

Parasites--The hookworm, *Ancylostoma pluridentatum,* is found in a high prevalence in the panther population. Other parasites identified from live-captured or necropsied panthers include eight arthropod species, eight nematode species, three cestode species, two trematode species, and three protozoa species (Forrester et al. 1985, Forrester 1992, Wehinger et al. 1995, Rotstein et al. 1999, Land et al. 2002). Of these only an arthropod, *Notoedres felis,* caused significant morbidity in at least one panther (Maehr et al. 1995).

Environmental Contaminants--Overall, mercury in south Florida biota has decreased over the last several years (Frederick et al. 2002). However, high mercury concentrations are still found in some panthers. At least one panther is thought to have died of mercury toxicosis and mercury has been implicated in the death of two other panthers in ENP (Roelke 1991). One individual panther had concentrations of 150 parts per million (ppm) mercury in its hair (Land et al. 2004). Elevated levels of p, p'– DDE were also detected in fat from that panther. The role of mercury and/or p, p'– DDE in this panther's death is unknown and no cause of death was determined despite extensive diagnostic testing. Elevated mercury concentrations have also been found in panthers from Florida Panther National Wildlife Refuge (FPNWR). Two sibling neonatal kittens from this area had hair mercury concentrations of 35 and 40 ppm. Although other factors were believed to have been responsible, these kittens did not survive to leave their natal den. Consistently high hair mercury values in ENP and FPNWR and the finding of elevated values in some portions of BCNP warrant continued monitoring (Land et al. 2004). Other environmental contaminants found in panthers include polychlorinated biphenyls (Arochlor 1260) and organochlorines (p, p'–DDE) (Dunbar 1995, Land et al. 2004).

Habitat Characteristics/Ecosystem

__Landscape Composition:__ Noss and Cooperrider (1994) considered the landscape implications of maintaining viable panther populations. Assuming a male home range size of 137,599 acres (55,685 ha) (Maehr 1990), an adult sex ratio of 50:50 (Anderson 1983), and some margin of safety, they determined that a reserve network as large as 15,625–23,438 mi^2 (40,469-60,703 km^2) would be needed to support an effective population size of 50 individuals (equating to an actual adult population of 100-200 panthers [Ballou et al. 1989]). However, to provide for long-term persistence based on an effective population size of 500 individuals (equating to 1,000 - 2,000 adult panthers [Ballou et al. 1989]), could require as much as 156,251-234,376 mi^2 (404,687-607,031 km^2). This latter acreage corresponds to roughly 60-70 percent of the Florida panther's historical range. Although it is uncertain whether this much land is needed for panther recovery, it does provide some qualitative insight into the importance of habitat conservation across large landscapes for achieving a viable panther population (Noss and Cooperrider 1994).

Between 1981 and 2003, more than 55,000 locations on more than 100 radio-collared panthers were collected. Belden et al. (1988), Maehr et al. (1991), Maehr (1997), Kerkoff et al. (2000), and Comiskey et al. (2002) provide information on habitat use based on various subsets of these data. Since almost all data from radio-collars have been collected during daytime hours (generally 0700-1100), and because panthers are most active at night (Maehr et al. 1990a), daytime radio locations are insufficient to describe the full range of panther habitat use (Beyer and Haufler 1994, Comiskey et al. 2002, Beier et al. 2003, Dickson et al. 2005, Beier et al. 2006).

A landscape-level strategy for the conservation of the panther population in south Florida was developed using a Florida panther potential habitat model based on the following criteria: (1) forest patches greater than 4.95 acres (2 ha); (2) non-urban cover types within 656 ft (200m) of forest patches; and (3) exclusion of lands within 984 ft (300m) of urban areas (Kautz et al. 2006). In developing the model, data from radio-collared panthers collected from 1981 through 2000 were used to evaluate the relative importance of various land cover types as panther habitat, thus identifying landscape components important for panther habitat conservation. Those components were then combined with a least cost path analysis to delineate three panther habitat conservation zones for south Florida: (1) Primary Zone – lands essential to the long-term viability and persistence of the panther in the wild; (2) Secondary Zone - lands which few panthers use contiguous with the Primary Zone, but given sufficient habitat restoration could accommodate expansion of the panther population south of the Caloosahatchee River; and (3) Dispersal Zone - the area which may facilitate future panther expansion north of the Caloosahatchee River (Kautz et al. 2006) (Figure 3). The Primary Zone is currently occupied and supports the breeding population of panthers. Although panthers move through the Secondary and Dispersal Zones, they are not permanently occupied. The Secondary Zone could support panthers with sufficient restoration.

These zones vary in size, ownership, and land cover composition. The Primary Zone is 2,270,711 acres (918,928 ha) in size, 73 percent of which is publicly owned (R. Kautz, Dennis, Breedlove, and Associates, pers. comm. 2005), and includes portions of the BCNP, ENP, Fakahatchee Strand Preserve State Park (FSPSP), FPNWR, Okaloacoochee Slough State Forest, and Picayune Strand State Forest. This zone's composition is 45 percent forest, 41 percent freshwater marsh, 7.6 percent agriculture lands, 2.6 percent prairie and shrub lands, and 0.52 percent urban lands (Kautz et al. 2006). The Secondary Zone is 812,157 acres (328,670 ha) in size, 38 percent of which is public land (R. Kautz, pers. comm. 2005). This zone's composition is 43 percent freshwater marsh, 36 percent agriculture, 11 percent forest, 6.1 percent prairie and shrub lands, and 2.3 percent low-density residential areas and open urban lands (Kautz et al. 2006). The Dispersal Zone is 28,160 acres (11,396 ha) in size, 12 percent of which is either publicly owned or in conservation easement. This zone's composition is 49 percent agriculture (primarily improved pasture and citrus groves), 29 percent forest (wetland and upland), 8.8 percent prairie and shrub land, 7.5 percent freshwater marsh, and 5.1 percent barren and urban lands (Kautz et al. 2006).

As part of their evaluation of occupied panther habitat, in addition to the average density estimate of one panther per 27,181 acres (11,000 ha) developed by Maehr et al. (1991), Kautz et al. (2006) estimated the present average density during the timeframe of the study, based on telemetry and other occurrence data, to average 1 panther per 31,923 acres (12,919 ha). In the following discussions of the number of panthers that a particular zone may support, the lower number is based on the 31,923 acres (12,919 ha) value (Kautz et al. 2006) and the higher number is based on the 27,181 acres (11,000 ha) value (Maehr et al. 1991).

Based on these average densities, the Primary Zone could support 71 to 84 panthers; the Secondary Zone 8 to 10 panthers without habitat restoration and 25 to 30 panthers with habitat restoration (existing high quality panther habitat currently present in the Secondary Zone is estimated at 32 percent of the available Secondary Zone lands); and the Dispersal Zone, 0 panthers. Taken together, the three zones in their current condition apparently have the capacity to support about 79 to 94 Florida panthers.

Kautz et al.'s (2006) assessment of available habitat south of the Caloosahatchee River determined non-urban lands in the Primary, Secondary, and Dispersal Zones were not sufficient to sustain a population of 240 individuals south of the Caloosahatchee River. However, Kautz et al. (2006) determined sufficient lands were available south of the Caloosahatchee River to support a population of 79 to 94 individuals (although not all lands are managed and protected).

Even though some suitable panther habitat remains in south-central Florida, it is widely scattered and fragmented (Belden and McBride 2005). Thatcher et al. (2006) used a statistical model in combination with a geographic information system to develop a multivariate landscape-scale habitat model based on the Mahalanobis distance statistic (D^2) to evaluate habitats in south central Florida for potential expansion of the Florida panther population. They identified 4 potential habitat patches: the Avon Park Bombing Range area, Fisheating Creek/Babcock-Webb Wildlife Management Area, eastern Fisheating Creek, and the Duette Park/Manatee County area. These habitat patches are smaller and more isolated compared with the current Florida panther range, and the landscape matrix where these habitat patches exist provides relatively poor habitat connectivity among the patches (Thatcher et al. 2006). Major highways and urban or agricultural development isolate these habitat patches, and they are rapidly being lost to the same development that threatens southern Florida (Belden and McBride 2005).

Diurnal Habitat Use: Diurnal panther locations appear to be within or closer to forested cover types, particularly cypress swamp, pinelands, hardwood swamp, and upland hardwood forests

(Belden 1986, Belden et al. 1988, Maehr 1990, Maehr et al. 1991, Maehr 1992, Smith and Bass 1994, Kerkhoff et al. 2000, Comiskey et al. 2002). Dense understory vegetation comprised of saw palmetto provides some of the most important resting and denning cover for panthers (Maehr 1990). Shindle et al. (2003) show that 73 percent of panther dens were in palmetto thickets.

Radio-collar data and ground tracking indicate panthers use the mosaic of habitats available to them as resting and denning sites, hunting grounds, and travel routes. These habitats include cypress swamps, hardwood hammocks, pine flatwoods, seasonally flooded prairies, freshwater marshes, and some agricultural lands. Although radio-collar monitoring indicates forest is a preferred cover type, panthers also utilize non-forest cover types (Belden et al. 1988, Maehr et al. 1991, Comiskey et al. 2002). Compositional analyses by Kautz et al. (2006) confirmed previous findings that forest patches comprise an important component of panther habitat in south Florida, but other natural and disturbed cover types are also present in the large landscapes that support panthers (Belden et al. 1988, Maehr et al. 1991, Comiskey et al. 2002). Kautz et al. (2006) found the smallest class of forest patches (*i.e.*, 9-26 acres [3.6-10.4 ha]) were the highest ranked forest patch sizes within panther home ranges; this indicates that forest patches of all sizes appear to be important components of the landscapes inhabited by panthers, not just the larger forest patches.

Nocturnal Habitat Use: Maehr et al. (1990a) provide the only descriptions of panther nocturnal activities and represent the available radiocollar data collected during night time hours. However, this paper does not provide analyses of nocturnal habitat use. Dickson et al. (2005) examined the movements of 10 female and 7 male puma at 15-minute intervals during 44 nocturnal periods of hunting or traveling in southern California. They found that traveling puma monitored over nocturnal periods used a broader range of habitats than what they appeared to use based on diurnal locations alone. The use of Global Positioning System (GPS) radiocollars is now being investigated to determine if this technology will be suitable to answer questions regarding Florida panther nocturnal habitat use.

Prey Habitat Use: Panther habitat selection is related to prey availability (Janis and Clark 1999, Dees et al. 2001) and, consequently, prey habitat use. Adequate cover and the size, distribution, and abundance of available prey species are critical factors to the persistence of panthers in south Florida and often determine the extent of panther use of an area. Duever et al. (1986) calculated a deer population of 1,760 in BCNP, based on Harlow (1959) deer density estimates of 1/210 acres (85 ha) in pine forest, 1/299 acres (121 ha) in swamps, 1/1,280 acres (518 ha) in prairie, 1/250 acres (101 ha) in marshes, and 1/111 acres (45 ha) in hammocks. Schortemeyer et al (1991) estimated deer densities at 1/49-247 acres (20-100 ha) in three management units of BCNP based on track counts and aerial surveys. Labisky et al. (1995) reported 1/49 acres (20 ha) in southeastern BCNP. Using track counts alone, McCown (1994) estimated 1/183-225 acres (74-91 ha) on the FPNWR and 1/133-200 acres (54-81 ha) in the FSPSP.

Hardwood hammocks and other forest cover types are important habitat for white-tailed deer and other panther prey (Harlow and Jones 1965, Belden et al. 1988, Maehr 1990, Maehr et al. 1991, Maehr 1992, Comiskey et al. 1994, Dees et al. 2001). Periodic understory brushfires (Dees et al. 2001) as well as increased amounts of edge (Miller 1993) may enhance deer use of hardwood hammocks, pine, and other forest cover types. However, wetland and other vegetation types can support high deer densities. In the Everglades, for example, deer appear to be adapted to a mosaic of intergrading patches comprised of wet prairie, hardwood tree islands, and peripheral wetland habitat (Fleming et al. 1994, Labisky et al. 2003). High-nutrient deer forage, especially preferred by females, includes hydrophytic marsh plants, white waterlily (*Nymphaea odorata*), and swamp lily (*Crinum americana*) (Loveless 1959, Labisky et al. 2003). Wetland willow (*Salix spp.*) thickets provide nutritious browse for deer (Loveless 1959, Labisky et al. 2003).

Marshes, rangeland, and low-intensity agricultural areas support prey populations of deer and hogs. The importance of these habitat types to panthers cannot be dismissed based solely on use or lack of use when daytime telemetry are the only data available (Comiskey et al. 2002, Beier et al. 2003, Comiskey et al. 2004, Beier et al. 2006).

Travel and Dispersal Corridors: In the absence of direct field observations/measurements, Harrison (1992) suggested that landscape corridors for wide-ranging predators should be half the width of an average home range size. Following Harrison's (1992) suggestion, corridor widths for Florida panthers would range 6.1-10.9 mi (9.8-17.6 km) depending on whether the target animal was an adult female or a transient male. Beier (1995) suggested corridor widths for transient male puma in California could be as small as 30 percent of the average home range size of an adult. For Florida panthers, this would translate to a corridor width of 5.5 mi (8.8 km). Without supporting empirical evidence, Noss (1992) suggests regional corridors connecting larger hubs of habitat should be at least 1.0 mi (1.6 km) wide. Beier (1995) makes specific recommendations for very narrow corridor widths based on short corridor lengths in a California setting of wild lands completely surrounded by urban areas; he recommended corridors with a length less than 0.5 mi (0.8 km) should be more than 328 ft (100 m) wide, and corridors extending 0.6-4 mi (1-7 km) should be more than 1,312 ft (400 m) wide. The Dispersal Zone encompasses 44 mi^2 (113 km^2) with a mean width of 3.4 mi (5.4 km). Although it is not adequate to support even one panther, the Dispersal Zone is strategically located and expected to function as a critical landscape linkage to south-central Florida (Kautz et al. 2006). Transient male panthers currently utilize this Zone as they disperse northward into south-central Florida.

Panther Recovery Objectives

The recovery objectives identified in the draft third revision of the Florida Panther Recovery Plan (Service 2006) are to (1) maintain, restore, and expand the Florida panther population and its habitat in south Florida and, if feasible, expand the known occurrence of Florida panthers north of the Caloosahatchee River to maximize the probability of the long-term persistence of this metapopulation; (2) identify, secure, maintain, and restore habitat in potential reintroduction areas within the panther's historic range, and to establish viable populations of the panther outside south and south-central Florida; and (3) facilitate panther conservation and recovery through public awareness and education.

Panther Management and Conservation

Habitat Conservation and Protection

Panthers, because of their wide-ranging movements and extensive spatial requirements, are particularly sensitive to habitat fragmentation (Harris 1984). Mac et al. (1998) defines habitat fragmentation as: "The breaking up of a habitat into unconnected patches interspersed with other habitat which may not be inhabitable by species occupying the habitat that was broken up. The breaking up is usually by human action, as, for example, the clearing of forest or grassland for agriculture, residential development, or overland electrical lines." The reference to "unconnected patches" is a central underpinning of the definition. For panther conservation, this definition underscores the need to maintain contiguous habitat and protected habitat corridors in key locations in south Florida and throughout the panther's historic range. Habitat fragmentation can result from road construction, urban development, and agricultural land conversions.

Habitat protection has been identified as being one of the most important elements to achieving panther recovery. While efforts have been made to secure habitat (Figure 8 and Table 1), continued action is needed to obtain additions to and inholdings for public lands, assure linkages are maintained, restore degraded and fragmented habitat, and obtain the support of private landowners for maintaining property in a manner that is compatible with panther use. Conservation lands used by panthers are held and managed by a variety of entities including FWS, NPS, Seminole Tribes of Florida, Miccosukee Tribe of Indians of Florida, FWC, Florida Department of Environmental Protection (FDEP), Florida Division of Forestry (FDOF), Water Management Districts (WMD), non-governmental organizations (NGO), counties, and private landowners.

Public Lands: Public lands in south Florida that benefit the panther are listed below and shown in Figure 8:

1. In 1947, ENP was established with 1,507,834 acres (610,201 ha) and in 1989 was expanded with the addition of 104,320 acres (42,217 ha).

2. In 1974, Congress approved the purchase and formation of BCNP, protecting 570,238 acres (230,768 ha), later 145,919 acres (59052 ha) were added.

3. In 1974, the State of Florida began acquiring land for the FSPSP, which encompasses over 80,000 acres (32,375 ha). Efforts are underway to acquire about 16,640 acres (6,734 ha).

4. In 1985, acquisition of Picayune Strand State Forest and Wildlife Management Area (WMA) began with the complex Golden Gate Estates subdivision buyouts and now comprises over 76,160 acres (30,821 ha). The Southern Golden Gate Estates buyout through State and Federal funds is complete. The South Belle Meade portion of Picayune Strand is about 90 percent purchased and although the State is no longer purchasing in South Belle Meade, Collier County's Transfer of Development Rights program is helping to secure the inholdings.

5. In 1989, FPNWR was established and now protects 26,240 acres (10,619 ha).

6. In 1989, the Corkscrew Regional Ecosystem Watershed Land and Water Trust, a public/private partnership, was established and to date has coordinated the purchase of 42 26,880 acres (10,878 ha).

7. In 1996, the South Florida WMD, purchased the 32,000 acres (12,950 ha) Okaloacoochee Slough State Forest.

8. In 2002 Spirit of the Wild WMA, consisting of over 7,040 acres (2,849 ha), was taken into public ownership by the State of Florida and is managed by FDOF.

9. In 2003, Dinner Island Ranch WMA consisting of 21,760 acres (8,806 ha) in southern Hendry County was taken into public ownership by the State of Florida and is managed by FDOF.

Tribal Lands: Lands of the Seminole Tribes of Florida and Miccosukee Tribe of Indians of Florida encompass over 350,079 acres (141,673 ha) in south Florida. Of these, 115,840 acres (46,879 ha) are used by panthers, and comprise 5 percent of the Primary Zone (R. Kautz, pers. comm. 2005). These lands are not specifically managed for the panther and are largely in cultivation.

Private Lands: A variety of Federal, State, and private incentives programs are available to assist private landowners and other individuals to protect and manage wildlife habitat. Voluntary agreements, estate planning, conservation easements, land exchanges, and mitigation banks are methods that hold untapped potential for conserving private lands. In 1954, the National Audubon Society established the nearly 10,880 acres (4,403 ha) Corkscrew Swamp Sanctuary. However, little additional private land has been protected south of the Caloosahatchee River for panther conservation. A number of properties identified by the State Acquisition and Restoration Council (ARC) for purchase by the Florida Forever Program are used by panthers (*e.g.*, Devil's Garden, Half Circle F Ranch, Pal Mal, Panther Glades). North of the Caloosahatchee River, Fisheating Creek Conservation Easement, 41,600 acres (16,835 ha) in Glades County is a private holding used by dispersing male panthers. Also, 73,235 acres of the 90,845 acres Babcock Ranch were purchased in 2006 by the State of Florida and Lee County for conservation and agriculture. An additional 2,000 acres of this ranch were put into a conservation easement.

Habitat and Prey Management

Land management agencies in south Florida are implementing fire programs that mimic a natural fire regime through the suppression of human-caused wildfires and the application of prescribed natural fires. No studies have been conducted to determine the effects of invasive plant management on panthers. However invasive vegetation may reduce the panther's prey base by disrupting natural processes such as water flow and fire and by significantly reducing available forage for prey (Fleming et al. 1994). All public lands in south Florida have active invasive plant treatment programs. Management for panther prey consists of a variety of approaches such as habitat management and regulation of hunting and off-road vehicle (ORV) use.

Response to Management Activities

Few studies have examined the response of panthers to various land/habitat management activities. Dees et al. (2001) investigated panther habitat use in response to prescribed fire and found that panther use of pine habitats was greatest for the first year after the area had been burned and declined thereafter. Prescribed burning is believed to be important to panthers because prey species (*e.g.*, deer and hogs) are attracted to burned habitats to take advantage of changes in vegetation structure and composition, including exploiting hard mast that is exposed and increased quality or quantity of forage (Dees et al. 2001). Responses of puma to logging activities (Van Dyke et al. 1986b) indicate that they generally avoid areas within their home range with intensification of disturbance.

There is the potential for disturbance to panthers from recreational uses on public lands. Maehr (1990) reported that indirect human disturbance of panthers may include activities associated with hunting and that panther use of Bear Island (part of BCNP) is significantly less during the hunting season. Schortemeyer et al. (1991) examined the effects of deer hunting on panthers at BCNP between 1983 and 1990. They concluded that, based on telemetry data, panthers may be altering their use patterns as a result of hunting.

Janis and Clark (2002) compared the behavior of panthers before, during, and after the recreational deer and hog hunting season (October through December) on areas open (BCNP) and closed (FPNWR, FSPSP) to hunting. Variables examined were: (1) activity rates, (2) movement rates, (3) predation success, (4) home range size, (5) home range shifts, (6) proximity to ORV trails, (7) use of areas with concentrated human activity, and (8) habitat selection. Responses to hunting for variables most directly related to panther energy intake or expenditure (*i.e.*, activity rates, movement rates, predation success of females) were not detected (Janis and Clark 2002). However, panthers reduced their use of Bear Island, an area of concentrated human activity, and were found farther from ORV trails during the hunting season, indicative of a reaction to human disturbance (Janis and Clark 2002). Whereas the reaction to trails was probably minor and could be related to prey behavior, decreased use of Bear Island most likely reflects a direct reaction to human activity and resulted in increased use of adjacent private lands (Janis and Clark 2002).

Transportation Planning and Improvements

Construction of highways in wildlife habitat typically results in loss and fragmentation of habitat, traffic related mortality, and avoidance of associated human development. Roads can also result in habitat fragmentation, especially for females who are less likely to cross them (Maehr 1990).

There are presently 28 wildlife underpasses with associated fencing suitable for panther use along I-75 (Figure 9). There are four underpasses suitable for panther use currently existing, and two additional underpasses presently proposed by the Florida Department of Transportation (FDOT) along State Road 29 (SR 29) (Department of the Army Public Notice SAJ-2004-778) (Figure 9). Several additional panther/wildlife crossings are proposed along roadways in rural Lee and Collier Counties (Shindle et al. 2001). In addition, Collier County, in cooperation with the National Wildlife Federation and the Florida Wildlife Federation, is coordinating a study of the segment of CR 846 east of Immokalee and the section of Oil Well Road where the road crosses Camp Kies Strand by Dr. Reed Noss and Dr. Daniel Smith to determine the optimum location for wildlife crossing construction (WilsonMiller 2005). An additional crossing of Camp Kies Strand on CR 846 west of Immokalee is also being evaluated. However, vehicular trauma still occurs on outlying rural roads and the FWC is conducting a study to determine the impacts of vehicular collisions to panthers and studying ways to minimize panther vehicle collisions (Swanson et al. 2006).

No panther-vehicle collisions have been recorded in the immediate vicinity of wildlife crossings, with the exception of one collision in December 2005 on SR 29. There have been no collisions on east-west I-75 in the vicinity of crossings since installation in 1991. Prior to 1991, there were five recorded deaths from collisions. FDOT has also identified the location of and constructed wildlife crossings on SR 29. Proposed crossings A and B (Figure 9) will be in an area of 10 documented collisions from 1980 to 2004. Crossings C and D, north of I-75, were installed in 1995. There were two recorded collisions in the vicinity of crossing D from 1979 to 1990, but none at either C or D since crossing installation. Crossing E was installed in 1997. There has been one collision about 1 mile to the north in 2002. Crossing F was installed in 1999. There was one documented collision in the immediate vicinity in 1981, two collisions about 1.5 miles to the north since crossing installation, and one collision about 0.5 mile to the south in December 2005.

Agriculture, Development, and Mining

The Service developed a draft Panther Habitat Assessment methodology and refugia design in 2003 to help guide the agency in evaluating permit applications for projects that could affect panther habitat (see discussion below). This draft methodology was a way to assess the level of impacts to panthers expected from a given project, and to evaluate the effect of any proposed compensation offered by the project applicant. Prior to development of the methodology, the Service from March 1984 through July 2003 concluded consultation on 42 projects involving the panther and habitat preservation (Table 2). The minimum expected result of these projects is impacts to 76,919 acres and the preservation of 15,479 acres of panther habitat. Of the 76,919 acres of impacts, 38,932 acres are due to agricultural conversion and 37,982 acres to development and mining. Portions (10,370 acres) of the largest agricultural conversion project, the 28,700 acres by U.S. Sugar Corporation, were re-acquired by the Federal Government as a component of the Talisman Land Acquisition (Section 390 of the Federal Agricultural Improvement and Reform Act of 1996 [Public Law 104-127] Farm Bill Cooperative Agreement, FB4) for use in the Comprehensive Everglades Restoration Project. The non-agriculture impacts are permanent land losses, whereas the agricultural conversions may continue to provide some habitat functional value to panthers, depending on the type of conversion.

From August 2003 to February, 2007, the Service concluded consultations on 58 projects affecting 17,169 acres with preservation of 18,334 acres (Table 2). Following our refugia design assessment approach, the projects affected 7,287 acres in the Primary Zone, 5,911 acres in the Secondary Zone, and 3,965 acres in the Other Zone. Compensation provided included 15,118 acres in the Primary Zone, 652 acres in the Dispersal Zone, 2 acres in the Secondary Zone, and 1,410 acres in the Other Zone. The project affected lands were primarily agricultural fields consisting of row crops and citrus groves and natural lands with varying degrees of exotic vegetation. Functional habitat value of these lands to the Florida panther, following our Panther Habitat Assessment methodology provided a PHU loss from development of 74,505 PHUs, with a corresponding PHU preservation and enhancement complement of 143,133 PHUs. The preservation lands were generally native habitat lands or disturbed lands that included restoration components. Restoration components included exotic species removal, fire management, wetland hydrology improvement, improved forest management practices, and full habitat restoration from agriculture uses to native habitats.

Panther Habitat Evaluation and Compensation

Population Viability Analysis

Population Viability Analysis (PVA) has emerged as a key component of endangered species conservation. This process is designed to incorporate demographic information into models that predict if a population is likely to persist in the future. PVAs incorporate deterministic and stochastic events including demographic and environmental variation, and natural catastrophes. PVAs have also been criticized as being overly optimistic about future population levels (Brook et al. 1997) and should be viewed with caution; however, they are and have been shown to be surprisingly accurate for managing endangered taxa and evaluating different management practices (Brook 2000). They are also useful in conducting sensitivity analyses to determine where more precise information is needed (Hamilton and Moller 1995, Beissinger and Westphal 1998, Reed et al. 1998, Fieberg and Ellner 2000).

As originally defined by Shaffer (1981), "a minimum viable population for any given species in any given habitat is the smallest isolated population having a 99 percent chance of remaining extant for 1,000 years despite the foreseeable effects of demographic, environmental and genetic stochasticity, and natural catastrophes." However, the goal of 95 percent probability of persistence for 100 years is the standard recommended by population biologists and is used in management strategies and conservation planning, particularly for situations where it is difficult to accurately predict long-term effects (Shaffer 1978, 1981, 1987, Sarkar 2004).

Since 1981, 139 Florida panthers have been radio-collared and monitored on public and private lands throughout south Florida (Lotz et al. 2005). These data were used by researchers to estimate survival rates and fecundity and were incorporated into PVA models previously developed for the Florida panther (Seal et al. 1989, 1992, Cox et al. 1994, Kautz and Cox 2001, Maehr et al. 2002b). These models incorporated a range of different model parameters such as general sex ratios, kitten survival rates, age distributions, and various levels of habitat losses, density dependence, and intermittent catastrophes or epidemics. The outputs of these models predicted a variety of survival scenarios for the Florida panther and predicted population levels needed to ensure the survival of the species.

Root (2004) developed an updated set of PVA models for the Florida panther based on RAMAS GIS software (Akçakaya 2002). These models were used to perform a set of spatially explicit PVAs. Three general single-sex (i.e., females only) models were constructed using demographic variables from Maehr et al. (2002b) and other sources. A conservative model was based on Seal and Lacy (1989), a moderate model was based on Seal and Lacy (1992), and an optimistic model was based on the 1999 consensus model of Maehr et al. (2002b). In each model, first-year kitten survival was set at 62 percent based on recent information from routine panther population monitoring (Shindle et al. 2001). All models assumed a 1:1 sex ratio, a stable age distribution, 50 percent of females breeding in any year, and an initial population of 41 females (82 individuals including males), the approximate population size in 2001-2002 (McBride 2001, 2002).

Basic Versions: The basic versions of each model incorporated no catastrophes or epidemics, no change in habitat quality or amount, and a ceiling type of density dependence. The basic versions of the models incorporated a carrying capacity of 53 females (106 panthers - 50/50 sex ratio). Variants of the models were run with differing values for density dependence, various levels of habitat loss, and intermittent catastrophes or epidemics. Each simulation was run with 10,000 replications for a 100-year period. The minimum number of panthers needed to ensure a 95 percent probability of persistence for 100 years was estimated in a series of simulations in which initial abundance was increased until probability of extinction at 100 years was no greater than 5 percent. More detailed information concerning the PVA model parameters appears in Root (2004).

The results of these model runs predicted a probability of extinction for the conservative model of 78.5 percent in 100 years with a mean final total abundance of 3.5 females. Also, the probability of a large decline in abundance (50 percent) was 94.1 percent. The moderate model resulted in a 5 percent probability of extinction and mean final abundance of 42.3 females in 100 years. The probability of panther abundance declining by half the initial amount was 20 percent in 100 years under the moderate model. The optimistic model resulted in a 2 percent probability of extinction and mean final abundance of 51.2 females in 100 years. The probability of panther abundance declining by half the initial amount was only 9 percent in 100 years under the optimistic model. These models also provide a probability of persistence (100 percent minus probability of extinction) over a 100-year period of 95 percent for the moderate model and 98 percent for the optimistic model.

One Percent Habitat Loss: Model results were also provided by Root (2004) for probability of extinctions for 1 percent loss of habitat, within the first 25 years of the model run. The 1 percent loss of habitat equates to essentially all remaining non-urban privately owned lands in the Primary Zone and corresponds to the estimated rate of habitat loss (Root 2004) from 1986 to 1996 for the five southwest counties based on land use changes. For the moderate model, the model runs predict a probability of extinction increase of about one percent, from a probability of extinction of about 5 percent with no loss of habitat to 6 percent with 1.0 percent habitat loss per year, for the first 25 years. For the optimistic model, probability of extinction increased from about 2 percent with no loss of habitat to 3 percent with 1.0 percent habitat loss per year, for the first 25 years. These models also predicted the mean final abundance of females would decrease from 41 to 31 females, a 24.3 percent reduction for the moderate model and from 41 to 38 females, a 7.3 percent reduction for the optimistic model.

The model runs also predict a probability of persistence (100 percent minus the probability of extinction) over a 100-year period of about 94 percent for the moderate model and 97 percent for the optimistic model. The model runs, predict a mean final abundance of 62 individuals (31 females and 31 males) for the moderate model and 76 individuals (38 females and 38 males) for the optimistic model.

Population Guidelines: Kautz et al. (2006), following review of the output of Root's PVA models and those of other previous PVAs for the Florida panther, suggested a set of population guidelines for use in management and recovery of the Florida panther. These guidelines are:

(1) populations of less than 50 individuals are likely to become extinct in less than 100 years; (2) populations of 60 to 70 are barely viable and expected to decline by 25 percent over 100 years; (3) populations of 80 to 100 are likely stable but would still be subject to genetic problems (*i.e.*, heterozygosity would slowly decline); and (4) populations greater than 240 have a high probability of persistence for 100 years and are demographically stable and large enough to retain 90 percent of original genetic diversity.

Population guidelines for populations of panthers between 50 and 60 individuals and between 70 and 80 individuals were not specifically provided in Kautz et al. (2006). However, the Service views the guidelines in Kautz et al. (2006) as a continuum. Therefore, we consider populations of 50 to 60 individuals to be less than barely viable or not viable with declines in population and heterozygosity. Similarly, we consider populations of 70 to 80 to be more than barely viable or somewhat viable with some declines in population and heterozygosity. Like other population guidelines presented in Kautz et al. (2006), these assume no habitat loss or catastrophes.

PVA Summaries and Population Guidelines: Root's (2004) moderate model runs, which have a carrying capacity 53 females (106 individuals), show final populations of 42.3 females (84 total) and 31.2 females (62 total) with extinction rates of 5 percent and 6 percent, respectively, for the basic and 1 percent habitat loss scenarios. The predicted final populations in Root (2004) are 84 and 62 panthers for no loss of habitat and 1 percent loss of habitat, respectively, over a 100-year period.

Kautz et al.'s (2006) population guidelines applied to the Root (2004) moderate models for a population of 62 to 84 panthers, with or without habitat loss, respectively, describe the "with habitat loss" population as barely viable and expected to decline by 25 percent over a 100-year period. The "without habitat loss" is likely stable but would still be subject to genetic problems.

In conclusion, the Service believes the model runs show lands in the Primary Zone are important to the survival and recovery of the Florida panther and sufficient lands need to be managed and protected in south Florida to provide for a population of 80 to 100 panthers, the range defined as likely stable over 100 years, but subject to genetic problems. As discussed in the following section, the Service has developed a south Florida panther conservation goal that, through regulatory reviews and coordinated conservation efforts with land owners and resource management partners, provides a mechanism to achieve this goal.

Model Violations: The actual likelihood of population declines and extinctions may be different than the guidelines and models suggest, depending upon the number of and severity of assumptions violated. The Service realizes that habitat loss is occurring at an estimated 0.8 percent loss of habitat per year (R. Kautz, FWC, personal communication, 2003). The Service has accounted for some habitat loss and changes in habitat quality within its regulatory program, and specifically through its habitat assessment methodology (discussed below). For example, we have increased the base ratio used within this methodology to account for unexpected increases in habitat loss. Similarly, we consider changes in habitat quality and encourage habitat restoration wherever possible.

With regard to the assumption of no catastrophes, the Service has considered the recent outbreak of feline leukemia in the panther population at Okaloacoochee Slough as a potential catastrophe. The FWC is carefully monitoring the situation and it appears to be under control at this time due to a successful vaccination program. However, if the outbreak spreads into the population, the Service will consider this as a catastrophe and factor this into our decisions.

We acknowledge uncertainties exist, assumptions can be violated, and catastrophes can occur. The Service and the FWC, along with our partners, will continue to monitor the panther population and the south Florida landscape and incorporate any new information and changes into our decision-making process.

South Florida Panther Population Goal

The Service's goal for Florida panther conservation in south Florida is to locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of a population of 80 to 100 individuals (adults and subadults) south of the Caloosahatchee River. The Service proposes to achieve this goal through land management partnerships with private landowners, through coordination with private landowners during review of development proposals, and through land management and acquisition programs with Federal, State, local, private, and Tribal partners. The acreages of lands necessary to achieve this goal, based on Kautz et al. (2006) average density of 31,923 acres (12,919 ha) per panther is 2,551,851 acres (1,032,720 ha) for 80 panthers or 3,189,813 acres (1,290,900 ha) for 100 panthers.

The principle regulatory mechanism that allows the Service to work directly with private land owners during review of development and land alteration projects is section 10 of the Act. The Service coordinates with Federal agencies pursuant to section 7 of the Act. In August 2000, the Service, to assist the Corps in assessing project effects to the Florida panther, developed the Florida panther final interim Standard Local Operating Procedures for Endangered Species (SLOPES) (Service 2000). The Florida panther SLOPES provide guidance to the Corps for assessing project effects to the Florida panther and recommends actions to minimize these effects. The Florida panther SLOPES also included a consultation area map that identified an action area where the Service believed land alteration projects may affect the Florida panther.

In the original SLOPES the consultation area map (MAP) was generated by the Service by overlaying existing and historical panther telemetry data on a profile of Florida and providing a connecting boundary surrounding most of these points. Since the development of the MAP, we have received more accurate and up-to-date information on Florida panther habitat usage. Specifically we have received two documents the Service believes reflects the most likely panther habitat usage profiles although documentation clearly shows panther use of areas outside these locations. These documents are the publications by Kautz et al. (2006) and Thatcher et al. (2006). Based on the information in these documents, we have clarified the boundaries of the MAP to better reflect areas where Florida panthers predominate (Figure 4) and refer to these areas cumulatively as the Panther Focus Area.

The Panther Focus Area was determined from the results of recent panther habitat models south of the Caloosahatchee River (Kautz et al. 2006) and north of the Caloosahatchee River (Thatcher et al. 2006). Kautz et al. (2006) model of landscape components important to Florida panther habitat conservation was based on an analysis of panther habitat use and forest patch size. This model was used in combination with radio-telemetry records, home range overlaps, land use/land cover data, and satellite imagery to delineate primary and secondary areas that would be most important and comprise a landscape mosaic of cover types important to help support of the current panther breeding population south of the Caloosahatchee River.

Thatcher et al. (2006) developed a habitat model using Florida panther home ranges in south Florida to identified landscape conditions (land-cover types, habitat patch size and configuration, road density and other human development activities, and other similar metrics) north of the Caloosahatchee River that were similar to those associated with the current panther breeding population.

The Panther Focus Area MAP, south of the Caloosahatchee River is divided into Primary, Secondary, and Dispersal Zones; and north of the Caloosahatchee River into the Primary Dispersal/Expansion Area.

Primary Zone is currently occupied and supports the only known breeding population of Florida panthers in the world. These lands are important to the long-term viability and persistence of the panther in the wild.

Secondary Zone lands are contiguous with the Primary Zone and although these lands are used to a lesser extent by panthers, they are important to the long-term viability and persistence of the panther in the wild. Panthers use these lands in a much lower density than in the Primary Zone.

Dispersal Zone is a known corridor between the Panther Focus Area south of the Caloosahatchee River to the Panther Focus Area north of the Caloosahatchee River. This Zone is necessary to facilitate the dispersal of panthers and future panther population expansion to areas north of the Caloosahatchee River. Marked panthers have been known to use this zone.

Primary Dispersal/Expansion Area is the Fisheating Creek/Babcock-Webb Wildlife Management Area region. These are lands identified by Thatcher et al. (2006) as potential panther habitat with the shortest habitat connection to the Panther Focus Area in south Florida. Several collared and uncollared male panthers have been documented in this area since 1973, and the last female documented north of the Caloosahatchee River was found in this area.

Landscape Preservation Need and Compensation Recommendations

Land Preservation Needs: To further refine the land preservation needs of the Florida panther and to specifically develop a landscape-level program for the conservation of the Florida panther population in south Florida, the Service as previously discussed, in February 2000, appointed a Florida Panther Subteam. The Subteam in addition to the assignments discussed previously, was also charged with developing a landscape-level strategy for the conservation of the Florida panther population in south Florida. The results of this collaborative effort are partially presented in Kautz et al. (2006). One of the primary goals of this effort was to identify a strategically located set of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of the south population of the Florida panther. Kautz et al. (2006) focused their efforts on the area south of the Caloosahatchee River, where the reproducing panther population currently exists.

Kautz et al. (2006) created an updated Florida panther potential habitat model based on the following criteria: (1) forest patches greater than 4.95 acres (2 ha); (2) non-urban cover types within 656 ft (200 m) of forest patches; and (3) exclusion of lands within 984 ft (300 m) of urban areas. The potential habitat map was reviewed in relation to telemetry data, recent satellite imagery (where available), and panther home range polygons. Boundaries were drawn around lands defined as the Primary Zone (Figure 5), defined as the most important area needed to support a self-sustaining panther population. Kautz et al. (2006) referred to these lands as essential; however, as observed in the two previous plans (Logan et al. 1993; Cox et al. 1994), lands within the boundaries of the Primary Zone included some urban areas and other lands not considered to be truly panther habitat (*i.e.*, active rock and sand mines). The landscape context of areas surrounding the Primary Zone was modeled and results were used to draw boundaries of the Secondary Zone (Figure 5), defined as the area capable of supporting the panther population in the Primary Zone, but where habitat restoration may be needed (Kautz et al. 2006).

Kautz et al. (2006) also identified, through a least cost path model, the route most likely to be used by panthers dispersing out of south Florida, crossing the Caloosahatchee River, and dispersing into south-central Florida. Kautz et al. (2006) used ArcView GIS© version 3.3 and ArcView Spatial Analyst© version 2 (Environmental Systems Research, Incorporated, Redlands, California) to construct the least-cost path models and identify optimum panther dispersal corridor(s). The least-cost path models operated on a cost surface that ranked suitability of the landscape for use by dispersing panthers with lower scores indicating higher likelihood of use by dispersing panthers. The lands within the boundaries of the least cost model prediction were defined as the Dispersal Zone (Figure 5). The preservation of lands within this zone is important for the survival and recovery of the Florida panther, as these lands are the dispersal pathways for expansion of the south Florida panther population. The Primary Zone covers 2,270,590 acres (918,895 ha); the Secondary Zone covers 812,104 acres (328,654 ha); and the Dispersal Zone covers 27,883 acres (11,284 ha); providing a total of 3,110,578 acres (1,258,833 ha) (Kautz et al. 2006).

As part of their evaluation of occupied panther habitat, in addition to the average density estimate of one panther per 27,181 acres (11,000 ha) developed by Maehr et al. (1991), Kautz et al. (2006) estimated the present average density during the timeframe of the study, based on telemetry and other occurrence data, to average 1 panther per 31,923 acres (12,919 ha). In the following discussions of the number of panthers that a particular zone may support, the lower number is based on the 31,923 acres (12,919 ha) value (Kautz et al. 2006) and the higher number is based on the 27,181 acres (11,000 ha) value (Maehr et al. 1991).

Based on these average densities, the Primary Zone could support 71 to 84 panthers; the Secondary Zone 8 to 10 panthers without habitat restoration and 25 to 30 panthers with habitat restoration (existing high quality panther habitat currently present in the Secondary Zone is estimated at 32 percent of the available Secondary Zone lands); and the Dispersal Zone, 0 panthers. Taken together, the three zones in their current condition apparently have the capacity to support approximately 79 to 94 Florida panthers.

Kautz et al.'s (2006) assessment of available habitat south of the Caloosahatchee River determined that non-urban lands in the Primary, Secondary, and Dispersal Zones were not sufficient to sustain a population of 240 individuals south of the Caloosahatchee River. However, Kautz et al. (2006) determined sufficient lands were available south of the Caloosahatchee River to support a population of 79 to 94 individuals (although not all lands are managed and protected).

Compensation Recommendations: To achieve our goal to locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of a population of Florida panthers south of the Caloosahatchee River, the Service chose the mid point (90 panthers) in Kautz et al.'s (2006) population guidelines that a population of 80 to 100 panthers is likely to be stable, although subject to genetic problems, through 100 years. In addition, a population of 90 individuals is eight individuals greater than a population of 82 individuals, which according to the best available PVA (Root 2004) is 95 percent likely to persist over 100 years (assuming a 50:50 male to female ratio). These eight individuals provide a buffer for some of the assumptions in Root's (2004) PVA. Our process to determine compensation recommendations for project affects that cannot be avoided in both our section 7 and section 10 consultations is based on the amount and quality of habitat we believe is necessary to support a population of 90 panthers in south Florida.

The Service, based on Kautz et al.'s (2006) average panther population density of 31,923 acres per panther determined 2,873,070 acres of Primary Zone "equivalent" lands need to be protected and managed. This equivalency factor is needed, since Secondary Zone lands are of less value than Primary Zone lands to the panther, to assure that additional acreage (special consideration) is required in the Secondary Zone to compensate for its lower quality panther habitat. In other words, more than 31,923 acres per panther would be needed, hypothetically, if this acreage were all in the Secondary Zone (see discussion of Primary Zone equivalent lands in the following section). The combined acreage of lands within the Primary, Dispersal, and Secondary Zones is 3,110,577 acres (1,258,833 ha) (Kautz et al. 2006). Currently, 2,073,865 acres of Primary Zone equivalent lands are preserved, so 799,205 additional acres need to be preserved to support a population of 90 panthers in south Florida (2,873,070 minus 2,073,865 equals 799,205).

The Service also consults on lands outside of the Primary, Secondary, and Dispersal zones that may effect panthers such as agricultural lands that are adjacent to the Panther Focus Area and proposals in urbanized areas that could generate traffic in or adjacent to the Panther Focus Area or have other identifiable impacts.

Primary Zone Equivalent Lands: Kautz et al. (2006), through their habitat evaluation of lands important to the Florida panther, identified three sets of lands, *i.e.,* Primary Zone, Secondary Zone, and Dispersal Zone, and documented the relative importance of these lands to the Florida panther. These lands generally referred to as the panther core lands (Figure 5), include the majority of the home ranges of the current population of the Florida panther. The Service, in our evaluation of habitat needs for the Florida panther expanded the boundaries of the Kautz et al. (2006) lands to include those lands south of the Caloosahatchee River where additional telemetry points historically were recorded. These additional lands (about 819,995 acres), referred to as the "Other" Zone, are added to the lands in Kautz et al.'s (2006) panther core lands (Figure 5) and represent the lands within the Service's 2000 consultation area boundary south of the Caloosahatchee River as shown in Figure 4. These lands (core lands and other zone lands) together are referred to by the Service as the core area. The "Other" Zone lands, as well as the lands within the Secondary Zone, provide less landscape benefit to the Florida panther than the Primary and Dispersal Zones, but are important as a component of our goal to preserve sufficient lands to support a population of 90 panthers in South Florida.

To account for the lower landscape importance of these lands in our preservation goals and in our habitat assessment methodology, we assigned lands in the Other Zone a value of 0.33 and lands in the Secondary Zone a value of 0.69 to convert these lands to Primary Zone value, *i.e.,* Primary Zone equivalents (Table 3). Kautz et al. (2006) identifies the need for restoration in the Secondary Zone to achieve maximum benefits. To estimate the Primary Zone equivalent of Secondary Zone lands, we derived a relative habitat value (average PHU value) for each by comparing the habitat ranks estimated in Kautz et al. (2006 – Table 1) for each habitat type per zone. The average PHU value for the Primary Zone is 6.94 and for the Secondary Zone 4.79. Based on this analysis, the habitat value of the Secondary Zone is roughly 69 percent of the Primary Zone, and restoration is needed to achieve landscape function (4.79/6.94=0.69). Dispersal Zone lands are considered equivalent to Primary Zones lands with a 1/1 value. At-risk lands in the Other Zone total 819,995 acres. Actions on some of the Other Zone lands such as some actions in areas that have already been urbanized will not have an impact on panthers or their habitat, and these case-specific determinations will be made based on a review of the specific proposals. We estimate 80 percent of these actions will have an impact on achieving the panther population goal, and will monitor this carefully as we review proposed actions (819,995 times 0.8 equals 655,996 acres). Multiply this acreage (655,996 acres) by 0.33 to determine the acres of Primary Zone equivalent lands the Other Zone can provide (655,996 times 0.33 equals 216,479 acres of Primary Zone equivalent lands). Using this assessment, the 503,481 acres of Secondary Zone lands equate to 347,402 acres of Primary Zone equivalent lands. These equivalent values, 0.33 and 0.69, for Other and Secondary Zones, respectively, and 1/1 for Dispersal Zone, are important components in our assessment of compensation needs for a project in the panther consultation area and are components of our habitat assessment methodology as discussed below.

Habitat Assessment Methodology

To evaluate project effects to the Florida panther, the Service considers the contributions the project lands provide to the Florida panther, recognizing not all habitats provide the same functional value. Kautz et al. (2006) also recognized not all habitats provide the same habitat value to the Florida panther and developed cost surface values for various habitat types, based on use by and presence in home ranges of panthers. The FWC (2006b), using a similar concept, assigned likely use values of habitats to dispersing panthers. The FWC's habitats were assigned habitat suitability rank between 0 and 10, with higher values indicating higher likely use by dispersing panthers.

The Service chose to evaluate project effects to the Florida panther through a similar process. We incorporated many of the same habitat types referenced in Kautz et al. (2006) and FWC (2006b) with several adjustments to the assigned habitat use values reflecting consolidation of similar types of habitats and the inclusion of Everglades Restoration water treatment and retention areas. We used these values as the basis for habitat evaluations and the recommended compensation values to minimize project effects to the Florida panther (Table 6), as discussed below.

Base Ratio: To develop a base ratio that will provide for the protection of sufficient acreage of Primary Zone equivalent lands for a population of 90 panthers from the acreage of Primary Zone equivalent non-urban lands at risk, we developed the following approach.

The available Primary Zone equivalent lands are estimated at 3,276,563 acres (actual acreage is 4,376,444 acres [the "actual acreage" value includes acres of lands in each category in the Secondary and Other Zones as well as the lands in the Primary Zone]) (see Table 3). Currently 2,073,865 acres of Primary Zone equivalent lands (actual acreage is 2,578,152 acres) of non-urban lands are preserved. The remaining non-urban at-risk private lands are estimated at 1,202,698 acres of Primary Zone equivalent lands (actual acreage is 1,798,295 acres). To meet the protected and managed lands goal for a population of 90 panthers, an additional 799,205 acres of Primary Zone equivalent lands are needed. The base ratio is determined by dividing the primary equivalents of at-risk habitat to be secured (799,205 acres) by the result of the acres of at-risk habitat in the Primary Zone (610,935 acres) times the value of the Primary Zone (1); plus the at-risk acres in the Dispersal Zone (27,883 acres) times the value of the Dispersal Zone (1); plus the at-risk acres in the Secondary Zone (503,481 acres) times the value of the Secondary Zone (0.69); plus the at-risk acres in the Other Zone (655,996 acres) times the value of the Other Zone (0.33); minus the at-risk acres of habitat to be protected (799,205 acres). The results of this formula provide a base value of 1.98.

$$799{,}205 / ((610{,}935 \times 1.0) + (27{,}883 \times 1) + (503{,}481 \times 0.69) + (655{,}996 \times 0.33)) - 799{,}205 = 1.98$$

In evaluating habitat losses in the consultation area, we used an estimate of 0.8 percent loss of habitat per year (R. Kautz , FWC, personal communication, 2004) to predict the amount of habitat loss anticipated in south Florida during the next 5 years (*i.e.*, 6,000 ha / year; 14,820 acres / year). We conservatively assumed that we would be aware of half of these projects. We assumed that half of the projects would occur in the Primary Zone and half would occur in the Secondary Zone. We estimated that over a 5-year period that about 37,000 acres would be developed without Federal review. We adjusted the base value from 1.98 to 2.23.

We also realize that collectively habitat losses from individual single-family residential developments will compromise the Service's goal to secure sufficient lands for a population of 90 panthers. We believe, on an individual basis, single-family residential developments by individual lot owners on lots no larger than 2.0 ha (5.0 acres) will not result in take of panthers on a lot-by-lot basis; however, collectively these losses may impact the panther. Panthers are a wide ranging species, and individually, a 2.0 ha (5.0 acre) habitat change will not have a measurable impact. Compensation for such small-scale losses on a lot-by-lot basis is unlikely to result in meaningful conservation benefits for the panther versus the more holistic landscape level conservation strategy used in our habitat assessment methodology. To account for these losses, we estimated about another 12,950 acres over a 5-year period (2,590 acres per year) would be developed through this avenue. We adjusted the base value from 2.23 to 2.48.

We also realize there is a need for road crossings in strategic locations and we believe there are projects that may not have habitat loss factors but will have traffic generation factors. The Service considers increases in traffic as an indirect effect from a project and can contribute to panther mortality. Therefore, we have added another 0.02 to the base ratio to address traffic impacts, which could provide an incentive to implement crossings in key locations. Following the same approached shown above, we adjusted the base ratio from 2.48 to the 2.5. The Service intends to re-evaluate this base ratio periodically and adjust as needed to make sure all adverse effects are adequately ameliorated and offset as required under section 7 of the Act and to achieve the Service's conservation goal for the Florida panther.

Landscape Multiplier: As discussed previously in the above section on Primary Zone Equivalent Lands, the location of a project in the landscape of the core area of the Florida panther is important. As we have previously discussed, lands in the Primary and Dispersal Zones are of the most importance in a landscape context to the Florida panther, with lands in the Secondary Zone of less importance, and lands in the Other Zone of lower importance. These zones affect the level of compensation the Service believes is necessary to minimize a project's effects to Florida panther habitat. Table 5 provides the landscape compensation multipliers for various compensation scenarios. As an example, if a project is in the Other Zone and compensation is proposed in the Primary Zone, a Primary Zone equivalent multiplier of 0.33 is applied to the PHUs (see discussion below) developed for the project. If the project is in the Secondary Zone and compensation is in the Primary Zone, then a Primary Zone equivalent multiplier of 0.69 is applied to the PHUs developed for the project.

Panther Habitat Units – Habitat Functional Value: Prior to applying the base ratio and landscape multipliers discussed above, we evaluate the project site and assign functional values to the habitats present. This is done by assigning each habitat type on-site a habitat suitability value from the habitats shown in Table 6. The habitat suitability value for each habitat type is then multiplied by the acreage of that habitat type resulting in a number representing PHUs. These PHUs are summed for a site total, which is used as a measurement of the functional value the habitat provides to the Florida panthers. This process is also followed for the compensation-sites.

<u>Exotic Species Assessment:</u> Since many habitat types in south Florida are infested with exotic plant species, which affects the functional value a habitat type provides to foraging wildlife species (*i.e.*, primarily deer and hog), we believe the presence of these species and the value these species provide to foraging wildlife needs to be considered in the habitat assessment methodology. As shown in Table 6, we have a habitat type and functional value shown for exotic species. This category includes not only the total acres of pure exotic species habitats present but also the percent-value acreages of the exotic species present in other habitat types.

For example, a site with 100 acres of pine flatwoods with 10 percent exotics would be treated in our habitat assessment methodology as 90 acres of pine flatwoods and 10 acres of exotics. Adding another 100 acres of cypress swamp with 10 percent exotics would change our site from 90 acres of pine flatwoods and 10 acres of exotics to 90 acres of pine flatwoods, 90 acres of cypress swamp, and 20 acres of exotics.

<u>Habitat Assessment Methodology Application – Example:</u> To illustrate the use of our habitat assessment methodology, we provide the following example. A 100-acre project site is proposed for a residential development. Plans call for the entire site to be cleared. The project site contains 90 acres of pine flatwoods and 10 acres of exotic vegetation, and is located in the "Secondary Zone." The applicant has offered habitat compensation in the "Primary Zone" to minimize the impacts of the project to the Florida panther. To calculate the PHUs provided by the site, we multiply the habitat acreage by the "habitat suitability value" for each habitat type and add those values to obtain a value of 840 PHUs ((90 acres of pine flatwoods x 9 [the habitat suitability value for pine flatwoods] = 810 PHUs) + (10 acres of exotic vegetation x 3 [the habitat suitability value for exotics] = 30 PHUs) = 840 PHUs). The value of 840 PHUs is then multiplied by the 2.5 (the base ratio) and 0.69 (the landscape multiplier) resulting in a value of 1,149 PHUs for the project site. In this example, the acquisition of lands in the Primary Zone containing at least 1,149 PHUs are recommended to compensate for the loss of habitat to the Florida panther resulting from this project.

Analysis of the species likely to be affected

The Florida panther is an endangered animal restricted to two to three million acres of land (6 to 9 percent of the total land area of Florida) in south Florida. The panther is a wide-ranging species that requires a biotically diverse landscape to survive. Dispersing subadult males wander widely through unforested and disturbed habitat. Human population in south Florida has dramatically increased, from one million in 1950 to six million in 1990, resulting in secondary disturbances such as increased human presence and noise, light, air, and water pollution. Increasing human population has resulted in increasing impacts on native habitat and flora and fauna. Resulting threats to panthers include road mortality, habitat loss, habitat fragmentation, and human disturbance.

<u>Wood Stork</u>

The wood stork was federally listed under the Act as endangered on February 28, 1984. No critical habitat has been designated for the wood stork; therefore, none will be affected.

Species Description

The wood stork is a large, long-legged wading bird, with a head to tail length of 85 to 115 cm (33 to 45 inches [in]) and a wingspan of 150 to 165 cm (59 to 65 in) (Coulter et al. 1999). The plumage is white, except for iridescent black primary and secondary wing feathers and a short black tail. Wood storks fly with there neck and legs extended. On adults, the rough scaly skin of the head and neck is unfeathered and blackish in color, the legs are dark, and the feet are dull pink. The bill color is also blackish. During courtship and the early nesting season, adults have pale salmon coloring under the wings, fluffy undertail coverts that are longer than the tail, and their toes are bright pink. Immature wood storks, up to the age of about 3 years, have yellowish or straw-colored bills and varying amounts of dusky feathering on the head and neck (Coulter et al. 1999).

Life History

Wood stork nesting habitat consists of mangroves as low as 1 m (3 ft), cypress as tall as 30.5 m (100 ft), and various other live or dead shrubs or trees located in standing water (swamps) or on islands surrounded by relatively broad expanses of open water (Palmer 1962, Rodgers et al. 1987, Ogden 1991, Coulter et al. 1999). Wood storks nest colonially, often in conjunction with other wading bird species, and generally occupy the large-diameter trees at a colony site (Rodgers et al. 1996). The same colony site will be used for many years as long as the colony is undisturbed and sufficient feeding habitat remains in surrounding wetlands. However, not all storks nesting in a colony will return to the same site in subsequent years (Kushlan and Frohring 1986). Natural wetland nesting sites may be abandoned if surface water is removed from beneath the trees during the nesting season (Rodgers et al. 1996). In response to this type of changes to nest site hydrology, wood storks may abandon that site and establish a breeding colony in managed or impounded wetlands (Ogden 1991). Wood storks that abandon a colony early in the nesting season due to unsuitable hydrological conditions may re-nest in other nearby areas (Borkhataria et al. 2004; Crozier and Cook 2004). Between breeding seasons or while foraging wood storks may roost in trees over dry ground, on levees, or large patches of open ground. Wood storks may also roost within wetlands while foraging far from nest sites and outside of the breeding season (Gawlik 2002).

While the majority of stork nesting occurs within traditional stork rookeries, a handful of new stork nesting colonies are discovered each year (Meyer and Frederick 2004, Service unpublished data). These new colony locations may represent temporary shifts of historic colonies due to changes in local conditions, or they may represent formation of new colonies in areas where conditions have improved.

Wood storks forage in a wide variety of wetland types, where prey are available to storks and the water is shallow and open enough to hunt successfully (Ogden et al. 1978; Browder 1984; Coulter 1987). Calm water, about 2 to 16 in (5 to 40 cm) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993). Typical foraging sites include freshwater marshes, ponds, hardwood and cypress swamps, narrow tidal creeks or shallow tidal pools, and artificial wetlands such as stock ponds, shallow, seasonally flooded roadside or agricultural ditches, and managed impoundments (Coulter et al. 1999; Coulter and Bryan 1993).

Several factors affect the suitability of potential foraging habitat for wood storks. Suitable foraging habitats must provide both a sufficient density and biomass of forage fish and other prey, and have vegetation characteristics that allow storks to locate and capture prey. During nesting, these areas must also be sufficiently close to the colony to allow storks to efficiently deliver prey to nestlings. Hydrologic and environmental characteristics have strong affects on fish density, and these factors may be some of the most significant in determining foraging habitat suitability, particularly in southern Florida.

Within the wetland systems of southern Florida, the annual hydrologic pattern is very consistent, with water levels rising over 3 feet during the wet season (June-November), and then receding gradually during the dry season (December-May). Storks nest during the dry season, and rely on the drying wetlands to concentrate prey items in the ever-narrowing wetlands (Kahl 1964). Because of the continual change in water levels during the stork nesting period, any one site may only be suitable for stork foraging for a narrow window of time when wetlands have sufficiently dried to begin concentrating prey and making water depths suitable for storks to access the wetlands. Once the wetland has dried to where water levels are near the ground surface, the area is no longer suitable for stork foraging, and will not be suitable until water levels rise and the area is again repopulated with fish. Consequently, there is a general progression in the suitability of wetlands for foraging based on their hydroperiods, with the short hydroperiod wetlands being used early in the season, the mid-range hydroperiod sites being used during the middle of the nesting season, and the longest hydroperiod areas being used later in the season (Kahl 1964; Gawlik 2002).

In addition to the concentration of fish due to normal drying, several other factors affect fish abundance in potential foraging habitats. Longer hydroperiod areas generally support more fish and larger fish (Trexler et al. 2002; Jordan et al. 1998; Loftus and Ecklund 1994; Turner et al. 1999). In addition, nutrient enrichment (primarily phosphorus) within the oligotrophic Everglades wetlands generally results in increased density and biomass of fish in potential stork foraging sites (Rehage and Trexler *In Press*), and distances from dry-season refugia, such as canals, alligator holes, and similar long hydroperiod sites also affect fish density and biomass. Within the highly modified environments of southern Florida, fish availability varies with respect to hydrologic gradients, nutrient availability gradients, and it becomes very difficult to predict fish density. The foraging habitat for most wood stork colonies within southern Florida includes a wide variety of hydroperiod classes, nutrient conditions, and spatial variability.

Dense submerged and emergent vegetation may reduce foraging suitability by preventing storks from moving through the habitat and interfering with prey detection (Coulter and Bryan 1993). Some submerged and emergent vegetation does not detrimentally affect stork foraging, and may be important to maintaining fish populations. Average submerged and emergent vegetation cover at foraging sites was 26 and 29 percent, respectively, at foraging sites at a Georgia colony, and ranged from 0 to100 percent (Coulter and Bryan 1993). These cover values did not differ significantly from random wetland sites. Similarly, densely forested wetlands may preclude storks from accessing prey within the areas (Coulter and Bryan 1993). Storks tend to select foraging areas that have an open canopy, but occasionally use sites with 50 to 100 percent canopy closure (Coulter and Bryan 1993; O'Hare and Dalrymple 1997; Coulter et al. 1999).

Wood storks feed almost entirely on fish between 2 and 25 cm (1 to 10 in) in length (Kahl 1964; Ogden et al. 1976; Coulter 1987) but may occasionally consume crustaceans, amphibians, reptiles, mammals, birds, and arthropods. Wood storks generally use a specialized feeding behavior called tactilocation, or grope feeding, but also forage visually under some conditions (Kushlan 1979). Storks typically wade through the water with the beak immersed and open about 7 to 8 cm (2.5 to 3.5 in). When the wood stork encounters prey within its bill, the mandibles snap shut, the head is raised, and the food swallowed (Kahl 1964). Occasionally, wood storks stir the water with their feet in an attempt to startle hiding prey (Rand 1956; Kahl 1964; Kushlan 1979). This foraging method allows them to forage effectively in turbid waters, at night, and under other conditions when other wading birds that employ visual foraging may not be able to forage successfully.

Wood storks generally forage in wetlands within 50 km (31 miles) of the colony site (Bryan and Coulter 1987), but forage most frequently within 20 km (12 miles) of the colony (Coulter and Bryan 1993). Maintaining this wide range of feeding site options ensures sufficient wetlands of all sizes and varying hydroperiods are available, during shifts in seasonal and annual rainfall and surface water patterns, to support wood storks. Adults feed furthest from the nesting site prior to laying eggs, forage in wetlands closer to the colony site during incubation and early stages of raising the young, and then further away again when the young are able to fly. Wood storks generally use wet prairie ponds early in the dry season then shift to slough ponds later in the dry season thus following water levels as they recede into the ground (Browder 1984).

Gawlik (2002) characterized wood storks as "searchers" that employ a foraging strategy of seeking out areas of high density prey and optimal (shallow) water depths, and abandoning foraging sites when prey density begins to decrease below a particular efficiency threshold, but while prey was still sufficiently available that other wading bird species were still foraging in large numbers (Gawlik 2002). Wood stork choice of foraging sites was significantly related to both prey density and water depth (Gawlik 2002). Because of this strategy, wood stork foraging opportunities are more constrained than many of the other wading bird species (Gawlik 2002).

Breeding wood storks are believed to form new pair bonds every season. First age of breeding has been documented in 3- to 4-year-old birds but the average first age of breeding is unknown. Eggs are laid as early as October in south Florida and as late as June in north Florida (Rodgers 1990; Service unpublished data). A single clutch of two to five (average three) eggs is laid per breeding season but a second clutch may be laid if a nest failure occurs early in the breeding season (Coulter et al. 1999). There is variation among years in the clutch sizes, and clutch size does not appear to be related to longitude, nest data, nesting density, or nesting numbers, and may be related to habitat conditions at the time of laying. Egg laying is staggered and incubation, which lasts about 30 days, begins after the first egg is laid. Therefore the eggs hatch at different times and the nestlings vary in size (Coulter et al. 1999). The younger birds are first to die during times of scarce food.

The young fledge in about 8 weeks but will stay at the nest for 3 to 4 more weeks to be fed. Adults feed the young by regurgitating whole fish into the bottom of the nest about three to ten times per day. Feedings are more frequent when the birds are young (Coulter et al. 1999).

Feedings are less frequent when wood storks are forced to fly great distances to locate food (Bryan et al. 1995). The total nesting period from courtship and nest-building through independence of young, lasts approximately 100 to 120 days (Coulter et al. 1999). Within a colony, nest initiation may be asynchronous, and consequently, a colony may contain active breeding wood storks for a period significantly longer than the 120 days required for a pair to raise young to independence. Adults and independent young may continue to forage around the colony site for a relatively short period following the completion of breeding.

Wood storks produce an average of 1.29 fledglings per nest and 0.42 fledglings per egg which is a probability of survivorship from egg laying to fledgling of 42 percent (Rodgers and Schwikert 1997). The probability of survivorship from egg laying to day 14 is 80 percent, to day 28 (hatching) 70 percent, to day 42 (nestling 2 weeks of age) 62 percent, to day 56 (nestling 4 weeks of age) 56 percent, to day 70 (nestling 6 weeks) 50 percent and to day 84 (fledgling) 42 percent. The greatest losses occur from egg laying to hatching with a 30 percent loss of the nest productivity. From hatching to nestlings of 2 weeks of age, nest productivity loss is an additional 8 percent. Corresponding losses for the remainder of the nesting cycles are on the average of a 6 percent per 2 week increase in age of the nestling (Rodgers and Schwikert 1997).

During the period when a nesting colony is active, storks are dependent on consistent foraging opportunities in wetlands within approximately 30 km for the nest site, with the greatest energy demands occurring during the middle of the nestling period, when nestlings are 23 to 45 days old (Kahl 1964). The average wood stork family requires 201 kg (443 pounds) of fish during the breeding season, with 50 percent of the nestling stork's food requirement occurring during the middle third of the nestling period (Kahl 1964). Receding water levels are necessary in south Florida to concentrate suitable densities of forage fish (Kahl 1964; Kushlan et al. 1975).

Many researchers (Flemming et al. 1994; Ceilley and Bortone 2000) believe that the short hydroperiod wetlands provide a more important pre-nesting foraging food source and a greater effect on early nestling survival for wood storks than the foraging base (grams of fish per square meter) that is suggested in short hydroperiod wetlands. For instance, Loftus and Eklund (1994) provide an estimate of 50 fish per square meter for long hydroperiod wetlands and 10 fish per square-meter for short hydroperiod wetlands. As a result of the consistent pattern of drying that normally occurs during the stork nesting season, the short hydroperiod wetlands would also be the ones used for foraging early in the season when long hydroperiod wetlands remain too deep for storks to forage effectively, or sufficient prey concentration has not yet occurred as a result of drying.

Although the short hydroperiod wetlands support fewer fish and lower fish biomass per unit area than long hydroperiod wetlands, these short hydroperiod wetlands were historically more extensive and provided foraging areas for storks during colony establishment, courtship and nest-building, egg-laying, incubation, and the early stages of nestling provisioning. This period corresponds to the greatest periods of nest failure (*i.e.*, 30 percent and 8 percent, respectively from egg laying to hatching and from hatching to nestling survival to two weeks) (Rodgers and Schwikert 1997).

Based on Kahl's (1964) estimate that 201 kg are needed for the success of a nest, and that 50 percent of the foraging base is needed in the middle third of the nesting cycle when chicks are approximately 23-45 days old (Kahl 1962), it is estimated that about 50 kg are needed to meet the foraging needs of the adults and nestling in the first third of the nesting cycle. Considering the relatively low foraging values these short hydroperiod wetlands provide in relationship to corresponding long hydroperiod wetlands, a much larger acreages of these wetlands are needed to ensure survival and to sustain development of nestlings. The disproportionate reduction (85 percent) of this specific habitat loss known to have occurred from development and overdrainage has been proposed as a major cause of late colony formation and survivorship reduction in early nestling survival rates (Fleming et al. 1994b).

Storks that are not breeding do not require the same degree of fish concentration that is required to sustain successful nesting. Kahl (1964) estimated the food requirements for an individual free-flying stork to be approximately 502 g (live weight) per day. Storks that are not nesting are able to find sufficient prey to sustain themselves in many wetlands that would not be suitable to sustain adults and chicks during nesting.

Following the completion of the nesting season, both adult and fledgling wood storks generally begin to disperse away form the nesting colony. Fledglings have relatively high mortality rates within the first 6 months following fledging, most likely as a result of their lack of experience, including the selection of poor foraging locations (Hylton et al. 2006). Post-fledging survival also appears to be variable among years, probably reflecting the environmental variability that affects storks and their ability to forage (Hylton et al. 2006).

In southern Florida, both adult and juvenile storks consistently disperse northward following fledging in what has been described as a mass exodus (Kahl 1964). Storks in central Florida also appear to move northward following the completion of breeding, but generally do not move as far (Coulter et al. 1999). Many of the juvenile storks from southern Florida move far beyond Florida into Georgia, Alabama, Mississippi, and South Carolina (Coulter et al. 1999; Borkhataria et al. 2004; Borkhataria et al. 2006). Some flocks of juvenile storks have also been reported to move well beyond the breeding range of storks in the months following fledging (Kahl 1964). This post-breeding northward movement appears consistent across years.

Both adult and juvenile storks return southward in the late fall and early winter months. In a study employing satellite telemetry, Borkhataria et al. (2006) reported nearly all storks that had been tagged in the southeastern U.S moved into Florida near the beginning of the dry season, including all subadult storks that fledged from Florida and Georgia colonies. Adult storks that breed in Georgia remained in Florida until March, and then moved back to northern breeding colonies (Borkhataria et al. 2006). Overall, about 75 percent of all locations of radio-tagged wood storks occurred within Florida (Borkhataria et al. 2006). Preliminary analyses of the rangewide occurrence of wood storks in December, recorded during the annual Christmas bird surveys, suggest that the vast majority of the southeastern U.S. wood stork population occurs in central and southern Florida. Relative abundance of storks in this region was 10 to 100 times higher than in northern Florida and Georgia (Service unpublished data). As a result of these general population-level movement patterns, during the earlier period of the stork breeding season in southern Florida, the wetlands upon which nesting storks depend are also being heavily used by a large portion of the southeastern U.S. wood stork population, including storks that breed in Georgia and the Carolinas, and subadult storks from throughout the stork's range. In addition, these same wetlands support a wide variety of other wading bird species (Gawlik 2002).

Population Dynamics

The United States breeding population of wood storks declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960 (49 FR 7332). The total number of nesting pairs in 1995 was 7,853 with 11 percent in South Carolina, 19 percent in Georgia, and 70 percent in Florida (Service 1997).

Since the 1960s, the wood stork population has declined in southern Florida and increased in northern Florida, Georgia, and South Carolina (Ogden et al. 1987). The number of nesting pairs in the Everglades and Big Cypress ecosystems (southern Florida) declined from 8,500 pairs in 1961 to 969 pairs in 1995. During the same period, nesting pairs in Georgia increased from 4 to 1,501 and nesting pairs in South Carolina increased from 11 to 829 (Service 1996). The number of nesting pairs in northern and central Florida doubled between 1976 and 1986 (Ogden 1991). Although Ogden (1991) attributed this to an increase in the availability of altered wetland and artificial wetland nesting sites, the regional increase coincided with the northward shift of the wood stork breeding population center and the overall population decline in the southeastern U.S.

Both the size and success of a wood stork colony varies from year to year based on availability of suitable wetland foraging areas, which can be affected by local rainfall patterns, regional weather patterns, and anthropogenic hydrologic management (Service 1996). The colony site may be vacant in years of drought due to inadequate foraging conditions in the surrounding area. Traditional colony nesting sites may be abandoned completely by storks when hydrological changes occur, removing surface water from beneath the colony trees. Conversely, nesting failures and colony abandonment may occur if unseasonable rainfall causes waters to rise when they are normally receding, thus dispersing rather than concentrating forage fish.

Between 1958 and 1985, the wood stork breeding population center shifted north from Lake Okeechobee to Polk County, a distance of about 132 km (82 miles). The 1976 breeding season was the last year when more pairs nested in south Florida than in central-north Florida. Productivity is generally higher in central-north Florida than south Florida. Whereas the number of colonies in south Florida has remained relatively stable, the number of colonies in central-north Florida region continues to increase (Ogden et al. 1987). The increase in central-north Florida is associated with an increase in colony numbers and not colony size. Colonies in the north are smaller than colonies in the south. Historically colonies in the south were associated with extensive wetlands and food was abundant. The implication is that food resources may be limiting colony sizes in central-north Florida (Ogden et al. 1987). Ogden et al. (1987) suggested the population shift is the result of deteriorating feeding conditions in south Florida and better nesting success rates in central-north Florida that compound population growth in that area.

The wood stork life history strategy has been characterized as a "bet-hedging" strategy (Hylton et al. 2006) in which high adult survival rates and the capability of relatively high reproductive output under favorable conditions allow the species to persist during poor conditions and capitalize on favorable environmental conditions. This life-history strategy may be adapted to variable environments (Hylton et al. 2006) such as the wetland systems of southern Florida.

Nest initiation date, colony size, nest abandonment, and fledging success of a wood stork colony varies from year to year based on availability of suitable wetland foraging areas, which can be affected by local rainfall patterns, regional weather patterns, and anthropogenic hydrologic management (Service 1997). A colony site may be vacant in years of drought or unfavorable conditions due to inadequate foraging conditions in the surrounding area (Kahl 1964). Traditional colony nesting sites may be abandoned completely by storks when hydrological changes occur such as removing surface water from beneath the colony trees (Service 1997; Coulter et al. 1999). Nesting failures and colony abandonment may also occur if unseasonable rainfall causes water levels to rise when they are normally receding, thus dispersing rather than concentrating forage fish (Kahl 1964; Service 1997; Coulter et al. 1999).

The annual climatological pattern that appeared to stimulate the heaviest nesting efforts by storks was a combination of the average or above-average rainfall during the summer rainy season prior to colony formation and an absence of unusually rainy or cold weather during the following winter-spring nesting season. This pattern produced widespread and prolonged flooding of summer marshes that maximized production of freshwater fishes, followed by steady drying that concentrated fish during the dry season when storks nest (Kahl 1964).

Status and Distribution

The wood stork is found from northern Argentina, eastern Peru, and western Ecuador north to Central America, Mexico, Cuba, Hispaniola, and the southeastern United States (AOU 1983). Only the population segment that breeds in the southeastern U.S. is listed as endangered. In the United States, wood storks were historically known to nest in all coastal states from Texas to South Carolina (Wayne 1910; Bent 1926; Howell 1932; Oberholser 1938; Dusi and Dusi 1968; Cone and Hall 1970; Oberholser and Kincaid 1974). Dahl (1990) estimates these states lost about 38 million acres, or 45.6 percent, of their historic wetlands between the 1780s and the 1980s. However, it is important to note wetlands and wetland losses are not evenly distributed in the landscape. Hefner et al. (1994) estimated 55 percent of the 2.3 million acres of the wetlands lost in the southeastern United States between the mid-1970s and mid-1980s were located in the Gulf-Atlantic Coastal Flats. These wetlands were strongly preferred by wood storks as nesting habitat. Currently, wood stork nesting is known to occur in Florida, Georgia, South Carolina, and North Carolina. Breeding colonies of wood storks are currently documented in all southern Florida counties except for Okeechobee County. Additional expansion of the breeding range of wood storks in the southeastern U.S. may continue in coming years, both to the north and possibly to the west along the Gulf Coast (Billy Brooks, Service, personal communication 2006).

The decline in the U.S. population of the wood stork is thought to be related to one or more of the following factors: (1) reduction in the number of available nesting sites; (2) lack of protection at nesting sites; and/or (3) loss of an adequate food base during the nesting season

(Ogden and Nesbitt 1979). Ogden and Nesbitt (1979) indicate a reduction in nesting sites is not the cause in the population decline, because the number of nesting sites used from year to year is relatively stable. They suggest loss of an adequate food base is a cause of wood stork declines. Changes in remaining wetland systems in Florida, including drainage and impoundment, may be a larger problem for wood storks than loss of foraging habitat (Ogden and Nesbitt 1979).

The primary cause of the wood stork population decline in the United States is loss of wetland habitats or loss of wetland function resulting in reduced prey availability. Almost any shallow wetland depression where fish become concentrated, either through local reproduction or receding water levels, may be used as feeding habitat by the wood stork during some portion of the year, but only a small portion of the available wetlands support foraging conditions (high prey density and favorable vegetation structure) that storks need to maintain growing nestlings. Browder et al. (1976; Browder 1978) documented the distribution and the total acreage of wetland types occurring south of Lake Okeechobee, Florida, for the period 1900 through 1973. We combined their data for habitat types known to be important foraging habitat for wood storks (cypress domes and strands, wet prairies, scrub cypress, freshwater marshes and sloughs, and saw grass marshes) and found these habitat types have been reduced by 35 percent since 1900.

The alteration of wetlands and the manipulation of wetland hydroperiods to suit human needs have also reduced the amount of habitat available to wood storks. The decrease in wood storks nesting on Cape Sable was related to the construction of the drainage canals during the 1920s (Kushlan and Frohring 1986). Water level manipulation can facilitate raccoon predation of wood stork nests when water is kept too low (alligators deter raccoon predation when water levels are high). Artificially high water levels may retard nest tree regeneration since many wetland tree species require periodic droughts to establish seedlings. Water level manipulation may decrease food productivity if the water levels and length of inundation do not match the breeding requirements of forage fish. Dry-downs of wetlands may selectively reduce the abundance of the larger forage fish species that wood storks tend to utilize, while still supporting smaller prey fish.

Since the 1970s, wood storks have also been observed to shift their nest sites to artificial impoundments or islands created by dredging activities (Ogden 1991). The percentage of nests in artificial habitats in central and north Florida has increased from approximately 10 percent of all nesting pairs in 1959 to 1960 to 60 to 82 percent between 1976 and 1986 (Ogden 1991). Nest trees in these artificially impounded sites often include exotic species such as Brazilian pepper or Australian pine (*Casuarina* spp.). Ogden (1996) has suggested the use of these artificial wetlands indicates wood storks are not finding suitable conditions within natural nesting habitat or they are finding better conditions at the artificial wetlands. The long-term effect of these nesting areas on wood stork populations is unclear.

Human disturbance is a factor known to have a detrimental affect on wood stork nesting (Service 1997). Wood storks have been known to desert nests when disturbed by humans, thus exposing eggs and young birds to the elements and to predation by gulls and fish crows. The role of chemical contamination in the decline of the wood stork is unclear. Pesticide levels high enough to cause eggshell thinning have been reported in wood storks but decreased productivity has not yet been linked to chemical contamination (Ohlendorf et al. 1978; Fleming et al. 1984). Burger et al. (1993) studied heavy metal and selenium levels in wood storks from Florida and Costa Rica.

Adult birds generally exhibited higher levels of contaminants than young birds. The authors attribute this to bioaccumulation in the adults who may be picking up contaminants at the colony nesting site and while foraging at other locations during the non-breeding season. There were higher levels of mercury in young birds from Florida than young birds or adults from Costa Rica. Young birds from Florida also exhibited higher levels of cadmium and lead than young birds from Costa Rica. The authors recommended the lead levels in Florida be monitored. Burger et al. (1993) drew no conclusions about the potential health effects to wood storks.

The wood stork population in the southeastern U.S. appears to be increasing. Preliminary population totals indicate that the stork population has reached its highest level since it was listed as endangered in 1984. In all, approximately 11,200 wood stork pairs nested within their breeding range in the southeastern U.S. Wood stork nesting was again recorded in North Carolina in 2006 after it was first documented there in 2005. This suggests that the northward expansion of wood stork nesting may be continuing. Several new colonies were located in 2006, including several in Florida. Of the preliminary total of 11,232 nesting pairs, 7,261 occurred within Florida. There were 1,919 nests recorded in Georgia, 1,963 in South Carolina, and 125 in North Carolina. Total nest numbers have also been over 9,000 in 2002 and 2003 (Service 2004). The number of colonies also continues to rise, and over 80 nesting colonies were reported in 2006 throughout the southeastern U.S. (Service, unpublished data), which is the highest to date in any one year.

The 2006 stork nesting season also appears to be very productive for storks throughout their range. While final productivity estimates are still not available, preliminary estimates are over 2.5 chicks per nest (Borkhataria et al. 2006). The apparent success this year is welcome news in light of the nearly complete failure of stork nesting in 2005 in southern Florida, and relatively poor nest success rates in this region that have occurred since 2002.

Recovery Goals

Measuring the biological aspect of the recovery of the wood stork is outlined in the Service's 1997 recovery plan. The plan's recovery criteria state that reclassification from endangered to threatened, could be considered when there are 6,000 nesting pairs and annual regional productivity is greater than 1.5 chicks per nest/year (calculated over a 3-year average). Delisting could be considered when there are 10,000 nesting pairs calculated over a 5-year period beginning at the time of reclassification and annual regional productivity is greater than 1.5 chicks per nest/year (calculated over a 5-year average). As a subset of the 10,000 nesting pairs, a minimum of 2,500 nesting pairs must occur in the Everglades and Big Cypress systems in south Florida. In 2001, the Service reinitiated another 5-year synoptic aerial survey effort for wood stork colonies throughout the southeast range of the species (Service 2003), and surveys have been conducted annually through 2006. Three-year averages calculated from nesting data from 2001 through 2006 indicate that the total nesting population has been consistently above the 6,000 threshold, and the averages have ranged from approximately 7,400 to over 8,700.

Wood Stork Nesting in the Southeastern U.S.

The 2006 estimate of total wood stork nesting pairs is the highest recorded since the stork was listed, and since the early 1960s (Table 7). The trend in the total nesting numbers shows a steady increasing trend, with some degree of variation around the trend that occurs as a result of environmental conditions, etc. The number of known stork colonies has also shown a steady increase over time (Figure 10), so the increase in nesting effort is primarily occurring as a result of nesting in more places, and not as a result of growth in known colonies.

Wood Stork Nesting in the Everglades and Big Cypress Systems

There is confusion in the definition among the Service and species experts about what constitutes the boundaries of the Everglades and Big Cypress systems. The MSRP defines the Everglades and Big Cypress systems as those colonies south of Lake Okeechobee from Lee County on the west coast to Palm Beach County on the East Coast. Nesting pairs for colonies in this region totaled have been variable, but have shown a general pattern of decline within the past 4 to 5 years (Crozier and Gawlik 2003; Service 2003; Crozier and Cook 2004, Cook and Call 2005). However, in a review of the 10-year nesting data (Table 8, Figure 11), wood stork nesting success have shown a significant increase from the mid-1990 from an average of 400 to 500 pairs to a high of 4,549 pairs in 1999, with a three-year running average over the 10-year period ranging from 507 to 3,742 pairs with considerable variability over the 10-year period. These observed fluctuations in the nesting between years and nesting sites has been attributed primarily to variable hydrologic conditions during the nesting season (Crozier and Gawlik 2003; Crozier and Cook 2004). Frequent heavy rains during nesting can cause water levels to increase rapidly. The abrupt increases in water levels during nesting, termed reversals (Crozier and Gawlik 2003), may cause nest abandonment, re-nesting, late nest initiation, and poor fledging success. Abandonment and poor fledging success was reported to have affected most wading bird colonies in southern Florida during 2004 and 2005 (Crozier and Cook 2004, Cook and Call 2005).

Analysis of the species likely to be affected

The United States breeding population of wood storks declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960 (49 FR 7332). The total number of nesting pairs in 1995 was 7,853 with 11 percent in South Carolina, 19 percent in Georgia, and 70 percent in Florida (Service 1997). However, the wood stork population in the southeastern U.S. appears to be increasing. Preliminary population totals indicate that the stork population has reached its highest level since it was listed as endangered in 1984. In all, approximately 11,200 wood stork pairs nested within their breeding range in the southeastern U.S. Wood stork nesting was again recorded in North Carolina in 2006 after it was first documented there in 2005. This suggests the northward expansion of wood stork nesting may be continuing. Several new colonies were located in 2006, including several in Florida.

The primary cause of the wood stork population decline in the United States is loss of wetland habitats or loss of wetland function resulting in reduced prey availability. The alteration of wetlands and the manipulation of wetland hydroperiods to suit human needs have also reduced the amount of habitat available to wood storks and affected the prey base availability. The altered hydrology of these systems has also fostered the invasion of these systems by the exotic plant species, melaleuca. This plant species produces a dense understory and closed canopy, limiting suitability of these wetland systems to foraging by wood storks, although sufficient prey base may be present in the wetlands. Increasing human population has resulted in increasing impacts on native habitat and flora and fauna. Resulting threats to wood storks include habitat loss, habitat fragmentation, and human disturbance.

ENVIRONMENTAL BASELINE – FLORIDA PANTHER

The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions, which occur simultaneously with the consultation in progress.

Status of the Species within the Action Area

As stated previously, for the purposes of this consultation, the action area includes the Corps' project area and surrounding lands frequently visited by panthers (Figure 7). The action area is a subset of the current geographic range of the panther and includes those lands that the Service believes may experience direct and indirect effects from the proposed development. Therefore, for both direct and indirect effects, the action area is defined as all lands within a 25-mile radius of the project. This action area does not include urban lands and lands west of I-75. The proposed action may have direct and indirect effects on the ability of panthers to breed, feed, and find shelter, and to disperse within the population.

The Service used current and historical radio-telemetry data, information on habitat quality, prey base, and evidence of uncollared panthers to evaluate panther use in the action area. Panther telemetry data are collected 3 days per-week from fixed-wing aircraft, usually in early to midmorning. However, researchers have shown panthers are most active between dusk and dawn (Maehr et al. 1990a, Beier 1995) and are typically at rest in dense ground cover during daytime monitoring flights (Land 1994). Therefore, telemetry locations may present an incomplete picture of panther activity patterns and habitat use (Comiskey et al. 2002). In addition, telemetry data alone may be misleading since less than half of the panther population is currently collared.

Although telemetry data may not provide a complete picture of panther activity patterns, telemetry locations are a good indicator, due to the extensive data set, of the approximate boundaries of home ranges, panther travel corridors, and the range of Florida panthers south of the Caloosahatchee River. The FWC also uses observational data collected during telemetry flights to assess the yearly breeding activity of radio-collared panthers. Female panthers accompanied by kittens or male panthers within close proximity of an adult female were assumed to have engaged in breeding activity during that year. Documentation by McBride (Shindle et al. 2003) shows that between July 2002 and June 2003, 12-collared panthers, 4-uncollared females, and 3-uncollared males had home ranges in or home ranges that overlapped or were immediately adjacent to the same survey unit as the Mirasol project. In addition, 8 other panthers that used this same survey unit previously died during this time period (Shindle et al. 2003). This unit, designated as Unit 5, includes the Florida Panther NWR, Corkscrew Swamp Sanctuary, and CREW.

Within the 25-mile radius action area, based on telemetry data as of January 2007, at least 27 living radio-collared panthers have overlapping home ranges. These panthers are FP 48 (female), FP 54 (male), FP 57 (female), FP 60 (male), FP 62 (male), FP 65 (male), FP 66 (female), FP 75 (female), FP 83 (female), FP 100 (female), FP 107 (female), FP 110 (female), FP 113 (male), FP 119 (male), FP 130 (male), FP 131 (male), FP 133 (male), FP 135 (male), FP 137 (male) and FP 139 (male), FP 140 (female), FP 141 (male), FP 143 (male), FP 144 (male), FP 146 (male), FP 147 (male), and FP 148 (female). In addition, McBride (2003) notes previous use of the action area by other panthers prior to their mortality. Six of these panthers are likely dispersing sub-adult males or sub-adult females without established territories. The nearest telemetry point to the site of a panther still alive as of this document, was FP 66 (female), recorded about 4 miles to the east. FP 92 (male) was documented less than 0.1 mile from the project site in July 2001; however, he died of unknown causes in September of that same year.

Historically, there have been a total of six radio-collared male and female panthers (FP 28, FP 64, FP 66 FP 92, FP 99, FP 104, and TX 101) recorded within 5 miles of the project site on 80 occasions based on telemetry data from February 1981 through June 30, 2006 (Figure 12). This translates to an average of 4.7 occurrences per year or one occurrence every 78 days. Panther 28 was documented 6 times in 1989 and died in 1992 from intraspecific aggression. Panther 64 was documented 8 times in 1998 and died in 1999 from intraspecific aggression. Panther 66 was documented 4 times and is alive with a home range in Belle Meade and FPNWR. Panther 92 was documented 19 times in 2001 and died in 2001 from unknown causes. Panther 99 was documented 37 times from 2001 to 2002 and died in 2002 from a vehicle collision. Panther 104 was documented 1 time in 2002 and died in 2006 from an infection. Texas puma 101 was documented 5 times in 1995 and died of unknown causes in 2000. No other radio-collared panthers have been documented within 5 miles of the project site since November 2002. The status and activities of uncollared Florida panthers within the action area are unknown. However, the Service believes the project site may occasionally be used by other non-collared panthers because it contains habitat types used by panthers and their prey, and the project vicinity has been used historically by panthers as indicated by telemetry locations.

Past and ongoing Federal and State actions affecting panther habitat in the action area include the issuance of Corps permits and State of Florida Environmental Resource Permits authorizing the filling of wetlands for development projects and other purposes. Since 1982, the Corps and the State have had a joint wetland permit application process, where all permit applications submitted to the State are copied to the Corps and vice versa. Within the 25-mile action area, the Service, since January 14, 1992, has formally consulted on 57 projects and informally consulted on 9 projects regarding the panther that were a result of Federal actions (database entries for formal consultations prior to 1992 are incomplete for projects in the action area). These projects have impacted or are expected to impact about 40,636 acres of panther habitat. These projects have also incorporated a total of 30,454 acres of preservation and restoration of panther habitat. The impacted lands generally are: (1) on the western fringe of occupied panther habitat; (2) vegetated with dense stands of exotic species, which may adversely affect the density of the panther prey base; and/or (3) support agricultural enterprises, *i.e.*, row crops, citrus, etc., which provide a lower quality habitat value to the Florida panther. The preserved lands, which are generally proximate to larger tracts of Federal, State, and other preserves, provide a higher quality habitat value for the Florida panther. The Service determined in the biological opinions issued for the 57 Federal actions requiring formal consultation, that individually and cumulatively these projects do not jeopardize the survival and recovery of the Florida panther.

From July 2000 through September 2006, the Service also engaged in informal consultation for projects under 5 acres with the Corps for about 757 projects affecting about 764.1 acres in Collier County (primarily Northern Golden Gate Estates) and about 202.8 acres in Lee County (primarily Lehigh Acres) (database entries for informal consultations prior to 2000 are incomplete for projects in the consultation area). Almost all of these projects involved the construction of single-family residences in partially developed areas, each in most cases involving less than an acre of direct impact. Although panthers have been known to cross these areas to other parts of their range, prey base and denning utilization of these areas have been affected by the level of development and the additions of these residences is not expected to significantly further impact these habitat functions. For these actions, the Service concurred with the Corps' determination of "may affect, but is not likely to adversely affect" for these individual projects. These projects have been incorporated into the Service's environmental baseline for the Florida panther.

We have received information that within the action area, the Corps has, between March 16, 2004, and August 8, 2005, issued non-jurisdictional wetland determinations (isolated wetlands) for 10 projects totaling 3,779 acres in Collier County and for 10 projects totaling 276 acres in Lee County. These determinations were issued per jurisdictional guidance provided recently in the Supreme Court decision, *Solid Waste Agency of Northern Cook County vs. U.S. Army Corps of Engineers,* 531 U.S. 159 (2001) and, therefore, they will not require a Federal Clean Water Act 404 wetland permit. These projects have been incorporated in the Service's environmental baseline for the Florida panther in this biological opinion and the Service has determined, based on the location of these projects (generally in the western fringe of the panther's geographic range), the quality of the habitat present on these project sites, and the overall status of the Florida panther, these projects individually and cumulatively do not jeopardize the survival and recovery of the Florida panther. However, since loss of panther foraging habitat may occur from construction of these projects and no Corps wetland permit is required, the Service is requesting the applicants pursue Habitat Conservation Plans in cooperation with the Service.

There have been 54 documented panther-vehicle collisions within the 25-mile action area (see Table 9 and Figure 9). The panther-vehicle collision closest to the project site (FP 99 [male]) occurred in 2002, on CR 846, about 7 miles east of the site. Another panther, UCFP 79 (female), was killed about 0.2 mile north of the FP 99 mortality on the same road in 2006. Four panther-vehicle collisions have occurred in the action area in 2006. One occurred 7 miles east of the project on CR 846; one occurred 17 miles south of the project on US 41; and, two occurred 11 miles and 25 miles north of the project on Corkscrew Road and I-75, respectively.

Activities within the action area have also benefited panthers. The issuance of Corps and State of Florida Environmental Resource Permits has preserved 30,454 acres of high quality panther habitat for permitted impacts to 40,636 acres of poor quality panther habitat (1992 to present). Installation of wildlife crossings under SR 29 and I-75 within the action area has also benefited the panther by protecting habitat connectivity and eliminating panther-vehicle collision mortalities. Additional benefits have resulted from the acquisition of high quality habitat through acquisition programs by the other Federal, State, and County resource agencies. Table 10 provides a summary of the State and County acquisitions within the last 5 years.

Moreover, the management of public lands, including prescribed fire and eradication of exotic vegetation in the Picayune Strand State Forest, Fakahatchee Strand State Preserve, Florida Panther NWR, ENP, and other conservation areas, is intended to improve habitat for panther prey species, which benefits panthers within these areas.

Factors Affecting Species Environment within the Action Area

Factors that affect the species environment (positively and negatively) within the action area include, but are not limited to, the presence and construction of highways and urban development, agriculture, resource extraction, public lands management (prescribed fire, public use, exotic eradication, etc.), hydrological restoration projects, public and private land protection efforts, effects of genetic inbreeding, and genetic restoration.

Development activities may result in avoidance or limited use of remaining suitable habitat by panthers as well as habitat loss, habitat fragmentation, habitat degradation, and also an increase in risk of vehicular collision (*e.g.,* injury or death).

Public and private land management practices can have a positive, neutral, or negative effect, depending on the management goals. Land protection efforts will help to stabilize the extant population. Hunting of the panther is no longer sanctioned, although there still may be instances of intentional or unintentional shooting of individuals for various reasons.

Wildlife Value and Habitat Quality: As discussed previously in the status of the species, the Service believes the existing habitat conditions present on a site and the foraging value that a site provides to the Florida panther and panther prey species are an important parameter in assessing the importance of the project site to the Florida panther and other wildlife species. In order to assess this importance, the Service requires wildlife surveys and plant species compositions as part of the applicant's biological assessment prepared for the project.

***Wildlife Value*:** A protected species survey was initially conducted by Turrell from June 1999 to March 2000 utilizing belt transects and drift fence and bucket trap arrays. Turrell has also provided more recent observations based on on-going wildlife surveys. A survey for white-tailed deer (*Odocoileus virginianus*) and feral hog (*Sus scrofa*) tracks was conducted and eight sets of white-tail deer tracks were observed, but no feral hog tracks were observed. Based on the track surveys, the applicant calculated a deer density of one deer per 591 acres. Evidence of armadillo, bobcat and raccoon was observed during the surveys. Other small mammals also constituting panther prey may utilize the site. Bears, which also prey on small mammals, have been documented by their tracks in the northeastern portion of Section 15 and along Broken-Back Road to the east of the project site.

Based on the track surveys (Tyson 1952), deer densities on exotic-infested private lands in Lee County have averaged one deer per 591 acres (Turrell 2001) to one deer per 534 acres (Passarella Associates, Incorporated 2004). In comparison, deer densities on wildlife management areas average one deer per 165 acres to one deer per 250 acres (Steelman et al. 1999). Density estimates from deer tracks, however, should be viewed with caution. Track estimates are most appropriately used as long-term indicators (McCown 1991) and several factors can influence counts including weather, food abundance, population density, season, and availability of water (O'Connell et al. 1999).

The Service believes the habitats on the property provide marginal quality foraging for prey species, which directly affects value of the habitat to panthers, and specifically, the frequency and duration of use of the property by panthers. As discussed previously, white-tailed deer densities and other prey species are influenced by the quality of the foraging habitat present in an area. Monotypic stands of poor quality foraging plant species and the invasion of a site by exotic plants provide lower habitat foraging values and affect the utilization by and density of foraging species.

The habitats in the project area have also experienced similar vegetation changes. Historical vegetation on the property included a mosaic of upland and wetland habitats that provided a seasonal pattern of plant growth. However, past agricultural practices and the invasion of the habitats by the exotics, melaleuca and Brazilian pepper, have resulted in the growth of dense stands of monotypic, unpalatable plant species that provide poor quality foraging needs for resident deer populations. While the on-site preservation area, with its growth of invasive exotic plant species and altered hydrology also displays similar foraging restrictions, the proposed enhancements will result in a more diverse mosaic of plant species, which will provide an increased foraging value to panther prey species, especially resident deer populations.

Habitat Quality/Habitat Assessment Methodology Application: The application of the habitat assessment methodology including the base ratio, landscape multiplier, PHU determinations, and compensation recommendations, are presented below for the Mirasol project and compensation areas.

Table 11 illustrates the PHU calculations for the Mirasol project with impacts to 773 acres of land in the Primary Zone and compensation provided by the preservation and enhancement of about 1,117 acres of panther habitat (941 acres on-site, about 94 acres off-site, and about 82 acres at PIMB) in the Primary Zone. Table 11 shows the 773-acre impact area to presently support 3,756 PHUs. This value is multiplied by 2.0 to provide the base ratio compensation need, which is 7,512 PHUs. The Service had previously agreed, prior to the reinitiation of formal consultation with the Corps, that a base ratio of 2.0 would be the multiplier for recommended compensation for project functional habitat evaluations.

Since the project is located in the Primary Zone and compensation is in the Primary Zone, the base ratio PHUs are unaffected by the landscape compensation multiplier of 1.0.

The 1,117 acres provided by on-site (6,500) and off-site preserves (738) and credits at PIMB (750) provides for 7,988 PHUs. Therefore, the Service believes the impacts associated with the habitat lost by the proposed project will be minimized by the compensation actions proposed by the applicant. The lands proposed for development are on the western limits of the panther's range and panther habitat value has been diminished by exotic infestation. Lands proposed for preservation are in the Primary Zone, adjacent to other natural lands, and will be consistent with the Service's panther goal to strategically locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of the Florida panther population south of the Caloosahatchee River.

Conservation Measures:

The beneficial effects of the project include preservation of 1,117 acres of Primary Zone panther habitat. The habitat quality provided to the Florida panther through preservation and restoration will be superior to that of the areas to be impacted. Though the project will result in a net loss in number of acres of habitat available to the panther, the habitat quality provided to the Florida panther through restoration and preservation will be superior to that of the areas to be impacted, and the habitat will be protected in perpetuity. The off-site panther habitat compensation parcel and surrounding area are presently providing a diverse mosaic of native plant species, which provide foraging value to resident deer populations. The site will be managed to prevent infestation by exotic vegetation in perpetuity. PIMB is in an area where panther usage has been high historically, though fewer collared panthers have been documented using this area recently. The mitigation bank, however, is in the panther Primary Zone and contains habitat valuable for breeding, foraging, and dispersal by the Florida panther. The restoration and preservation of the habitats at PIMB as a result of the credits purchased for this project will increase the overall quality of the habitats to panthers and should result in increased use by panthers.

EFFECTS OF THE ACTION

This section analyzes the direct and indirect effects of the project on the Florida panther and Florida panther habitat.

Factors to be Considered

Residential, commercial, and industrial development projects may have a number of direct and indirect effects on the Florida panther and panther habitat. Direct impacts, which are primarily habitat based, may include: (1) the permanent loss and fragmentation of panther habitat; (2) the permanent loss and fragmentation of habitat that supports panther prey; (3) roadway improvements: (4) the loss of available habitat for foraging, breeding, and dispersing panthers; (5) a reduction in the geographic distribution of habitat for the species; (6) harassment by construction activities; and (7) habitat compensation. Indirect effects may include: (1) an increased risk of roadway mortality to panthers traversing the area due to the increase in vehicular traffic; (2) increased disturbance to panthers and panther prey in the project vicinity due to human activities (human/panther interactions); (3) the reduction in value of panther habitat adjacent to the project due to habitat fragmentation; and (4) a potential increase of intraspecific aggression between panthers due to reduction of the geographic distribution of habitat of the panther. These indirect effects are habitat based, with the exception of vehicular mortality, which could result in lethal "take." Intraspecific aggression, though habitat based, could also result in lethal "take."

This project site contains marginal quality panther habitat (see discussion under Wildlife Assessment) and is located within the western portion of the geographic range of the Florida panther. The timing of construction for this project, relative to sensitive periods of the panther's lifecycle, is unknown. Panthers have the potential to be found on and adjacent to the proposed construction footprint year-round. The project will be constructed in a single, disruptive event, and result in permanent loss and alteration of a portion of the existing ground cover on the project site. The time required to complete construction of the project is not known, but it is likely that land clearing associated with the development could be undertaken in phases over several years. The disturbance associated with the project will be permanent and result in a loss of habitat currently available to the panther.

Analyses for Effects of the Action

The 1,714-acre Mirasol project site forms essentially a cul-de-sac on the extreme western edge of the Florida panther Primary Zone as designated by Kautz et al. (2006), and is located inside the Panther Focus Area as defined by the Service. The site currently provides habitat of mostly low quality for the Florida panther (see discussion under Wildlife Assessment). The project site is located on the western fringe of occupied habitat, is adjacent to existing or previously permitted urban development, and is not located within known dispersal corridors (FWC 2006b) between larger publicly owned managed lands. The project will result in the conversion of 773 acres of marginal quality panther habitat on-site into residential development and golf course.

Compensation for the loss of 773 acres of panther habitat will be through the protection and restoration of 941 acres on-site and about 176 acres of panther habitat off-site. Lands preserved are in the Primary Zone (Kautz et al. 2006) of the panther core lands (Figure 5). Restoration will be primarily through the removal of non-native and nuisance vegetation with some hydrological enhancement. The total compensation will provide about 7,988 PHUs to minimize the impact of the loss of 3,756 PHUs.

Direct Effects

Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, are reasonably certain to occur and include: (1) the permanent loss and fragmentation of panther habitat; (2) the permanent loss and fragmentation of habitat that supports panther prey; (3) roadway improvements: (4) the loss of available habitat for foraging, breeding, and dispersing panthers; (5) a reduction in the geographic distribution of habitat for the species; (6) harassment by construction activities; and (7) habitat compensation. The direct effects this project will have on the Florida panther within the action area are discussed below.

Permanent Loss and Fragmentation of Panther Habitat: The project will result in the loss of about 773 acres of habitat suitable for foraging and dispersal by the Florida panther. The remaining 941 acres on the 1,713-acre will be enhanced and preserved. The project lands are located inside and along the western edge of the Primary Zone. It is surrounded by existing or proposed development and agricultural activities. The land will be converted to residential development and golf course. The site offers a limited prey base and limited denning opportunities due to the artificially elevated water levels throughout the site. Though the habitat value of the project site to the panther is marginal, the habitat loss may adversely affect the panther by decreasing the spatial extent of lands available to the panther.

Panthers, because of their wide-ranging movements and extensive spatial requirements, are also particularly sensitive to habitat fragmentation (Harris 1984). Mac et al. (1998) defines habitat fragmentation as: "The breaking up of a habitat into unconnected patches interspersed with other habitat, which may not be inhabitable by species occupying the habitat that was broken up. The breaking up is usually by human action, as, for example, the clearing of forest or grassland for agriculture, residential development, or overland electrical lines." The reference to "unconnected patches" is a central underpinning of the definition. For panther conservation, this definition underscores the need to maintain contiguous habitat and protected habitat corridors in key locations in south Florida. Habitat fragmentation can result from road construction, urban development, and agricultural land conversions within migratory patterns of panther prey species and affect the ability of panthers to move freely throughout their home ranges. Construction of highways in wildlife habitat typically results in loss and fragmentation of habitat, traffic related mortality, and avoidance of associated human development. Roads can also result in habitat fragmentation, especially for females who are less likely to cross them (Maehr 1990).

As described above, the project site is adjacent to existing and permitted urban development and roadways and is at the extreme west edge of the Service's Panther Focus Area. The property is not located within known dispersal or connection corridors (FWC 2006b) to larger publicly owned managed lands. As a result of our analysis, we believe that fragmentation of panther habitat is not expected to result from project implementation.

Permanent Loss and Fragmentation of Habitat that Supports Panther Prey: Prey surveys documented use of the site by white-tailed deer, primary panther prey species. Melaleuca, which has infested over 85 percent of the project site at densities of greater than 50 percent coverage, is of poor foraging value to these and other prey species. The project will result in the loss of about 773 acres of habitat available for use by panther prey species on the 1,713-acre project site. It is bounded by CR 846 and existing development to the south, agricultural activity to the north, and existing and proposed development to the west. The northeast property boundary is undeveloped while the southeast boundary is adjacent to numerous small farms and out-parcels. Immediately to the east of these out-parcels is a former rock and gravel mine known as Mule Pen Quarry that has been converted into a residential development known as Heritage Bay. Although the native habitats have been degraded by high densities of exotic plants and hydrological alteration, suggesting that the foraging value of panther prey habitat is generally poor, the loss of habitat may adversely affect the panther by decreasing the spatial extent of lands available for use by panther prey. As described above however, the project site is in an area adjacent to existing and permitted urban development and roadways and is at the extreme west edge of the consultation area. The property is not located within known dispersal or connection corridors (FWC 2006b) to larger publicly owned managed lands. Therefore, as a result of our analysis, fragmentation of panther prey habitat is not expected.

Road Way Improvements: No expansion of surrounding roads will occur as part of the Mirasol project. Some improvements may be necessary to enhance the existing lanes and drainage swales to meet public health and safety standards for ingress and egrass of vehicles to the project development.

Loss of Available Habitat for Foraging, Breeding, and Dispersing Panthers: The site is bounded by existing or proposed residential development to the west and south, agricultural activity to the north, and provides limited use potential for the panther due to the exotic infestation and the distance from the more commonly used core lands of the panther. According to the FWC, an un-collared animal is known to frequent Bird Rookery Swamp approximately three miles northeast of the project, and a collared animal has been tracked north of Twin Eagles Golf Course approximately five miles to the east of the Project. Another collared animal was tracked onto the northern section of the project site in 2002 where it spent time as it progressed further north. Two living panthers, FP 146 (male) and FP 148 (female) have been documented about 8 to 9 miles south of the project on numerous occasions in 2006. Prior to that, the last animal documented within 10 miles of the project was in 2003, which was TX 106. TX 106 was last documented on January 6, 2003, and removed from the wild on January 8, 2003. Since the habitat quality of the site is generally poor, as it is primarily exotic-infested with limited foraging value for prey species, we believe panther usage of the site is limited; however, habitat loss may adversely affect the panther by decreasing the spatial extent of lands available to the panther for foraging, breeding, and dispersing.

Reduction in the Geographic Distribution of Habitat for the Species: The project will result in the loss of about 773 acres of non-developed land along the western edge of the Panther Focus Area. This loss represents only 0.04 percent of the 1,962,294 acres of available non-urban private lands in south Florida in the core area of the Florida panther (Table 3). The Service believes the habitat values lost by the development will be minimized by the preservation and restoration actions proposed by the applicant. The lands proposed for development are primarily exotic-infested native communities on the western fringe of the occupied range of the Florida panther and are adjacent to existing roads, urban areas, agriculture, and mining to the south, west, north, and east, respectively. The lands proposed for preservation are consistent with the Service's panther conservation strategy to locate, preserve, and restore sets of lands containing sufficient area, access, and appropriate cover types to ensure the long-term survival of the Florida panther south of the Caloosahatchee River.

Harassment by Construction Activities: The timing of construction for this project, relative to sensitive periods of the panther's lifecycle, is unknown. However, land clearing associated with the development will be completed in phases over several years. There are no known den sites within the project boundaries and the quality and quantity of the habitat foraging base for prey species is low. Therefore, we believe panther usage of the property is limited and we do not believe project construction will result in direct panther mortality, but may result in temporary disturbance to resident or dispersing panthers.

Compensation: The impact of the habitat lost as a result of the development will be minimized by the preservation and restoration actions proposed by the applicant. The applicant's proposed preservation acreage is estimated at 1,117 acres. The lands proposed for development are hydrologically disturbed, are invaded by exotic vegetation, are on the fringe of the currently occupied range of the Florida panther, are adjacent to urban areas and are adjacent to CR 846. The lands proposed for preservation are connected to other larger tracts of preserved lands and are consistent with the Service's panther goal to locate and preserve sets of lands containing sufficient area and appropriate cover types to ensure the long-term survival of the Florida panther south of the Caloosahatchee River.

Interrelated and Interdependent Actions

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. No interrelated or interdependent actions are expected to result from the project.

Indirect Effects

Indirect effects are those effects that result from the proposed action and are reasonably certain to occur. The indirect effects this project will have on the Florida panther within the action area are discussed below and in the assessment of functional habitat values previously discussed. They include: (1) an increased risk of roadway mortality to panthers traversing the area due to the increase in vehicular traffic; (2) increased disturbance to panthers and panther prey in the project vicinity due to human activities (human/panther interactions); (3) the reduction in value of panther habitat adjacent to the project due to habitat fragmentation; and (4) a potential increase of intraspecific aggression between panthers due to reduction of the geographic distribution of habitat of the panther.

Increased Risk of Roadway Mortality: In evaluating a project's potential to increase roadway mortality to the Florida panther, we consider the location of the project in relation to surrounding native habitats, preserved lands, and wildlife corridors that are frequently used by the Florida panther. We also consider the current configuration and traffic patterns of surrounding roadways and the projected increase and traffic patterns expected to result from the proposed action. We evaluate the habitats present on-site, their importance in providing foraging needs for the Florida panther and panther prey species, and if the site development would further restrict access to surrounding lands important to the Florida panther and panther prey species.

The project will result in minor increased vehicular traffic in the project vicinity during construction and operation. Vehicular mortality and injury data (see Table 9 and Figure 9) provided by the FWC indicate collisions with motor vehicles have been increasing since 2001 in the 25-mile radius project action area. In 2003 and 2004, there were seven documented panther-vehicle collisions per year within the project action area (Table 9). These 2 years represent the most panthers killed by vehicles in single years in the action area. Four panthers per year were killed in 2005 and 2006. Of the 54 documented collisions, 47 (87 percent) have occurred more than 10 miles away from the project site and 53 (98 percent) occurred more than 5 miles from the project site. There have been no panther-vehicle collisions closer than 5 miles from the project site.

According to traffic studies by Vanasse and Daylor, Incorporated, construction traffic will be coming from CR 846 and CR 951, which are south of the project. The access is along major roadways already heavily traveled. It is projected approximately 65 percent of the project traffic post construction will be to and from the west of the project on Immokalee Road (CR 846), 25 percent will be to/from the south of the project on CR 951, and 10 percent will be to/from the east of CR 951 on Immokalee Road. From a project average, daily traffic volume standpoint, 3,663 vehicles per day are projected on Immokalee Road to the west of the project, 1,409 vehicles per day are projected on CR 951 south of Immokalee Road, and 564 vehicles per day are projected on Immokalee Road to the east of CR 951. The projected project traffic estimated as a percentage of existing traffic represents an increase by about 9 percent of the existing traffic of Immokalee Road to the west of the project, by about 7 percent of the existing traffic on CR 951 south of Immokalee Road, and by about 3 percent of the existing traffic of Immokalee Road to the east of CR 951. From a percentage basis, the project traffic is projected to be 7 percent of the capacity of Immokalee Road to the west of the project, 3.1 percent of the capacity on CR 951 south of Immokalee Road, and 1 percent of the capacity of Immokalee Road to the east of CR 951.

The risk to the panther from collisions with vehicles as a result of the Mirasol project is difficult to quantify, the Service believes that the increase in traffic generated by the project may potentially contribute to mortality of panthers in the action area. Panthers are known to use the lands within the project vicinity and four panthers were killed within the project action area in 2006. The closest mortality was on CR 846 on-quarter mile north of the Collier County Fairgrounds on November 28, 2002, about 5 miles northeast of the proposed project site. Another panther, UCFP 79, was killed in that same vicinity on January 26, 2006. The most recent collision occurred on November 26, 2006. That panther, UCFP 88, was killed about 17 miles southwest of the project site on US 41 between Manatee Road and CR 951.

Panther and Prey Disturbance (Panther/Human Interactions): Potential increases in disturbance to the Florida panther and panther prey were evaluated. As discussed previously in our assessment of fragmentation, we considered habitat quality related factors and occurrence data for the Florida panther and panther prey species. This information is also the basis of our evaluation of disturbance to the Florida panther and to panther prey species. As discussed previously, the habitat on the project site consists of exotic-dominated wetland and upland communities that provide low quality habitat to the Florida panther. The site is primarily disturbed pine flatwoods, mixed hardwood-pine, and cypress swamp with greater than 50 percent melaleuca coverage over 85 percent of those habitat types, and thus exhibiting limited foraging value to panther prey species. Though panthers and panther prey may occasionally use the habitats within the project area, we believe panther usage of the property is infrequent and we do not believe project construction will result in a significant increase in panther/human interactions and prey disturbance.

Habitat Fragmentation: Considering our discussion of fragmentation under Direct Effects, the project site is located on the western fringe of occupied habitat, is adjacent to existing and proposed urban development, and is not located within known dispersal corridors to larger publicly owned managed lands important to the panther; therefore, fragmentation of panther habitat is not expected to result from project implementation. The project site is located on the western fringe of the Panther Focus Area. It is surrounded by existing or proposed development and agricultural activities. Therefore, fragmentation of panther prey species habitat is not expected.

Intraspecific Aggression: Potential increases in intraspecific aggression and disturbance to the Florida panther were evaluated. As discussed previously in our assessment of fragmentation and habitat for panther and panther prey, we considered habitat quality related factors and occurrence data for the Florida panther and panther prey species as factors affecting intraspecific aggression.

Since 1987 there has been only one documented panther mortality attributed to intraspecific aggression within 10 miles of the project site. FP 64 (male) died about 9 miles northeast of the project site in March 1999. This animal was killed by an uncollared male in Audubon's Corkscrew Sanctuary. The project area, on the other hand, is surrounded by existing and approved development and is in an area that has been previously fragmented by roads and land conversion. As previously discussed, the habitats on the property provide for low quality foraging for prey, which directly affects the frequency and duration of use of the property by panthers. However, the reduction in the geographic range of habitat for dispersal and/or escape cover may contribute to a potential increased risk of death or injury of panthers in the action area due to intraspecific aggression.

Species Response to the Proposed Action

The proposed action will result in increased human activity and noise in the project area during construction of the project. However, since panthers are not commonly known to use lands within and adjacent to the project site, activities associated with construction of the Mirasol project are not anticipated to significantly increase risk of disturbance to panthers, though some temporary disturbance may occur.

The project will result in the loss of a relatively small amount (773 acres) of potential panther habitat according to the most current home range estimates of the Florida panther (Lotz et al. 2005). This represents 2.6 percent of a female panther's average home range (29,059 acres) and 1.2 percent of a male panther's average home range (62,542 acres). The project area provides mostly poor quality panther habitat and panthers are not known to commonly use the project area; however, the loss of habitat may contribute to increases in intraspecific aggression decreasing the spatial extent of lands available to the panther for foraging, breeding, and dispersing. We anticipate any resident panthers with home ranges overlapping or in the vicinity of the project area will adjust the size and location of their ranges to account for this loss and that adjustment is anticipated to occur in concert with project construction.

Panthers are sensitive to habitat fragmentation. However, the project site is located on the western fringe of occupied habitat, is adjacent to urban development, and is not located within known dispersal corridors (FWC 2006b) between larger publicly owned managed lands. Therefore, fragmentation of panther habitat is not expected to result from project implementation.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions unrelated to the proposed action but located in the action area that would affect panthers are not considered in this section because they would require separate consultations pursuant to section 7 of the Act. To identify future private actions that would affect panthers and that may reasonably be certain to occur in the action area, the Service first identified the types of land alteration actions that could occur in the action area, then developed a mechanism to distinguish between those that will require future federal review and those that are not likely to be a future federal action, and thus meet the cumulative effects definition. To estimate future non-federal actions, the Service chose to identify and tabulate recent past non-federal actions and project this level of development as representative of future non-federal actions.

Within the action area, past and ongoing state and county actions affecting panther habitat include: (1) State of Florida DRI Orders (2001 to 2004); (2) Comprehensive Plan Amendments (2003 to 2004); (3) Lee and Collier County Zoning Amendments (2003 to 2004); (3) Collier County's PUDs (2001 to 2004); (4) Lee County's PUDs (2003 to April 2004); and (5) South Florida Water Management District's Environmental Resource Permits (2003 to 2004) (Figure 13). To evaluate these effects, the Service incorporated the Florida Land Use, Cover and Forms Classification System (FLUCCS) mapping to determine properties that may be exempt from Federal Clean Water Act section 404 wetland regulatory reviews by the Corps. To determine which of these projects would likely be exempt from Federal Clean Water Act section 404 wetland regulatory reviews by the Corps, we identified the percentage of the project site that was classified as wetland habitat, based on the FLUCCS mapping units. The mapping units relied on by the Service included the 600 series (wetland classifications) and the 411 and 419 pine flatwood classifications (hydric pine systems). For listing purposes, properties with less than 5 percent wetlands were considered by the Service to be generally exempt from regulatory review as these quantities of wetlands could be avoided by project design.

Within the action area, based on FLUCCS mapping, about 2,581 acres could be expected to be subject to development without Federal permit involvement through the Clean Water Act section 404 (Table 12). This level of development represents 9.0 percent of a female panther's average home range (29,059 acres) and 4.2 percent of a male panther's average home range (62,542 acres).

State and county land alteration permits in southwest Florida not part of those actions listed above, generally included single-family residential developments within Northern Golden Gate Estates and Lehigh Acres. Vacant lands within the area of Northern Golden Gate Estates (north of I-75), also within the action area, totaled about 34,028 acres as of September 2004 (Figure 14). To evaluate these effects, the Service overlaid the plat boundaries on 2004 aerials, queried the parcel data from Collier County's Property Appraisers Office, noted lots with developments, compared those to 2003 aerials, and noted the changes. Vacant lands within the area of Northern Golden Gate Estates (north of I-75) totaled about 35,768 acres as of August 2003. The breakdown of acres for August 2003 is: (1) wetlands, about 17,572 acres; (2) uplands, about 17,990 acres; and (3) water, about 210 acres. These changes were overlain on the National Wetlands Inventory (NWI) maps for presence of wetlands. This evaluation was used to estimate the acreage of properties that may be exempt from Federal Clean Water Act section 404 wetland regulatory reviews by the Corps. A comparison of the 2003 and 2004 data for Northern Golden Gate Estates indicates about 1,740 acres of land were converted from vacant to developed with the breakdown as: (1) wetlands, about 696 acres; and (2) uplands, about 1,740 acres.

The evaluation process provided an estimate of 417 lots totaling 1,740 acres for Northern Golden Gate Estates. Therefore, using NWI mapping for the Northern Golden Gate Estates, a total of about 1,740 acres could be expected to be subject to development in a year in these areas without Federal permit involvement. Based on historical records for wetland permits issued by the Corps for these areas, most of these projects will involve the construction of single-family residences in partially developed areas and will involve less than an acre of impact. This level of development represents 3.59 percent of a female panther's average home range (29,059 acres) and 1.67 percent of a male panther's average home range (62,542 acres).

Vacant lands within the area of Lehigh Acres, also within the action area, totaled about 34,852 acres as of April 2003 (Figure 15). The breakdown of acres is: (1) wetlands, about 1,057 acres; (2) uplands, about 33,592 acres; and (3) water, about 202 acres. A review of aerial photography and Lee County building permit data for Lehigh Acres from the 1-year period prior to April 2003 indicates about 441 acres of land was converted from vacant to occupied, during the 1-year period. The breakdown of converted acres is estimated as: (1) wetlands, 66 acres; (2) uplands, 375 acres; and (3) water, 0 acres. Therefore, using NWI mapping, about 375 acres could be expected to be subject to development in a year in this area without Federal permit involvement.

In conclusion, the Service's cumulative effects analysis has identified about 4,000 acres within the action area that could be developed without Federal wetland permit involvement. This level of development, which the Service believes is representative of future non-Federal actions, is reasonably certain to occur and, therefore, meets the definition of cumulative effect. This level of projected future development represents 14 percent of a female panther's average home range (29,059 acres) and 6.5 percent of a male panther's average home range (62,542 acres), though the impacts will be scattered and generally located on the fringes of occupied panther habitat, supported primarily with disturbed vegetative communities, in row crops, or in partially developed areas. These lands represent 0.22 percent of the non-urban private lands at risk in the core area (1,962,294 acres) (Table 3). Based on the above analysis, we believe the loss of the habitat associated with these lands, though insignificant in the short term, may adversely impact the panther as development continues to occur in the future in the action area. The Service has accounted for some habitat loss and changes in habitat quality through its habitat assessment methodology and is encouraging state and county environmental staff to pursue section 10 (HCP) process to account for and compensate for adverse effects to the Florida panther.

SUMMARY OF EFFECTS

Panther Usage: The timing of construction for this project, relative to sensitive periods of the panther's lifecycle, is unknown. However, it is likely all land clearing associated with the development will be completed in phases over several years. There are no known den sites within the project boundaries and the quality and quantity of the foraging prey base is low. Though panthers likely use the habitats within the project's action area, we believe panther usage of the project site is infrequent and we do not believe project construction will result in direct panther mortality, but may result in temporary disturbance to resident or dispersing panthers.

Traffic: There will be traffic increases with project development. As discussed above and in previous sections, the lands on the project site provide limited value to the Florida panther and panther prey species, the site is adjacent to existing and proposed urban development, and the proposed action will further restrict suitability of the site for use by either resident or dispersing panthers. Panthers, however, are known to use the lands within the action area and collisions with motor vehicles have been increasing since 2001 in the project action area. Although the risk to the panther from collisions with vehicles as a result of the Mirasol project is difficult to quantify, the Service believes that the increase in traffic generated by the project may potentially contribute to mortality of panthers in the 25-mile radius action area.

Habitat Loss: The Service, based on the habitat evaluations discussed previously, believes the project will result in the direct and indirect loss of about 773 acres of mostly low quality panther habitat within the Primary Zone (see discussion under Wildlife Assessment). Habitat types are primarily exotic-infested wetlands and other natural communities. The prevalence of exotics within the project area provides limited foraging value to panther prey species. We believe panther usage of the site is limited; however, the permanent loss is anticipated to adversely affect the panthers in the action area by decreasing the spatial extent of lands available for foraging, breeding, and dispersing. This loss of about 773 acres of panther habitat represents 0.04 percent of the 1,962,294 acres of available non-urban private lands in the core area. This small loss (0.04 percent) of non-urban private lands on the western edge of the panther's range will not adversely affect the Service's land conservation and preservation goals.

Compensation: The project will provide for the preservation of about 1,117 acres of Primary Zone habitat. The functional value of the habitats to the panther will be maintained long-term through hydrological restoration and the removal of exotic vegetation. The preservation of these lands in the panther core area represents 0.14 percent of the 799,205 acres of private lands still needed for the population of 90 individuals. The preservation of about 1,117 acres of panther habitat in the Primary Zone will minimize the impact of the loss of 773 acres lower quality habitat to the panther and will further the Service's panther conservation goal.

The proposed compensation plan, which provides habitat preservation and restoration inside and outside the project action area, benefits the survival and recovery of the Florida panther as referenced in the draft Panther Recovery Plan (Service 2006) goal 1.1.1.2.3. This goal recommends that habitat preservation and restoration within the Primary Zone be provided in situations where land use intensification can not be avoided. The applicant has proposed equivalent habitat protection and restoration, to compensate for both the quantity and functional value of the lost habitat.

Fragmentation: The project site is also located on the western edge of occupied habitat, is adjacent to other existing and proposed development, and is not located within known dispersal corridors to larger publicly owned managed lands important to the panther. Therefore, fragmentation of panther habitat is not expected to result from project implementation.

Intraspecific Aggression: Potential increases in intraspecific aggression and disturbance to the Florida panther were evaluated. The Service believes, as previously discussed, the habitat on the property provides low quality foraging for prey species, which directly affects the frequency and duration of use of the property by panthers. However, the reduction in the geographic range of habitat for dispersal and/or escape cover may contribute to a potential increased risk of death of injury of panthers in the action area due to intraspecific aggression.

Cumulative Analysis: In the cumulative analysis, the Service identified the potential loss of about 4,046 acres within the action area that could be developed without Federal wetland permit involvement and we believe this level of development represents future non-Federal actions expected to occur in the action area. This level of development represents a small percentage (0.22 percent of the 1,962,294 acres) of available non-urban private lands in the core area. In general, these lands are primarily within previously impacted areas or are in the western more urbanized portion of the Florida panther's consultation area. Although this small percentage of lands may be lost from the core area of private lands available for panther conservation, the Service believes the loss of these lands will not adversely affect the Service's land conservation and preservation goals.

Conservation Land Acquisitions: The State and County land acquisition programs acquired about 17,092 acres of lands within the action area from 2000 to 2004 (Table 10), which represents 2.1 percent of the 799,205 acres of private lands still needed for the population of 90 individuals. These lands are generally located within the core lands of the Florida panther and are intended to be actively managed for the benefit of many wildlife species including the Florida panther. The preservation of these lands in the panther core lands will have a beneficial effect on the panther and further the Service's goal in panther conservation.

CONCLUSION

In conclusion, the Service believes there will be no direct take in the form of mortality or injury of the Florida panther resulting from this project. However, the increase in traffic and potential increase in intraspecific aggression in the action area as a result of the project may potentially contribute to indirect take of panthers in the form of death or injury. This indirect take is difficult to quantify due to the wide-ranging habit of the species and the challenge of linking the death or injury of a single panther to increases in panther interactions (intraspecific aggression) or traffic generated as a result of the Mirasol project. The adverse affects of project-generated traffic and intraspecific aggression potential, however, is not anticipated to appreciably diminish or preclude the survival and recover of the panther. The loss of habitat from implementing the project, taking into consideration the status of the species, remaining habitat, and other factors considered by this biological opinion, such as the overall recovery objectives and other cumulative effects from actions in the action area, will be minimized by the conservation of other, more functionally valuable habitat. Taking all of the above into consideration, the Service believes the proposed construction and operation of the Mirasol project is not likely to jeopardize the continued existence of the Florida panther. Critical habitat has not been designated for this species; therefore, none will be affected.

ENVIRONMENTAL BASELINE – WOOD STORK

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions, which occur simultaneously with the consultation in progress. The project area is 1,713.45 acres and consists of 1,476.71 acres of wetlands and 236.74 acres of uplands. The proposed development footprint is 830 acres, which includes a developed area of 773 acres and internal preserves of 57 acres. The 773 acre developed area includes 645 acres of wetlands and 127.6 acres of uplands. The internal preserves include 55 acres of wetlands and 2 acres of uplands. The applicant is also proposing an additional preserve of 884 acres adjacent to the development footprint. The 884 acre preserve consist of 776 acres of wetlands and 108 acres of uplands. Total on-site preserve is 941 acres, 884 acres adjacent to development footprint and 57 acres within the development footprint. The 941 acres includes 831 acres of wetlands and 110 acres of uplands.

Existing Project Area Habitat Conditions

The analysis of existing habitats expected to be impacted by the proposed project is based on vegetation mapping conducted by Turrell in their FLUCCS mapping provided in the Corps August 24, 2006 Public Notice. Information on the project site was also based on recent Service (2006) field verification surveys. The prevalent community type, although historically classified as pine and pine/cypress flatwoods is primarily a community dominated by the exotic forest species, melaleuca. In most vegetated communities recently surveyed by the Service during field visits, the community was classified as primarily a closed canopy forest, with an understory, when one was present, of remnant herbaceous graminoid species.

Melaleuca expansion into native habitat and density increases in previously invaded habitat have increased substantially from 1972 through 2006 as seen in aerial photographs over this time frame. It is expected melaleuca invasion and density increases over the project area would increase without the eradication efforts proposed by the project.

Status of Species within the Action Area

As stated previously, the Service has determined, for the purposes of this biological opinion, the action area is considered to include the project site and the CFAs of the three wood stork nesting colonies described previously (Figure 16). The action area for both direct and indirect effects encompasses approximately 1,621.1 square-miles of Collier, Lee, and Hendry Counties, Florida. The proposed action may have direct and indirect effects on the ability of wood storks to breed, feed, and find shelter within the action area.

Wood Stork Nesting in the Action Area

Three active nesting colonies are known to occur within the action area. Two of these colonies are located within Corkscrew, approximately 5.5 miles and 6.6 miles northeast of the project site. The third wood stork nesting colony is located approximately 16.5 miles east of the project site, just north of the Fakahatchee Strand State Preserve. Wood stork nest surveys have been conducted annually at these nesting colonies through aerial surveys (Meyer and Frederick 2004) and ground-based monitoring of stork numbers and reproductive success (J. Lauritsen, Corkscrew, personal communication, 2004). Data for the two colonies located in Corkscrew indicate 900 nests in 1999, 1,722 nests in 2000, no nest in 2001, 1,240 nests in 2002, 1,100 nests in 2003, and 520 nests in 2004. In 2005, birds attempted to nest but most nests were ultimately abandoned. In 2006, 800 pairs nested and 1,550 birds fledged with an average of 1.9 fledglings per nest (Lauritsen 2006). Additional data collected by the National Audubon Society indicate 2,538 wood storks fledged during 2000 and 3,160 fledged during 2002. In 2003 and 2004, 780 and 450 young were fledged, respectively (Audubon 2004). On average over the last 44 years, 1,654 nests are initiated yearly, producing an average of 2,161 fledged young, or 1.3 young fledged per nest. However, the 44-year average is somewhat misleading. Prior to 1968, as many as 5,000 wood stork nests were initiated annually. Nesting activity peaked in 1961 when 6,000 nests were initially producing a record 17,000 young fledged, or 2.8 fledged young per nest.

The production of wood stork colonies varies considerably between years and locations, apparently in response to differences in food availability; colonies limited by food resources may fledge an average of 0.5 to 1.0 young per active nest; colonies not limited by food resources may fledge between 2.0 and 3.0 young per active nest (Ogden 1996). The 44-year average indicates, at least for the two colonies at Corkscrew, these colonies are generally limited by food resources. During the year 2002, these colonies were not limited by food resources. No data on nest productivity is available for the colony north of Fakahatchee Strand State Preserve; however, based on the overlapping CFAs, it is likely these birds face many of the same foraging conditions as the storks nesting within Corkscrew.

Historical data on colony locations identifies the Everglades basin colonies and the Corkscrew colonies as the primary nesting locations for wood storks in south Florida (Ogden and Nesbitt 1979). In the late 1950s and early 1960s, the Corkscrew colonies accounted for 51 percent of the Florida population, and supported approximately 6,000 nesting pairs (Jason Lauritsen, Corkscrew, personal communication, 2002). Survey data collected between 1991 and 1995 indicate the Corkscrew colonies represent approximately 12 percent of the Florida population of nesting storks and this is consistently one of the largest nesting colonies in Florida. The original listing recognized the relationship between the declining wood stork population, the loss of suitable foraging habitat, and colony nesting failures, particularly in the breeding colonies in south Florida where human actions had reduced wetland areas by about 35 percent (Ogden and Nesbitt 1979). Although the Corkscrew colonies currently account for 12 percent of the Florida nesting population, these colonies continue to occasionally produce large numbers of young in south Florida (Service 1999). The acquisition and preservation of these colonies' habitat, and recovery of more natural hydropatterns within the foraging grounds surrounding these colonies, are recognized as critical to the recovery of wood storks in south Florida (Service 1997; 1999).

Historic and Current Patterns of Wood Storks in the Project Footprint

No data are available to indicate wood storks have historically nested in the Mirasol project area and none are known to have nested there since systematic statewide wading bird surveys were initiated in the 1970s.

Ongoing wildlife surveys have been conducted and documented by Turrell. During the survey periods wood storks have been observed perching on cypress and slash pine trees along the Cocohatchee Canal. Wood storks have also been documented foraging along the canal where water flows over an armored shoreline approximately 0.5 mile to the west of the property. Foraging has also been documented within an open pasture area immediately to the west of the property. No foraging has been documented on the Mirasol property by Turrell; however, wood storks were documented by Audubon of Florida foraging in wetlands at the Mirasol property on several occasions from late September through December 2006 (Jason Lauritsen, email communication, January 5, 2007).

Fish density investigations have been ongoing on the property for the last three years. During the course of this investigation, the site has been surveyed by Turrell every week while standing water was present and no storks have been observed foraging on the site.

The wood stork is known to forage within suitable wetland habitats located throughout the 1,621 square mile action area. Suitable wood stork foraging habitat consists of shallow wetlands with water depths of 2 to 15 inches. Data obtained from the NWI indicate approximately 473,462 acres of wetlands containing potentially suitable habitat for wood stork foraging occur within the action area (Figure 16). However, the inventory was last updated in 1984 and increasing development in Lee, Collier, and Hendry Counties has impacted some of these potential foraging areas. In order to provide a more accurate accounting of the wetlands within the core foraging areas of the three wood stork colonies, the Service used both the NWI and the FLUCCS maps. The specific step-by-step analysis used is referenced below.

The District maps are based on Florida Land Use Codes and Forms Classification System (FLUCCS) codes, which is a different land use classification than that used in the NWIs. Corresponding NWI and wetland FLUCCS codes that provide overlapping wetland categories are the 500 and 600 series FLUCCS codes. However, there are several FLUCCS codes in the 200 and 400 categories that could be either upland or wetland. For instance, the majority of the subject property on the District maps is depicted as 4119 (pine flatwood [an upland FLUCCS code designation]). U.S. Army Corps of Engineers (Corps) approved jurisdictional information on these types of habitats in the action area shows the majority of these properties as being hydric pine flatwoods and are considered wetlands although not classified as such by the FLUCCS codes. The District maps also do not allow for wetland determinations on agricultural activities, such as pastures (200 series). For this reason, our analysis used both sets of maps. Specifically, we used the 1984 NWI map as the base map and overlaid the District maps. We eliminated the NWI wetlands areas that the District maps depicted as developed. Those areas indicated on the District map as passive agricultural (such as pasture and fallow lands) that were also shown to be wetlands on the 1984 NWI maps were left in and counted as wetlands for purposes of this analysis. We also included those lands with a FLUCCS code of 4119 (hydric pine flatwoods) as wetlands in our analysis.

Factors Affecting Species Environment within the Action Area

Wood Stork Foraging Habitat

Researchers have shown wood storks forage most efficiently and effectively in habitats where prey densities are high, and the water shallow and canopy open enough to hunt successfully (Ogden et al. 1978; Browder 1984; Coulter 1987). Prey availability to wood storks is dependent on a composite variable consisting of density (number or biomass/m^2) and the vulnerability of the prey items to capture (Gawlik 2002). For wood storks, prey vulnerability appears to be largely controlled by physical access to the foraging site, water depth, the density of submerged vegetation, and the species-specific characteristics of the prey. For example, fish populations may be very dense, but not available (vulnerable) because the water depth is too great (>30 cm) for storks or the tree canopy at the site is too dense for storks to land. Calm water, about 5 to 40 cm (2 to 16 in) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993).

Coulter and Bryan's (1993) study suggested wood storks preferred ponds and marshes, and visited areas with little or no canopy more frequently. Even in foraging sites in swamps, the canopy tended to be sparse. They suggested open canopies may have contributed to detection of the sites and more importantly may have allowed the storks to negotiate landing more easily than at closed-canopy sites. In their study the median amount of canopy cover where wood stork foraging was observed was 32 percent. Other researchers (Frederick, personnel communication, 2006 and Rodgers, personnel communication, 2006) also confirm wood storks will forage in woodlands, though the woodlands have to be fairly open and vegetation not very dense. Furthermore, the canopies must be open enough for wood storks to quickly take flight to avoid predators. In south Florida, they agree wood storks will forage in melaleuca-dominated wetlands when the trees are noncontinuous, in broken stands (blowdowns), in small islands, or sparsely distributed. They will not forage in melaleuca where the stem density is high and the canopy closed (Frederick, personnel communication, 2006).

Melaleuca-infested Wetlands

As discussed previously, wetland suitability for wood stork foraging is partially dependent on vegetation density. Melaleuca is a dense-stand growth plant species, effectively producing a closed canopy and dense understory growth pattern that generally limits a site's accessibility to foraging by wading birds. However, O'Hare and Dalrymple (1997) suggest that moderate infestations of melaleuca may have little effect on some species' productivity (*i.e.*, amphibians and reptiles) as long as critical abiotic factors such as hydrology remain. They also note as the levels of infestation increase, usage by wetland dependent species decreases. Their studies also show the number of fish species present in a wetland system remain stable at certain levels of melaleuca. However, the availability of the prey base for wood storks and other foraging wading birds is reduced by the restriction of access caused from dense and thick exotic vegetation. Wood storks and other wading birds can forage in these systems in open area pockets (*e.g.*, wind blow-downs), provide multiple conditions are optimal (*e.g.*, water depth, prey density). In O'Hare and Dalrmyple's study (1997), they identify five cover types and provide information on the number of wading bird species and the number of individuals observed within each of these vegetation classes. Their vegetation classes are:

DMM:	75 to 100 percent mature dense melaleuca coverage
DMS:	75 to 100 percent sapling dense melaleuca coverage
P75:	50 to 75 percent melaleuca coverage
P50:	0 to 50 percent melaleuca coverage
MAR (Marsh):	0 to 10 percent coverage

The number of wading bird (wetland-dependent) species and individuals per cover type is:

Cover Type	# of Species(S)	# of Individuals (I)
DMM	1	2
DMS	4	10
P75	10	59
P50	11	92
MAR	12	132

To develop an estimate of the importance a particular wetland type may have (based on density and aerial coverage by exotic species) to wetland dependent species, we developed a foraging suitability value using observational data from O'Hare and Dalrymple (1997). The Foraging Suitability Value (Table 13) is calculated by multiplying the number of species by the number of individuals and dividing this by the maximum number of individuals. This approach was developed to provide us with a method of assessing wetland acreages and their relationship to prey densities and prey availability. We consider wading bird use to be a general index of food availability. Based on this assessment we developed the following index:

Exotic Percentage	Foraging Suitability (Percent)
Systems with between 0 and 25 percent exotics	foraging suitability value of 100
Systems with between 25 and 50 percent exotics	foraging suitability value of 70
Systems with between 50 and 75 percent exotics	foraging suitability value of 37
Systems with between 75 and 90 percent exotics	foraging suitability value of 3
Systems with between 90 and 100 percent exotics	foraging suitability value of 0

Exotic Species in the Project Footprint

The prevalent community type, although historically classified as pine and pine/cypress flatwoods is primarily a community dominated by the exotic forest species, melaleuca. In most vegetated communities, the community was classified as primarily a closed canopy forest, with an understory, when one was present, of remnant herbaceous graminoid species.

As discussed previously, melaleuca expansion into native habitat and density increases within previously invaded habitat have increased substantially from 1972 through 2006 as seen in aerial photographs over this time frame. It is expected that melaleuca invasion and density increases over the project area would increase without the eradication efforts proposed by the project.

Table 14 provides a summary of all upland and wetland acreages within the project development footprint. However, since most upland land uses and wetlands with dense melaleuca coverage provide little to no foraging value to wood storks, the Table 15 provides only the suitable wetland habitat types within the project development footprint. A summary of the information from Tables 14 and 15 shows that about 645 out of the project's 1,477 acres of wetland cover types to be developed are within the development footprint (700 acres of wetlands are within the development footprint – 645 to be developed and 55 to be preserved). Of those 645 acres of wetland cover types, about 491 acres are suitable for wood stork foraging (154 acres with greater than 90 percent exotics), with a variance in functional value depending on the density of melaleuca.

Our first step in our assessment was to identify the amount of acreages that we believe provides foraging values to wading bird species (wood storks). For this step, we considered that the melaleuca cover type and cover types with greater than 90 percent melaleuca coverage provide no to minor foraging value to wood storks; they were therefore eliminated from the acreages of habitats that we believe are important for wood stork foraging. Applying this assessment to the wetland cover types in the Mirasol development footprint we estimate foraging loss to wood storks to be about 491 acres, although of varying value (Table 15).

Exotic Species in the Mirasol Action Area

As discussed previously, the Mirasol action area is in the overlapping core foraging areas of the three adjacent wood stork colonies. These colonies are:

- #619310 (CORK1) in Corkscrew Swamp Sanctuary, with approximately 285,286 acres of wetland cover types;
- #619018 (CORK2) also in Corkscrew Swamp Sanctuary, with approximately 292,149 acres of wetland cover types; and
- #619161 (CATH) (North Catherine Island) approximately 16.5 miles east-southeast of the project site, with approximately 394,040 acres of wetland cover types.

With overlap, all three colonies encompass approximately 481,666 acres of wetland cover types.

Based on aerial surveys and site inspections by Service personnel of wetland systems throughout the action area, we estimated that about 10% of the total CFA would have dense melaleuca coverage and would not be suitable for wood stork foraging. Following this approach, suitable foraging habitat within the CFAs is then estimated at 256,730 acres for CORK1, 267,934 acres for CORK2, and 354,636 acres for CATH (Table 16). All three colonies encompass 433,500 acres where wood stork suitable habitat for foraging may potentially occur. As in the Mirasol development area, the dense melaleuca areas (>90 percent) were considered to have minimal wood stork foraging value.

Fish Prey Density per Hydroperiod

Prey densities can be affected by the density and types of vegetation present in a wetland and by the hydroperiod of the wetland. In the O'Hare and Dalrymple (1997) study, the authors suggest that moderate infestations of melaleuca may have little effect on some species' productivity as long as critical abiotic factors such as hydrology remain, although dense melaleuca (greater than 75 percent canopy densities) do show a gradual reduction in prey bases. However, fish densities do vary with duration of hydroperiod and can have a significant effect on wood stork foraging and nest productivity. For instance, research on Everglades fish populations using a variety of quantitative sampling techniques (pull traps, throw traps, block nets) have shown that the density of small forage fish increases with hydroperiod: marshes inundated for <120 days average ± 4 fish/m^2; whereas those flooded for >340 days of the year average ± 25 fish/m^2 (Loftus and Eklund 1994; Trexler et al. 2002).

The Service (1999) described a short hydroperiod wetland as wetlands with between 0 and 180-day inundation, and long hydroperiod wetlands as greater than 180-day inundation. However, Trexler et al. (2002) defined short hydroperiod wetlands as systems with less than 300 days per year inundation. In our discussion of hydroperiods in this biological opinion, we are considering short hydroperiod wetlands to be those that have an inundation of 180 days or fewer.

The most current information on hydroperiods in the action area was developed by the District for evaluation of various restoration projects throughout the Everglades Protection Area. In their modeling efforts, they identified seven hydroperiods:

- Class 1 (0-60 days inundation)
- Class 2 (60-120 days inundation)
- Class 3 (120-180 days inundation)
- Class 4 (180-240 days inundation)
- Class 5 (240-300 days inundation)
- Class 6 (300-330 days inundation)
- Class 7 (330-365 days inundation)

Trexler et al. (2002) in studies in the Everglades provided densities, or the number of fish per square meter, for only six hydroperiods, although covering the same range of hydroperiods developed by the District. Trexler et al.'s (2002) hydroperiods and fish densities are:

	Density		Density
• Class 1 (0-120 days inundation)	= 2.0	• Class 4 (240-300 days inundation)	= 4.5
• Class 2 (120-180 days inundation)	= 3.0	• Class 5 (300-330 days inundation)	= 4.8
• Class 3 (180-240 days inundation)	= 4.0	• Class 6 (330-365 days inundation)	= 5.0

Trexler et al. (2002) fish densities are provide as the square root of the number of fish per square meter. For our assessment, we squared these numbers to provide fish per square meter, a simpler calculation when other prey density factors are included in our evaluation of adverse effects to listed species from the proposed action and also extrapolated the densities over seven hydroperiods, which is the District's number.

Based on the above discussion, the following mean annual fish densities were extrapolated to the seven District Model hydroperiods:

- Class 1 (0-60 days) = 2 fish/m^2
- Class 2 (60-120 days) = 4 fish/m^2
- Class 3 (120-180 days) = 9 fish/m^2
- Class 4 (180-240 days) =16 fish/m^2
- Class 5 (240-300 days) = 20 fish/m^2
- Class 6 (300-330 days) = 23 fish/m^2
- Class 7 (330-365 days) = 25 fish/m^2

Fish Biomass per Hydroperiod

However, a more important parameter than fish per square meter in defining fish densities is the biomass these fish provide. In the ENP and WCA-3 studies by Turner et al. (1999) and Trexler et al. (2002), the standing stock (biomass) of large and small fishes combined in unenriched Class 5 and 6 hydroperiod wetlands averaged between 5.5-6.5 g wet mass/m^2. However, in short hydroperiod wet prairies in Corkscrew Swamp biomass values were estimated between 2 -2.5 g wet mass/m^2 (wet mass represents between 2 and 2.5 times dry mass [Kushlan et al. 1986]). A value of 0.5 g dry mass/m^2 was reported by Turner et al. (1999) for Carlson and Duever (1979) wet prairies in Corkscrew Swamp. Relating this information to the hydroperiod classes developed by the District, we estimated the mean annual biomass densities per hydroperiod. For our assessment we considered Class 7 hydroperiod wetlands based on Turner et al. (1999) and Trexler et al. (2002) studies to have a mean annual biomass of 6.5 g wet mass/m^2. The remaining biomass weights were determined as a direct proportion of the number of fish per total weight of fish for a Class 7 hydroperiod (6.5 grams divided by 25 fish equals 0.26 grams per fish). Based on the above discussion, the biomass per hydroperiod class is:

- Class 1 (0-60 days) = 0.5 grams/m^2
- Class 2 (60-120 days) = 1.0 grams/m^2
- Class 3 (120-180 days) = 2.3 grams/m^2
- Class 4 (180-240 days) = 4.2 grams/m^2
- Class 5 (240-300 days) = 5.2 grams/m^2
- Class 6 (300-330 days) = 6.0 grams/m^2
- Class 7 (330-365 days) = 6.5 grams/m^2

Wood Stork Suitable Prey Size per Hydroperiod

However, wood storks are highly selective in their feeding habits and in studies on fish consumed by wood storks, primarily sunfish and four other species of fish comprised over 85 percent of the number and 84 percent of the biomass of over 3,000 prey items collected from adult and nestling wood storks (Ogden et al. 1976). Ogden et al. (1976, 1978) noted that the key species consumed by wood storks included:

Sunfishes (*Centrarchidae*; 14% of individuals, 44% of biomass);
Yellow Bullhead (*Italurus natalis*; 2% of individuals, 12% of biomass);
Marsh killfish (*Fundulus confluentus*; 18% of individuals, 11% of biomass);
Flagfish (*Jordenella floridae*, 32% of individuals, 7% of biomass);
Sailfin Molly (*Poecilia latipinna*, 20% of individuals, 11% of biomass).

These species were also observed to be consumed in much greater proportions than they occur at feeding sites, and abundant smaller species (*e.g*., mosquitofish, least killfish, bluefin killfish) are under-represented, which the researchers believed was probably because their small size does not elicit a bill-snapping reflex in these tactile feeders (Coulter et al. 1999). Their studies also showed that in addition to selecting larger species of fish, wood storks consumed individuals that are significantly larger (>3.5 cm) than the mean size available (2.5 cm), and many were greater than one-year old (Ogden et al. 1976; Coulter et al. 1999). Ogden et al.'s (1976 – Figure 4) also shows that wood storks also generally consumed fish that were between 1.5 and 9.0 cm in length.

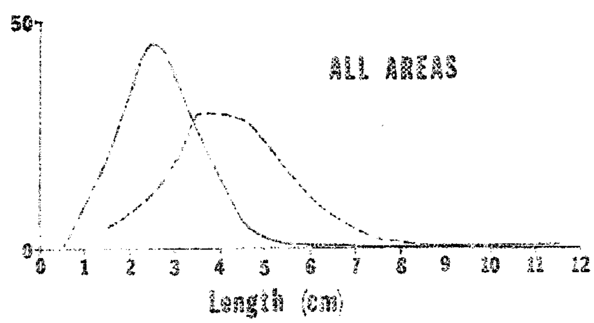


FIGURE 4. Length frequency distribution of fish available to and consumed by Wood Storks in different habitats.

In Ogden et al.'s (1979) figure 4, the dotted line is the distribution of fish consumed and the solid line is the available fish. Straight interpretation of the area under the dotted line curve represents the size classes of fish likely consumed by wood storks and is the basis of our determination of the amount of biomass that is within the size range of fish most likely consumed by wood storks.

To estimate that fraction of the available fish biomass that potentially might be consumed by wood storks, the following analysis was conducted. Trexler et al.'s (2002) 2-year throw-trap of absolute and relative fish abundance distributed across 20 study sites in the ENP and the WCAs was assumed to be representative of the Everglades fish assemblage available to wood storks (n = 37,718 specimens of 33 species). The mean biomass of each species within this fish fauna that fell within the wood stork prey size limits of 1.5-9.0 cm was estimated from the length and wet mass relationships for Everglades's animals developed by Kushlan et al. (1986). The proportion of each species that was outside of this prey length and biomass range was estimated using the species mean and variance provided in Kushlan et al. in Table 1 (1986). These biomass estimates assumed the length and mass distributions of each species was normally distributed and the fish biomass could be estimated by eliminating that portion of each species outside of this size range. Finally, these biomass estimates of available fish prey were standardized to a sum of 6.5 g/m^2 for Class 7 hydroperiod wetlands.

For example, in Appendix 1, in Kushlan et al. (1986) the warmouth (*Lepomis gulosus*) had an average biomass of 36.76 g/m^2 (Kushlan et al. 1986) and accounted for 4.8 percent of the freshwater Everglades ichthyofauna; after standardization, warmouth biomass would be about 0.5 g/m^2 of the total fish biomass in a 6.5 g/m^2 sample from long hydroperiod wetlands. However, the size frequency distribution (assumed normal) for warmouth indicate that 48 percent are too large for wood storks and 0.6 are too small, so the warmouth biomass within the wood stork's preferred size range is only 0.25 g/m^2. Using this approach summed over all species, in long hydroperiod wetlands only about 3.54 g/m^2 of the 6.5 g/m^2 sample consists of fish within the size range preferred by wood storks.

Alternatively, the preferred sunfishes and four other species that accounted for 84 percent of the biomass eaten by wood storks (Ogden et al. 1976) would total 2.34 g/m^2 under this approach; adding another 16 percent would suggest that 2.79 g/m^2 of fish are likely to be consumed by wood storks of the 6.5 g/m^2 that are available. The mean of these two estimates is 3.17 g/m^2 for long hydroperiod wetlands. This proportion of available fish prey of a suitable size (3.17 g/m^2 / 6.5 g/m^2 = 0.49) was then multiplied by the total fish biomass in each hydroperiod class to provide an estimate of the total biomass of a hydroperiod that is the appropriate size and species composition most likely consumed by wood storks. Following this approach, the biomass per hydroperiod potentially vulnerable to predation by wood storks is:

- Class 1 (0-60 days) = 0.25 grams/m^2
- Class 2 (60-120 days) = 0.49 grams/m^2
- Class 3 (120-180 days) = 1.13 grams/m^2
- Class 4 (180-240 days) = 2.1 grams/m^2
- Class 5 (240-300 days) = 2.5 grams/m^2
- Class 6 (300-330 days) = 2.9 grams/m^2
- Class 7 (330-365 days) = 3.2 grams/m^2

Wood Stork-Wading Bird Prey Consumption Competition

Another factor in assessing wood stork foraging potential is the likelihood that wood storks will be the wading bird species that actually consumes the concentrated prey. Fleming et al. (1994b) provides an estimate of 10 percent of the total biomass in their studies of wood stork foraging as the amount that is actually consumed by the storks. However, the Fleming et al. (1994b) estimate also includes a second factor, the suitability of the foraging site for wood storks, a factor that we have calculated separately. In their assessment these two factors accounted for a 90 percent reduction in the biomass actually consumed by the storks. We are considering that these two factors are equally important and are treated as equal components in the 90 percent reduction; therefore, we consider each factor to represent 45 percent of the reduction. In consideration of this approach, Fleming et al.'s (1994) estimate that 10 percent of the biomass would actually be consumed by storks would equate to an estimate that 55 percent of the available biomass would actually be consumed by the storks and is the factor we believe represents the amount of the prey base that is actually consumed by the wood stork.

Nest Productivity

Many researchers including Flemming et al. (1994) and Ceilley and Bortone (2000) believe the short hydroperiod wetlands provide a more important pre-nesting foraging food source and a greater early nestling survivor value for wood storks than the foraging base (grams of fish per square meter) suggests. Although the short hydroperiod wetlands provide less fish, these prey bases historically were more extensive and provided foraging needs of the pre-nesting storks and the early-age nestlings, which corresponds to the greatest periods of mortality in wood stork nest productivity.

The total nesting period, from courtship and nest-building through independence of young, lasts approximately 100 to 120 days (Coulter et al. 1999). Wood storks produce an average of 1.29 fledglings per nest and have a probability of survivorship from egg laying to fledgling of 42 percent (Rodgers and Schwikert 1997). The greatest losses occur from egg laying to hatching with a 30 percent loss of the nest productivity. The second highest level of loss occurs from hatching to nestlings of 2 weeks of age with an additional 8 percent. Corresponding losses for the remainder of the nesting cycles are on the average of 6 percent per two week increase in age of the nestling (Rodgers and Schwikert 1997).

Kahl (1964) estimated that 201 kg of forage was needed for a successful nest, with 50 percent of the nestling stork's food requirement occurring during the middle third of the nestling period. The remaining foraging needs (based on Kahl's (1964) productivity graph) are generally linear with an estimate of 25 percent (50 kg) needed to meet the foraging needs of the adults and nestling in the first third of the nesting cycle and 25 percent (50 kg) needed for fledging to dispersing juveniles.

Hydrology

Action Area: The Service's action area for the project is the CFAs for the three wood stork colonies (Figure 17) and includes the footprint of the proposed development and preserve areas.

Alteration of hydrology and historical flow-ways resulting in restrictive flows and drainage, as demonstrated for the Cocohatchee basin, can negatively influence wetlands and other surface water systems important to wood storks through changes in seasonal flooding and drawdown cycles and extended periods of unusually high water or low water, resulting in changes in the vegetative community from a mixed open forest canopy with a herbaceous component to a closed canopy, dense forest without a herbaceous component.

The National Wetlands Inventory (NWI), the District Land Use Maps, and personal knowledge have been used to estimate wetland coverage and hydroperiod classes within the CFA of the three colony sites. As previously discussed, we consider short hydroperiods to be wetlands inundated for 180 days or fewer which includes Classes 1, 2, and 3. Following this approach, the wetland hydroperiods for three CFAs were estimated and are shown in Figure 18 and Table 16. The acreages in Table 16 are estimated from the NWI and SFWMD maps.

We estimate about 227,845 acres of short-hydroperiod wetlands are within the core foraging areas of the three rookeries, with an additional 253,821 acres of long-hydroperiod wetlands. Of this acreage, we estimate about 205,061 acres of short-hydroperiod and 228,439 acres of long-hydroperiod wetlands are suitable for wood stork foraging (10 percent of wetlands support melaleuca coverage greater than 90 percent).

Project Wetlands: A similar assessment of the wetland hydroperiods for the proposed development footprint and preserve areas are provided in Figure 19 and Table 17. Tables 19, 20, and 21 provide the detailed assessment of these hydroperiods. The hydroperiods of the wood stork suitable foraging wetlands within the development footprint are estimated at 477.17 acres of short-hydroperiod wetlands and 14.14 acres of long hydroperiod wetlands.

The hydroperiods (Figure 20 and Table 18) of wood stork suitable foraging wetlands within the preserve footprints (existing conditions) are estimated at 394.6 acres of short-hydroperiod wetlands and 203.56 acres of long-hydroperiod wetlands. Following preserve hydroperiod restoration and wetland enhancements, which are components of the proposed action, wood stork suitable foraging wetlands are estimated at 507.56 acres of short-hydroperiod wetlands and 323.8.31 acres of long-hydroperiod wetlands, an increase of 233.2 acres of wood stork suitable foraging wetlands.

Summary of the Factors Affecting Vulnerability of Wetland Habitats to Wood Stork Foraging in the Action Area

Through the above discussions, we have identified that there are essentially four variables in assessing wood stork foraging habitat. The first is the density of melaleuca within habitats suitable for wood stork foraging, the second is the hydroperiod of the wetland affected, the third is the fish density (biomass) available to the wood stork from the biomass of the wetlands affected, and the fourth is the likelihood that the wood stork is the wetland species that actually consumes the concentrated prey. All four of these parameters when combined provide us with an estimate of the effect of wetland foraging loss and gains in grams of fish in our assessment of the effects of the action on wood storks.

As an example, a 50-acre wetland with 60 percent melaleuca coverage, with a Class 5 hydroperiod would provide about 102,950 grams (103 kg) of fish potentially vulnerable to predation by wood storks.

Fifty acres converts to 202,350 m^2; 60 percent melaleuca coverage equates to a 37 percent foraging potential; a Class 5 wetland has 2.5 grams of suitable fish per m^2; and 55 percent of the biomass is actually consumed by wood storks and not other species of wading birds. Thus, the following calculation can be made:

$$(202{,}350 * .37 * 2.5 * .55 = 102{,}950)$$

An underlying assumption of this assessment method is that fishes within these wetlands either are available to storks or become available at some point during the dry season. The declining water levels over time result in the prey in different wetlands becoming available to storks at some point during the spring dry-down.

EFFECTS OF THE ACTION - WOOD STORK

This section analyses the direct and indirect effects of the project on the wood stork and wood stork habitat. As defined by the Corps, the proposed action includes the construction of an upscale residential and golf course community to be known as "Mirasol." The proposed development would consist of residential areas (234 acres); lakes (148 acres); road right of way (52 acres); clubhouse, maintenance, and sales buildings (22 acres); a 36-hole golf course and paths (222 acres); open space (95 acres); and on-site preserves (941 acres). The project site is 1,713 acres and consists of 1,476 acres of jurisdictional wetlands and 237 acres of uplands. Jurisdictional areas consist of melaleuca, disturbed hydric pine, pine-cypress, and cypress communities. The project proposes to impact 645 acres of wetlands. The project also proposes compensatory mitigation through the enhancement and preservation of 941 acres on-site consisting of 831 acres of wetlands and 110 acres of uplands. Fifty-seven of the 941 acres of preserve are within the development footprint consisting of about 55 acres of forested wetlands and 2 acres of forested uplands that will be enhanced and preserved. The remaining 884 acres would be located north of the development and form a contiguous preserve with other adjacent preserves. The 884-acre preserve would consist of approximately 776 acres of forested wetlands, and 108 acres of uplands.

Factors to be Considered

Development pressures due to ongoing population growth in Collier and Lee Counties continue to threaten wetlands in the action area. Data from the U.S. Census Bureau indicate during the period of 1968 to 2000 the populations of Collier, Hendry, and Lee Counties have increased by 94, 78, and 88 percent, respectively. The population of this three-countywide area was estimated at 731,675 during the 2000 census, and is expected to continue to grow, with a concomitant increase in the filling of wetlands due to development.

Residential, commercial, and industrial development projects may have a number of direct and indirect effects on the wood stork and wood stork habitat. Direct impacts, which are primarily habitat based, may include: (1) the permanent loss of available habitat for foraging, feeding, breeding, and dispersing wood storks; (2) changes in hydroperiods of wetlands that supports wood stork foraging, feeding, breeding, and dispersing wood storks; (3) the fragmentation of wood stork habitat; (4) harassment by construction activities; (5) a reduction in the geographic distribution of habitat for the species; and (6) habitat compensation. Indirect effects may include: (1) increases in disturbance frequency, intensity or severity to wood storks in the project vicinity due to human activities; (2) changes in the wood stork prey base; and (3) changes in the value of wood stork habitat adjacent to the project due to project related hydrological alterations. These indirect effects are habitat based.

This project site contains wood stork foraging habitat and is located within the CFA of three wood stork colonies. The timing of construction for this project, relative to sensitive periods of the wood stork's lifecycle, is unknown. Wood storks may be found on and adjacent to the proposed construction footprint year-round. The project will be constructed in a single, disruptive event, and result in permanent loss and alteration of a portion of the existing ground cover on the project site. The time required to complete construction of the project is not known, but it is likely land clearing associated with the development could be undertaken in phases over several years. The disturbance associated with the project will be permanent and result in a loss of habitat currently available to the wood stork; however, fragmentation of habitat will not occur due to the proposed project's position in the landscape of existing development. We evaluated impacts to storks using the method described in the Environmental Baseline Section above, which combines the effects of canopy cover and prey availability on the relative suitability of these wetlands for stork foraging. Impacts to storks were determined based on the calculated reduction in prey availability (biomass).

Analyses for Effects of the Action

Wood storks, as previously discussed, forage most efficiently and effectively in habitats where prey densities are high, and the water shallow and open enough to hunt successfully (Ogden et al. 1978; Browder 1984; Coulter 1987). Calm water, about 2 to 16 in (5 to 40 cm) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993). Typical foraging sites include freshwater marshes, ponds, hardwood and cypress swamps, narrow tidal creeks or shallow tidal pools, and artificial wetlands such as stock ponds, shallow, seasonally flooded roadside or agricultural ditches, and managed impoundments.

Habitat: As discussed in the previous section on Factors Affecting the Species and Environments within the Action Area, suitable wood stork foraging habitat within the footprint of the project site is affected by the density of exotic plant species and percent of canopy closure within affected wetlands. Based on these discussions, suitable wood stork habitat is estimated at about 491 acres (Table 15) with significant variance in functional value; although about 645 acres (Table 14) of the project area are vegetated wetland communities. As discussed previously, we believe that dense melaleuca (>90 percent), because of its restrictive canopy, has effectively precluded wood storks from foraging in these communities. The remaining communities, although with varying densities of exotic species, still provide some foraging value to the wood stork, though the value is dependant on the density of the exotic species. Based on wading bird richness values (the number of species and the number of individuals) provided in the O'Hare and Dalrymple (1997) study, we estimated wetland communities with between 75 and

90 percent melaleuca coverage provided a wood stork foraging suitability value of 3 percent, between 50 to 75 percent melaleuca coverage provided a wood stork foraging suitability value of 37 percent, between 25 and 50 percent melaleuca coverage provided a wood stork foraging suitability value of 70 percent, and between 0 to 25 percent melaleuca coverage provided a wood stork foraging suitability value of 100 percent (Table 13).

Wood Stork Assessment: Wood storks forage most efficiently and effectively in habitats where prey densities are high and the water shallow and open enough to hunt successfully (Ogden et al. 1978; Browder 1984; Coulter 1987). In the previous section, we provided an assessment of the openness of the wetlands and their importance to wood stork foraging. The second component of importance to wood stork foraging efficiency is related to prey fish densities, which are referenced as the number of fish per m^2 (a quantity measurement), or the grams of fish per m^2 (a biomass measurement). The most important factor affecting these parameters is the existing hydroperiod of the wetlands affected. The shorter the hydroperiod, the less the amount of time available for growth and maturation of fish prey species within the hydrated wetlands, which generally results in less numbers and lower biomass of fish in these systems. Researchers in fish density studies in ENP, WCA-3, and Corkscrew Swamp provided standing stock (biomass) of large and small fishes for various wetland hydroperiods (Turner et al. 1999, Trexler et al. 2002, Carlson and Duever 1979).

However, as previously discussed, wood storks are very selective in the size of fish they consume, generally between 1.5 and 9.0 cm in length and usually greater than one year old (Ogden et al. 1976, Coulter et al. 1999). Factoring this size restriction and species preference into the standing stock (biomass) of large and small fishes referenced above, we determined the biomass of each hydroperiod that would be consumed by storks based on preferred size. By incorporating the last remaining factor in the prey density foraging value to wood stork, the amount of the prey base actually consumed by wood stork per hydroperiod (55 percent of the available wood stork suitable biomass, which is based on Fleming et al.'s [1994b] studies [see detailed discussion in the Factors Affecting the Species and the Environment in the Action Area]), we can estimate the amount of biomass actually consumed in grams/ m^2 per hydroperiod.

As an example, a 50-acre wetland with 60 percent melaleuca coverage, with a Class 5 hydroperiod would provide about 102,950 grams (103 kg) of fish potentially vulnerable to predation by wood storks. Fifty acres converts to 202,350 m^2; 60 percent melaleuca coverage equates to a 37 percent foraging potential; a Class 5 wetland has 2.5 grams of suitable fish per m^2; and 55 percent of the biomass is actually consumed by wood storks and not other species of wading birds. Thus, the following calculation can be made:

$$(202{,}350*.37*2.5*.55=102{,}950)$$

***Project Footprint Foraging Prey Base Assessment*:** Following this approach, a foraging prey base evaluation of the proposed project footprints based on the above information provides a biomass foraging loss to wood storks of 273 kilograms of fish biomass (Table 20). The prey base loss is based on 491 acres of suitable wood stork foraging habitat with a range of functional value. The exotic species density habitat suitability values range from 3 percent to 100 percent, depending on the density of exotic vegetation. The hydroperiods vary from Class 2 (60 to 120 days) to Class 5 (240 to 300 days) with 51 percent of the project footprint represented by Class 3. We consider the wood stork suitable fish density (grams per m^2 per hydroperiod class) to be as described in the earlier section relating to fish densities in each wetland class. As previously noted, the wood stork consumption percentage is 55 percent (*i.e.*, 55 percent of the biomass will actually be consumed by wood storks).

Direct Effects

Direct effects are those effects caused by the proposed action at the time of construction, are primarily habitat based, are reasonably certain to occur, and include: (1) the permanent loss of available habitat for foraging, feeding, breeding, and dispersing wood storks; (2) changes in hydroperiods of wetlands that supports wood stork foraging, feeding, breeding, and dispersing wood storks; (3) the fragmentation of wood stork habitat; (4) harassment by construction activities; (5) a reduction in the geographic distribution of habitat for the species; and (6) habitat compensation. The direct effects this project will have on the wood stork within the action area are discussed below.

Permanent Loss of Habitat: The project will result in the loss of approximately 645 acres of wetlands on the site. The land will be converted to support a residential/golf course community. Habitat quality for wood storks is generally poor, as it is primarily disturbed flatwoods supporting an average of 65 percent exotics. In our assessment of wood stork foraging suitability, we estimated that of the 645 acres of wetlands, only 491 are considered suitable for foraging by wood storks, with a range of functional value. This loss represents approximately 0.1 percent of the available foraging area within each of the three colonies whose CFAs overlap the project (Table 16). No wood storks are known to have nested within the project area and all of the wading bird censuses conducted to date have demonstrated that the area is periodically used by resident and or migratory, over-wintering wood storks. Therefore, based on the analyses provided above on the level of melaleuca infestation within the project wetlands and the analysis of project area foraging base in the Environmental Baseline, we believe there will be a loss of 491 acres of wood stork foraging habitat of varying foraging value to the wood stork.

Changes in the Mosaic of Hydroperiods: Stork nesting success generally relies on a mosaic of hydroperiods within the core foraging area of the colony. Storks nest during the dry season, and rely on the drying wetlands to concentrate prey items in the ever-narrowing wetlands (Kahl 1964). Because of the continual change in water levels during the stork nesting period, any one site may only be suitable for stork foraging for a narrow window of time when wetlands have sufficiently dried to begin concentrating prey, making water depths suitable for storks to access the prey. Once the wetland has dried to where the water levels are near the ground surface, the area is no longer suitable for stork foraging, and will not be suitable until water levels rise and the area is again repopulated with fish. Consequently, there is a general progression in the suitability of wetlands for foraging based on their hydroperiods, with the short hydroperiod wetland used early in the season, the mid-range hydroperiod sites being used during the middle of the nesting season, and the longest hydroperiod areas being used later in the season (Kahl 1964; Gawlik 2002).

In our evaluation of hydroperiods within the wood stork action area (overlap of all three rookeries), we determined that of the available wetlands within the action area (481,666 acres), there were about 227,845 acres of short-hydroperiod wetlands of which only 205,061 acres were suitable for wood stork foraging (10 percent with greater than 90 percent coverage of exotics). Short-hydroperiod wetlands in the project footprint total about 575.66 acres of which about 477.17 acres are suitable for wood stork foraging. The loss of the 477.17 acres of short-hydroperiod wetlands suitable for wood stork foraging represents about 0.11 percent of the short-hydroperiod wetlands in the action area. Long-hydroperiod wetlands in the project footprint total about 69.7 acres of which about 14 acres are suitable for wood stork foraging, this loss of long-hydroperiod wetlands represents about 0.006 percent of the available long-hydroperiod wetlands in the action area.

In our assessment of the Mirasol development footprint, we noted that the predominant wetland hydroperiod was a Class 3 (51 percent) with an average of 120 to 180 days inundation. To complete this analysis, we assumed the existing available foraging habitat acreages would be available with or without the project. We calculated the proposed development will result in the loss of 272,745 grams (272.7 kg) of fish biomass, of which 243,356 grams (243.4 kg) represent short-hydroperiod wetlands, and 29,389.7 grams (29 kg) represent long-hydroperiod wetlands (Table 20).

In our assessment of the preservation lands (Tables 20 and 21), we determined that prior to restoration the preserve lands, these lands provide for an existing foraging base of 978,227 grams (978.3 kg) of fish biomass and following restoration these lands provide 2,842,045.9 grams (2,842.1 kg) of fish biomass, an increase of 1,863,818.9 grams (1,864 kg) of fish biomass.

Since the importance of short-hydroperiod wetlands in relationship to early nesting productivity of a wood stork colony is extremely critical, as discussed previously, we also calculated the productivity of both short- and long-hydroperiod wetlands separately. The existing preserve lands currently provide 212,412.6 grams (212.4 kg) of short-hydroperiod fish biomass with a corresponding long-hydroperiod productivity of 765,814 grams (765.9 kg) of fish biomass. Following restoration, the preserve lands will provide 1,252,345 grams (1,252.3 kg) of fish biomass of short-hydroperiod wetlands and 1,589,700.1 grams (1,589.7 kg) of long-hydroperiod fish biomass.

Following the above analysis, the restoration actions proposed for the preserve lands will provide an increase of 1,039,932 grams (1,139.9 kg) of fish biomass in short-hydroperiod wetlands and 823,886 grams (823.9 kg) of fish biomass in long-hydroperiod wetlands. Considering that the expected fish productivity loss from the proposed development is 272,745 grams (272.7 kg) of fish biomass, of which 243,356 grams (243.4 kg) represent short-hydroperiod wetlands, and 29,389.7 (29 kg) represent long-hydroperiod wetlands, the proposed restoration actions will provide a 4.27 fold increase in availability of fish biomass for short-hydroperiod wetlands, and a 28.03 fold increase in availability of fish biomass of long-hydroperiod wetlands.

However, as we discussed previously, bio-mass production in individual classes of wetland hydroperiods as it relates to nesting productivity of a wood stork colony is extremely critical in the overall success of a colony. Therefore, we also calculated the productivity of both short- and long-hydroperiod wetlands separately by hydroperiod (Table 19). As shown in Table 19, Class 2 hydroperiod wetlands show an overall loss of 66.69 acres and a corresponding loss of 33.68 kg of fish biomass. Class 3 hydroperiod wetlands show an overall loss of 297.53 acres of wetlands but with an increase of 830.25 kg of fish biomass. The biomass increase is associated with the restoration of wetlands within the preserve areas. Class 4 hydroperiod wetlands show an over all increase of 107.16 acres of wetlands with a corresponding increase of 730.8 kg of fish biomass. Class 5 wetlands show an overall loss of 1.06 acres of wetlands, but with an increase of 63.7 kg of fish biomass. Again, the biomass increase is associated with the restoration of wetlands within the preserve areas.

In our evaluation of project affects to wood storks foraging across all hydroperiods, we believe project related foraging losses need to be offset in our evaluation of take. As shown in Table 19, wood stork biomass foraging losses from the proposed development are compensated for in the enhancements of the preserve lands with the exception of the losses associated with Class 2 hydroperiod wetlands. Our evaluation shows an overall loss of 66.69 acres with a corresponding loss of 33.68 kg of fish biomass. We will use this biomass loss as the basis for estimating take.

To summarize the discussion above, the project development will result in the loss of 645 acres of wetlands, of which 491 acres are suited for wood stork foraging (154 acres with melaleuca coverage greater than 90 percent are not considered suitable for wood stork foraging). The proposed preservation lands consist of 941 acres, with 831 acres of wetlands and 110 acres of uplands. Within the 831 acres of wetlands, only 598 acres are suitable for wood stork foraging prior to enhancement (233 acres with melaleuca coverage greater than 90 percent are not considered suitable for wood stork foraging). Following enhancement, all 831 acres are suitable for wood stork foraging. The hydroperiod class analysis, by individual hydroperiod classes, shows that over all, the project development will result in a loss of 273 kgrams of fish biomass from wetland losses in the project development. The proposed restorations will provide an increase of 1,864 kgrams of biomass over existing baseline of the wetlands in the preserve. The net increase in 1,591 kgrams of fish biomass for the project (1864 – 273 = 1,591). However, on an individual hydroperiod analysis, the project development will result in the loss of 33.68 kgrams of fish biomass associated with a class 2 hydroperiod. All the other hydroperiod classes show an increase in the fish biomass available for wood stork foraging following enhancement of the preserve wetlands. Since our analysis shows a loss of 33.68 kgrams of fish biomass in the class 2 hydroperiod, this loss represent an adverse effect to wood stork foraging base and is the value for our estimate of incidental take for wood stork nest productivity.

***Fragmentation of Habitat*:** Mac et al. (1998) define habitat fragmentation as, "The breaking up of a habitat into unconnected patches interspersed with other habitat which may not be inhabitable by species occupying the habitat that was broken up. The breaking up is usually by human action, as, for example, the clearing of forest or grassland for agriculture, residential development, or overland electrical lines." In the case of the proposed project, habitat will be affected by the development of the property. However, in a larger framework, the Mirasol project area is located adjacent to urban development and is in an area of intense development pressure; therefore, fragmentation of wood stork habitat is not expected to result from project implementation. The project site proposes a large preserve area that connects existing and proposed preserve areas to the west with existing and proposed preserved lands to the east. For these reasons, fragmentation of wood stork foraging habitat is not expected.

Construction: The timing of construction for this project relative to sensitive periods of the wood stork's lifecycle is unknown. However, it is likely all land clearing associated with the development will occur in phases over several years. There are no known roosting or colony sites within the project boundaries and the quality and quantity of the foraging prey base (based on previous discussion of habitat quality and foraging values) is low. Therefore, we believe wood stork usage of the property is limited and we do not believe project construction will result in direct wood stork harassment or mortality.

Reduction in Geographic Distribution of Habitat: The wood stork population in the southeastern United States appears to be continuing to grow. Preliminary population totals indicate that the stork population has reached its highest level since it was listed as endangered 1984. In all, approximately 10,900 wood stork pairs nested within their breeding range in the southeastern U.S. Wood stork nesting was again recorded in North Carolina in 2006 after it was first documented there in 2005. This suggests the northward expansion of wood stork nesting may be continuing. Several new colonies were located in 2006, including several in Florida. The number of colonies also continues to rise, and over 80 nesting colonies were reported in 2006 throughout the southeastern U.S. (Service unpublished data), which is the highest to date in any one year. The proposed Mirasol project will not significantly reduce the geographic distribution of habitat and the distribution of the species.

Compensation: Wood stork habitat lost by the development will be offset by the preservation and enhancement of about 831 acres of wetlands on-site, of which about 55 acres of forested wetlands would be enhanced and preserved within the developed portions of the project and the remaining 776 acres would be located north of the development and form a contiguous preserve with additional off-site preserve lands. In addition, the project will also provide another 27.68 wetland mitigation credits (about 82 acres), and will provide approximately about 94 acres of additional preserve lands that also provide foraging benefit to wood storks. The lands proposed for development are primarily hydrologically disturbed, exotic infested, and are adjacent to CR 846 and existing urban areas. The lands proposed for preservation are connected to other larger tracts of preserved lands and are consistent with the Service's wood stork goal to acquire, enhance, preserve, and recover natural hydropatterns within foraging habitat of the wood stork

Interrelated and Interdependent Actions

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. No interrelated or interdependent actions are expected to result from the project.

Indirect Effects

Indirect effects are defined as those effects that are caused by the proposed action, and are later in time but are still reasonably certain to occur (50 CFR 402.02). The indirect effects this project may have on the wood stork within the action area are discussed below. They include: (1) increases in disturbance frequency, intensity or severity to wood storks in the project vicinity due to human activities; (2) changes in the wood stork prey base; and (3) changes in value of wood stork habitat adjacent to the project due to project related hydrological alterations.

Increased Disturbance: The timing of construction for this project, relative to sensitive periods of the wood stork's lifecycle, is unknown. Wood storks may be found on and adjacent to the proposed construction footprint year-round. The project will be constructed in a single, disruptive event, and result in permanent loss and alteration of a portion of the existing ground cover on the project site. The time required to complete construction of the project is not known, but it is likely land clearing associated with the development could be undertaken in phases over several years. The on-site wetland preserves, which provide a foraging prey base for wood storks in a suburban setting, may increase the likelihood of harassment and disturbance to the species. However, this is a common occurrence throughout the species range and is not expected to adversely affect the wood stork. In order to minimize potential human/stork interactions, the project is proposing to educate all residents (through literature and signage) as to the potential presence of wood storks around the community.

Changes in Wood Stork Prey Base:

Prey Base Loss: The proposed action will result in the loss of 645 acres of wetlands, of which 491 are considered suitable for foraging by wood storks. In our assessment of adverse effects to the resident prey base available to foraging wood storks, we calculated an at-risk prey base of 273 kilograms of fish biomass (Table 20), of which 89 percent is attributed to short hydroperiod wetlands (243 kg). The hydroperiods vary from Class 2 (60 to 120 days) to Class 5 (240 to 300 days) with 66 percent of the project footprint represented by Class 3. We do not believe additional indirect affects to the prey base will occur.

Prey Base Increase: Increases in the availability of potential foraging habitat and prey resulting from the proposed restoration and enhancement measures are expected to exceed the estimated loss of 273 kg of fish prey base lost to project. The restoration and enhancement activities result in an increase in wood stork suitable foraging biomass of 1,864 kg (Table 21 and 21). The exotic species density habitat suitability values range from 0 percent to 100 percent, depending on the habitat polygon. The hydroperiods range from Class 2 (60 to 120 days) to Class 6 (300 to 330 days) with 61percent of the mitigation area represented by Class 3 (120 to 180 days). The wood stork suitable fish density (grams per m^2 per hydroperiod class) is as described in the earlier section relating to fish densities in each wetland class. As previously noted, the wood stork consumption percentage is 55 percent (*i.e.*, 55 percent of the biomass will actually be consumed by wood storks).

We estimate the applicant's restoration work will provide an increase of 1,039.9 kg of fish biomass in short-hydroperiod wetlands and 823.9 kg of fish biomass in long-hydroperiod wetlands (1,039.9 plus 823.9 equals 1,863.8 [1,864]). Considering the expected fish productivity loss from the proposed development is 272.7 kg of fish biomass, of which 243.4 kg represent short-hydroperiod wetlands, and 29.4 kg represent long-hydroperiod wetlands, the proposed restoration actions will provide a 4.27 fold increase in availability of fish biomass for short-hydroperiod wetlands, and a 28.03 fold increase in availability of fish biomass of long-hydroperiod wetlands.

However, as we discussed previously, we evaluate wood stork biomass productivity per hydroperiod class and based on our analysis, we believe the project will result in the loss of 33.67 kg of fish biomass associated with the loss of 66.69 acres of Class 2 hydroperiod wetlands. This biomass loss is our basis of estimating take.

Changes in value of wood stork habitat adjacent to the project due to project related hydrological alterations: During the mid 1970s, a significant acreage north of the Project was converted to vegetable crop production. Additional development activities were also occurring to the west. This resulted in a system of berms being constructed, which effectively funneled the surface water from thousands of acres (which historically occurred as sheet flow over a broad area of ± 15 miles) into a highly restricted flow-way with relatively few outfalls to the Cocohatchee Canal. This water, directed into the Project area via the restrictions, routing, agricultural pumping and the berm adjacent to the Cocohatchee Canal, backs up across the Project site for extended periods during the summer. Water lines, lichen lines, and adventitious roots on melaleuca trees are visible in most areas. These biological indicators reflect the water levels elevated by the off-site flows from the north. This altered hydrology caused the wetlands within the Project site and adjacent lands to expand through flooding and degradation of the upland communities. However, these hydroperiod is extremely variable and ground water levels typically drop to more than four feet below grade during the dry season, facilitating the colonization of the area by melaleuca and debilitating the restoration of appropriate native communities. Over 85 percent of the Project site has melaleuca densities of greater than 50 percent coverage. The applicant has incorporated into the on-site wetland preserves, and the adjacent preservation wetlands a series of control structures designed to regulate and temper the seasonal changes in hydroperiods and restore these systems to more natural communities. These changes, as discussed in the previous section are expected to result in an increase in the amount and availability of fish biomass to wood stork foraging.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

To determine the cumulative effects of the project on the wood stork, the Service has analyzed future actions reasonably certain to occur within an action area. For evaluation purposes, the Service is considering the action area for the wood stork to include the CFAs of all three nesting colonies as they encompass the project area or a portion of it (Figure 17). The process to identify cumulative effects follows the same procedure identified for the Florida panther.

Within the action area, past and ongoing State and County actions affecting wood stork habitat include: (1) State of Florida DRI Orders (2001 to 2004); (2) Comprehensive Plan Amendments (2003 to 2004); (3) Lee and Collier County Zoning Amendments (2003 to 2004); (3) Collier County's PUDs (2001 to 2004); (4) Lee County's PUDs (2003 to April 2004); and (5) South Florida Water Management District's Environmental Resource Permits (2003 to 2004) (Figure 13). To evaluate these effects, the Service incorporated the Florida Land Use, Cover and Forms Classification System (FLUCCS) mapping to determine properties that may be exempt from Federal Clean Water Act section 404 wetland regulatory reviews by the Corps. To determine which of these projects would likely be exempt from Federal Clean Water Act section 404 wetland regulatory reviews by the Corps, we identified the percentage of the project site that was classified as wetland habitat, based on the FLUCCS mapping units. The mapping units relied on by the Service included the 600 series (wetland classifications) and the 411 and 419 pine flatwood classifications (hydric pine systems). For listing purposes, properties with less than 5 percent wetlands were considered by the Service to be generally exempt from regulatory review as these quantities of wetlands could be avoided by project design. We initially identified 76 projects affecting 1,210 acres of wetlands associated with 87,784 acres. Of this list, we are aware or have reviewed 29 of these projects affecting 1,063 acres of wetlands associated with 75,574 acres. For our assessments purposes, we identified 47 projects within the combined wood stork foraging area encompassing about 12,201 acres affecting 147 acres of wetlands (Table 23, Figure 21). We added to this the 762 acres of wetlands associated with the proposed developments in Northern Golden Gate Estates and Lehigh Acres for a total of 909 acres of wetlands associated with development of about 13,689 acres. The Service believes these 909 acres of wetlands may be developed without Federal review. As shown in Table 23, cumulative wetland impacts within the action area constitute less than 0.02 percent of all wetlands available to wood storks in the three CFAs.

Although these wetlands may be adversely affected by non-federally reviewed actions and the productivity as a foraging prey base for wood storks may be affected, we believe based on the status of species discussed previously and the status of the species in the action area, the loss/reduction of foraging value to the wood storks associated with these systems is not significant (0.02 percent).

SUMMARY OF EFFECTS – WOOD STORK

The project will result in the direct loss of 645 acres of wetland on the site of which about 154 acres is not considered suitable for foraging by wood storks primarily due to the high density of melaleuca. Any loss of potential wood stork foraging habitat attributable to the project will be offset by the preservation and enhancement of about 831 acres of on-site wetlands, of which about 55 acres of forested wetlands would be enhanced and preserved within the developed portions of the project and the remaining 776 acres would be located north of the development and form a contiguous preserve with additional off-site preserve lands. In addition, the project is proposing to purchase 27.68 wetland mitigation credits (equating to about 82 acres), and will also provide about 94 acres of off-site preserve as part of their panther compensation. Wetlands within this off-site preserve will also support wood stork foraging.

However, as we discussed previously, we evaluate wood stork biomass productivity per hydroperiod class and based on our analysis, we believe the project will result in the loss of 33.67 kg of fish biomass associated with the loss of 66.69 acres of Class 2 hydroperiod wetlands. This biomass loss is our basis of estimating take.

CONCLUSION – WOOD STORK

After reviewing the status of the wood stork, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the development of Mirasol by J.D. Nicewonder, Jr., as proposed, is not likely to jeopardize the continued existence of the wood stork. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." "Harm" is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking, that is incidental to and not intended as part of the agency action, is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The terms and conditions described below are nondiscretionary and must be undertaken by the Corps so they become binding conditions of any grant or permit issued to J.D. Nicewonder, Jr., as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require J.D. Nicewonder, Jr., to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protection coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or J.D. Nicewonder, Jr., must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Florida Panther

The Service anticipates that incidental take of the Florida panther will be difficult to detect for the following reasons: (1) the Florida panther is wide-ranging; (2) the lands on the project site provide limited value to the Florida panther and panther prey species; and (3) lands adjacent to the project site consists of existing and proposed urban development that reduce their suitability for use by either resident or dispersing panthers. Therefore, the Service does not anticipate construction of the project will result in the direct mortality or injury of any Florida panthers. However, the Service anticipates indirect take of the panther in the form of harm and harassment because of potential increases in traffic and interspecific aggression within the 25-mile radius action area. This level of incidental take may be monitored with the loss of 773 acres of panther habitat within the Primary Zone.

Wood Storks

The Service anticipates incidental take of wood storks will be difficult to detect for the following reasons: (1) wood storks forage over a wide area; (2) the CFA includes all wetlands within 18.6 miles of the colony site; and (3) losses in nesting productivity may be masked by seasonal fluctuations in numbers based on other natural causes affecting food availability, such as drought or flooding, which will also affect foraging efficiency and nesting success.

We estimated the project will result in the permanent loss of about 491 acres of available wood stork foraging habitat. We also estimated there would be a loss of about 273 kg of forage biomass available to the wood stork. However, the applicant has proposed conservation measures that will ultimately increase the amount of available foraging habitat and available forage biomass. As a result of the restoration and preservation of wetland within and outside of the project area, we determined the Mirasol project will result in a net gain of 1,591 kg of fish biomass (1,864 kg - 273 kg) from the restoration and enhancement of the 831 acres of mainly short hydroperiod suitable wood stork foraging habitat biomass. The 1,591 kg of fish biomass represents 797 kg of short-hydroperiod and 794 kg of long-hydroperiod fish biomass productivity. Since we believe, in general, short-hydroperiod wetlands are critical limiting factors in the action area, the proposed action, with its preserve enhancements, will provide a net increase in nest productivity associated with short-hydroperiod wetlands of about 16 nests over base conditions (797 divided by 50 equals 15.9). We also note a corresponding increase of 5 nest over base conditions for long hydroperiod wetlands (794 divided by 150 equals 5.3).

However, as we discussed previously, we evaluate wood stork biomass productivity per hydroperiod class and based on our analysis, we believe the project will result in the loss of 33.67 kg of fish biomass associated with the loss of 66.69 acres of Class 2 hydroperiod wetlands (short hydroperiod). This biomass loss represents a loss of the productivity of one nest per year (33.67 divided by 50 equals 0.67) over base conditions of Class 2 hydroperiod wetlands.

In addition to direct effects on the non-nesting wood storks, increases in foraging opportunities resulting from the proposed action may also decrease the likelihood these non-nesting wood storks will compete for prey with nesting wood storks. Because we can not reliably predict the degree of competition or the number of non-nesting storks that forage in this area, we are unable to quantify any incidental take resulting from decreased competition.

The Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712), or the Bald Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to listed species or destruction or adverse modification of critical habitat to either species.

REASONABLE AND PRUDENT MEASURES

The Service believes the Corps and the applicant have developed a project that has conservation measures necessary and appropriate to minimize the effect of incidental take of the Florida panther and wood stork. In summary, to compensate for impacts to 773 acres of habitat, J.D. Nicewonder, Jr., proposes to enhance and preserve 941 acres on the project site, 94 acres off-site and about 82 acres of habitat associated with 27.68 mitigation bank credits at PIMB in Collier County, for a total preservation proposal of 1,117 acres.

To minimize take of wood storks, the Service considers it necessary and appropriate to collect hydrological data to ensure hydrological impacts do not occur to the on-site preserve and off-site wetlands within the project vicinity.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline reporting/monitoring requirements. The terms and conditions described below are non-discretionary, and must be undertaken by the Corps so they become binding conditions of any grant or permit issued to J.D. Nicewonder, Jr., as appropriate, for the exemption in section 7(o)(2) to apply.

The Corps has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require J.D. Nicewonder, Jr., to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protection coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or J.D. Nicewonder, Jr., must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement (50 CFR § 402.14(i)(3)). Although we have not identified any specific Reasonable and Prudent Measures not incorporated in the project, we are providing the following for clarification:

1. The preservation-sites will be managed in perpetuity for the control of invasive exotic vegetation as defined by the Florida Exotic Pest Plant Council's Pest Plant List Committee's 2001 List of Invasive Species (Category 1)(2005);

2. The Corps will provide a copy of the final permit to the Service upon issuance. The Corps will monitor the permit conditions regarding conservation measures to minimize incidental take of panthers by providing the Service a report on implementation and compliance with the conservation measure within 1 year of the issuance date of the permit;

3. **Monitor hydrological effects throughout the project area:** The applicant will place three water level data loggers (Global Water Instrumentation WL1S or similar) and two logging type rain gauges within the project boundaries. The water level loggers will be placed inside of 2 inch PVC pipe wells and sunk to a depth of approximately 8 feet below ground level. This will place the loggers below the water table and will allow for continuous monitoring of the water levels, above and below ground, experienced on the site. The rain gauges will be set to collect and record rainfall events on a daily basis so comparisons can be

made with the on-site rainfall and water levels experienced. Locations for the loggers for both the rainfall and water level are shown as an exhibit in the site monitoring plan.

In addition to the on-site data collection, additional information will be included in the data comparisons from stations already set up within the Service's identified action area for the wood stork. The District, the U.S. Geological Survey, and the National Resource Conservation Service all have data collection stations set up within this area. The information collected by these agencies is currently available via the internet. The information is presented on the District's website at http://www.sfwmd.gov/org/ema/dbhydro/index.html.

The surface water levels and rainfall data will be included in a report that will be given to the Corps and the Service on an annual basis. This monitoring will be done in conjunction with the vegetative and exotic removal monitoring conducted for the project. The reports will be produced annually for 5 years after the construction.

4. **Monitor Wood Stork Productivity:** In conjunction with the rainfall and water level data collection, the applicant will monitor the productivity of storks utilizing the Corkscrew colony. The Corkscrew staff already monitors the productivity of the colony in the form of the number of nests constructed as well as the number of young fledged. This information is available and will be included in the annual reports presented to the Corps and the Service.

5. **Monitor Forage Fish Productivity:** Since the Service estimated potential incidental take based of forage production, the project will implement a monitoring program to estimate the forage fish production on the project site preserves. The applicant will also document the utilization of the preserve by wood storks. This information will be useful in conjunction with the available productivity and hydrological data to determine if the project design serves to increase or decrease foraging opportunities.

   Sampling sites will be established along transects that will incorporate all of the different wetland communities in the on-site preserves. The proposed transect locations are shown as an exhibit in the site monitoring plan. The main habitats to be sampled are hydric pine flatwoods, hypericum prairie, and cypress. The sampling device will be a 1 m^2 Wegener ring or similar throw trap. The ring will be thrown at various points along the transect to cover a representative portion of the habitat area. All fish caught inside the ring will be identified and counted. Results will be presented in the annual report to the agencies.

6. **Annual Report:** An annual report will be presented to the Corps and to the Service in order to comply with 50 CFR part 402.14(i)(3), which states "In order to monitor the impacts of incidental take, the Federal agency or any applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement." The report will contain the following information:

   a. The current status of the construction of the project as well as any construction phases or milestones that have been completed;

b. A summary of the rainfall data collected on-site as well as data from the other agency rainfall monitoring stations identified in the report;
c. A summary of the on-site water level data as well as the off-site data available from the other agency monitoring stations;
d. Current status of the exotic removal and regeneration of the native vegetation throughout the preserve area and the off-site preserve lands;
e. Ongoing results of the forage fish sampling including species diversity and densities broken down by habitat types and water depths; and
f. Any observed on-site foraging by wood storks. Included in this information will be number of storks observed, habitat or general area observed, number of days or duration of observation, and estimated foraging efficiency.

7. Upon locating a dead, injured, or sick threatened or endangered species, initial notification must be made to the nearest Service Law Enforcement Office; Fish and Wildlife Service; 9549 Koger Boulevard, Suite 111; St. Petersburg, Florida 33702; 727-570-5398. Secondary notification should be made to the FWC; South Region; 3900 Drane Field Road; Lakeland, Florida; 33811-1299; 1-800-282-8002; and

8. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured panthers or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service is not proposing any conservation recommendations at this time.

REINITIATION NOTICE

This concludes formal consultation on the Mirasol development project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; (3) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation and effort in protecting fish and wildlife resources. If you have any questions regarding this project, please contact Allen Webb at 772-562-3909, extension 246.

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

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Table 1.* Targeted and Acquired Acreage Totals of Conservation Lands in South Florida Directly Affecting the Panther within the Consultation Area.

Name	Targeted[1] Acreage	Acquired Acreage	Indian Reservation
Federal Conservation Lands			
Everglades National Park	1,508,537	1,508,537	--
Big Cypress National Preserve	720,000	720,000	--
Florida Panther National Wildlife Refuge	26,400	26,400	--
Subtotal	**2,254,937**	**2,254,937**	--
State of Florida: Florida Forever Program			
Belle Meade	28,505	19,107	--
Corkscrew Regional Ecosystem Watershed	69,500	24,028	--
Twelvemile Slough	15,653	7,530	--
Panther Glades	57,604	22,536	--
Devil's Garden	82,508	0	--
Caloosahatchee Ecoscape	18,497	2,994	--
Babcock Ranch	91,361	0	--
Fisheating Creek	176,760	59,910	--
Subtotal	**540,388**	**136,105**	**--**
State of Florida: Other State Acquisitions			
Water Conservation Area Number 3	491,506	491,506	--
Holey Land Wildlife Management Area	33,350	33,350	--
Rotenberger Wildlife Management Area	25,019	20,659	--
Fakahatchee Strand State Preserve	74,374	58,373	--
Picayune Strand State Forest	55,200	55,200	--
Okaloacoochee Slough State Forest and WMA	34,962	34,962	--
Babcock-Webb Wildlife Management Area	79,013	79,013	--
Subtotal	**793,424**	**773,063**	**--**
Indian Reservations[2]			
Miccosukee Indian Reservation	--	--	81,874
Big Cypress Seminole Indian Reservation	--	--	68,205
Brighton Seminole Indian Reservation	--	--	37,447
Subtotal	**--**	**--**	**187,526**
GRAND TOTALS	**3,588,749**	**3,164,105**	**187,526**

1 Targeted acres not available for all lands. In Such cases, targeted equals acquired acreage.

2 Indian lands are included due to their mention in the MSRP. Acreages taken from GIS data.

* Table 2 was excerpted from the Brief of Amicus (2003). However, the lands shown as acquired in this table may include some private in-holdings and may include lands currently under sales negotiations or condemnation actions.

Table 2. Habitat preservation efforts resulting from formal and informal consultations with the Service for projects affecting Florida panther habitat from March 1984 to October 2006.

Date	Service Log Number	Corps Application Number	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
03/29/84	4-1-83-195	83M-1317	Ford Test Track	Collier	530	0	0	0
02/21/85	4-1-85-018	unknown	I-75	Broward Collier	1,517	0	0	0
10/17/86	4-1-87-016 4-1-87-017	unknown	Exxon Master Plan	Collier	9	0	0	0
01/07/87	4-1-86-303	86IPM-20130	Citrus Grove	Collier	11,178	0	0	0
01/11/88	4-1-88-029	unknown	NERCO - Clements Energy	Collier	3	0	0	0
02/23/88	4-1-88-055	unknown	Shell Western E&P	Collier Dade Monroe	0	0	0	0
02/10/89	4-1-89-001	FAP IR-75-4(88)81	SR 29/I-75 Interchange	Collier	350	0	0	0
08/15/90	4-1-90-289	unknown	I-75 Recreational Access	Collier	150	0	0	0
09/24/90	4-1-90-212	89IPD-20207	U.S. Sugar Corporation	Hendry	28,740	700	0	700
03/12/91	4-1-91-229	90IPO-02507	Lourdes Cereceda	Dade	97	0	0	0
01/14/92	4-1-91-325	199101279	Dooner Gulf Coast Citrus	Collier	40	40	0	40
09/25/92	4-1-92-340	unknown	STOF, BCSIR Citrus Grove	Hendry	1,995	0	0	0
06/18/93	4-1-93-217	199200393	Corkscrew Road	Lee	107	0	0	0
02/25/94	4-1-94-209	199301131	Daniels Road Extension	Lee	65	0	0	0
05/09/94	4-1-93-251	199202019	Corkscrew Enterprises	Lee	900	100	100	200
10/27/94	4-1-94-430	199302371 199400807 199400808	Florida Gulf Coast University Treeline Boulevard	Lee	1,088	526	0	526
05/24/95	4-1-95-230	199302130	Turner River Access	Collier	1,936	0	0	0
08/07/95	4-1-95-274	199405501	Bonita Bay Properties	Collier	509	491	0	491

Date	Service Log Number	Corps Application Number	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
08/15/95	4-1-94-214	199301495	SW Florida Airport Access Road	Lee	14	0	0	0
09/19/96	4-1-95-F-230	199302052 199301404	I-75 Access Points	Broward	116	0	0	0
03/10/98	4-1-98-F-3	L30 (BICY)	Calumet Florida	Collier Broward Dade	0	0	0	0
03/27/98	4-1-97-F-635	199604158	Willow Run Quarry	Collier	359	190	0	190
06/11/99	4-1-98-F-398	199800622	STOF Water Conservation Plan	Hendry	1,091	0	0	0
09/27/99	4-1-98-F-310	199130802	Daniels Parkway	Lee	2,093	0	94	94
12/08/99	4-1-98-F-517	199607574	Cypress Creek Farms	Collier	239	0	24	24
04/17/00	4-1-98-F-428	199507483	Miromar	Lee	1,323	0	194	194
06/09/00	4-1-99-F-553	199900619	Naples Reserve	Collier	833	0	320	320
02/21/01	4-1-00-F-135	199803037	Corkscrew Ranch	Lee	106	0	0	0
04/17/01	4-1-00-F-584	200001436	Sun City	Lee	1,183	0	408	408
07/30/01	4-1-94-357	199003460	Naples Golf Estates	Collier	439	175	0	175
08/31/01	4-1-00-F-183	199900411	Colonial Golf Club	Lee	1,083	0	640	640
12/14/01	4-1-00-F-585	199301156	SW Florida Airport	Lee	8,058	0	6,986	6,986
01/30/02	4-1-98-F-372	199402492	Florida Rock	Lee	5,269	802	0	802
03/07/02	4-1-00-F-178	199901251	Southern Marsh Golf	Collier	121	75	80	155
04/24/02	4-1-01-F-148	199901378	Hawk's Haven	Lee	1,531	267	0	267
09/24/02	4-1-01-F-135	200001574	Verandah	Lee	1,456	0	320	320
10/08/02	4-1-02-F-014	199602945	Winding Cypress	Collier	1,088	840	1,030	1,870
05/19/03	4-1-02-F-1741	200200970	Apex Center	Lee	95	10	18	28
06/10/03	4-1-01-F-1955	200003795	Walnut Lakes	Collier	157	21	145	166
06/18/03	4-1-01-F-136	199701947	Twin Eagles Phase II	Collier	593	57	98	155

Date	Service Log Number	Corps Application Number	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
06/23/03	4-1-01-F-143	199905571	Airport Technology	Lee	116	55	175	230
07/02/03	4-1-98-F-428	199507483	Miromar	Lee	342	158	340	498
09/04/03	4-1-02-F-1486	200206725	State Road 80	Lee	33	2	12	14
10/06/03	4-1-02-F-0027	200102043	Bonita Beach Road	Lee	1,117	145	640	785
12/29/03	4-1-02-F-1743	200202926	The Forum	Lee	650	0	310	310
01/18/05	4-1-04-F-4259	199702228	Bonita Springs Utilities	Lee	79	0	108	108
02/21/03 03/09/05	4-1-01-F-607	200001926	Mirasol	Collier	800	914	145	1,059
03/31/05	4-1-04-F-5656	200306759	Gateway Shoppes II	Collier	82	0	122	122
04/08/05	4-1-04-F-8176	2004-5312	Seminole Mine	Broward	110	0	220	220
04/29/05	4-1-04-F-5780 4-1-04-F-5982	2003-5331 2003-6965	Arborwood and Treeline Avenue	Lee	2,329	0	1,700	1,700
06/06/05	4-1-03-F-7855	2003-11156	Collier Regional Medical	Collier	44	0	64	64
06/14/04 03/21/05	4-1-04-F-5744	199603501	Terafina	Collier	437	210	261	471
02/22/05 03/16/05 06/29/05 04/04/06	4-1-04-F-6866	200309416	Ava Maria DRI	Collier	5,027	0	6,114	6,114
06/29/05	4-1-03-F-3915	199806220	Wenthworth Estates	Collier	917	0	458	458
07/15/05	4-1-04-F-5786	199405829	Land's End Preserve	Collier	231	0	61	61
09/08/05	4-1-04-F-5260	200106580	Parklands Collier	Collier	489	157	434	591
09/23/05 10/26/05	4-1-04-F-9348	200101122	Super Target-Tarpon Bay Plaza	Collier	34	0	20	20
11/23/05	4-1-04-F-6043	20034914	Summit Place	Collier	108	0	61	61
11/29/05	4-1-04-F-8847	20048995	STOF Administrative Complex	Collier	6	0	8	8
12/06/05	4-1-03-F-3483	200302409	SW Florida Commerce	Lee	207	0	305	305

Date	Service Log Number	Corps Application Number	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
			Center					
12/06/05	4-1-04-F-6691	200310689	Rattlesnake Hammock Road Widening	Collier	23	0	23	23
01/04/06	4-1-04-F-8388	2004554	Immokalee Regional Airport - Phase I	Collier	67	0	43	43
01/04/06	4-1-04-F-9777	20048577	Logan Boulevard Extension	Collier	30	0	10	10
1/13/06	4-1-04-F-6707	20042404	Journey's End	Collier	66	0	34	34
01/26/06	4-1-04-F-8940	20047053	The Orchard	Lee	93	0	81	81
02/19/06	4-1-05-F-11724	2005834	Firano at Naples	Collier	24	0	19	19
02/22/06	4-1-04-F-6504	200491	Corkscrew Road	Lee	20	0	47	47
02/23/06	4-1-04-F-5244	200312276	Summit Church	Lee	10	0	13	13
03/31/06	4-1-05-F-11343	20051909	Coral Keys Homes	Miami-Dade	41	0	61	61
05/05/06	41420-2006-I-0274	2005-6176	Santa Barbara , Davis to Radio Road, Widening	Collier	6	0	3	3
05/9/06	41420-2006-I-0263	20056298	Santa Barbara and Radio Road Widening	Collier	29	0	20	20
05/9/06	41420-2006-F - 0089	20043248	Collier Boulevard, Immokalee Rd. to Goldengate Blvd.	Collier	14	0	16	16
05/16/06	4-1-05-F-10309	19971924	Sabal Bay	Collier	1,017	1,313	223	1,536
06/05/06	4-1-05-I-8486	20041688	Seacrest School	Collier	31	0	16	16
06/09/06	4-1-05-I-10965	200303733	HHJ Development	Dade	3	0	4	4
06/14/06	4-1-05-F-11855	200411010	Keysgate School	Dade	39	0	62	62

Date	Service Log Number	Corps Application Number	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
06/15/06	41420-2006-FA-0811 and I-0362	20056149	Collier County Wellfield	Collier	29	0	36	36
07/12/06	41420-2006-F-0282	200311150	Cypress Shadows	Lee	244	0	326	326
07/28/06	4-1-04-F-12330	20047920	Hamilton Place	Dade	10	0	50	50
07/28/06	4-1-04-F-7279	20041695	Raffia Preserve	Collier	131	0	119	119
08/15/06	41420-2006-I-0151	20031963	Naples Custom Homes	Collier	10	0	9	9
08/21/06	4-1-03-F-3127	19956797	Atlantic Civil Agriculture Expansion	Dade	981	0	1553	1553
08/21/06	4-1-03-I-0540	20041813	ASGM Business Park	Collier	41	0	25	25
9/12/06	41420-2006-FA-0589 and F-0554	20037414	Miccosukee Government Complex	Dade	17	0	37	37
9/22/06	41420-2006-I-0355	20040047	Immokalee Seminole Reservation Road Improvements	Collier	17	0	35	35
10/16/06	41420-2006-FA-1488 and F-0442	199507483	Miromar Lakes Addition	Lee	366	0	390	390
10/05/06	41420-2006-I-0616	20065295	New Curve on Corkscrew Road	Lee	12	0	18	18
10/18/06	41420-2007-FA-0029 and F-0787	2004777	Treeline Preserve	Lee	97	0	95	95
10/25/06	41420-2006-FA-1129 and F-0442	20047046	Koreshan Boulevard Extension	Lee	14	0	31	31
10/26/06	41420-2006-FA-1636 and F-0787	200306755	Jetway Tradeport	Lee	38	0	51.5	52

Date	Service Log Number	Corps Application Number	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
10/26/06	41420-2006-I-0849	20055702	Marina Del Lago	Lee	49	0	36	36
10/27/06	41420-2006-I-0203	20057180	Living Word Family Church	Collier	18	0	35	35
10/30/06	41420-2006-I-0607	200604878	SeminoleTribe Access Road	Hendry	2	0	5	5
11/15/06	41420-2006-TA-0727	N/A	Liberty Landing	Collier	27	0	19	19
pending	41420-2006-F-0850	200312445	Airport Interstate Commerce Park	Lee	323	0	371	371
02/21/03 03/09/05 05/03/07	4-1-01-F-607	200001926	Mirasol	Collier	773	941	182	1,117
pending	4-1-04-F-6112	20021683	Alico Airpark (Haul Ventures)	Collier	241	75	414	489
				Totals	94,088	7,349	26,464	33,814

Table 3: Undeveloped Privately Owned Land within Florida Panther Core Area

	Acres	Primary Equivalent Factor	Primary Equivalent Acres
Primary	610,935	1.00	610,935
Dispersal	27,883	1.00	27,883
Secondary	503,481	0.69	347,402
Other	655,996*	0.33	216,479

*** About 819,995 acres are at risk in the other zone with about 80 percent with resource value**

Table 4: Land Held for Conservation within the Florida Panther Core Area

	Acres	Primary Equivalent Factor	Primary Equivalent Acres
Primary	1,659,657	1.00	1,659,657
Dispersal	0	1.00	0
Secondary	308,623	0.69	212,950
Other	609,872	0.33	201,258

Table 5. Landscape Compensation Multipliers

Zone of Impacted Lands	Zone of Compensation Lands	Multiplier
Primary	Secondary	1.45
Secondary	Primary	0.69
Other	Secondary	0.48
Other	Primary	0.33

Table 6. Habitat suitability values for use in assessing habitat value to the Florida panther.

Land Cover Type	**Value**	**Land Cover Type**	**Value**	**Land Cover Type**	**Value**
Water	0	STA	4.5	Cypress swamp	9
Urban	0	Shrub swamp	5	Sand pine scrub	9
Coastal strand	1	Shrub and brush	5	Sandhill	9
Reservoir	1.5	Dry prairie	6	Hardwood-Pine forest	9
Mangrove swamp	2	Grassland/pasture	7	Pine forest	9
Salt marsh	2	Freshwater marsh	9	Xeric oak scrub	10
Exotic plants	3	Bottomland hardwood	9	Hardwood forest	10
Cropland	4	Bay swamp	9		
Orchards/groves	4	Hardwood swamp	9		

Table 7. Wood Stork Nesting Data in the Southeastern U.S. (Gawlik 1987, Service 2006)

YEAR	**TOTAL**		**FLORIDA**		**GEORGIA**		**SOUTH CAROLINA**		**NORTH CAROLINA**	
	Nesting Pairs	**Colonies**	**Nesting Pairs**	**Colonies**	**Nesting Pairs**	**Colonies**	**Nesting Pairs**	**Colonies**	**Nesting Pairs**	**Colonies**
1981	4,442	22	2,365	19	275	2	11	1		
1982	3,575	22	778	19	135	2	20	1		
1983	5,983	25	2,350	22	363	2	20	1		
1984	6,245	29	1,550	25	576	3	22	1		
1985	5,193	23	1,455	17	557	5	74	1		
1986	5,835	36	5,067	29	648	4	120	3		
1987			**		506	5	194	3		
1988			**		311	4	179	3		
1989			**		543	6	376	3		
1990			**		709	10	536	6		
1991	4,073	37	2,293	23	969	9	664	3		
1992			**		1,091	9	475	3		
1993	6,729	43	4,262	28	1,661	11	806	3		
1994	5,768	47	3,589	26	1,468	14	712	7		
1995	7,853	54	5,617	33	1,501	17	829	6		
1996			**		1,480	18	953	7		

YEAR	TOTAL		FLORIDA		GEORGIA		SOUTH CAROLINA		NORTH CAROLINA	
	Nesting Pairs	Colonies	Nesting Pairs	Colonies	Nesting Pairs	Colonies	Nesting Pairs	Colonies	Nesting Pairs	Colonies
1997	5,166	59	2,870	36	1,379	15	917	8		
1998			**		1,665	15	1,093	10		
1999	9,000	63	7341	42	1,139	13	520	8		
2000			**		566	7	1,236	11		
2001	4,998	44	2,662	22	1,162	12	1,174	9		
2002	7,855	70	5,463	48	1,256	14	1,136	10		
2003	9,551	78	6,449	49	1,653	18	1,356	11		
2004	8,857	93	5,227	63	1,596	17	2,034	13		
2005	5,560	74	2,336	41	1,817	19	1,407	14	32	1
2006	11,232	81	7,216	49	1,928	21	1,963	12	125	1

**Some data from Florida not readily available due to inconsistent survey or reporting.

Table 8. Total Number of Wood Stork Nesting Pairs within the Everglades and Big Cypress Basins, 1996 to Present

Year	Nesting Pairs	3-Year Running Average
1996	600	-
1997	445	-
1998	475	507
1999	4,549	1,823
2000	3,996	3,007
2001	2,681	3,742
2002	2,880	3,186
2003	2,386	2,649
2004	1,015	2,094
2005	634	1,345
2006	2,710	1,453

Table 9. Panther-Vehicle Collisions within the Mirasol Action Area as of February 5, 2007.

Distance from Project	Roadway	Year	Sex	Panther	Result
24 miles southeast	SR 29	1979	F	UCFP04	Death
22 miles east	SR 29	1980	M	UCFP05	Death
22 miles southeast	SR 84	1983	M	FP01	Death
20 miles southeast	SR 84	1984	F	UCFP12	Death
20 miles southeast	SR 84	1985	F	UCFP13	Death
21 miles southeast	SR 84	1985	M	FP04	Death
14 miles south	CR 951	1985	F	NONE	Injury
25 miles southeast	SR 29	1985	M	FP07	Death
20 miles southeast	SR 84	1986	F	UCFP15	Death
23 miles east	CR 858	1987	M	FP20	Injury
22 miles east	SR 29	1988	M	FP13	Death
18 miles north	Daniels Road	1989	M	FP28	Injury
17 miles northeast	CR 850	1989	M	UCFP18	Death
24 miles southeast	SR 29	1990	M	FP37	Death
22 miles east	SR 29	1991	F	UCFP20	Death
14 northwest	Alico Road	1992	M	NONE	Injury
22 miles east	SR 29	1992	F	UCFP21	Death
18 miles northwest	Daniels Road	1993	M	UCFP22	Death
25 miles northeast	CR 846	1993	M	FP50	Death
22 miles east	SR 29	1994	F	FP31	Death
23 miles northeast	CR 846	1995	F	FP52	Death
25 miles northeast	CR 846	1997	?	UCFP31	Death
23 miles southeast	SR 29	1998	M	FP64	Death
23 miles southeast	SR 29	1998	M	FP51	Injury
21 miles east	CR 858	2000	M	K76	Death
21 miles northeast	CR 846	2000	M	UCFP35	Death
24 miles northeast	CR 846	2000	F	UCFP37	Death
22 miles east	SR 29	2001	M	UCFP41	Death
22 miles east	SR 29	2002	M	FP98	Death
25 miles northeast	CR 846	2002	F	UCFP48	Death
22 miles northeast	CR 846	2002	F	UCFP49	Death
7 miles east	CR 846	2002	M	FP99	Death
14 miles northeast	CR 846	2003	M	UCFP50	Death
22 miles east	SR 29	2003	F	FP106	Death
22 miles east	SR 29	2003	F	UCFP53	Death
22 miles east	SR 29	2003	M	UCFP54	Death
14 miles northeast	CR 846	2003	F	UCFP58	Death
21 miles east	CR 858	2003	F	UCFP59	Death
23 miles southeast	US 41	2003	M	UCFP60	Death
10 miles southeast	I-75	2004	M	UCFP63	Death

Distance from Project	Roadway	Year	Sex	Panther	Result
23 miles southeast	SR 29	2004	M	UCFP65	Death
14 miles southeast	I-75	2004	M	UCFP66	Death
11 miles south	US 41	2004	M	K156	Death
11 miles south	I-75	2004	M	K94	Death
22 miles east	SR 29	2004	F	UCFP69	Death
22 miles east	SR 29	2004	F	UCFP70	Death
14 miles south	CR 951	2005	M	UCFP73	Death
22 miles northeast	SR 29	2005	M	UCFP75	Death
11 miles south	CR 951	2005	M	K153	Death
17 miles south	US 41	2005	M	UCFP76	Death
7 miles east	CR 846	2006	F	UCFP79	Death
25 miles north	I-75	2006	M	UCFP81	Death
11 miles north	Corkscrew Road	2006	M	UCFP87	Death
17 miles south	US 41	2006	F	UCFP88	Death

Table 10. County and State Acquisitions within the Action Area (Acres)

Year	*County*	*State*
1999	67.20	8,838.85
2000	542.03	2,179.29
2001	590.89	2,449.52
2002	2,054.02	3,558.82
2003	116.55	65.95
2004	**	**
Totals	3,370.69	17,092.43

**Data unavailable

Table 11
Florida Panther Habitat Matrix
Panther Habitat Units

Land Cover Types	Habitat Values	Project Development 773 acres				On-site Preserve 941 acres				Off-site Preserve PIMB 82 acres				Off-site Preserve Primary Zone 94 acres			
		Functional Units Needed 7512*				Functional Units Provided 6500**				Functional Units Provided 738				Functional Units Provided 750*** average of 8 PHU's per acre			
		Pre		Post		Pre		Post		Pre		Post		Pre		Post	
		Acres	PHU	Acres	PHU	Acres	PHU	Acres	PHU	Acres	PHU	Acres	PHU	Acres	PHU	Acres	PHU
Water/Urban	0	0	0	773	0	1	0	31	0								
Exotic Plants	3	553	1659			607	1822	0	0								
Hardwood Swamp	9	1	9			1	9	1	9								
Cypress Swamp	9	44	393			102	917	119	1075	41	369	0	0				
Pine Forest	9	174	1563			228	2048	780	7024	41	369	0	0				
Freshwater Marsh	9	0	0			1	9	8	74								
Dry Prairie	6	2	12			1	6	1	6								
Subtotal		773	3756	773	0	941	4812	941	8188	82	738	0	0				

* The Service had previously agreed, prior to the reinitiation of formal consultation with the Corps, that a base ratio of 2.0 would be the multiplier for recommended compensation for project functional habitat evaluations.

** Functional Units provided is one-half of the difference between pre and post enhancement values added to the pre value.

*** As part of the applicant's compensation proposal, an additional 750 PHUs are proposed for acquisition within Primary Zone lands.

Table 12. Mirasol Consultation Area Project List – Panthers

Less than 5 percent Wetland Acres						
Project Name	**Wetland Acres**	**Total Acres**	**Percent Wetland Acres**	**DRI**	**PUD**	**District**
BOB EVANS FT MYERS	0.00	0.23	0.00%			2003
BONITA BEACH RD / BONITA GRANDE INTERSECTION IMPROVEMENTS	0.00	0.17	0.00%			2004
BONITA BEACH RD / BONITA GRANDE INTERSECTION IMPROVEMENTS	0.00	0.40	0.00%			2004
BONITA BEACH RD / BONITA GRANDE INTERSECTION IMPROVEMENTS	0.00	0.38	0.00%			2004
CALOOSA LAKES	0.00	196.74	0.00%			2003
CITY GATE COMMERCE CENTER	0.00	10.83	0.00%			2003
DAVES TOWING	0.00	0.67	0.00%			2003
DAVIS CROSSINGS	0.00	20.86	0.00%			2003
FLEET LEGACY AT LEHIGH	0.00	9.38	0.00%			2003
IMMOKALEE FIFTH STREET DITCH PROJECT	0.00	0.88	0.00%			2003
IMMOKALEE FLORIDA SPECIALTIES DITCH ENCLOSURE	0.00	1.24	0.00%			2003
LEE COUNTY ELEMENTARY SCHOOL S	0.00	47.08	0.00%			2004
OAK RIDGE SUBDIVISION	0.00	1.02	0.00%			2003
PALM STREET OUTFALL IMPROVEMENTS	0.00	0.46	0.00%			2003
QUARRY LAKE ESTATES	0.00	41.23	0.00%			2004
R AND L CARRIERS FORT MYERS	0.00	41.26	0.00%			2003
ROOKERY BAY PEDESTRIAN BRIDGE CROSSING	0.00	0.23	0.00%			2003
SHADOW LAKES (F.K.A. BELL PRESERVE)	0.00	0.23	0.00%			2003
SIX MILE CYPRESS PLAZA ROAD REALIGNMENT	0.00	0.22	0.00%			2004
TAYLOR ROAD / HOMESTEAD ROAD TURN LANE	0.00	0.45	0.00%			2003
TIERRA BAY	0.00	66.26	0.00%			2004
VAN ROEKEL AND VAN ROEKEL DVM PH1	0.00	0.72	0.00%			2003
WALLS CORNER LOT	0.00	0.23	0.00%			2003
WOODWARD MANOR	0.00	10.35	0.00%			2003
ASTRON PLAZA	0.00	8.56	0.00%		2004	
COLONADES AT SANTA BARBARA	0.00	6.83	0.00%		2004	
DA VINCI ESTATES IN OLDE CYPRESS	0.00	40.37	0.00%		2001	
IMMOKOLEE SENIOR HOUSING	0.00	7.44	0.00%		2004	
MILLER SQUARE	0.00	1.9	0.00%		2003	
SALVATION ARMY	0.00	6.51	0.00%		2001	
SANDPIPER VILLAGE	0.00	14.99	0.00%		2002	
MANDALAY	0.00	28.06	0.00%		2003	
AIRPORT SOUTH INTERCHANGE CPD	0.00	31.65	0.00%		2002	
CPD EAST COUNTY WATER CONTROL DISTRICT CPD	0.00	3.18	0.00%		2004	
VILLAGE WALK - BONITA SPRINGS	0.04	631.33	0.01%			2003
BRISTOL PINES	0.01	22.77	0.04%		2004	
SEACREST UPPER SCHOOL CAMPUS	0.01	9.97	0.10%			2004
CORKSCREW GROWERS SEC 3 RPD/CPD	3.60	652.91	0.55%		2002	
LEE PARKLANDS - NORTHWEST MODIFICATIONS	3.53	316.71	1.11%			2003
MAGNOLIA SQUARE PHASE 3	0.57	42.83	1.33%			2004
JOEL BLVD SIDEWALK IMPROVEMENTS (CTY RD 884)	0.21	11.83	1.78%			2003
JAMERSON EXCAVATION	2.54	125.21	2.03%			2004
LEE BOULEVARD 130	4.17	139.14	2.99%			2003
COLLIER REGIONAL MEDICAL	0.83	18.48	4.49%			2003
FIRST NATIONAL BANK OF FLORIDA/NAPLES LAKES BRANCH	0.41	8.96	4.57%			2003
		2,581.15				

Table 13. Foraging Suitability Values for Various Densities of Exotics

Cover Type	# of Species (S)	# of Individuals (I)	S * I	Foraging Suitability Value
DMM	1	2	2	0
DMS	4	10	40	3
P75	10	59	590	37
P50	11	92	1089	70
MAR	12	132	1584*	100

* Represents maximum number of individuals

Table 14. Acreages of Habitats within the Impact Footprint

	Pre-Development Acreage Total	< 25% Melaleuca Coverage	25% - 50% Melaleuca Coverage	50% - 75% Melaleuca Coverage	75%-90% Melaleuca Coverage	90%-100% Melaleuca Coverage
UPLANDS						
411 – Pine Flatwoods	122.70	18.51	72.58		31.61	
ROW – Road Right-of-way	4.92			4.92		
WETLANDS						
424 – Melaleuca	154.04				42.5	111.51
617 – Mixed Wetland Hardwoods	1.25		1.25			
621 – Cypress	10.78	2.79	6.00	1.99		
624 – Pine / Cypress Flatwood	32.04		4.88	16.60	10.56	
625 – Hydric Pine Flatwood	443.80		80.58	116.13	247.09	
643 – Disturbed Prairie	3.44	3.44				
DEVELOPMENT TOTAL	**772.97**	**24.74**	**165.29**	**139.64**	**331.79**	**111.51**

Table 15. Acres of Suitable Foraging Habitat within the Development Footprint

	Pre-Development Acreage	< 25% Melaleuca Coverage	25% - 50% Melaleuca Coverage	50% - 75% Melaleuca Coverage	75% - 90% Melaleuca Coverage
617 – Mixed Wetland Hardwoods	1.25		1.25		
621 – Cypress	10.78	0.03	2.76	7.99	
624 – Pine / Cypress Flatwood	28.51		4.88	9.63	10.56
625 – Hydric Pine Flatwood	450.27		80.58	123.1	247.09
643 – Disturbed Prairie	3.44	3.44			
TOTAL	**491.31**	**3.47**	**89.47**	**140.72**	**257.65**

Table 16. Hydroperiod Classes of Wetlands Suitable for Wood Stork Foraging in the Action Area and Suitable Wood Stork Foraging Area.

Hydroperiod	Combined Core Foraging Area Acreage	Combined Suitable Wood Stork Core Foraging Area Acreage
Class 1 - 0 to 60 days Class 2 - 60 to 120 days Class 3 - 120 to 180 days	227,845	205,061
Class 4 - 180 to 240 days Class 5 - 240 to 300 days Class 6 - 300 to 330 days Class 7 - 330 to 365 days	253,821	228,439
TOTAL	**481,666**	**433,500**

Table 17. Hydroperiod Classes of Wetlands Suitable for Wood Stork Foraging in the Project Area.

Hydroperiod	Development Footprint
Class 1 - 0 to 60 Days	
Class 2 - 60 to 120 Days	66.69
Class 3 - 120 to 180 Days	410.48
Class 4 - 180 to 240 Days	13.08
Class 5 - 240 to 300 Days	1.06
Class 6 - 300 to 330 Days	
Class 7 - 330 to 365 days	
TOTAL	491.31

Table 18. Hydroperiod Classes of Wetlands Suitable for Wood Stork Foraging in the Preserve Area. (Pre and Post enhancement activities)

Hydroperiod	Preserve Area Footprint Pre-Enhancement	Preserve Area Footprint Post-Enhancement
Class 1 - 0 to 60 Days		
Class 2 - 60 to 120 Days	17.01	17.01
Class 3 - 120 to 180 Days	377.60	490.55
Class 4 - 180 to 240 Days	118.22	238.46
Class 5 - 240 to 300 Days	85.07	85.07
Class 6 - 300 to 330 Days	0.27	0.27
Class 7 - 330 to 365 days		
TOTAL	**598.17**	**831.36**

Table 19. Acreage and Biomass in Individual Hydroperiod Classes of Wetlands Suitable for Wood Stork Foraging in the Development and the pre and post Restoration of the Preserves.

Hydroperiod	Existing Footprint		Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days	66.69	44.97	17.01	7.26	17.01	18.55	-66.69	-33.68
Class 3 - 120 to 180 Days	410.48	198.39	377.60	205.15	490.55	1,233.79	-297.53	830.25
Class 4 - 180 to 240 Days	13.08	25.70	118.22	358.09	238.46	1,114.59	107.16	730.80
Class 5 - 240 to 300 Days	1.06	3.69	85.07	405.98	85.07	473.37	-1.06	63.70
Class 6 - 300 to 330 Days			0.27	1.74	0.27	1.74	0.00	0.00
Class 7 - 330 to 365 days								
TOTAL	**491.31**	**272.75**	**598.17**	**978.22**	**831.36**	**2,842.04**	**-258.12**	**1,591.07**

- The acreage net change is based on the overall increase/decrease in suitable wood stork foraging habitat within the project. The project will result in the loss of 645 acres of wetlands, of which 491 are considered suitable for wood stork foraging. The preserves include 831 acres of wetlands of which 598 acres are suitable, without restoration, for wood stork foraging. Following restoration, all 831 acres are suitable for wood stork foraging. Although restoration provides an increase of 233 acres of wood stork foraging habitat, the project development provides a loss of 491 acres of foraging habitat with an overall project loss of 258 acres of wood foraging habitat.

- The biomass net change is based on the overall increase/decrease of fish biomass available to wood storks. The proposed development will provide a loss of 273 kg of biomass. The preserves, prior to enhancement, provide a biomass of 978 kg, with a post enhancement value of 2,842 kg, equating to an increase of 1,864 kg of biomass. Subtraction the development loss from the biomass increase from the preserve restoration, the proposed action provides a net increase of 1,591 kg of biomass available for wood stork foraging.

Table 20. Wood Stork Suitable Foraging Prey Base Loss (Development Area)

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetland Impacts (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
1	424/624	Melaleuca(>75%) / Cypress / Pine	2.37	2	9591.06	0.03	0.49	0.55	77.54
3	621	Cypress / Melaleuca (>50%)	2.50	4	10117.15	0.37	2.10	0.55	4323.56
4	424	Melaleuca	42.50	3	171991.55	0	1.13	0.55	0
6	624/424	Pine / Cypress / Melaleuca (>50%)	6.97	3	28206.61	0.37	1.13	0.55	6486.25
8	624	Pine / Cypress / Melaleuca (>75%)	8.19	3	33143.78	0.03	1.13	0.55	617.97
14	625/424	Pine Flatwoods / Melaleuca (>50%)	1.68	3	6798.72	0.37	1.13	0.55	1563.40
20	424/625	Melaleuca(>50%) / Pine Flatwoods	29.71	3	120232.21	0.37	1.13	0.55	27648.00
21	643	Disturbed Wet Prairie	3.44	3	13921.20	1.00	1.13	0.55	8652.02
24	621	Cypress / Melaleuca (>25%)	0.82	5	3318.43	0.70	2.50	0.55	3193.98
26	625/424	Pine Flatwoods / Melaleuca (>25%)	30.71	2	124279.07	0.70	0.49	0.55	23445.25
27	424	Melaleuca	9.24	3	37392.99	0	1.13	0.55	0
28	621	Cypress / Melaleuca (>50%)	0.69	4	2792.33	0.37	2.10	0.55	1193.30
34	625/424	Pine Flatwoods / Melaleuca (>25%)	19.51	2	78954.24	0.70	0.49	0.55	14894.72
35	621	Cypress	0.03	4	121.41	1.00	2.10	0.55	140.22
36	625/424	Pine Flatwoods / Melaleuca (>25%)	16.30	3	65963.82	0.70	1.13	0.55	28697.56
38	424	Melaleuca	46.75	3	189190.71	0	1.13	0.55	0
41	621	Cypress / Melaleuca (>25%)	0.22	4	890.31	0.70	2.10	0.55	719.81
42	624	Pine / Cypress / Melaleuca (>25%)	4.88	3	19748.68	0.70	1.13	0.55	8591.66
44	424/625	Melaleuca(>50%) / Pine Flatwoods	18.44	3	74624.10	0.37	1.13	0.55	17160.18
45	621	Cypress / Melaleuca (>25%)	0.70	4	2832.80	0.70	2.10	0.55	2290.32
46	424/625	Melaleuca(>50%) / Pine Flatwoods	12.59	3	50949.97	0.37	1.13	0.55	11716.20
47	424/625	Melaleuca(>75%) / Pine Flatwoods	3.29	3	13314.17	0.03	1.13	0.55	248.24
50	424/625	Melaleuca(>75%) / Pine Flatwoods	54.38	3	220068.25	0.03	1.13	0.55	4103.17
52	621	Cypress / Melaleuca (>50%)	1.31	4	5301.39	0.37	2.10	0.55	2265.55
54	621	Cypress / Melaleuca (>50%)	1.50	4	6070.29	0.37	2.10	0.55	2594.14
55	424/624	Melaleuca(>50%)/Cypress/Pine	3.36	4	13597.45	0.37	2.10	0.55	5810.87
56	424/621	Cypress / Melaleuca (>50%)	1.75	4	7082.01	0.37	2.10	0.55	3026.49
57	424/624	Melaleuca(>50%)/Cypress/Pine	6.27	3	25373.81	0.37	1.13	0.55	5834.83
58	617	Mixed Wetland Hardwoods	1.25	2	5058.58	1.00	0.49	0.55	1363.29
61	424/625	Melaleuca(>75%) / Pine Flatwoods	28.91	3	116994.72	0.03	1.13	0.55	2181.37
64	424/625	Melaleuca(>75%) / Pine Flatwoods	28.37	3	114809.42	0.03	1.13	0.55	2140.62
65	424/625	Melaleuca(>75%) / Pine Flatwoods	8.91	3	36057.52	0.03	1.13	0.55	672.29
68	621	Cypress / Melaleuca (>25%)	1.02	4	4127.80	0.70	2.10	0.55	3337.32
70	424/625	Melaleuca(>50%) / Pine Flatwoods	5.57	3	22541.01	0.37	1.13	0.55	5183.42
71	424/625	Melaleuca(>25%) / Pine Flatwoods	8.85	3	35814.71	0.70	1.13	0.55	15581.19
76	424/625	Melaleuca(>50%) / Pine Flatwoods	12.11	2	49007.47	0.37	0.49	0.55	4886.78
79	424/625	Melaleuca(>75%) / Pine Flatwoods	20.65	3	83567.66	0.03	1.13	0.55	1558.12
82	621	Cypress / Melaleuca (>50%)	0.24	5	971.25	0.37	2.50	0.55	494.12
85	424	Melaleuca	55.55	4	224803.07	0	2.10	0.55	0
86	424/625	Melaleuca(>75%) / Pine Flatwoods	3.84	3	15539.94	0.03	1.13	0.55	289.74

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetland Impacts (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
87	424/625	Melaleuca(>25%) / Pine Flatwoods	2.99	3	12100.11	0.70	1.13	0.55	5264.15
89	424/625	Melaleuca(>50%) / Pine Flatwoods	0.74	2	2994.68	0.37	0.49	0.55	298.61
90	424/625	Melaleuca(>75%) / Pine Flatwoods	98.60	3	399020.40	0.03	1.13	0.55	7439.74
92	424/625	Melaleuca(>25%) / Pine Flatwoods	2.22	3	8984.03	0.70	1.13	0.55	3908.50
100	424/625	Melaleuca(>50%) / Pine Flatwoods	27.49	3	111248.18	0.37	1.13	0.55	25582.08
101	424/625	Melaleuca(>50%) / Pine Flatwoods	7.80	3	31565.51	0.37	1.13	0.55	7258.65
102	424/625	Melaleuca(>75%) / Pine Flatwoods	0.14	3	566.56	0.03	1.13	0.55	10.56
							TOTAL		272,745.8

Table 21. Mirasol Preserve – Wood Stork Suitable Foraging Prey Base Pre-Enhancement

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
20	424/625	Melaleuca(>50%) / Pine Flatwoods	3.43	3	13,880.73	0.37	1.13	0.55	3,191.94
21	643	Disturbed Wet Prairie	0.85	3	3,439.83	1.00	1.13	0.55	2,137.85
22	621	Cypress	4.36	5	17,644.31	1.00	2.50	0.55	24,260.93
23	624	Pine / Cypress	2.67	4	10,805.12	1.00	2.10	0.55	12,479.91
26	625/424	Pine Flatwoods / Melaleuca (>25%)	0.96	2	3,884.99	0.70	0.49	0.55	732.90
30	621	Cypress	6.34	4	25,657.09	1.00	2.10	0.55	29,633.94
35	621	Cypress	0.55	4	2,225.77	1.00	2.10	0.55	2,570.77
36	625/424	Pine Flatwoods / Melaleuca (>25%)	2.72	3	11,007.46	0.70	1.13	0.55	4,788.80
38	424	Melaleuca	1.39	3	5,625.14	0	1.13	0.55	0.00
41	621	Cypress / Melaleuca (>25%)	1.27	4	5,139.51	0.70	2.10	0.55	4,155.30
42	624	Pine / Cypress / Melaleuca (>25%)	0.88	3	3,561.24	0.70	1.13	0.55	1,549.32
44	424/625	Melaleuca(>50%) / Pine Flatwoods	0.16	3	647.50	0.37	1.13	0.55	148.90
45	621	Cypress / Melaleuca (>25%)	4.87	4	19,708.21	0.70	2.10	0.55	15,934.09
46	424/625	Melaleuca(>50%) / Pine Flatwoods	0.02	3	80.94	0.37	1.13	0.55	18.61
50	424/625	Melaleuca(>75%) / Pine Flatwoods	3.17	3	12,828.55	0.03	1.13	0.55	239.19
53	621	Cypress / Melaleuca (>25%)	1.82	4	7,365.29	0.70	2.10	0.55	5,954.83
54	621	Cypress / Melaleuca (>50%)	1.31	4	5,301.39	0.37	2.10	0.55	2,265.55
55	424/624	Melaleuca(>50%)/Cypress/Pine	0.09	4	364.22	0.37	2.10	0.55	155.65
57	424/624	Melaleuca(>50%)/Cypress/Pine	0.53	3	2,144.84	0.37	1.13	0.55	493.22
58	617	Mixed Wetland Hardwoods	0.14	2	566.56	0.70	0.49	0.55	106.88
59	621	Cypress	0.88	5	3,561.24	1.00	2.50	0.55	4,896.70
60	621	Cypress	3.93	4	15,904.16	1.00	2.10	0.55	18,369.30
61	424/625	Melaleuca(>75%) / Pine Flatwoods	2.00	3	8,093.72	0.03	1.13	0.55	150.91
68	621	Cypress / Melaleuca (>25%)	0.64	4	2,589.99	0.70	2.10	0.55	2,094.01

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
70	424/625	Melaleuca(>50%) / Pine Flatwoods	0.42	3	1,699.68	0.37	1.13	0.55	390.85
71	424/625	Melaleuca(>25%) / Pine Flatwoods	2.83	3	11,452.61	0.70	1.13	0.55	4,982.46
81	621	Cypress / Melaleuca (>50%)	2.60	5	10,521.84	0.37	2.50	0.55	5,352.98
82	621	Cypress / Melaleuca (>50%)	0.13	5	526.09	0.37	2.50	0.55	267.65
84	540	Cattle Pond	0.08	6	323.75	1.00	2.90	0.55	516.38
85	424	Melaleuca	18.53	4	74,988.32	0	2.10	0.55	0.00
86	424/625	Melaleuca(>75%) / Pine Flatwoods	10.35	3	41,885.00	0.03	1.13	0.55	780.95
89	424/625	Melaleuca(>50%) / Pine Flatwoods	15.91	2	64,385.54	0.37	0.49	0.55	6,420.20
90	424/625	Melaleuca(>75%) / Pine Flatwoods	7.73	3	31,282.23	0.03	1.13	0.55	583.26
92	424/625	Melaleuca(>25%) / Pine Flatwoods	5.92	3	23,957.41	0.70	1.13	0.55	10,422.67
93	625	Hydric Pine Flatwoods	2.34	3	9,469.65	1.00	1.13	0.55	5,885.39
94	621	Cypress	18.57	5	75,150.19	1.00	2.50	0.55	103,331.51
95	424/624	Melaleuca(>25%)/Cypress/Pine	20.43	3	82,677.35	0.70	1.13	0.55	35,968.78
96	424/625	Melaleuca(>25%) / Pine Flatwoods	5.77	3	23,350.38	0.70	1.13	0.55	10,158.58
97	621	Cypress	0.39	5	1,578.28	1.00	2.50	0.55	2,170.13
99	424/625	Melaleuca(>50%) / Pine Flatwoods	1.93	3	7,810.44	0.37	1.13	0.55	1,796.05
100	424/625	Melaleuca(>75%) / Pine Flatwoods	40.24	3	162,845.65	0.03	1.13	0.55	3,036.26
101	424/625	Melaleuca(>50%) / Pine Flatwoods	22.84	3	92,430.28	0.37	1.13	0.55	21,254.81
102	424/625	Melaleuca(>75%) / Pine Flatwoods	8.27	3	33,467.53	0.03	1.13	0.55	624.00
105	424/625	Melaleuca(>75%) / Pine Flatwoods	7.55	4	30,553.79	0.03	2.10	0.55	1,058.69
106	424/625	Melaleuca(>25%) / Pine Flatwoods	1.41	4	5,706.07	0.70	2.10	0.55	4,613.36
107	424/625	Melaleuca(>50%) / Pine Flatwoods	21.33	4	86,319.52	0.37	2.10	0.55	36,888.65
108	424/625	Melaleuca(>75%) / Pine Flatwoods	2.85	4	11,533.55	0.03	2.10	0.55	399.64
109	540	Cattle Pond	0.19	6	768.90	1.00	2.90	0.55	1,226.40
114	621	Cypress	21.11	4	85,429.21	1.00	2.10	0.55	98,670.74
115	424/625	Melaleuca(>75%) / Pine Flatwoods	6.59	3	26,668.81	0.03	1.13	0.55	497.24
118	424	Melaleuca	107.97	3	436,939.47	0	1.13	0.55	0.00
119	424/625	Melaleuca(>25%) / Pine Flatwoods	12.63	4	51,111.84	0.70	2.10	0.55	41,323.92
124	424/624	Melaleuca(>50%)/Cypress/Pine	9.14	3	36,988.30	0.37	1.13	0.55	8,505.64
125	424/625	Melaleuca(>50%)/ Pine Flatwoods	6.37	3	25,778.50	0.37	1.13	0.55	5,927.89
126	621	Cypress	1.16	4	4,694.36	1.00	2.10	0.55	5,421.98
127	424/624	Melaleuca(>50%)/Cypress/Pine	1.29	3	5,220.45	0.37	1.13	0.55	1,200.47
129	424/621	Melaleuca(>25%)/Cypress	3.46	4	14,002.14	0.70	2.10	0.55	11,320.73
131	424	Melaleuca	2.71	4	10,966.99	0	2.10	0.55	0.00
132	424/621	Melaleuca(>25%)/Cypress	3.67	5	14,851.98	0.70	2.50	0.55	14,295.03
134	424/625	Melaleuca(>75%) / Pine Flatwoods	62.54	3	253,090.62	0.03	1.13	0.55	4,718.87
135	424	Melaleuca	42.41	4	171,627.33	0	2.10	0.55	0.00
137	424/625	Melaleuca(>75%) / Pine Flatwoods	32.88	3	133,060.76	0.03	1.13	0.55	2,480.92
138	424/625	Melaleuca(>50%)/ Pine Flatwoods	11.67	3	47,226.86	0.37	1.13	0.55	10,860.05
143	422	Brazilian Pepper	3.59	3	14,528.23	0	1.13	0.55	0.00
144	621	Cypress	9.11	5	36,866.89	1.00	2.50	0.55	50,691.98
145	424	Melaleuca	5.34	4	21,610.23	0	2.10	0.55	0.00

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
146	424	Melaleuca	19.58	4	79,237.52	0	2.10	0.55	0.00
147	424/624	Melaleuca(>50%)/ Pine / Cypress	2.53	4	10,238.56	0.37	2.10	0.55	4,375.45
148	424/621	Melaleuca(>25%)/Cypress	15.38	5	62,240.71	0.70	2.50	0.55	59,906.68
149	424/625	Melaleuca(>25%) / Pine Flatwoods	9.28	4	37,554.86	0.70	2.10	0.55	30,363.10
150	424/625	Melaleuca(>75%) / Pine Flatwoods	25.99	3	105,177.89	0.03	1.13	0.55	1,961.04
153	424/625	Melaleuca(>50%)/ Pine Flatwoods	12.43	3	50,302.47	0.37	1.13	0.55	11,567.30
156	424/625	Melaleuca(>50%)/ Pine Flatwoods	3.91	3	15,823.22	0.37	1.13	0.55	3,638.63
157	424	Melaleuca	15.47	4	62,604.92	0	2.10	0.55	0.00
158	424/625	Melaleuca(>50%)/ Pine Flatwoods	7.29	3	29,501.61	0.37	1.13	0.55	6,784.04
159	424/625	Melaleuca(>25%) / Pine Flatwoods	0.70	3	2,832.80	0.70	1.13	0.55	1,232.41
160	621	Cypress	9.58	5	38,768.92	1.00	2.50	0.55	53,307.26
161	640	Flag Pond	1.43	5	5,787.01	1.00	2.50	0.55	7,957.14
162	424/621	Melaleuca(>50%)/Cypress/Pine	7.42	5	30,027.70	0.37	2.50	0.55	15,276.59
163	424	Melaleuca	4.34	4	17,563.37	0	2.10	0.55	0.00
165	424/624	Melaleuca(>50%)/Cypress/Pine	0.89	4	3,601.71	0.37	2.10	0.55	1,539.19
166	621	Cypress	3.05	5	12,342.92	1.00	2.50	0.55	16,971.52
167	424/624	Melaleuca(>50%)/Cypress/Pine	2.25	3	9,105.44	0.37	1.13	0.55	2,093.84
168	424/625	Melaleuca(>75%)/Cypress/Pine	38.94	3	157,584.73	0.03	1.13	0.55	2,938.17
169	424/624	Melaleuca(>50%)/Cypress/Pine	3.07	4	12,423.86	0.37	2.10	0.55	5,309.34
170	424/624	Melaleuca(>50%)/Cypress/Pine	0.79	4	3,197.02	0.37	2.10	0.55	1,366.25
172	621	Cypress	2.12	5	8,579.34	1.00	2.50	0.55	11,796.60
174	424	Melaleuca	11.86	4	47,995.76	0	2.10	0.55	0.00
175	424/624	Melaleuca(>25%)/Cypress/Pine	6.67	4	26,992.56	0.70	2.10	0.55	21,823.48
177	621	Cypress	5.49	5	22,217.26	1.00	2.50	0.55	30,548.73
178	621	Cypress	0.89	5	3,601.71	1.00	2.50	0.55	4,952.34
179	625	Hydric Pine Flatwoods	12.78	3	51,718.87	1.00	1.13	0.55	32,143.28
TOTALS									**978,226.99**

Table 22. Mirasol Preserve – Wood Stork Suitable Foraging Prey Base Post Construction

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
20	424/625	Melaleuca(>50%) / Pine Flatwoods	3.43	3	13,880.73	1.00	1.13	0.55	8,626.87
21	643	Disturbed Wet Prairie	0.85	3	3,439.83	1.00	1.13	0.55	2,137.85
22	621	Cypress	4.36	5	17,644.31	1.00	2.50	0.55	24,260.93
23	624	Pine / Cypress	2.67	4	10,805.12	1.00	2.10	0.55	12,479.91
26	625/424	Pine Flatwoods / Melaleuca (>25%)	0.96	2	3,884.99	1.00	0.49	0.55	1,047.00

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetlan d Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumptio n Percentage	Grams of Fish Biomass
30	621	Cypress	6.34	4	25,657.09	1.00	2.10	0.55	29,633.94
35	621	Cypress	0.55	4	2,225.77	1.00	2.10	0.55	2,570.77
36	625/424	Pine Flatwoods / Melaleuca (>25%)	2.72	3	11,007.46	1.00	1.13	0.55	6,841.14
38	424	Melaleuca	1.39	3	5,625.14	1.00	1.13	0.55	3,496.02
41	621	Cypress / Melaleuca (>25%)	1.27	4	5,139.51	1.00	2.10	0.55	5,936.14
42	624	Pine / Cypress / Melaleuca (>25%)	0.88	3	3,561.24	1.00	1.13	0.55	2,213.31
44	424/625	Melaleuca(>50%) / Pine Flatwoods	0.16	3	647.50	1.00	1.13	0.55	402.42
45	621	Cypress / Melaleuca (>25%)	4.87	4	19,708.21	1.00	2.10	0.55	22,762.98
46	424/625	Melaleuca(>50%) / Pine Flatwoods	0.02	3	80.94	1.00	1.13	0.55	50.30
50	424/625	Melaleuca(>75%) / Pine Flatwoods	3.17	3	12,828.55	1.00	1.13	0.55	7,972.94
53	621	Cypress / Melaleuca (>25%)	1.82	4	7,365.29	1.00	2.10	0.55	8,506.90
54	621	Cypress / Melaleuca (>50%)	1.31	4	5,301.39	1.00	2.10	0.55	6,123.10
55	424/624	Melaleuca(>50%)/Cypress/Pine	0.09	4	364.22	1.00	2.10	0.55	420.67
57	424/624	Melaleuca(>50%)/Cypress/Pine	0.53	3	2,144.84	1.00	1.13	0.55	1,333.02
58	617	Mixed Wetland Hardwoods	0.14	2	566.56	1.00	0.49	0.55	152.69
59	621	Cypress	0.88	5	3,561.24	1.00	2.50	0.55	4,896.70
60	621	Cypress	3.93	4	15,904.16	1.00	2.10	0.55	18,369.30
61	424/625	Melaleuca(>75%) / Pine Flatwoods	2.00	3	8,093.72	1.00	1.13	0.55	5,030.25
68	621	Cypress / Melaleuca (>25%)	0.64	4	2,589.99	1.00	2.10	0.55	2,991.44
70	424/625	Melaleuca(>50%) / Pine Flatwoods	0.42	3	1,699.68	1.00	1.13	0.55	1,056.35
71	424/625	Melaleuca(>25%) / Pine Flatwoods	2.83	3	11,452.61	1.00	1.13	0.55	7,117.80
81	621	Cypress / Melaleuca (>50%)	2.60	5	10,521.84	1.00	2.50	0.55	14,467.52
82	621	Cypress / Melaleuca (>50%)	0.13	5	526.09	1.00	2.50	0.55	723.38
84	540	Cattle Pond	0.08	6	323.75	1.00	2.90	0.55	516.38
85	424	Melaleuca	18.53	4	74,988.32	1.00	2.10	0.55	86,611.50
86	424/625	Melaleuca(>75%) / Pine Flatwoods	10.35	3	41,885.00	1.00	1.13	0.55	26,031.53
89	424/625	Melaleuca(>50%) / Pine Flatwoods	15.91	2	64,385.54	1.00	0.49	0.55	17,351.90
90	424/625	Melaleuca(>75%) / Pine Flatwoods	7.73	3	31,282.23	1.00	1.13	0.55	19,441.90
92	424/625	Melaleuca(>25%) / Pine Flatwoods	5.92	3	23,957.41	1.00	1.13	0.55	14,889.53
93	625	Hydric Pine Flatwoods	2.34	3	9,469.65	1.00	1.13	0.55	5,885.39
94	621	Cypress	18.57	5	75,150.19	1.00	2.50	0.55	103,331.51
95	424/624	Melaleuca(>25%)/Cypress/Pine	20.43	3	82,677.35	1.00	1.13	0.55	51,383.97
96	424/625	Melaleuca(>25%) / Pine Flatwoods	5.77	3	23,350.38	1.00	1.13	0.55	14,512.26
97	621	Cypress	0.39	5	1,578.28	1.00	2.50	0.55	2,170.13
99	424/625	Melaleuca(>50%) / Pine Flatwoods	1.93	3	7,810.44	1.00	1.13	0.55	4,854.19
100	424/625	Melaleuca(>75%) / Pine Flatwoods	40.24	3	162,845.65	1.00	1.13	0.55	101,208.57
101	424/625	Melaleuca(>50%) / Pine Flatwoods	22.84	3	92,430.28	1.00	1.13	0.55	57,445.42
102	424/625	Melaleuca(>75%) / Pine Flatwoods	8.27	3	33,467.53	1.00	1.13	0.55	20,800.07
105	424/625	Melaleuca(>75%) / Pine Flatwoods	7.55	4	30,553.79	1.00	2.10	0.55	35,289.63
106	424/625	Melaleuca(>25%) / Pine Flatwoods	1.41	4	5,706.07	1.00	2.10	0.55	6,590.51
107	424/625	Melaleuca(>50%) / Pine Flatwoods	21.33	4	86,319.52	1.00	2.10	0.55	99,699.05
108	424/625	Melaleuca(>75%) / Pine Flatwoods	2.85	4	11,533.55	1.00	2.10	0.55	13,321.25
109	540	Cattle Pond	0.19	6	768.90	1.00	2.90	0.55	1,226.40

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
114	621	Cypress	21.11	4	85,429.21	1.00	2.10	0.55	98,670.74
115	424/625	Melaleuca(>75%) / Pine Flatwoods	6.59	3	26,668.81	1.00	1.13	0.55	16,574.66
118	424	Melaleuca	107.97	3	436,939.47	1.00	1.13	0.55	271,557.88
119	424/625	Melaleuca(>25%) / Pine Flatwoods	12.63	4	51,111.84	1.00	2.10	0.55	59,034.18
124	424/624	Melaleuca(>50%)/Cypress/Pine	9.14	3	36,988.30	1.00	1.13	0.55	22,988.23
125	424/625	Melaleuca(>50%)/ Pine Flatwoods	6.37	3	25,778.50	1.00	1.13	0.55	16,021.34
126	621	Cypress	1.16	4	4,694.36	1.00	2.10	0.55	5,421.98
127	424/624	Melaleuca(>50%)/Cypress/Pine	1.29	3	5,220.45	1.00	1.13	0.55	3,244.51
129	424/621	Melaleuca(>25%)/Cypress	3.46	4	14,002.14	1.00	2.10	0.55	16,172.47
131	424	Melaleuca	2.71	4	10,966.99	1.00	2.10	0.55	12,666.87
132	424/621	Melaleuca(>25%)/Cypress	3.67	5	14,851.98	1.00	2.50	0.55	20,421.47
134	424/625	Melaleuca(>75%) / Pine Flatwoods	62.54	3	253,090.62	1.00	1.13	0.55	157,295.82
135	424	Melaleuca	42.41	4	171,627.33	1.00	2.10	0.55	198,229.57
137	424/625	Melaleuca(>75%) / Pine Flatwoods	32.88	3	133,060.76	1.00	1.13	0.55	82,697.26
138	424/625	Melaleuca(>50%)/ Pine Flatwoods	11.67	3	47,226.86	1.00	1.13	0.55	29,351.49
143	422	Brazilian Pepper	3.59	3	14,528.23	1.00	1.13	0.55	9,029.29
144	621	Cypress	9.11	5	36,866.89	1.00	2.50	0.55	50,691.98
145	424	Melaleuca	5.34	4	21,610.23	1.00	2.10	0.55	24,959.82
146	424	Melaleuca	19.58	4	79,237.52	1.00	2.10	0.55	91,519.33
147	424/624	Melaleuca(>50%)/ Pine / Cypress	2.53	4	10,238.56	1.00	2.10	0.55	11,825.53
148	424/621	Melaleuca(>25%)/Cypress	15.38	5	62,240.71	1.00	2.50	0.55	85,580.97
149	424/625	Melaleuca(>25%) / Pine Flatwoods	9.28	4	37,554.86	1.00	2.10	0.55	43,375.86
150	424/625	Melaleuca(>75%) / Pine Flatwoods	25.99	3	105,177.89	1.00	1.13	0.55	65,368.06
153	424/625	Melaleuca(>50%)/ Pine Flatwoods	12.43	3	50,302.47	1.00	1.13	0.55	31,262.98
156	424/625	Melaleuca(>50%)/ Pine Flatwoods	3.91	3	15,823.22	1.00	1.13	0.55	9,834.13
157	424	Melaleuca	15.47	4	62,604.92	1.00	2.10	0.55	72,308.69
158	424/625	Melaleuca(>50%)/ Pine Flatwoods	7.29	3	29,501.61	1.00	1.13	0.55	18,335.25
159	424/625	Melaleuca(>25%) / Pine Flatwoods	0.70	3	2,832.80	1.00	1.13	0.55	1,760.59
160	621	Cypress	9.58	5	38,768.92	1.00	2.50	0.55	53,307.26
161	640	Flag Pond	1.43	5	5,787.01	1.00	2.50	0.55	7,957.14
162	424/621	Melaleuca(>50%)/Cypress/Pine	7.42	5	30,027.70	1.00	2.50	0.55	41,288.09
163	424	Melaleuca	4.34	4	17,563.37	1.00	2.10	0.55	20,285.70
165	424/624	Melaleuca(>50%)/Cypress/Pine	0.89	4	3,601.71	1.00	2.10	0.55	4,159.97
166	621	Cypress	3.05	5	12,342.92	1.00	2.50	0.55	16,971.52
167	424/624	Melaleuca(>50%)/Cypress/Pine	2.25	3	9,105.44	1.00	1.13	0.55	5,659.03
168	424/625	Melaleuca(>75%)/Cypress/Pine	38.94	3	157,584.73	1.00	1.13	0.55	97,938.91
169	424/624	Melaleuca(>50%)/Cypress/Pine	3.07	4	12,423.86	1.00	2.10	0.55	14,349.56
170	424/624	Melaleuca(>50%)/Cypress/Pine	0.79	4	3,197.02	1.00	2.10	0.55	3,692.56
172	621	Cypress	2.12	5	8,579.34	1.00	2.50	0.55	11,796.60
174	424	Melaleuca	11.86	4	47,995.76	1.00	2.10	0.55	55,435.10
175	424/624	Melaleuca(>25%)/Cypress/Pine	6.67	4	26,992.56	1.00	2.10	0.55	31,176.40
177	621	Cypress	5.49	5	22,217.26	1.00	2.50	0.55	30,548.73
178	621	Cypress	0.89	5	3,601.71	1.00	2.50	0.55	4,952.34

ACOE AREA	FLUCCS CODE	DESCRIPTION	Project Wetland Acreage	Hydroperiod Class	Wetlands (m^2)	Habitat Suitability Value	Grams / m^2 / Hydroperiod Class	Wood Stork Consumption Percentage	Grams of Fish Biomass
179	625	Hydric Pine Flatwoods	12.78	3	51,718.87	1.00	1.13	0.55	32,143.28
TOTALS									2,842,045.92

Table 23. Mirasol Consultation Area Project List - Wood Stork

Project Name	Wetland Acreage SUM	Project Acreage SUM	Percent Wetlands	Permit Date (Final Agency Action)
PINE FOREST SUBDIVISION	.48	10	4.95%	6/30/2006
PREMIER AIRPORT PARK, LLP (FKA AIRPORT EXCHANGE PARK)	46.08	962	4.79%	4/12/2006
FOREST RIDGE F.K.A. COBBLESTONE	25.80	546	4.73%	10/12/2006
SANIBEL WAY TOWNHOMES	.93	20	4.61%	9/17/2004
STRATFORD DOWNS	2.62	59	4.43%	12/14/2006
MAJESTIC FOUNTAINS	1.78	43	4.11%	12/8/2004
PUEBLO BONITO PHASE 3	1.31	35	3.70%	12/14/2005
BERKSHIRE TOWNHOMES	2.87	83	3.47%	4/13/2005
WATERFORD LANDING	2.87	83	3.47%	8/15/2006
THREE OAKS PARKWAY WIDENING FROM CORKSCREW RD TO ALICO RD	6.36	198	3.21%	4/12/2006
TORTUGA PRESERVE	7.20	241	2.99%	10/12/2005
ECO PUBLIC PARK	.07	3	2.67%	6/1/2006
LEE CO HIGH SCHOOL FFF / PLANTATION HIGH SCHOOL IMPROVEMENTS	1.00	39	2.57%	9/14/2005
PELICAN LANDING GOLF RESORT VENTURES	16.47	665	2.48%	10/11/2005
SUNSET FALLS (F.K.A. WATERSTONE)	23.98	981	2.44%	6/14/2006
COLONIAL PLAZA	9.22	388	2.38%	12/6/2005
BURNT STORE ACRES	8.07	370	2.18%	10/13/2004
BURNT STORE ACRES	2.69	123	2.18%	5/8/2006
WESTGATE REGIONAL CENTRE CPD	.53	26	2.04%	3/23/2005
ALICO LAKES VILLAGE	.61	31	1.97%	12/22/2005
BAINBRIDGE COLONIAL AND WINKLER	.67	39	1.72%	6/19/2006
COVE AT CYPRESS RESERVE THE	.32	20	1.59%	10/3/2005
MAJORCA PALMS ESTATES PUD	.40	25	1.58%	7/29/2005
SANIBEL BRIDGE TOLL PLAZA RECONSTRUCTION	.62	45	1.36%	7/18/2005
CYPRESS RIDGE	.47	35	1.33%	4/19/2005
MARBELLA ON CYPRESS CONDOMINIUMS	.47	35	1.33%	4/3/2006
MAGNOLIA LAKES	.74	57	1.30%	10/28/2004
SHOPPES AT NORTH CAPE THE	.28	22	1.28%	7/7/2006

Project Name	Wetland Acreage SUM	Project Acreage SUM	Percent Wetlands	Permit Date (Final Agency Action)
SABAL POINT AND PRAIRIE CREEK AT VERANDAH	.27	22	1.24%	7/18/2005
ISLAND PINES	.38	31	1.22%	1/5/2005
ELDERBERRY LANE EXTENSION	.01	1	1.16%	10/12/2004
CALOOSA FOREST	2.69	239	1.12%	1/15/2004
CHALLENGER-33	1.02	100	1.02%	4/4/2005
RIVER POINTE	.30	40	0.75%	1/12/2006
CENTRAL CAPE BUSINESS PARK	.24	32	0.74%	12/28/2004
GULF COAST CHURCH OF CHRIST	.10	14	0.74%	8/29/2005
LAKE MCGREGOR DRIVE RPD	.57	86	0.66%	1/31/2006
VILLAGE AT ENTRADA	.15	34	0.44%	4/22/2005
MIRADA FKA ASCOT PRESERVE	.25	60	0.42%	1/26/2007
CRANE LANDING FKA FLAGLER 251	7.19	2031	0.35%	8/11/2004
ESTATES AT ENTRADA - THE	13.00	3808	0.34%	1/11/2007
ARROWHEAD RESERVE	.18	54	0.33%	5/11/2005
OASIS COVE FKA REFLECTION COVE	.10	33	0.31%	8/9/2006
LAKE SHALLOWFORD ESTATES	.06	20	0.30%	11/12/2004
JUDD CREEK	.56	193	0.29%	7/12/2006
NORTH OAKS	.42	154	0.27%	8/9/2006
MOODY RANCH	.40	243	0.16%	11/21/2005
EAGLE PRESERVE	.01	16	0.06%	2/7/2005
PELICAN PRESERVE NINE HOLES	.36	678	0.05%	2/8/2006
BUCKINGHAM ESTATES	.03	100	0.03%	12/22/2004
Total	147	12,201		

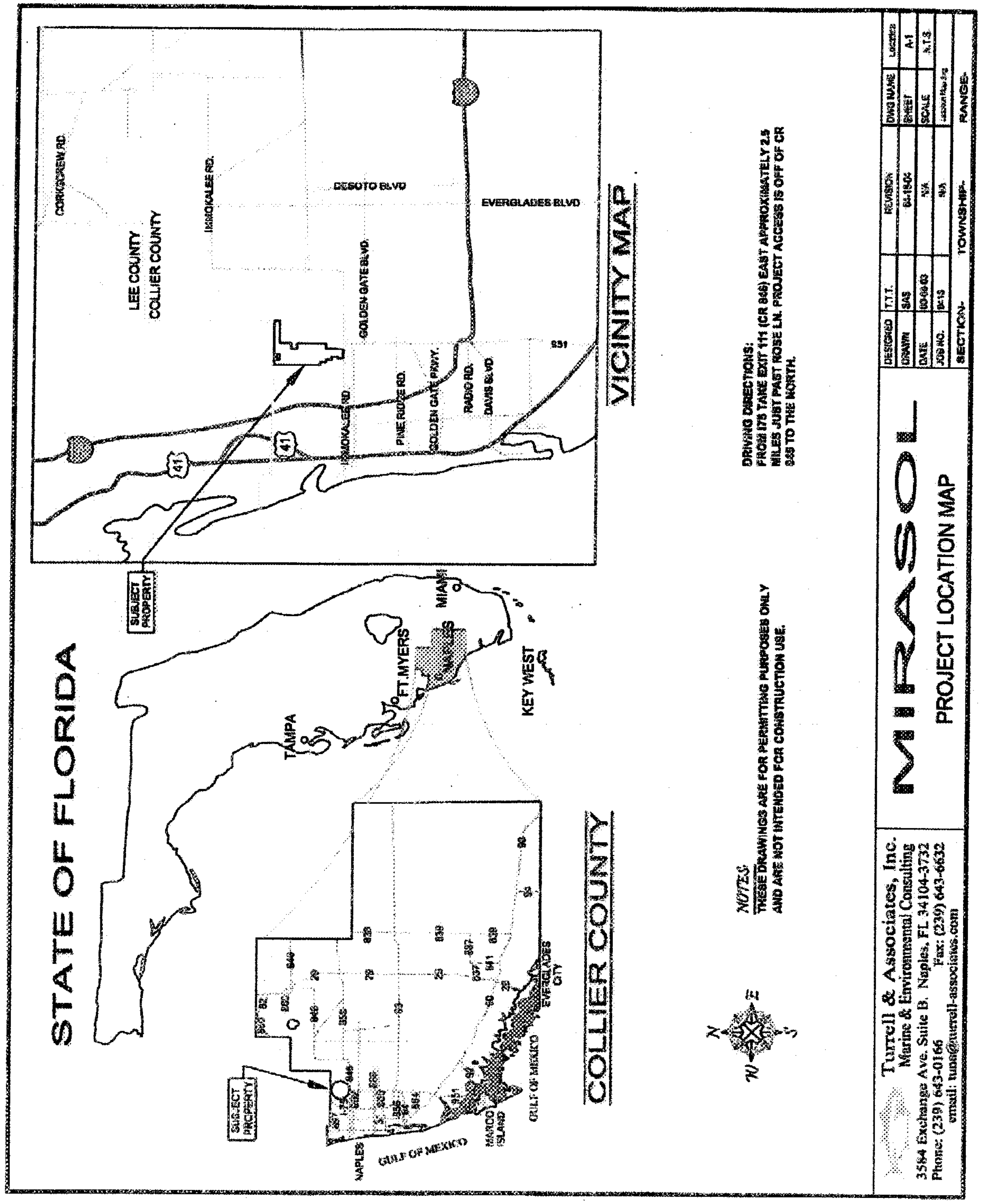


Figure 1. Location of proposed Mirasol project site.

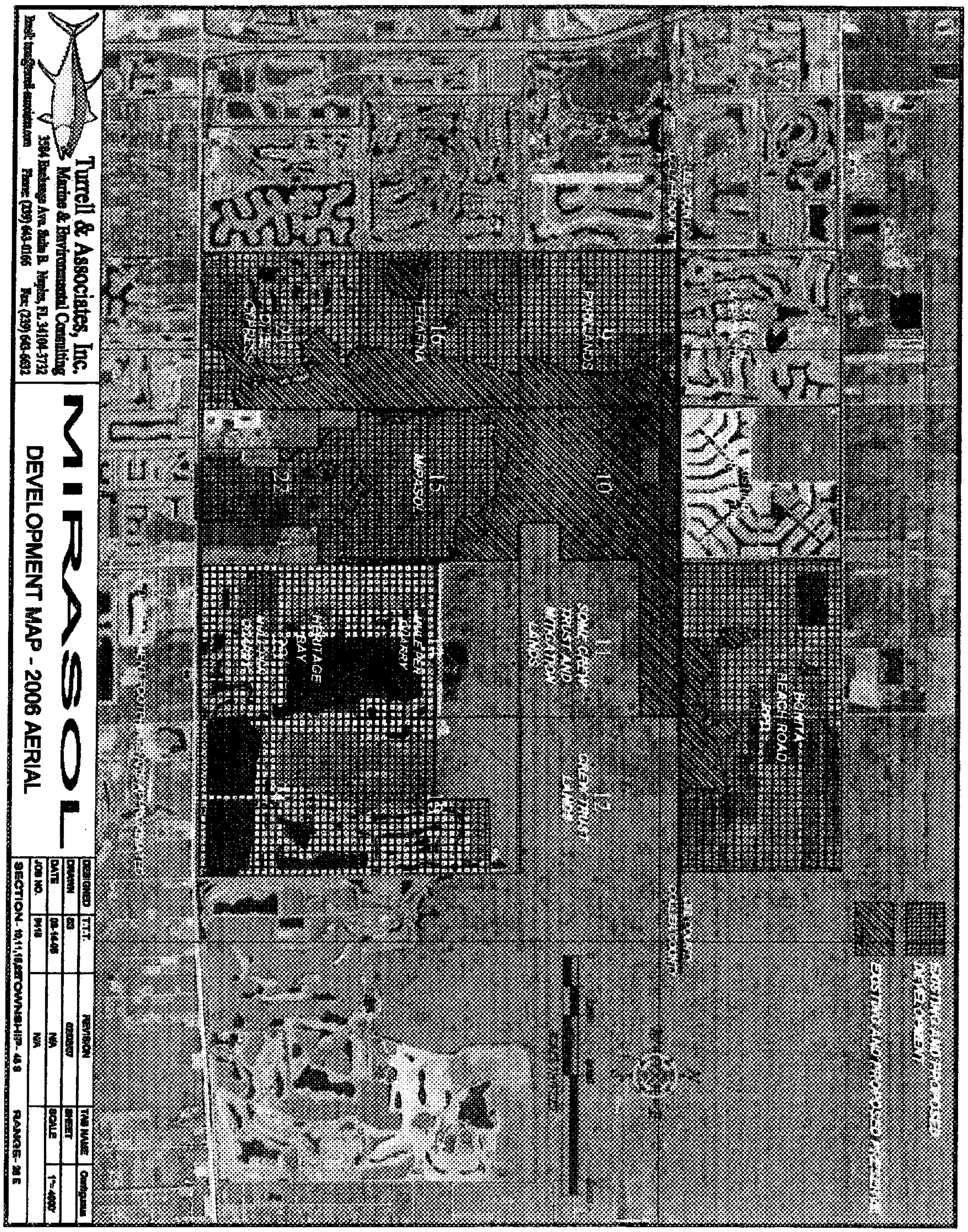


Figure 2. Site plan for Mirasol project.

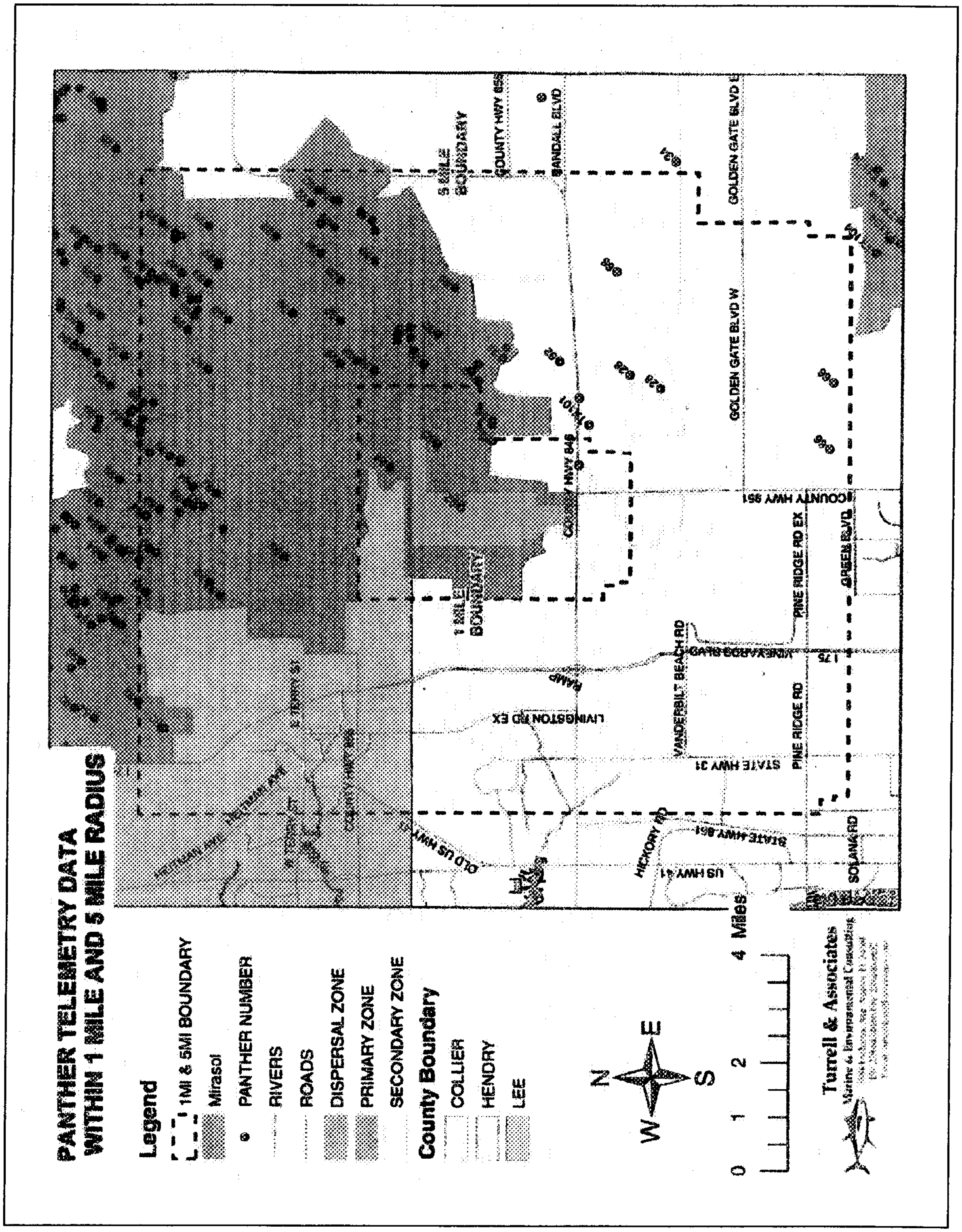


Figure 3. Mirasol project site in relation to panther Primary and Secondary Zones.

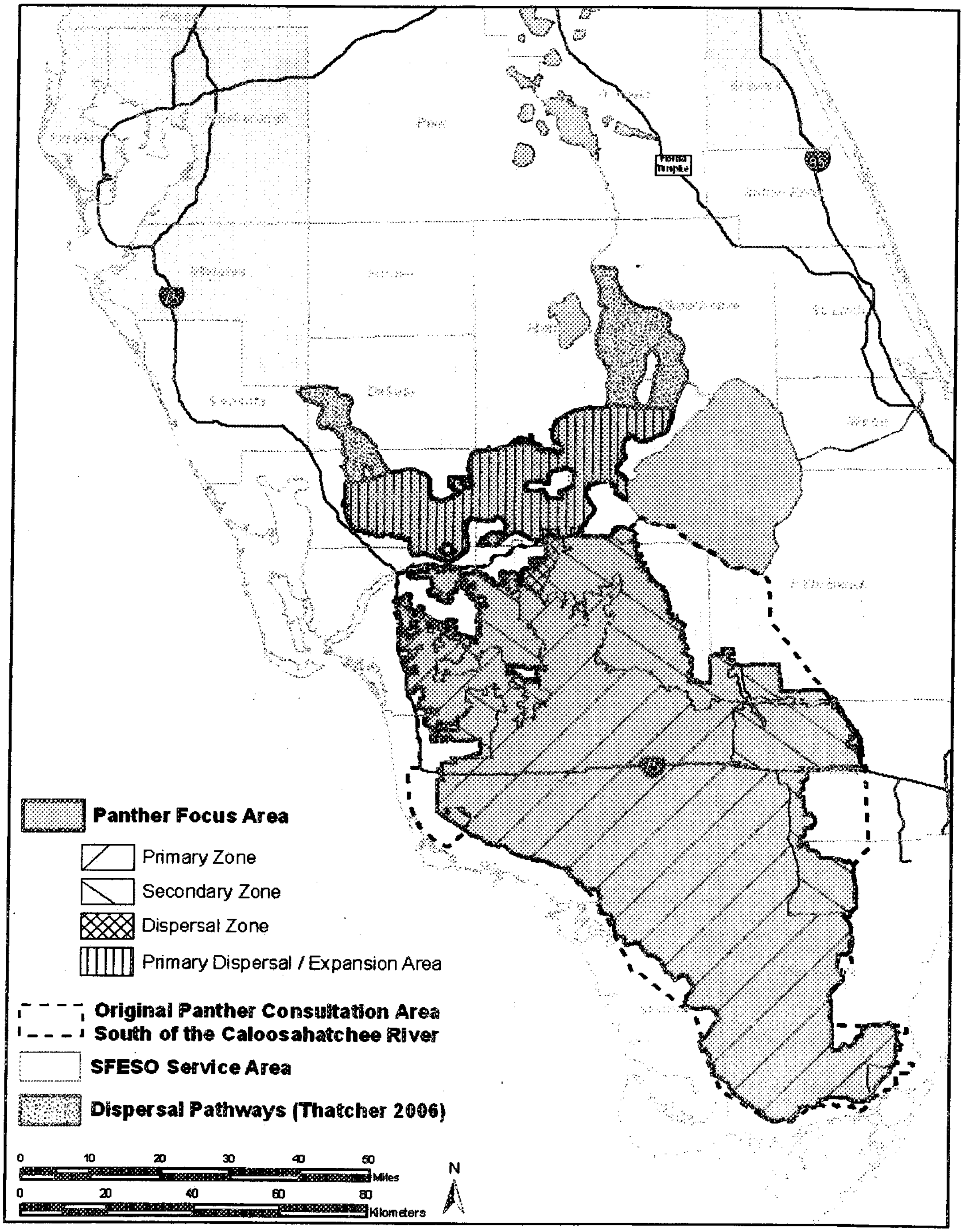


Figure 4. Florida Panther Focus Area.

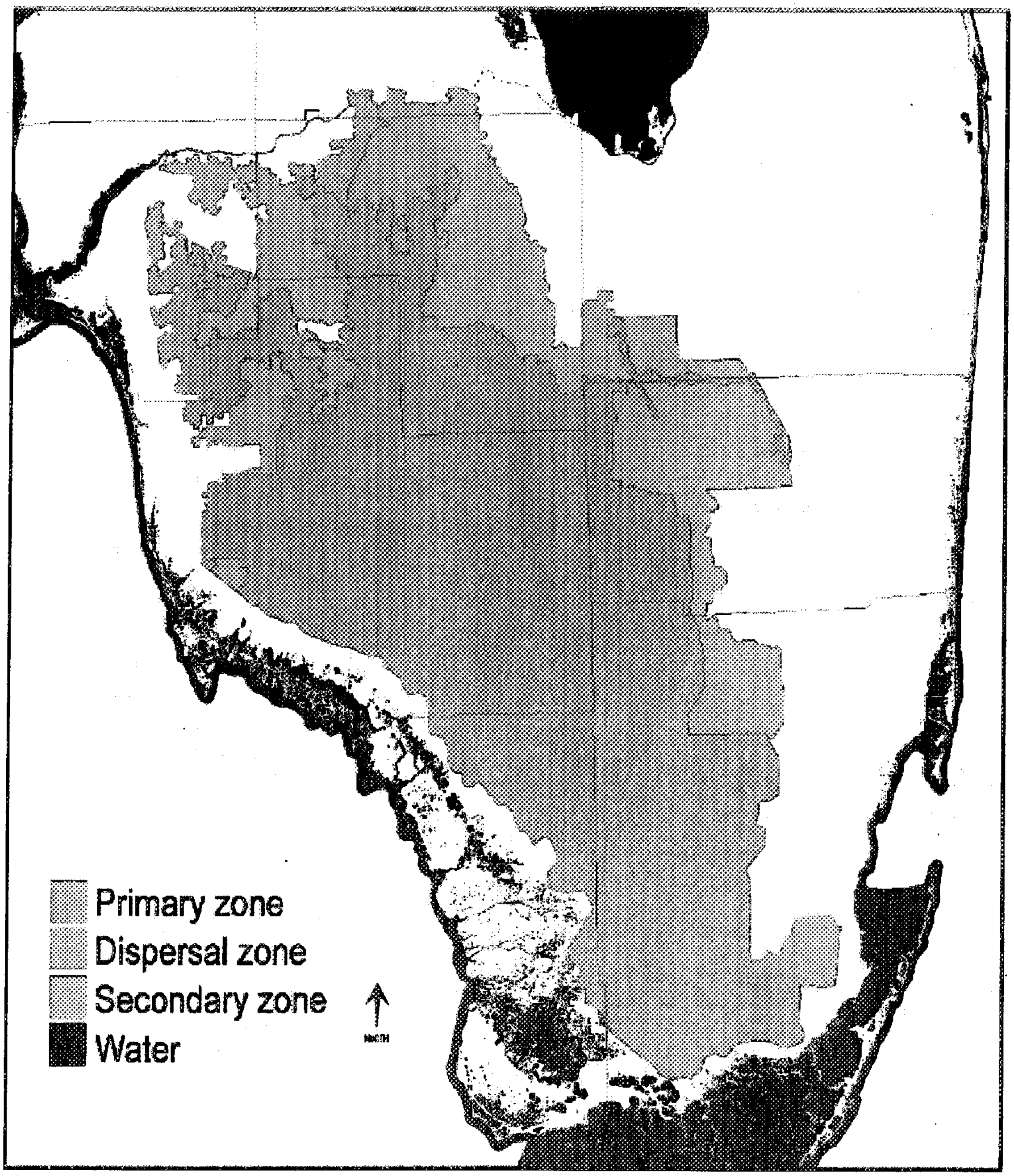


Figure 5: Florida Panther Zones (Kautz et al 2006)

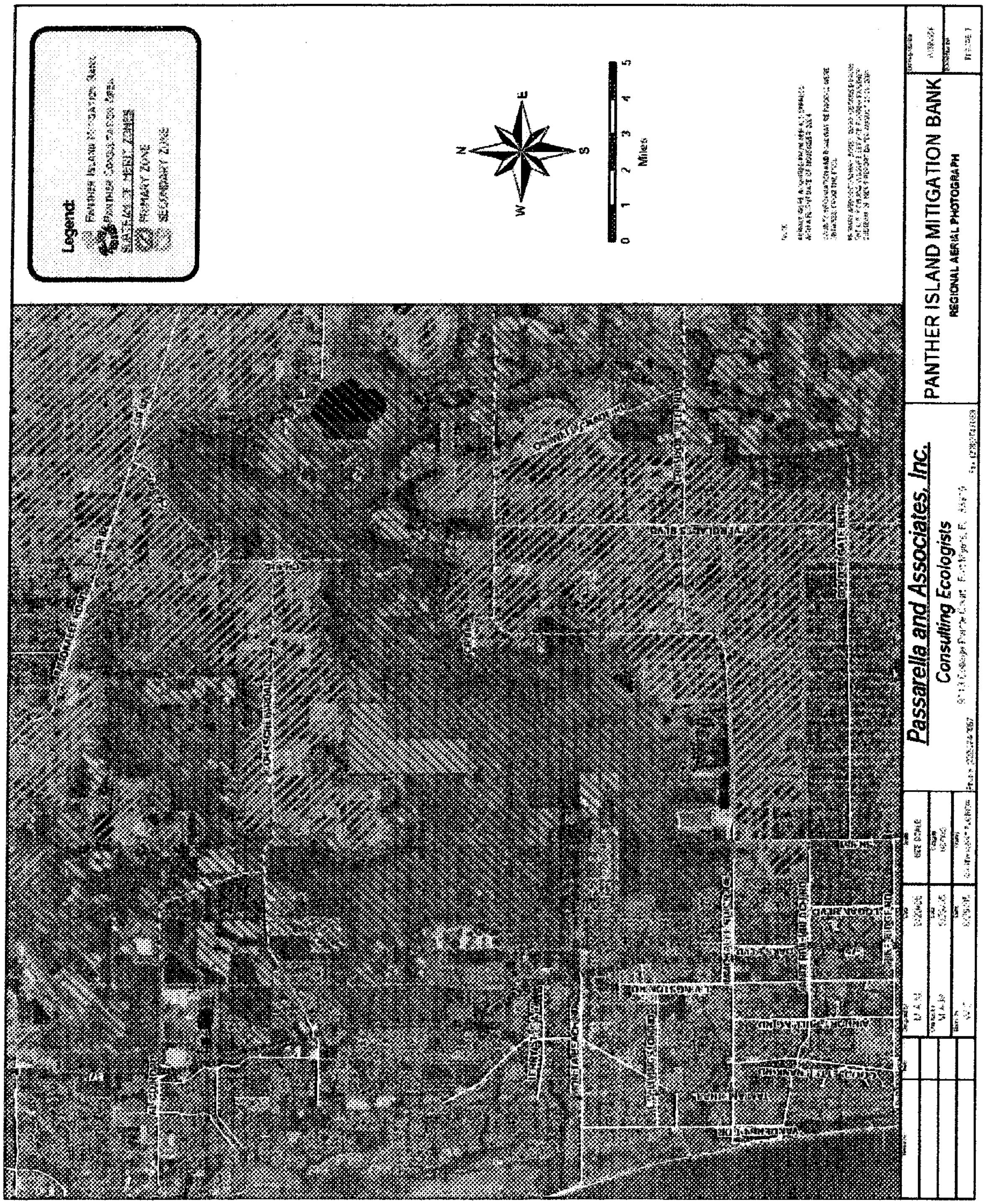


Figure 6. Location of Panther Island Mitigation Bank compensation site.

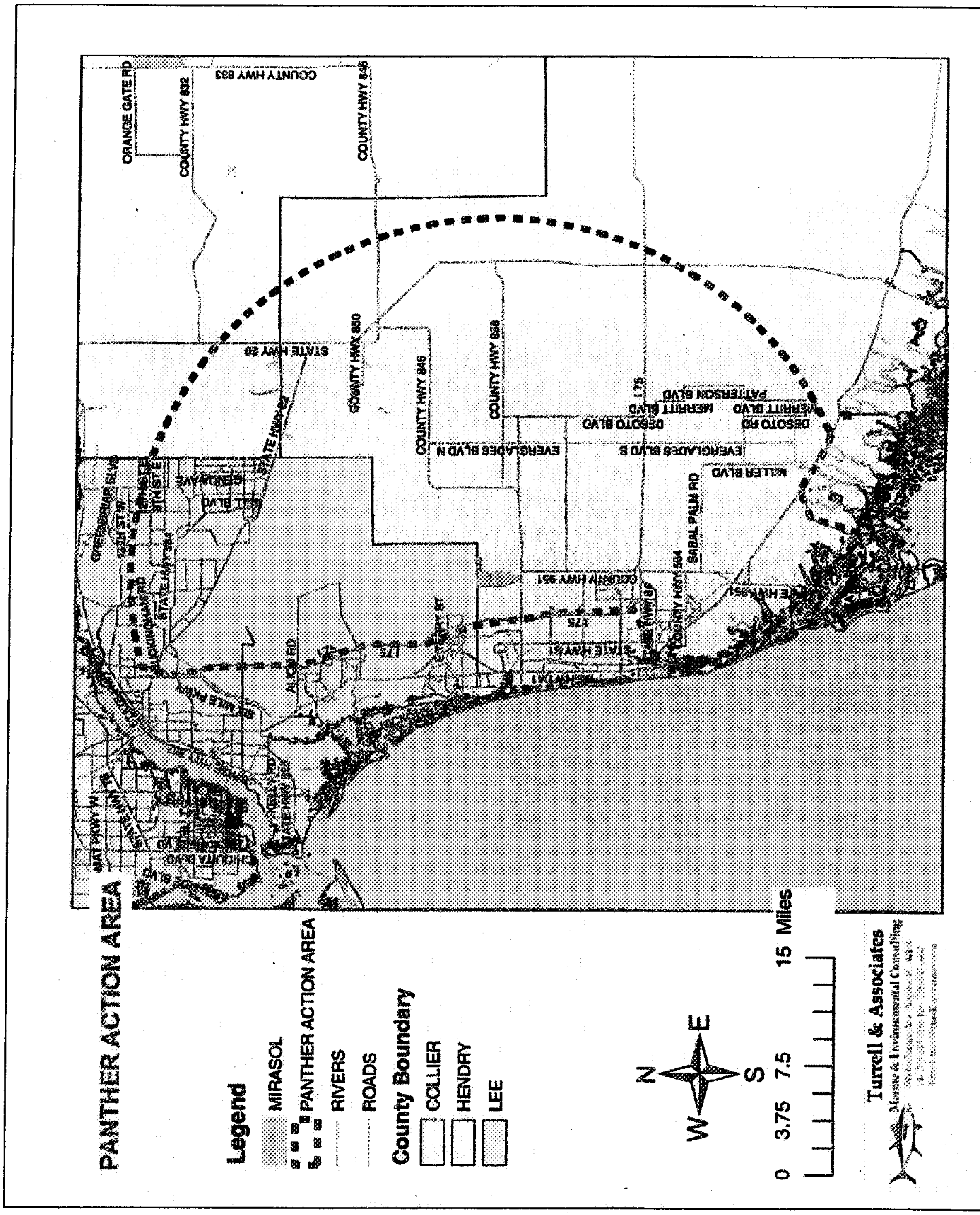


Figure 7. 25-mile Florida Panther Action Area for the Mirasol Project.

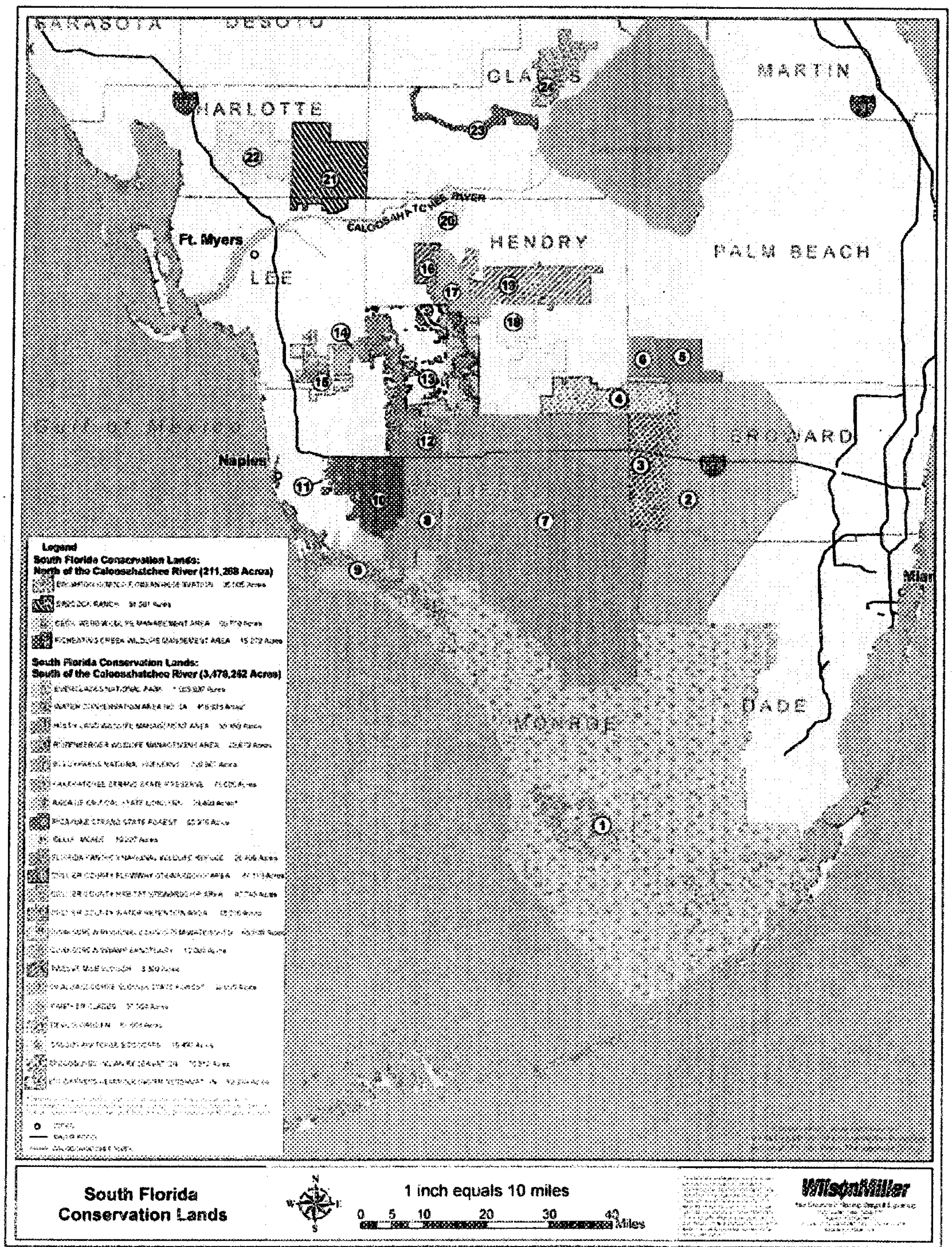


Figure 8. South Florida conservation lands.

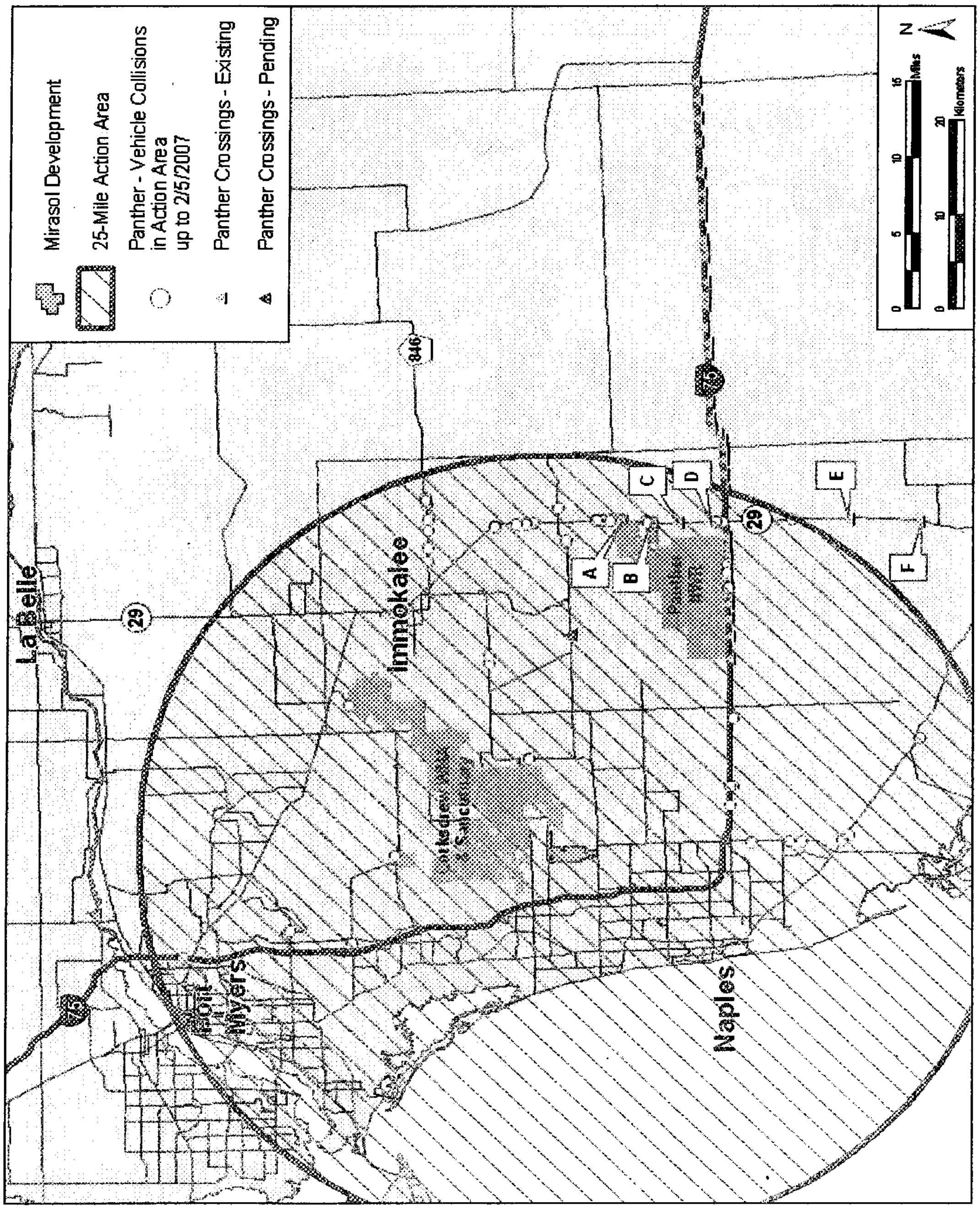


Figure 9. Panther-vehicle collisions and wildlife crossings within panther action area as of February 5, 2007.

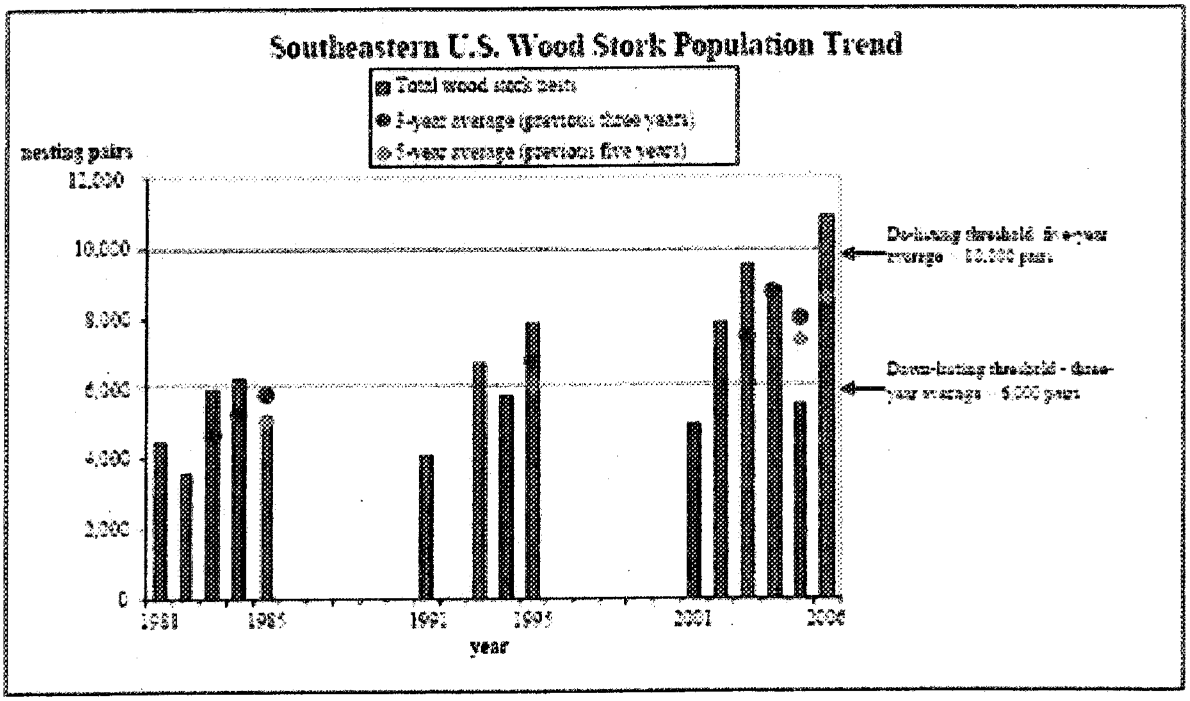


Figure 10. Total Wood Stork Nesting in the Southeastern U.S. in Relation to Recovery Criteria

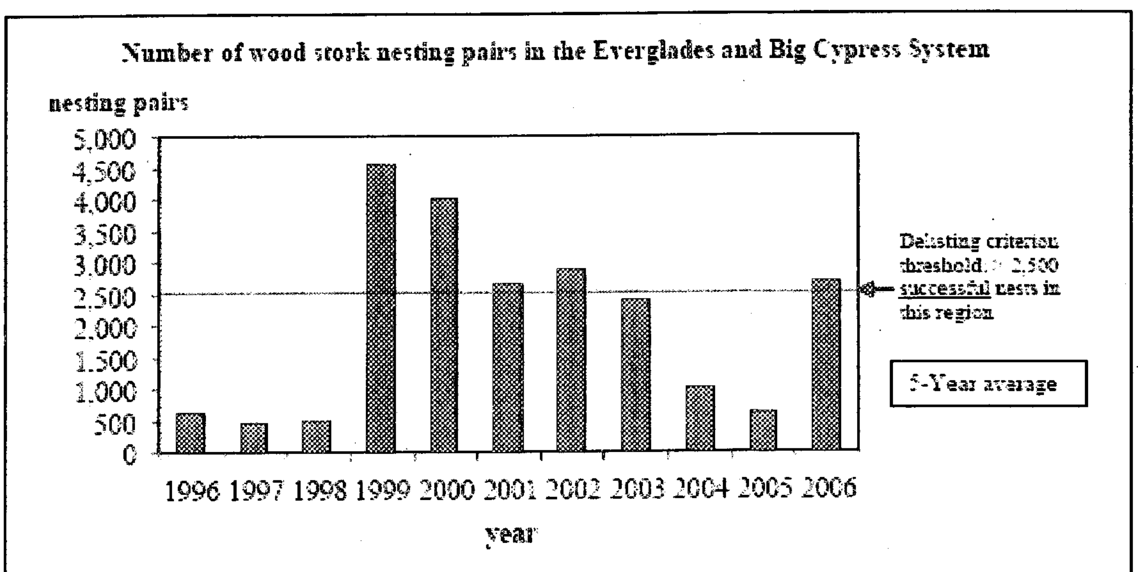


Figure 11. Graph of Wood Stork Nesting in Everglades and Big Cypress System

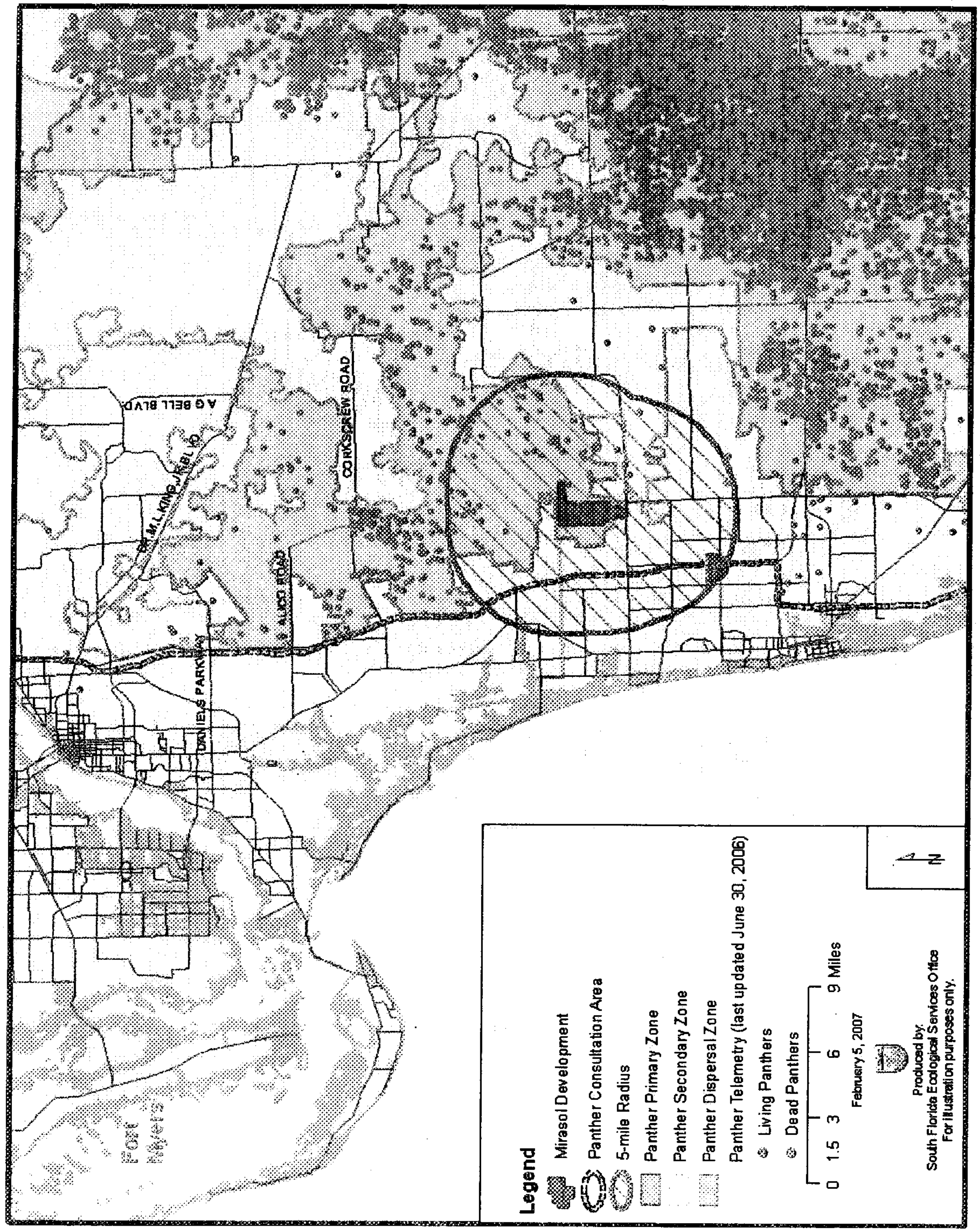


Figure 12. Telemetry showing panther activity within 5-mile radius of Mirasol project.

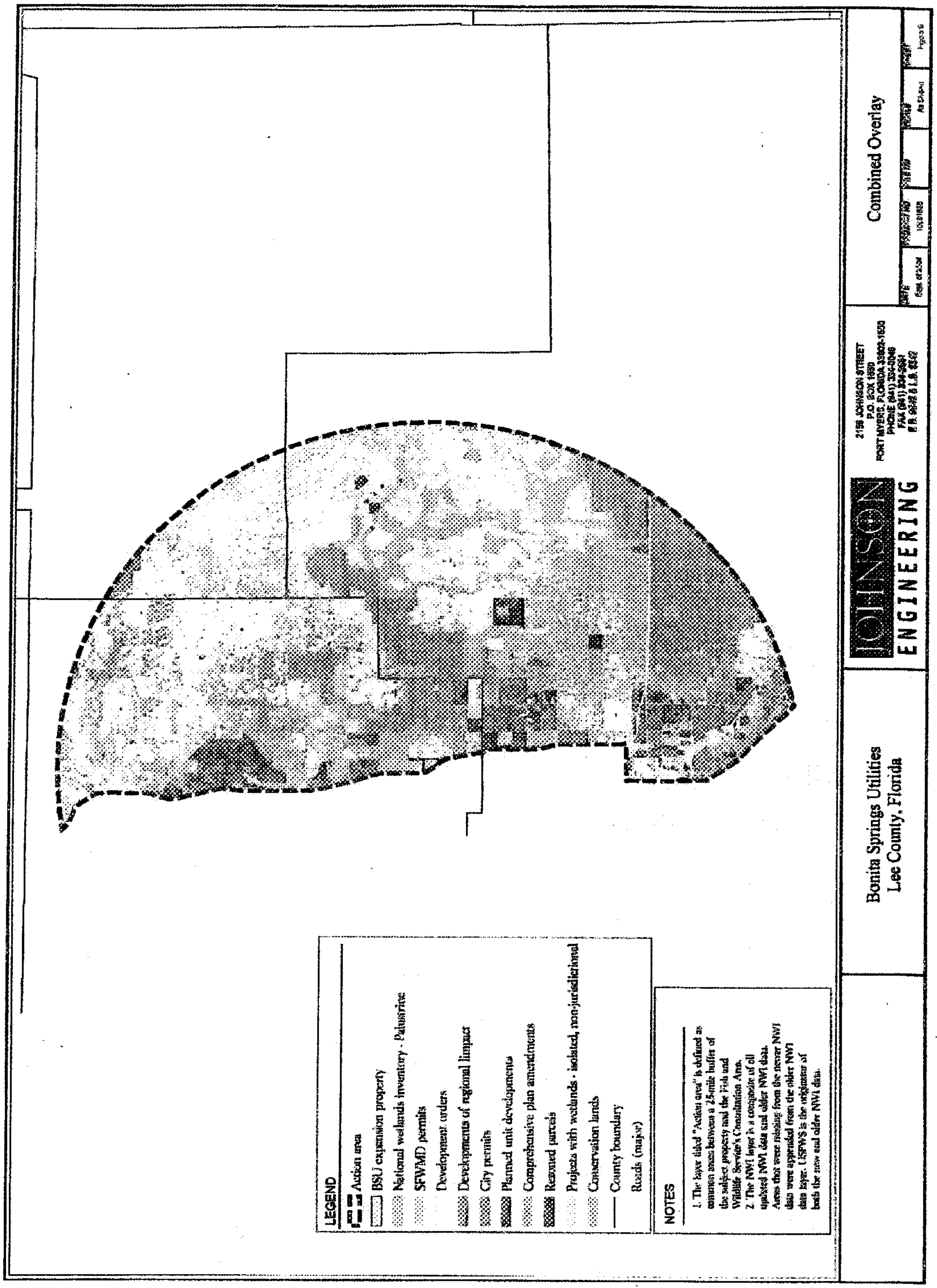


Figure 13. Projects in cumulative impact analysis

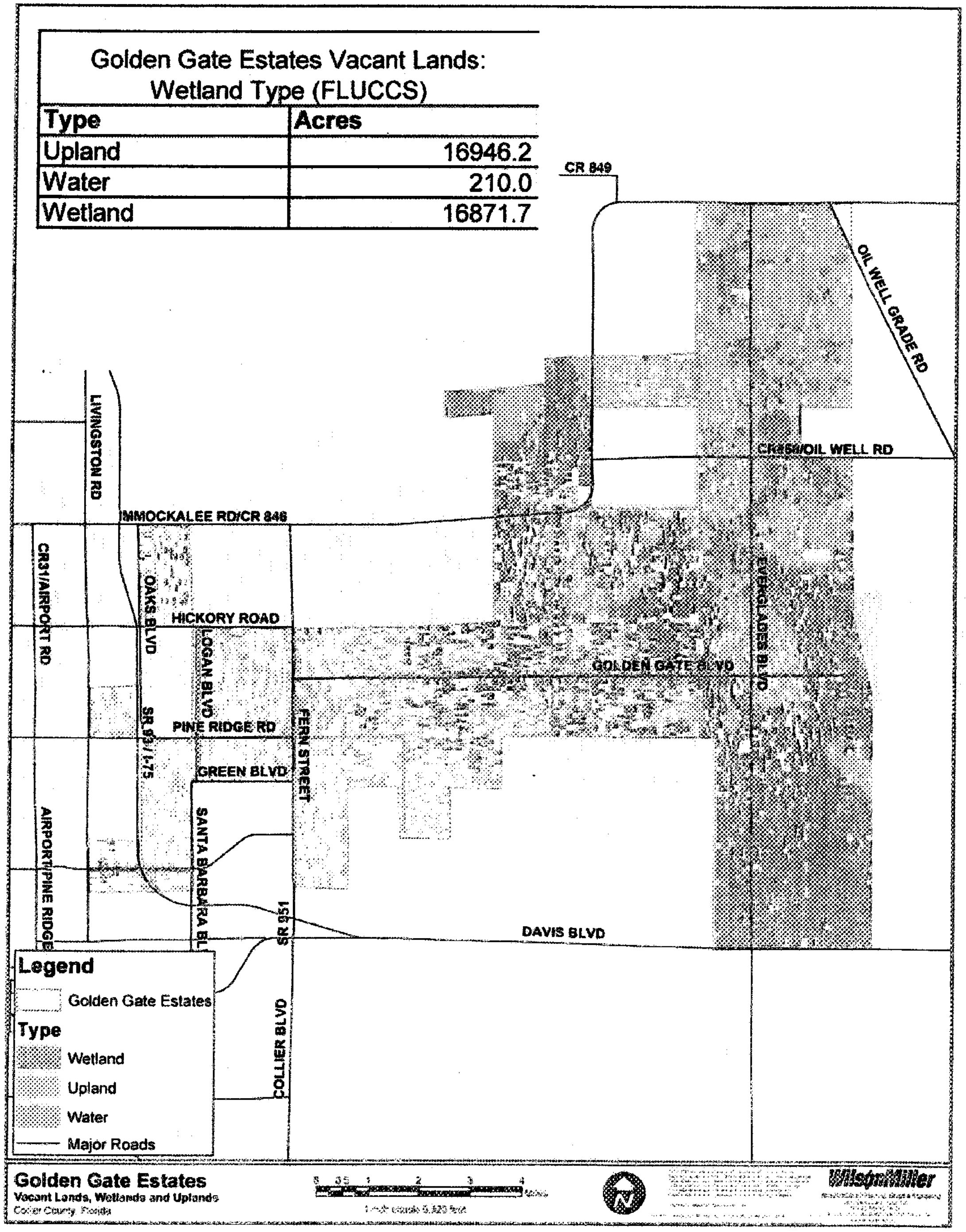


Figure 14. Northern Golden Gates Estates vacant lands.

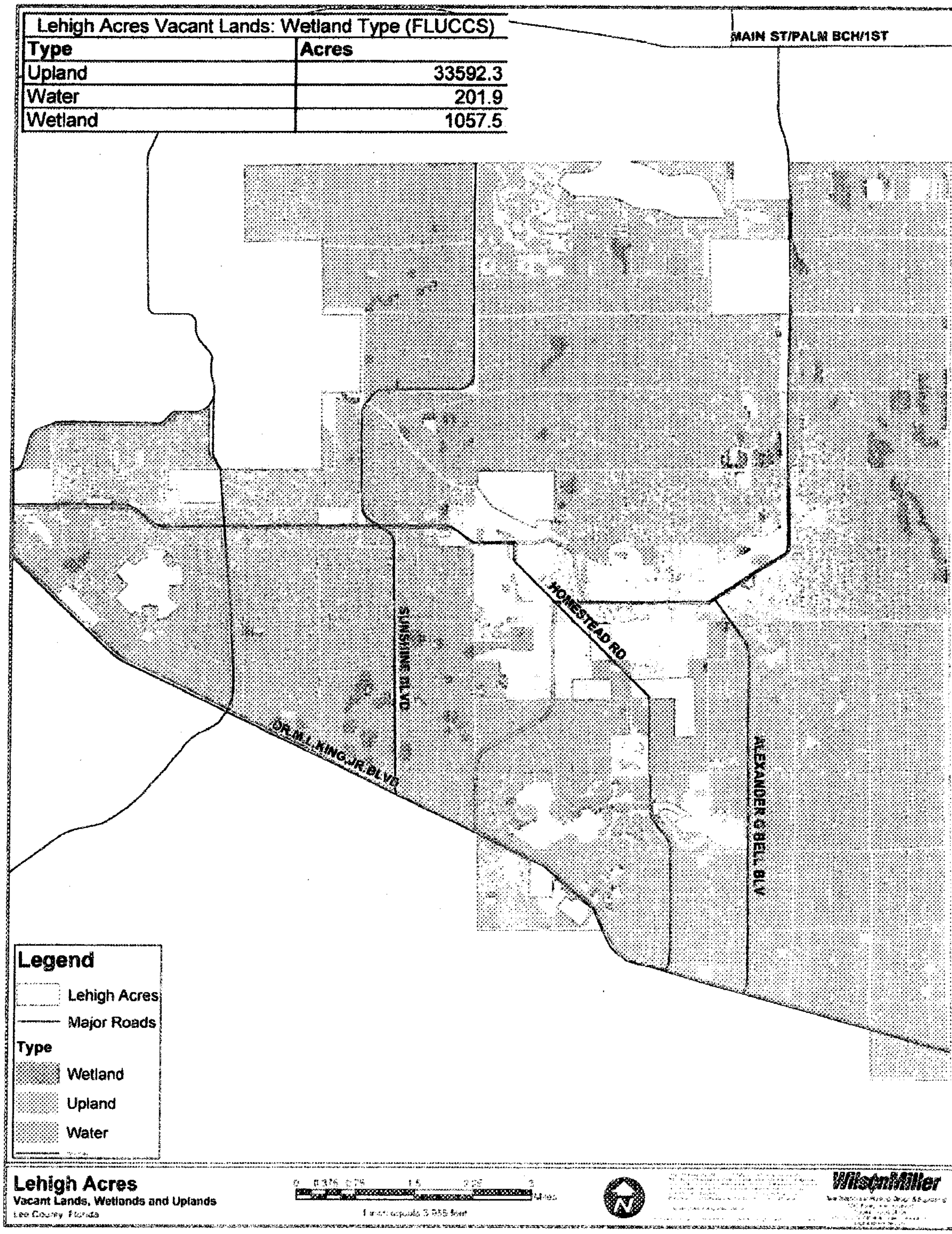


Figure 15. Lehigh Acres vacant lands

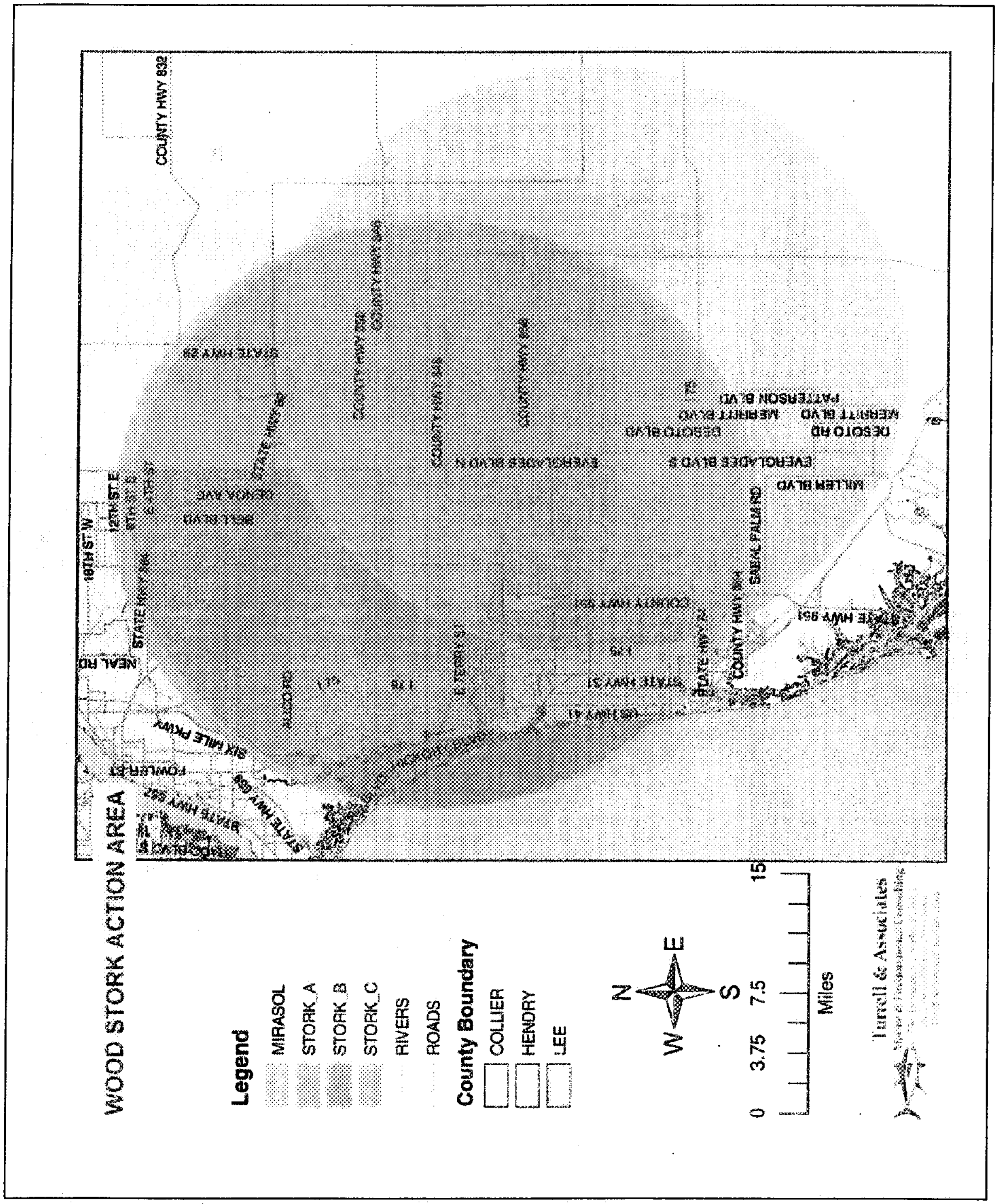


Figure 16. Action Area for the Wood Stork

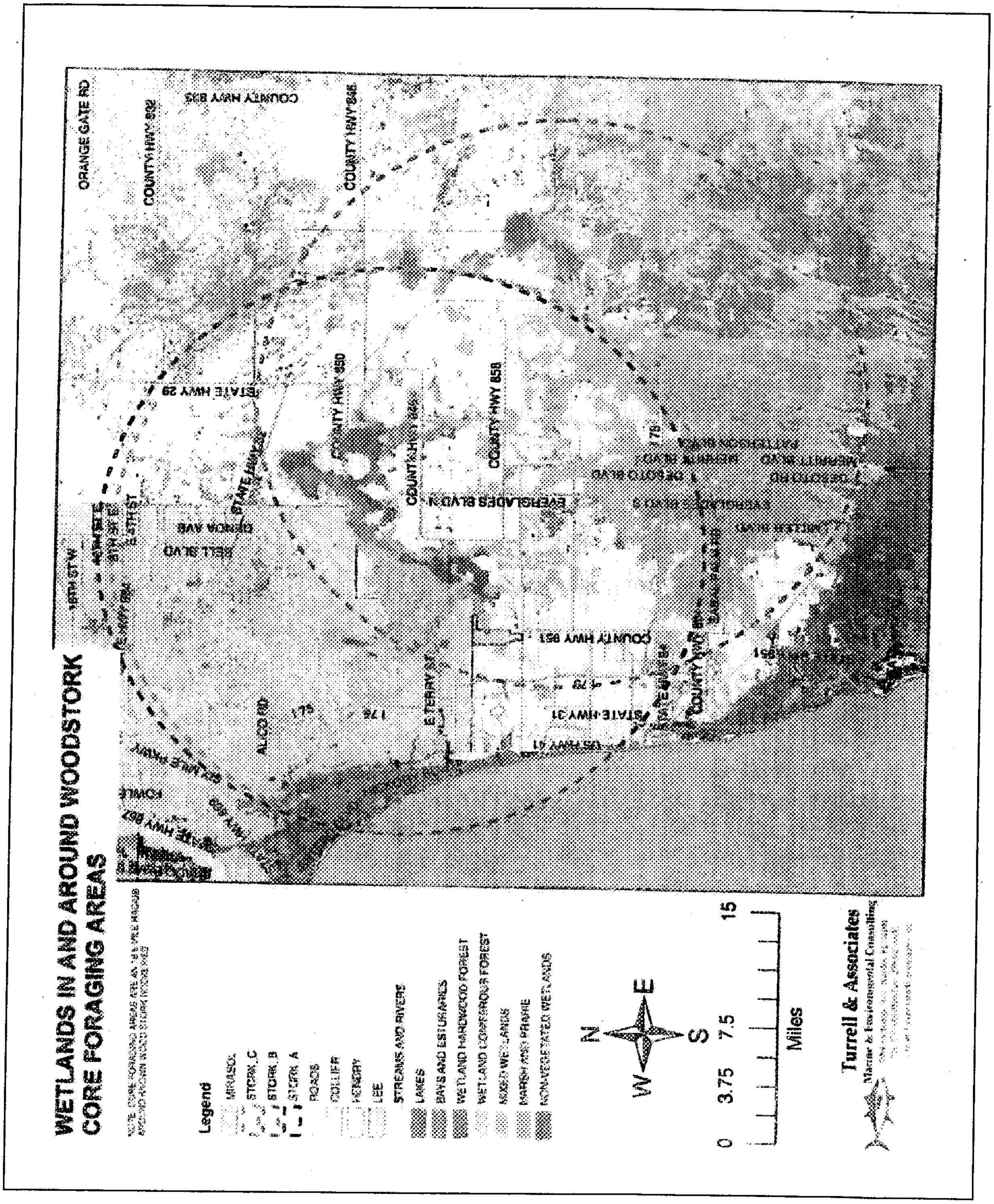


Figure 17. Wetlands in and Around Wood Stork Action Area

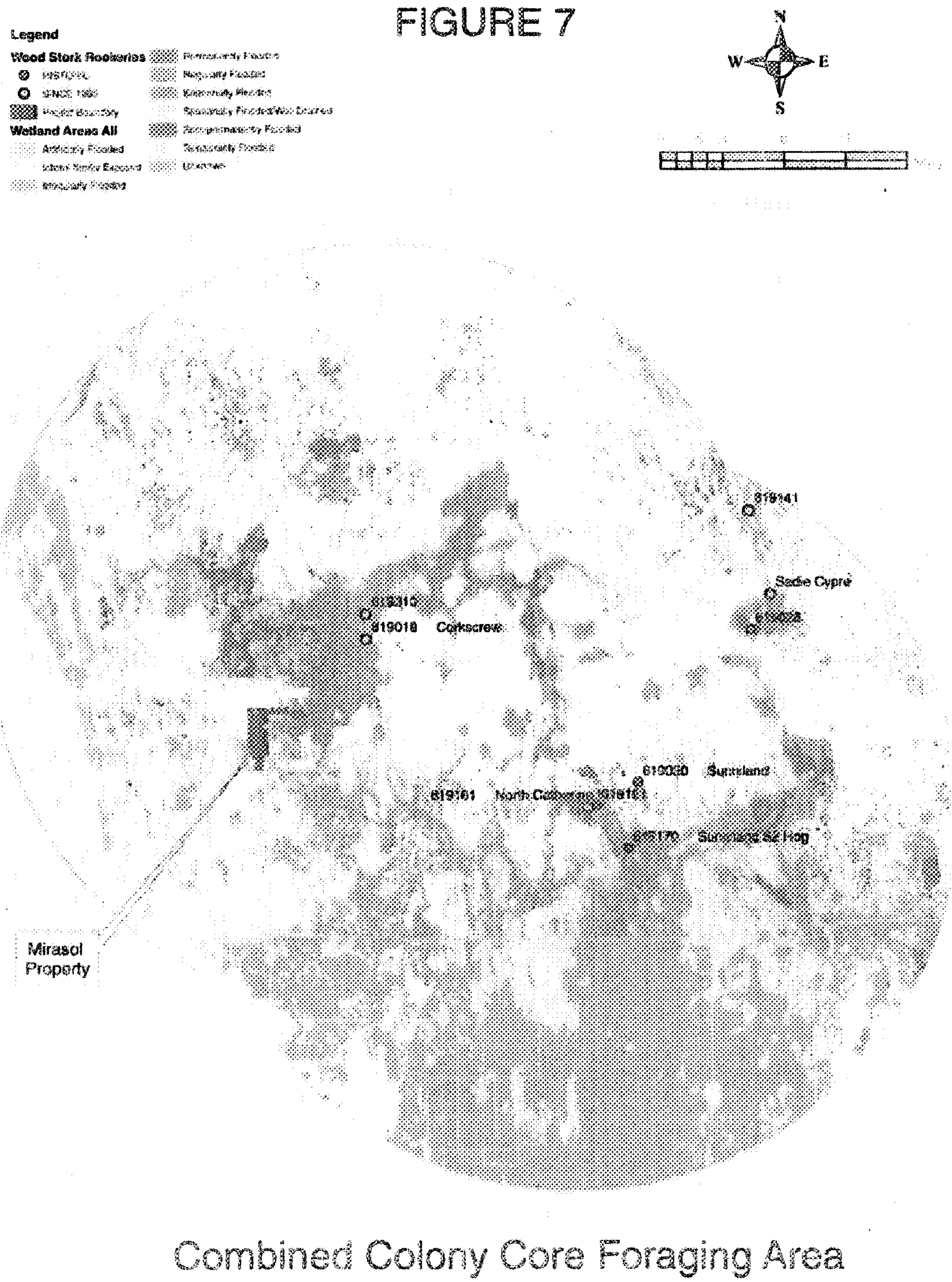


Figure 18. Hydroperiods of Core Foraging Areas of Affected Rookeries

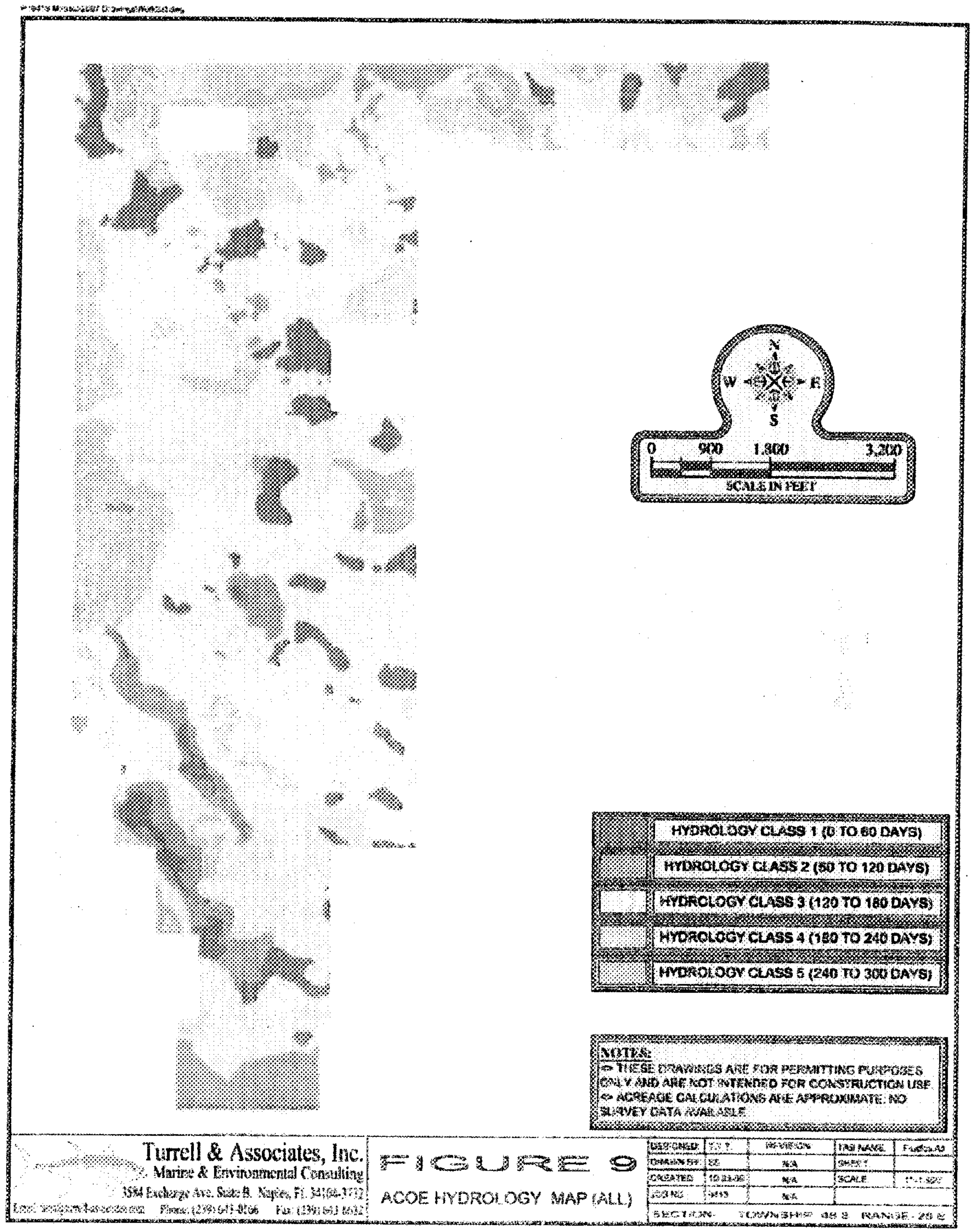


Figure 19. Hydroperiods of Mirasol Project Area

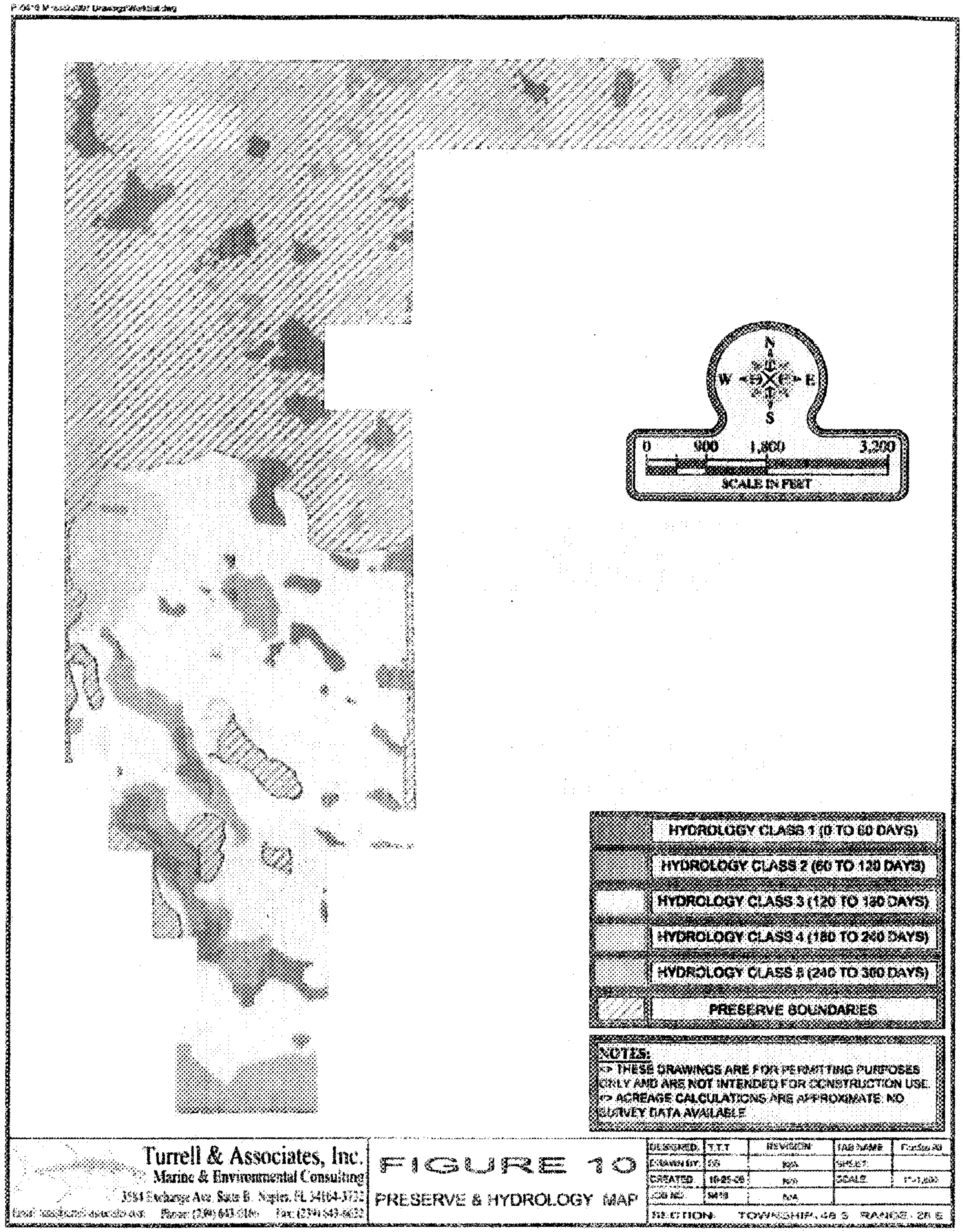
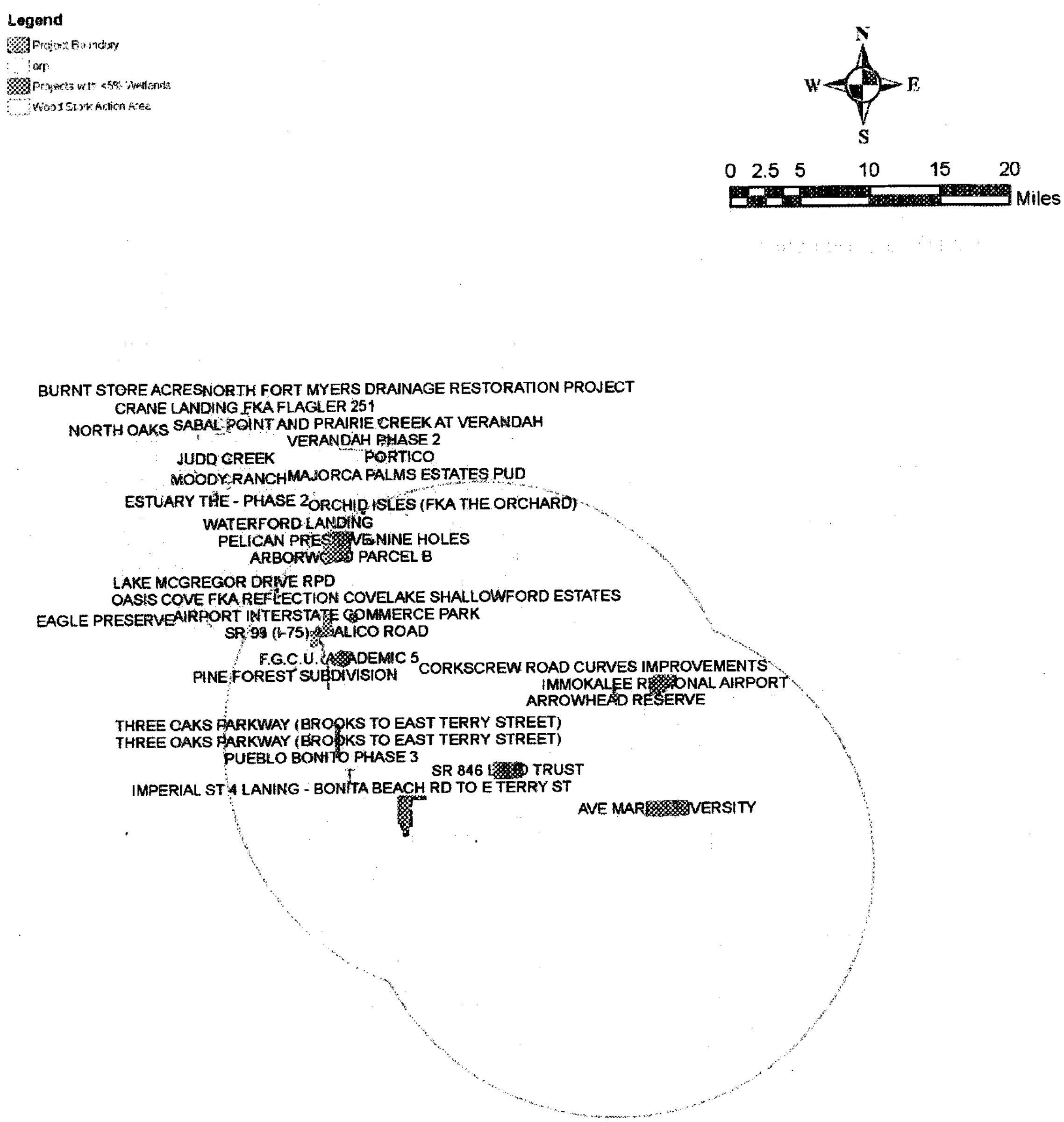


Figure 20. Hydroperiods of Mirasol Project Area Showing Preserve Boundaries.



ERP Projects within Wood Stork Action Area with <5% Wetlands

Figure 21. Projects in Wood Stork Consultation Area.

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

ATTACHMENT H
Standard Protection Measures for the Eastern Indigo Snake
(2 pages)

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

STANDARD PROTECTION MEASURES
FOR THE EASTERN INDIGO SNAKE

1. The permittee shall coordinate with the Fish and Wildlife Service's (FWS) South Florida Ecosystem Office during the establishment and implementation of eastern indigo snake protection plans.

2. A qualified biologist shall be present on site during all construction and clearing phases of the project. The name(s) and qualification of the proposed biologist(s) shall be submitted to the FWS for review and approval.

3. An eastern indigo snake protection/education plan shall be developed for all construction crew to follow. Educational materials should include a combination of posters or videos, pamphlets, and lectures. The protection plan shall be provided to the FWS for review and approval 30 days prior to any construction or clearing activities. The protection plan should include the following information:

a. a description of the eastern indigo snake, its habits and protection under Federal Law;

b. instructions not to injure, harm, harass or kill this species;

c. directions to notify the qualified biologist or designated leader if an eastern indigo snake is sighted;

d. directions to cease construction activity, notify the qualified biologist, and allow the eastern indigo snake sufficient time to move away from the site on its own before resuming construction. If an approved relocation program is to be used, the qualified biologist should be notified of any sightings of an eastern indigo snake and construction should cease immediately. The qualified biologist should promptly relocate the eastern indigo snake before resuming activity (only the qualified biologist is permitted to come in contact with, or relocate an eastern indigo snake); and

e. telephone numbers of pertinent agencies to be contacted if an eastern indigo snake is found dead.

4. The applicant should coordinate with the Florida Fish and Wildlife Conservation Commission (FWC) to determine if they have already established a relocation program for gopher tortoises. If gopher tortoises are present, the qualified biologist shall map and flag the location of all gopher tortoise burrows on the site. Prior to actual clearing, the qualified biologist shall update that initial survey no more than two weeks prior to clearing. These maps shall be made available to all construction crews. The qualified biologist shall also be responsible for identifying potential release sites prior to construction. This information should be submitted to the FWS for review and approval.

5. An underground camera shall be used to investigate each gopher tortoise burrow for eastern indigo snakes. If the survey finds an eastern indigo snake and the burrow will be destroyed by construction activity, then burrows shall then be carefully excavated with a backhoe while monitoring the snake's position and condition with the underground camera. In burrows that are unsuitable for camera use, the burrow will be carefully excavated with a combination of backhoe and hand excavation.

6. If an eastern indigo snake is found in the burrow, it will be captured and released immediately into a pre-identified and approved preserve area near a marked inactive or abandoned gopher tortoise burrow. Eastern indigo snakes shall only be held in captivity long enough to transport them to a release site; at no time shall two snakes be kept in the same container during transportation. A map of marked available inactive or abandoned burrows should be made available to the qualified biologist. This will allow for prompt release of an eastern indigo snake.

7. A monitoring report summarizing all activities pertaining to the eastern indigo snake shall be provided to the FWS. This report shall be submitted within 60 days of the conclusion of clearing and construction phases and following maintenance activities that may occur. The report shall contain the following information:

a. any sightings of eastern indigo snakes;

b. summaries of any relocated snakes (e.g., locations of where and when they were found and relocated);

c. thorough description of the preserve area (e.g., types of habitat, percent cover of dominant species); and

d. summaries of maintenance activities and schedules.

SAJ-2000-1926(IP-HWB)
Mirasol (revised)

ATTACHMENT I
AS BUILT CERTIFICATION

(3 pages)

AS-BUILT DRAWINGS

1. The permittee shall provide as-built drawings of the authorized work, including mitigation, and a completed As-Built Certification Form. The drawings and Certification Form are to be submitted within 60 days of completion of the authorized work, including mitigation, or at the expiration of the construction authorization of the permit, whichever comes first. The drawings and Certification Form must be signed and sealed by a professional engineer registered in the State of Florida. In the event that the completed work deviates from the approved permit drawings and special conditions, the permittee shall describe, on the Certification Form, the deviations between the work authorized by the permit and the work as constructed. A blank form is attached. Please note that the depiction and description of the deviations on the drawings and Certification Form does not necessarily mean that the Corps will approve of them.

2. As-built drawings shall include:

a. Location of the authorized work footprint (as shown on the permit drawings) with an overlay of the work as constructed.

b. Clear indication of any deviations which have been described on the As-Built Certification Form.

c. The Department of the Army Permit Number.

d. A plan view of the overall footprint of the project showing all "earth disturbance", including wetland impacts, water management structures, and any on-site mitigation areas.

e. A detailed plan view of all created and/or restored or enhanced mitigation areas showing planting zones, and cross-sections of the mitigation areas showing elevations corresponding to the plantings; elevations of the inverts of any control structures (inflow and outflow) servicing the mitigation areas.

f) Any stormwater management system, that is a part of a wetland creation, restoration or enhancement mitigation project, especially elevations of the inverts of the control structures.

AS-BUILT CERTIFICATION BY PROFESSIONAL ENGINEER

Submit this form and one set of as-built engineering drawings to the U.S. Army Corps of Engineers, Enforcement Branch, Post Office Box 4970, Jacksonville, Florida 32232-0019. If you have questions regarding this requirement, please contact the Enforcement Branch at 904-232-2907.

1. Department of the Army Permit Number:

2. Permittee Information:

Name ______________________________

Address ______________________________

____

3. Project Site Identification:

Physical location/address ______________________

____

4. As-Built Certification:

I hereby certify that the authorized work, including any mitigation required by Special Conditions to the permit, has been accomplished in accordance with the Department of the Army permit with any deviations noted below. This determination is based upon on-site observation, scheduled and conducted by me or by a project representative under my direct supervision. I have enclosed one set of as-built engineering drawings.

____
Signature of Engineer

____
Name (Please type)

______________________________ ______________________________
(FL, PR or VI) Reg Number Company Name

____
Address

____
City State ZIP

(Affix Seal) ______________ ______________________
Date Telephone Number

Deviations from the approved permit drawings and special conditions: (attach additional pages if necessary)

CESAJ-RD-SW-F **5 October 2007**
APPLICATION NO. SAJ-2000-1926(IP-HWB)

MEMORANDUM FOR RECORD

SUBJECT: Supplemental Department of the Army Environmental Assessment and Statement of Findings on Above-Numbered Permit Application.

1. APPLICANT: J.D. Nicewonder, Jr.
148-B Bristol East Road
Bristol, Virginia 24201

2. The Corps sent its intent to issue letter to the applicant on 25 May 2007. The project involves the construction of a residential, golf-course development known as "Mirasol" and is located north of Immokalee Road and east of Interstate 75 in Sections 10, 11, 15, and 22, Township 48 South, Range 26 East, Collier County, Florida.

3. History of Application. The South Florida Water Management District (SFWMD) issued its Environmental Resource Permit (#11-02031-P) (ERP) for the project on 14 February 2002. The Corps of Engineers denied the application for the project on 7 December 2005. The project was subsequently modified and re-submitted to SFWMD. The modified project (ERP modification) was then approved by the SFWMD on 12 October 2006. The ERP modification was administratively challenged and the administrative proceedings for the challenge were finalized on 24 July 2007, and on 13 September 2007, the SFWMD Governing Board granted the ERP modification.

4. The project plans authorized by the ERP modification did not materially differ from the Corps draft permit.

5. By email submitted on 11 September 2007, the National Wildlife Federation, Florida Wildlife Federation, Audubon of Florida, Collier County Audubon Society, and the Conservancy of Southwest Florida (collectively "NAFLACC"), provided the Corps with copies of a May 1997 policy statement made by the SFWMD Environmental Advisory Committee and an April 1996 technical memorandum prepared by SFWMD that reviewed scientific literature on the functionality of melaleuca-dominated wetlands in South Florida. Based upon these documents, NAFLACC requested the Corps reconsider the WRAP (Wetland Rapid Assessment Procedure) analysis and other aspects of the permit review for Mirasol, Saturnia Falls (SAJ-1996-3501) and Parklands-Collier (SAJ-2001-6580).

6. Both documents submitted by NAFLACC on 11 September 2007, pertain to SFWMD rulemaking in the late 1990's and provide background for state legislative action of that period, including (1) a bill that did not pass referred to as the Melaleuca Control Act designed to waive mitigation requirements for wetlands with greater than 75% melaleuca and (2) a 1996 bill that would have established mitigation ratios based on percent of melaleuca coverage. The other policy document addressed a 1996 SFWMD

mitigation policy, the "Melaleuca Rule," that was approved by the Governing Board. Both documents refer to state mitigation policies, practices, and procedures, which have never been adopted by the Corps.

7. NAFLACC presents no scientific information or explanation why the Corps WRAP analysis for Mirasol, Saturnia Falls, and Parklands-Collier needs reconsideration. The Corps evaluated the impacts and mitigation plans for all three projects using WRAP. A WRAP analysis addresses the functional values of existing wetlands and predicts the functional values of preserved, enhanced, and restored wetlands following project development and successful completion of the proposed mitigation program. Wetland polygons are mapped accordingly to habitat type and are assigned functional credit values based on the ecosystem function they provide relative to a "fully-functional" wetland system of a similar type. A WRAP analysis includes variables for wildlife utilization, canopy and ground cover, habitat support/buffer, field hydrology, and water quality. The Corps recognizes that the functional capacity of melaleuca wetlands does not drop to zero nor does the ecosystem "crash" when melaleuca coverage exceeds 75%. After each polygon is evaluated, the functional credits for all polygons are then summed for both the pre-development condition and the post-development condition in order to compare functional losses (proposed project impacts) to functional gains (proposed mitigation lift).

8. The Corps finds that the wetlands on the project site have been objectively assessed and that the scores are appropriate considering the project site has been subjected to forest fires, invasion by exotic vegetation, and hydrological alterations. The Corps finds that no information has been provided to warrant reconsideration of the WRAP analysis.

9. By email submitted on 13 September 2007, NAFLACC provided the Corps with their analysis of the Biological Opinion (BO) dated 3 May 2007, prepared by the U.S. Fish and Wildlife Service (FWS). According to NAFLACC, the BO is arbitrary and capricious and based on flawed science.

10. The Corps has reviewed the BO prepared by the FWS and finds that the method for evaluating potential impacts to the wood stork is consistent with the method currently being used to evaluate wood stork impacts from rock mining in the Lake Belt Region of Miami-Dade County. The method is rationale and based on current scientific information and documents. The Corps defers to the FWS and their assessment of potential impacts to threatened and endangered species.

11. The impacts of the proposed work on navigation and the environment have been reviewed through the original Environmental Assessment and Statement of Findings dated 11 May 2007. There is no new information that has been presented that would require a re-evaluation of that assessment. The 11 May 2007 assessment and this Supplement comprise the Department of the Army Environmental Assessment and Statement of Findings for permit CESAJ-RD-SW-F SAJ-2000-1926(IP-HWB).

12. I find that issuance of a Department of the Army permit is not contrary to the public interest.

PREPARED BY:

HARRY W. BERGMANN, JR.
Lead Biologist

REVIEWED BY:

STEPHEN R. SULLIVAN
Chief, South Permits Branch

APPROVED BY:

PAUL L. GROSSKRUGER
Colonel, Corps of Engineers
Commanding

ESPLANADE GOLF & COUNTRY CLUB OF NAPLES
PERMIT MODIFICATION

ACOE ENVIRONMENTAL SUPPLEMENT

REVISED JUNE 23, 2015

PREPARED BY:

TURRELL, HALL & ASSOCIATES, INC
3584 EXCHANGE AVENUE
NAPLES, FL 34104
(239) 643-0166

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EXHIBITS

APPENDICES

1.0 INTRODUCTION

DILILLO SITE

The DiLillo property is a 19.66 acre forested parcel located approximately ¼ mile north of Immokalee Road (SR 846) and immediately south of the west end of Broken Back Road, west of the Collier Blvd. (C.R. 951) extension (Plateau Road) in North Naples. The property is situated in Section 22, Township 48 South, Range 26 East, Collier County, Florida.

The applicant is proposing to add the DiLillo parcel to the existing Esplanade Golf & Country Club PUD (Esplanade PUD), previously known as Mirasol PUD (Exhibit 8- Esplanade PUD Additional Lands Map). This addition would increase the existing living unit number by 47, for a total of 1,168 units. Of the proposed 19.66 acres, approximately 0.82 acres has been set aside as upland preserve. The majority of the site has been infested to a large degree by Brazilian pepper, with some melaleuca present as well. The native upland habitats have very little if any exotic plant coverage.

Surrounding land use includes single and multi-family residential and golf course, tree farm, forested land permitted for commercial development, road and single-family lots.

ESPLANADE PUD

ACOE

A modification to the ACOE Esplanade permit (SAJ-2000-01926 (IP-HWB)) would change the existing total acreage from 1,798 acres to approximately 1,818 acres. The revised 1,818-acre Esplanade PUD footprint would preserve approximately 125.92 acres worth of upland habitats and 998.8 acres of wetland habitats. (See Table 2, page 8).

With the modification wetland fill impacts would increase from 426.35 acres (2,560,000 cyd) to 439.18 acres (2,642,796 cyd), a 12.83 acre (87,2796 cyd) increase, and dredge impacts would increase from 135.52 acres (2,450,000 cyd) to 138.66 acres (2,582,647 cyd), a difference of 3.14 acres (132,647 cyd).

SFWMD

A modification to the SFWMD Esplanade permit (11-02031-P) would create approximately 130.26 acres worth of upland and 995.96 acres worth of wetland preserves. Wetland impacts would also increase from 514.41 to 530.38 acres total. (See Table 2, page 8).

This document provides information concerning the proposed addition of the DiLillo site to the Esplanade PUD as it relates to natural resources and environmental issues. It was written to support an ERP application submitted to the South Florida Water Management District and the U.S. Army Corps of Engineers.

2. EXISTING CONDITIONS (Pre-Development)

2.1 VEGETATION ASSOCIATIONS

The existing habitat types (based on FLUCCS codes) are shown in Table 1 below and Exhibit 2 (FLUCCS Map).

Of the total 19.66 acres contained within the DiLillo property boundary, 18.8% are classified as uplands (3.69 ac.), 81.2% are classified as wetlands (15.97 ac.). The majority of the property has been infested to some degree by noxious exotic vegetation.

Table 1: FLUCCS Codes and Acreage

FLUCCS Code	FLUCCS Description	Total Acres	Wetland Acres	Upland Acres
321e4	Palmetto Prairie (>75% Exotic)	1.35		1.35
411	Pine Flatwood	1.52		1.52
411e3	Pine Flatwood (50-75% Exotic)	0.65		0.65
426	Tropical Hardwood	0.17		0.17
624e3	Cypress-Pine Flatwood (50-75% Exotics)	5.77	5.77	
624e4	Cypress-Pine Flatwood (>75% Exotics)	10.20	10.20	
	TOTAL	**19.66**	**15.97**	**3.69**

The following provides a listing of the major FLUCCS map units present on the property as well as the plant species surveyed there and the extent and estimated percentage of exotic infestation.

<u>321e4 – Palmetto Prairie & Brazilian Pepper, 1.35 acres, 7% of the site</u>

Brazilian pepper	*Schinus terebinthifolius*	C & M	Dominant
slash pine	*Pinus elliotti*	C	Rare
cabbage palm	*Sabal palmetto*	M	Rare
swamp fern	*Blechnum serrulatum*	G	Rare
saw palmetto	*Serenoa repens*	G	Dominant

<u>411 – Mesic Pine Flatwood, 1.52 acres, 8% of the site</u>

slash pine	*Pinus elliottii*	C	Dominant
melaleuca	*Melaleuca quinquenervia*	C	Rare
ear-leaf acacia	*Acacia auriculiformis*	C	Rare
Java plum	*Syzgium cumini*	C	Rare
Brazilian pepper	*Schinus terebinthifolius*	M	Occasional
swamp bay	*Persea palustris*	M	Common
dahoon holly	*Ilex cassine*	M	Common
myrsine	*Myrsine guianensis*	M	Common
wax myrtle	*Myrica cerifera*	M	Common
saw palmetto	*Serenoa repens*	G	Dominant
wiregrass	*Aristida stricta*	G	Common
rusty lyonia	*Lyonia ferruginea*	G	Rare
grapevine	*Vitus rotundifolia*	V	Common and a rare

<u>411e3 – Mesic Pine Flatwood & Brazilian pepper, 0.65 acres, 3% of the site</u>

slash pine	*Pinus elliotti*	C	Dominant
Brazilian pepper	*Schinus terebinthifolius*	C & M	Dominant
Java plum	*Syzgium cumini*	C	Common
melaleuca	*Melaleuca quinquenervia*	C	Common
cabbage palm	*Sabal palmetto*	C & M	Common
dahoon holly	*Ilex cassine*	M	Common
guava	*Psidium guava*	M & G	Common/ Occasional
swamp fern	*Blechnum serrulatum*	G	Dominant
Bahamas coffee	*Psychotria sulzneri*	G	Common
myrsine	*Myrsine guianensis*	G	Occasional
grapevine	*Vitis rotundifolia*	V	Rare

<u>426 – Tropical Hardwood, 0.17 acres, 1% of the site</u>

arrow-wood	*Viburnum dentatum*	C	Dominant
ironwood	*Reynosia septentrionalis*	C	Dominant
cabbage palm	*Sabal palmetto*	C	Rare
swamp bay	*Persea borbonia*	C	Rare
melaleuca	*Melaleuca quinquenervia*	C	Rare
Brazilian pepper	*Schinus terebinithifolius*	C & M	Rare
myrsine	*Myrsine guianensis*	M & G	Dominant/ Occasional
wild coffee	*Psychotria spp.*	G	Occasional
Boston fern	*Nephrolepis spp.*	G	Common
saw palmetto	*Serenoa repens*	G	Occasional
poison ivy	*Toxicodendron radicans*	V	Occasional

<u>624e3 – Cypress / Pine (60-75% Exotic), 5.77 acres, 29% of the site</u>

cypress	*Taxodium distichum*	C	Common
slash pine	*Pinus elliotti*	C	Common
cabbage palm	*Sabal palmetto*	C	Rare
ear-leaf acacia	*Acacia auriculiformis*	C & M	Occasional/Common
melaleuca	*Melaleuca quinquenervia*	C & M	Common/ Dominant
Brazilian pepper	*Schinus terebinthifolius*	C & M	Common/ Dominant
Java plum	*Syzgium cumini*	C & M	Occasional/ Common
myrsine	*Myrsine guianensis*	M	Common
wax myrtle	*Myrica cerifera*	M	Common
cocoplum	*Chrysobalanus icaco*	M	Occasional
sawgrass	*Cladium jamaicense*	G	Common
yellow-eyed grass	*Xyris spp.*	G	Common
pipewort	*Eriocaulon spp.*	G	Occasional
marsh fleabane	*Pluchea foetida*	G	Common
St. John's wort	*Hypericum sp.*	G	Occasional
swamp fern	*Blechnum serrulatum*	G	Common

<u>624e4 – Cypress / Pine (80-100% Exotic), 10.2 acres, 52% of the site</u>

cypress	*Taxodium distichum*	C	Common
slash pine	*Pinus elliotti*	C	Common
cabbage palm	*Sabal palmetto*	C	Rare
ear-leaf acacia	*Acacia auriculiformis*	C & M	Common
melaleuca	*Melaleuca quinquenervia*	C & M	Dominant

Brazilian pepper	*Schinus terebinthifolius*	C & M	Common/ Dominant
Java plum	*Syzgium cumini*	C & M	Occasional/ Common
myrsine	*Myrsine guianensis*	M	Common
wax myrtle	*Myrica cerifera*	M	Common
cocoplum	*Chrysobalanus icaco*	M	Occasional
sawgrass	*Cladium jamaicense*	G	Common
yellow-eyed grass	*Xyris spp.*	G	Common
marsh fleabane	*Pluchea foetida*	G	Common
swamp fern	*Blechnum serrulatum*	G	Common

C = Canopy M = Midstory G = Groundcover V = Vine E = Epiphyte * - Protected species

2.2 WETLANDS AND OTHER SURFACE WATERS

Qualified Turrell, Hall & Associates, Inc. environmental staff inspected the project lands for the purpose of delineating wetlands and other surface waters. The wetland delineation methodologies and criteria set forth by the state (in Chapter 62-340, FAC, Delineation of the Landward Extent of Wetlands and Surface Waters) and the US Army Corps of Engineers (in the 1987 Corps of Engineers Wetlands Delineation Manual) were followed in determining whether an area classified as a wetland or other surface water and in delineating the limits (boundaries) of potential jurisdictional wetlands and other surface waters.

2.2.1 Wetland Seasonal High Water Table & Hydroperiod

Historically water levels on this property reached abnormally high elevations during the wet season due to blocked flow from the north and east and water being funneled through the former Mirasol property to the west into this parcel. Water would back-up on the DiLillo site, artificially increasing the hydroperiod.

Seasonal High Water will likely never return to normal levels with the surface water management system on the Esplanade property effectively blocking that historic sheet flow from the east and development to the north and east also blocking water movement. The site hydrology is now secondarily impacted by development surrounding it in three (3) directions. Ultimately this parcel's site water management will be tied into Esplanade's main system. A control elevation of 13.4' NGVD will be used for this site to match that of the corresponding basin in Esplanade.

2.2.2 Jurisdictional Status of Wetlands & Other Surface Waters

The Esplanade wetland lines established based on the state methodology differ from those established based on the federal (USACE) methodology within Sections 15 and 22. As a result, the upland and wetland acreages differ between the two agencies. For the purposes of the Collier County submittal, the State wetland jurisdictional lines and associated acreages are utilized. The wetland boundaries flagged (marked) by staff ecologists were subsequently survey-located.

All of the wetlands now present on the DiLillo project lands (and delineated with the two methodologies) are assumed to be jurisdictional with both the State and Federal permitting agencies per their delineation guidelines.

2.3 LISTED PLANT AND ANIMAL SPECIES

A thorough survey for listed animal and plant species was conducted on the project lands by Turrell, Hall & Associates biologists. This threatened and endangered species survey and its results are discussed in Appendix B. The report describes the approximate locations where listed animal species were observed on and near the project lands during the course of the referenced survey and includes a map of those locations in the report (Exhibit 1 of Appendix B). The listed animal species which were either observed directly on or flying over PUD project lands or identified by indirect observations included snowy egret, Tri-colored heron, little blue heron, white ibis, wood stork, black bear and fox squirrel. The only species noted on the DiLillo site was white ibis. Construction was well underway on Esplanade adjacent to this site and the activities combined with the density of exotic plant species would also reduce the likelihood of nesting, denning and foraging activities.

2.4 HISTORICAL/ ARCHEOLOGICAL RESOURCES

The Florida Division of Historical Resources provided comments on June 9th that they were not aware of any known historic and archaeological sites on this parcel. A Phase I Archaeological Survey was conducted though in September 2013 as due diligence by the permittee during high water conditions and will be forwarded to Division of Historical Resources for their records. An upland area designed as 411e3 and 426 at the south central portion of the site was not inundated during the survey and two (2) of the four (4) shovel tests located faunal bone and marine shell within 60 cm of the surface. The Archaeologist references this find as a previously unrecorded prehistoric site number 8CR1308 in his report. He recommended preservation of this habitat and the permittee agreed to preserve this entire area of upland habitat in perpetuity.

2.5 SOILS

Based on the National Resource Conservation Service (NRCS) "Soil Survey of Collier County Area, Florida" (NRCS, 1998) there are two (2) different soil types (soil map units) present on the project lands (see Exhibit 5- Soils Map). Soil type #14, Pineda Fine Sand Limestone Substratum (Hydric), dominates this site. Also present are small inclusions of #21 Boca Fine Sand (Non-Hydric). As an additional note, one such inclusion was missed by the NRCS at the south end of the site where the proposed upland preserve is located. Exhibit 6 provides a soils map for the project area as derived from the NRCS mapping. The following sub-sections provide a brief description of each soil map unit identified on the project lands. Information is provided about the soil's landscape position (i.e. its typical location in the landscape on a county-wide basis), the soil's profile (i.e. textural composition and thickness or depth range of the layers or horizons commonly present in the soil), and the soil's drainage and hydrologic characteristics. The soils occurring on project lands are as follows:

(21) Boca Fine Sand (Non-Hydric)- This nearly level, poorly drained soil is on the flatwoods. Individual areas are elongated and irregular in shape and range from 20 to 350 acres. The slope is 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is fine sand to a depth of about 26 inches; the upper part is light gray and the lower part is brown. The subsoil is dark grayish brown fine sandy loam to a depth of about 30 inches. Limestone bedrock is at a depth of about 30 inches.

In 95 percent of areas mapped as this soil, Boca and similar soils make up 79 to 93 percent of the map unit. The characteristics of Hallandale soils are similar.

Soils of dissimilar characteristics included in this map unit are small areas of Pineda and Riviera, limestone substratum soils in slough landscape positions. These soils make up about 7 to 21 percent of the unit.

The permeability of this soil is moderate. The available water capacity is very low. In most years, under natural conditions, the seasonal high water table is between 6 to 18 inches of the surface of 1 to 6 months. In other months, the water table is below 18 inches and recedes to a depth of more than 40 inches during extended dry periods. Rarely is it above the surface.

Natural vegetation consists mostly of South Florida slash pine, cabbage palm, saw palmetto, wax myrtle, chalky bluestem and pineland three awn.

This soil has severe limitations for most urban uses because of wetness. If this soil is used as septic tank absorption fields, it should be mounded to maintain the system well above the seasonal high water table. For recreational uses, this soil also has severe limitations because of wetness, but with proper drainage to remove excess surface water during wet periods, many of these limitations can be overcome.

This Boca soil is in capability subclass IIIw.

(14) Pineda Fine Sand, Limestone Substratum (Hydric)- This nearly level poorly drained soil is in sloughs and poorly defined drainage ways. Individual areas are elongated and irregular in shape and range from 20 to 300 acres. The slope is 0 to 2 percent.

Typically, the surface layer is dark grayish brown fine sand about 4 inches thick. The subsurface layer is light brownish gray fine sand to a depth of about 12 inches. The subsoil is to a depth of about 55 inches; the upper part is brownish yellow and very pale brown fine sand, the middle part is grayish brown sandy clay loam, and the lower part is light brownish gray and dark grayish brown fine sandy loam. Limestone bedrock is at a depth of about 55 inches.

In 95 percent of areas mapped as this soil, Pineda and similar soil make up 79 to 100 percent of the map unit. The characteristics of Holopaw and Riviera, limestone substratum soils are similar.

Soils of dissimilar characteristics included in this unit are small areas of Boca, Hallandale and Malabar soils on similar landscape positions. These soils make up about 11 percent or less of the unit.

The permeability of this soil is slow. The available water capacity is low. In most years, under natural conditions, the seasonal high water table is within 12 inches of the surface for 3 to 6 months. In other months, the water table is below 12 inches and recedes to a depth of more than 40 inches during extended dry periods. During periods of high rainfall, the soil is covered by shallow slowly moving water for periods of about 7 to 30 days.

Natural vegetation consists of South Florida slash pine, wax myrtle, chalky bluestem, blue maidencane and gulf muhly.

This soil has severe limitations for most urban uses because of the high water table. To overcome this limitation, building sites and septic tank absorption fields should be mounded. This soil also has severe limitations for recreational development because of wetness and sandy textures. Problems associated with wetness can be corrected by providing adequate drainage and drainage outlets to control the high water table. The sandy texture limitation can be overcome by adding suitable topsoil or by resurfacing the area.

This Pineda soil is in capability subclass IIIw.

3.0 PROPOSED CONDITIONS (Post-Development)

3.1 PROPOSED PROJECT

The current Esplanade project proposal consists of a maximum of 1,121 living units, 18 holes of golf, an associated clubhouse, the required lakes and infrastructure, a constructed water pass-through, and a substantial preserve. With the proposed modification 47 living units would be added with the DiLillo 19.66-acre parcel to create a total of 1,168 living units, 1,124 acres of ACOE preserve, and 1,126 acres of SFWMD preserve area with approximately 31.87 acres of constructed wood stork foraging improvements. Construction of the project will result in impacts to 530.38 acres (SFWMD) and 577.64 acres (ACOE) of jurisdictional wetlands (see Exhibit 3). The main access to the project is via Immokalee Road (CR 846) at the southern project boundary. A secondary access may be constructed off of Plateau or Broken Back Road on the eastern side of the project.

The DiLillo parcel, included in the acreages updated above, will provide 18.84 acres worth of Residential/Golf Course and Lake area which was not previously approved under the Esplanade PUD. Of the site acreage, 15.97 are considered jurisdictional wetlands and 3.69 are considered upland. Impacts are proposed to all but 0.82 acres of upland on this parcel.

All of the proposed preserves will be enhanced though the removal of exotic vegetation, the re-establishment of native species within the preserve areas, and specific management activities designed to enhance the habitats for wildlife utilization. Species specific management activities such as mid-story vegetation control and prescribed burning will also be undertaken to enhance and augment the viability of the native habitat for listed species utilization. All preserve areas will be placed under conservation easements, and will be maintained exotic free in perpetuity. The large northern and western preserve is proposed to eventually be given to the CREW Trust (along with an endowment account for future maintenance) once the enhancement, creation, and foraging improvement activities have been completed. The smaller southern preserves will remain under the control of the CDD or homeowner's association but will still be maintained in perpetuity.

Table 2: Proposed Acreage with ERP Modification

	DiLillo Site	**Esplanade PUD ACOE**	**Esplanade PUD SFWMD**
Total Project Area	**19.66 Ac.**	**~1,818 Ac.**	**~1,818 Ac.**
Total Wetland Area	15.97 Ac.	1,562.15 Ac.	1,511.79 Ac.
Total Upland Area	3.69 Ac.	255.86Ac.	306.22Ac.
Total Project Development Area	**18.84 Ac.**	**694.12Ac.**	**691.78Ac.**
Wetland Preserve	0.00 Ac.	998.86 Ac.	995.96 Ac.
Upland Preserve	0.82 Ac.	125.92 Ac.	127.92 Ac.
Total Preserve Area	**0.82 Ac.**	**1,124.47 Ac.**	**1,123.88 Ac.**
Dredge Acreage	3.4 Ac	188.66 Ac	
Fill Acreage	12.83 Ac.	439.18 Ac.	
Total Dredge & Fill Area	**15.97 Ac.**	**627.84 Ac.**	**530.38 Ac.**

3.2 PROJECT IMPACTS TO WETLANDS

The proposed project will impact a total of 15.97 acres of wetlands which have been degraded to significant extent by exotic vegetation infestations and hydrological impacts. Exhibit 3 (Impacts and Dredge & Fill Maps) depicts the wetlands which will be impacted by the proposed development.

3.2.1 Direct Permanent Impacts

Development of the proposed project will result in direct, permanent impacts to a total of 15.97 acres of jurisdictional wetlands. As used herein, the term "direct impacts" refers to actions that will result in the complete elimination of jurisdictional areas (i.e. excavation and fill). The wetlands proposed to be impacted are all heavily degraded by exotic vegetation. UMAM scores for the existing functional values of these wetlands range from 0.4-0.43 typically. (See Table 4- UMAM Summary and Appendix A- UMAM Analysis).

3.2.2 Temporary Impacts

Any temporary impacts would occur within the first foot or two of heavily exotic-invaded Pine-Cypress (624-e3 and e4) habitat to the south or to Fallow Agricultural lands (261) to the east while clearing the property boundary, because of the amount of low, multi-branched trunk growth associated with the dense Brazilian pepper in these areas. This area is within the zone of secondary impacts associated with mitigation in the UMAM analysis regardless.

3.2.3 Secondary Impacts To Offsite Wetlands & Water Resources

The proposed layout of the project's development features will minimize potential secondary impacts to the adjacent off-site wetlands as much as possible by providing an appropriate buffer between development and wetland areas. Currently there are 0.97 acres worth of secondary impacts associated with this project.

Table 3: Preserves, Impacts & Secondary Impacts

FLUCCS Code	On-Site Wetland Habitat	Total Acres	Impacts	Preserves	Secondary Impacts
624-e3	Cypress-Pine Flatwood (50-75% Exotics)	5.77	5.77	0.00	0.00
624-e4	Cypress-Pine Flatwood (>75% Exotics)	10.20	10.20	0.00	0.00
	TOTAL	**15.97**	**15.97**	**0.00**	**0.00**
FLUCCS Code	**Off-Site Wetland Habitat**	**Total Acres**			**Secondary Impacts**
261	Fallow Crop Land	0.40			0.40
624-e3	Cypress-Pine Flatwood (50-75% Exotics)	0.02			0.02
624-e4	Cypress-Pine Flatwood (>75% Exotics)	0.55			0.55
	Total Offsite	**0.97**			**0.97**
FLUCCS Code	**On-Site Upland Habitat**	**Total Acres**	**Impacts**	**Preserves**	**Secondary Impacts**
321e3	Palmetto Prairie (50-75% Exotic)	1.35	1.35	0.00	0.00
411	Pine Flatwood	1.52	1.52	0.00	0.00
411e3	Pine Flatwood (50-75% Exotic)	0.65	0.00	0.65	0.00
426	Tropical Hardwood	0.17	0.00	0.17	0.00
	TOTAL	**3.69**	**2.87**	**0.82**	**0.00**

3.3 PROJECT IMPACTS TO LISTED SPECIES

A thorough survey for listed animal and plant species was conducted on the project lands by Turrell, Hall & Associates ecologists. This listed species survey and its results are discussed in Appendix B. Appendix B, Exhibit 1 shows the approximate locations where listed animal species were observed on and near the project lands during the course of the referenced survey. The listed animal species observed on/ flying over these PUD project lands by Turrell, Hall & Associates included snowy egret, tricolored heron, little blue heron, white ibis, wood stork, and Florida black bear. Of these species, only white ibis was noted on the DiLillo site.

The existing condition of the subject site is a heavily exotic infested, hydrologically altered, viably reduced property. Special interest in the property as Big Cypress fox squirrel habitat was taken into account during the survey efforts. Investigation of the site in the course of this study has shown that the property offers, at best, limited use potential for any wildlife due to the exotic infestation, artificially high wet season water levels and the distance from an established core protected habitat area. The site is part of essentially an island that is completely surrounded by existing and future development. The undeveloped areas to the east and south of the parcel have both been under review for development though no site work has been done on them to date. According to the Florida Fish and Wildlife Conservation Commission, the closest known panther was an uncollared animal that ranged from Bird Rookery Swamp approximately three miles to the northeast down to the residences along Rose Blvd approximately ½ mile to the west. The subject property offers a limited prey base, limited denning opportunities due to the exotic vegetation, an altered hydrologic regime, and no through connectivity to other wildlife areas.

Development of the subject site is not expected to result in detrimental impacts to state or federally listed wildlife species, primarily because past use patterns, surrounding activities, and altered hydrology, as outlined above, have reduced the sites' ability to support populations of listed species. In the most recent U.S. Fish and Wildlife Service Biological Opinion for the Esplanade (Mirasol) project FWS stated that the project would not jeopardize the existence of wood storks or panthers. They also opined that the project may impact wood storks by eliminating potential forage base due to the proposed wetland impacts but their opinion was that the enhancements proposed to the project preserves would more than off-set the proposed impacts. The enhancements now realized with the construction of the foraging areas and removal of exotics within the project preserves have improved wood stork and other wading bird foraging activities and should give assurances that wood storks will not be adversely affected by the project.

The Esplanade project, to which this parcel is being added, has the potential to support several listed species, as well as a host of non-listed resident and transient species. Preservation and enhancement of the extensive on-site preserve will increase the usefulness of the property as feeding/foraging areas for all species currently utilizing the area. Proper management of the preserve areas, coupled with the size of the preserve, and the limited access should serve to create an area of great use to several local listed species.

Existing Species Management and Protection Plans in place for Esplanade will be applied to the 0.82 acre preserve on the DiLillo site as well.

3.4 PROJECT IMPACTS TO ARCHAEOLOGICAL/ HISTORICAL RESOURCES

As outlined in Section 2.4 of this report a previously undocumented cultural resource was located within the habitat areas 411e3 and 426 at the south end of the site during a Phase I archaeological survey. The Archaeologist (Bob Carr- Archaeological and Historical Conservancy) recommended preservation of this upland area in entirety. The permittee agreed to preserve this area and place it under conservation easement. Since it becomes part of the Esplanade Internal Preserve System, exotic removal and maintenance activities will occur in conjunction with the other internal systems. Only hand-mechanical (chainsaw/ machete) exotic removal or herbicidal treatments will occur in this preserve to prevent earth disturbance. A sign will also be erected to alert future maintenance crews to the fact there are cultural resources present that cannot be disturbed.

4.0 WETLAND MITIGATION PROGRAM

Modification of the Esplanade Golf & Country Club ERP to add the DiLillo parcel will result in 15.97 acres of impacts to existing wetlands located within the DiLillo boundary. Mitigation for these permanent impacts will be provided through the purchase of off-site mitigation credits. A 0.17- acre Tropical Hardwood Hammock surrounded by 0.65 acres of Pine Flatwood will also be preserved and enhanced onsite, but is not considered mitigation for proposed wetland impacts.

On-Site Preservation/ Restoration

A 0.82- acre upland preserve is proposed on the DiLillo site, which will be managed according to the Internal Preserve portions of the existing Esplanade Golf & Country Club Preserve Management Plan, but with no earth disturbing activities due to its special resource protection status.

Mitigation Banking

In order to compensate for 15.97 acres of permanent wetland impacts, the applicant will purchase mitigation bank credits from an approved regional mitigation bank. Wetland function calculations left the project in need of 6.99 units of mitigation. A UMAM Analysis is found in Appendix A and summarized below in Table 4 (Chapter 7).

4.1 PROTECTION OF UPLANDS VIA CONSERVATION EASEMENTS

The preserve area will be placed under appropriate conservation easements which will protect the future integrity of the uplands and the historical resources. Easements will ensure that the conservation areas are preserved and protected in perpetuity within this PUD.

4.2 PRESERVE ENHANCEMENT VIA MAINTENANCE & ERADICATION OF EXOTIC & NUISANCE SPECIES

The preserve area will be maintained in perpetuity to ensure that the areas are free from exotic/invasive plant species immediately following maintenance events and such that exotic and nuisance plane species will constitute no more than 5% of the total plant cover in the interim between these maintenance events. Exotic invasive plant species will include Category I and Category II species identified in the current “Invasive Plant List” published by the Florida Exotic Pest Plan Council (FLEPPC) as well as Class I and Class II Prohibited Aquatic Plants listed in Chapter 62C-52.011, Florida Administrative Code. Nuisance plant species will include native plant species deemed detrimental due to their potential adverse competition with desirable native species.

During initial enhancement activities no wheeled or tracked equipment may enter this area to disturb the soil due to the presence of cultural resources. All exotic plant material will be removed by hand with either chainsaws or machetes and/ or killed in-place.

Visual inspection for exotic, non-native and nuisance plant invasion will be conducted annually and all exotic, non-native and nuisance vegetation including those defined by County codes and the Florida Exotic Pest Plant Council, found within the preserve areas will be flagged, mapped and reported for treatment. Felled material will be removed from the preserve areas where possible or killed in place where removal would cause extreme damage to the surrounding native areas. Any stumps remaining after the exotic, non-native and nuisance removal will be treated with a U.S. EPA approved herbicide and visible tracer dye to prevent regeneration from the roots. These maintenance activities will be performed in perpetuity as needed.

4.3 PRESERVE DELINEATION

Preserves will be clearly delineated with appropriate signage both during and after construction activities. Protective barricades will be used to cordon off construction areas and keep construction equipment out of preserve areas. A double row of silt fence will be used along preserve areas to separate them from the construction activities. The silt fence will remain in place until the perimeter berm is installed around the area of work. Appropriate signage will be placed along the perimeter of the preserves at 100 to 150 foot spacing, or at a minimum, behind every other lot.

4.4 MITIGATION SPECIFICATIONS

The mitigation program will require exotic and nuisance plant eradication activities as previously noted. The following paragraphs provide additional information and specifications regarding these activities.

4.1.1 Exotic & Nuisance Vegetation Eradication

As previously permitted, eradication methods will be employed throughout the preserve area in both uplands and wetlands. They may include physical removal of exotics and/or directed herbicide applications as dictated by the mitigation feature type and specific conditions and species encountered. Initial exotic and nuisance plant eradication efforts will involve a combination of methods including directed herbicide applications and cutting down exotics with subsequent application of herbicides to the stumps. Non-mechanized exotic and nuisance plant eradication methods will be employed wherever practical in order to preserve the greatest amount of existing native vegetation still present within the preserve areas. Methods include the use of hand implements such as chainsaws and machetes to cut down exotic vegetation with follow-up applications of herbicides as well as directed herbicide applications alone. Areas of exotic eradication handled in this manner will be allowed to recruit naturally for a year before determining if any replanting is necessary.

Because of the protected cultural resources and size of the preserve exotic species will be felled by hand and removed from the preserve area during the initial exotic/nuisance vegetation eradication process. Wheeled/ tracked equipment use will be prohibited in this preserve that might disturb the soil due to the presence cultural resources.

Following initial eradication, subsequent maintenance events will commonly employ non-mechanized exotic and nuisance plant eradication methods. These methods may include directed herbicide applications and/or physical removal of exotics. Maintenance events will be done in conjunction with those of the annual internal preserve since the proposed upland preserve also would be considered internal.

4.1.2 Mitigation Goals

Mitigation goals for this 0.82 acre preserve will be consistent with those of the Esplanade Internal Preserves for consistency. These goals include the following:

- 50% coverage of desirable plant species after two (2) years
- 75% coverage of desirable plant species after three (3) years
- 80% coverage of desirable plant species after five (5) years
- Less than 4% exotic and nuisance vegetation present for three (3) years or more
- 80% survivorship of any planted species

5.0 PREESRVE MONITORING PROGRAM

The permittee will submit monitoring reports to the SFWMD and USACE documenting general conditions in the Esplanade preserve areas established for the Esplanade wetland impact mitigation program. At a minimum one (1) “baseline”, one (1) "time zero", and five (5) annual monitoring reports will be submitted for Internal and External Preserves. No alterations to the existing Esplanade monitoring program are proposed at this time due to the size of the added DiLillo conservation area, and the fact it is not wetland and that it was not used as mitigation for wetland impacts.

6.0 MITIGATION/ PRESERVE MANAGEMENT PROGRAM

The DiLillo preserve area will be maintained to suppress infestation by exotic/invasive and nuisance plant species. Maintenance/management actions will be conducted by hand as required to meet the mitigation success criteria previously described. Once the applicable regulatory agencies have determined that all success criteria have been achieved and annual monitoring is no longer necessary, these areas will be maintained in perpetuity such that exotic and nuisance plant infestations do not exceed the maximum allowed by the mitigation success criteria.

After initial eradication efforts are complete, follow-up exotic and nuisance plant control will include directed herbicide applications and/or physical removal methods throughout all portions of the preserve area. Exotic/nuisance plant control is likely to occur on at least a semi-annual basis for the first three years following completion of initial eradication efforts. Such maintenance events may be conducted more frequently if field observations indicate the need. At the end of this period, the frequency of activities necessary to adequately control nuisance and exotic plants will be re-assessed and a program developed for future maintenance. At a minimum there will be at least one exotic/nuisance plant control event per year of monitoring.

Supplemental plantings are not proposed on this site due to the presence of historical resources within 60 cm of the surface. Only natural recruitment will be allowed in this preserve.

A qualified biologist or similar environmental professional will inspect the preserve area at least once a year for the duration of the mitigation monitoring program. During the first few years inspections will likely occur more frequently in an effort to rectify any potential problem situations (e.g., exotic/nuisance plant infestations, mortality of planted species, etc.) before they worsen. The necessary maintenance activities will be determined by the biologist during these inspections. The maintenance will be conducted during the course of the year following issuance of the biologist's recommendations.

Following completion of the mitigation monitoring program, the preserve area will be maintained in perpetuity such that the total vegetative cover accounted for by nuisance plants constitutes no more than 4% of total plant cover, as is the limit for the Esplanade Internal Preserves.

7.0 BASIS OF MITIGATION PROGRAM AS ADEQUATE COMPENSATION FOR PROPOSED WETLAND IMAPCTS

For the DiLillo parcel addition to Esplanade's PUD, the wetland mitigation program is composed entirely of an offsite mitigation bank credit purchase. As demonstrated through the UMAM calculations/ analyses, it is anticipated that 6.99 mitigation bank credits will compensate for the project's proposed wetland impacts.

A WRAP summary is presented below (Table 4) for existing conditions of onsite wetlands that will be permanently impacted by the project. A UMAM analysis for this site is also provided in Appendix A.

As can be seen in the table below, the proposed mitigation program will compensate for any functional loss that will result from the project's impacts to jurisdictional wetlands. There will be no net loss of wetland functions/ values with the addition of the DiLillo parcel to the Esplanade PUD.

Table 4: UMAM Summary of the Proposed Wetland Impact and Mitigation Activities

	ONSITE HABITATS	IMPACTS		IMPACTS	
FLUCCS	DESCRIPTION	DIRECT	CREDIT/LOSS	SECONDARY	CREDIT/LOSS
624E3	Pine/Cypress/Cabbage palm (50-75% Exotic)	5.77	-2.50		
624e4	Pine/Cypress/Cabbage palm (>75% Exotic)	10.20	-4.42		
		15.97	**-6.92**		
	OFFSITE HABITATS				
261	Fallow Crop Land			0.02	0.00
624E3	Pine/Cypress/Cabbage palm (50-75% Exotic)			0.55	-0.04
624e4	Pine/Cypress/Cabbage palm (>75% Exotic)			0.40	-0.03
				0.97	**-0.07**

TOTAL CREDIT LOSS FROM DEVELOPMENT	**-6.99**

Mitigation Cost Estimate

It is anticipated that annual onsite maintenance costs will be approximately $4,000.00 during the first five (5) years and then approximately $700.00 per year thereafter in annual maintenance. Panther Island Mitigation Bank will be used for mitigation credit purchase and the cost of those credits would be $516,960 (7.18 credits at $72,000/credit).

Proposed mitigation costs for this project would be $520,960.

8.0 MITIGATION PROGRAM AS ADEQUATE COMPENSATION FOR LOSS OF PANTHER HABITAT AND WOODSTORK FORAGING HABITAT

8.1 PANTHER ANALYSIS AND MITIGATION

The proposed project impacts 18.84 acres worth of mixed upland and wetland habitats on the DiLillo parcel within the Primary Panther Zone (See Exhibit 8- Panther Habitat Zone Map). Even though 0.82 acres of Pine Flatwood and Tropical Hardwood habitat will be preserved onsite it was considered as impacts when calculating panther mitigation needed because of an agreement that the internal preserves of Esplanade would more than likely not see panther use. Using the 19.66 acre impact number, this site yielded an existing conditions score of 95.78 PHUs. With no onsite preservation credit, the site requires 239.45 functional units as mitigation for habitat loss. Since there are already 6.99 credits proposed for purchase from Panther Island Mitigation Bank as compensation for project wetland impacts, those credits would also provide 239.45 Functional Units, yielding the need for 4.24 additional Functional Unit for this parcel as a stand-alone project. (See Appendix D for Panther Analysis).

Table 5: Panther Analysis for DiLillo Site

Land Cover Types	Habitat Types	Project Development			
		19.66 acres			
		Functional Units Needed			
		239.45			
		Pre		Post	
		Acres	PHU	Acres	PHU
Water/Urban				19.66	0.00
Exotic Plants	3.00	13.87	41.61		0.00
Upland Hardwood	9.00	0.14	1.26		0.00
Cypress-Pine	9.30	3.84	35.71		0.00
Pine Forest	9.50	1.81	17.20		0.00
Subtotal		**19.66**	**95.78**	**19.66**	**0.00**

Panther Island Mitigation Bank*
6.99 wetland credits
31.97 USACE acres/ **20.13** SFMWD acres
Functional Units Provided
235.21
average PHUs **7.60** per acre
4.24 PHUs still needed

** Panther Island Mitigation Bank: 1 WRAP credit = 22.1 PHUs and 4.43 acres (USACE) or 2.88 acres (SFWMD)*

8.2 WOODSTORK ANALYSIS AND MITIGATION

There are 15.97 acres of wetland impacts proposed for this project, with a total biomass loss of 6,124.34 grams (6.12 kg). This project is situated within the foraging zones for three (3) woodstork nests. With the purchase of 6.99 mitigation bank credits from Panther Island Mitigation Bank, 7.41 kg of biomass will be provided yielding a net gain of 1.29 log of biomass. (See Appendix D for Woodstork Analysis)

Table 7: Woodstork Analysis for DiLillo Site

FLUCCS Code	Hydroperiod Class	Biomass (g)	Total Acres	m²	%EXOTC	Suitability Index	**LOST BIOMASS (g)**
624e4	2	0.62	5.77	23,350.36	60%	37%	5,356.57
624e4	2	0.62	10.20	41,277.94	85%	15%	767.77
			15.97	**64,628.30**			**6,124.34**

6,124.34 grams biomass = 6.12 kg biomass

PIMB credit = 1.06 kg biomass
so 6.99 credits = 7.41 kg biomass provided by offsite mitigation (surplus of 1.29 kg)

Present Value of Escrow Fund

See National Fish and Wildlife discussion below

Unknown but Assumed Annual Cost	3 month 2.12%	6 month 2.10%	1 year 2.00%	2 year 1.86%
$ 100,000	$ 4,716,981	$ 5,464,481	$ 5,000,000	$ 5,376,344
$ 150,000	$ 7,075,472	$ 8,196,721	$ 7,500,000	$ 8,064,516
$ 200,000	$ 9,433,962	$ 10,928,962	$ 10,000,000	$ 10,752,688
$ 250,000	$ 11,792,453	$ 13,661,202	$ 12,500,000	$ 13,440,860
$ 300,000	$ 14,150,943	$ 16,393,443	$ 15,000,000	$ 16,129,032

The risk-free rate of return is the theoretical rate of return of an investment with zero ris
an investor would expect from an absolutely risk-free investment over a specified perioc
In theory, the risk-free rate is the minimum return an investor expects for any investmer
unless the potential rate of return is greater than the risk-free rate.
In practice, however, the risk-free rate does not exist because even the safest investmer
the interest rate on a three-month U.S. Treasury bill is often used as the risk-free rate fo
Source: Investopedia

Source:* *National Fish and Wildlife Foundation* *(https://www.nfwf.org/whatwe
stewardship.aspx)

Long-Term Stewardship Funds

Long-term stewardship funds or "mitigation endowments" are a specialized clas
typically arise when a permit or other governmental approval requires as a comp
real property be purchased or otherwise set aside in perpetuity for conservation
be established to provide ongoing payment for a defined set of land managemen
also in perpetuity. The funds described in item (2) are often referred to as long-
"endowment" funds.

It is important to note that the long-term stewardship funds (LTSFs) managed l
existence only because of the mitigation requirements set forth in a permit or
other components of permit-required mitigation, LTSFs are legally exacted funds
than philanthropic or other charitable funds managed by NFWF. **In recognition**
and manages permit-required LTSFs, IDEA acts solely as an agent, trustee, or e
agency or the permit regime itself, in each case solely to ensure the funds are a
requirements specified in the applicable laws, regulations, permits, and mitiga
management plans).

Another critical point is that the calculation of the appropriate initial value of a
for its accuracy on the quality of the underlying inputs derived from the underl
essential inputs are: (1) the year-by-year work items required for long-term ma
and (2) the fully-loaded costs to perform each of those items, including approp

and (2) the fully-loaded costs to perform each of those items, including approp
variability in tasks and costs that may occur over long periods of time.
Once the tasks, costs, and contingencies for a particular LTSF have been confirm
that stream of annual cash needs into a lump-sum, present value amount. This
the application of a "capitalization rate" (sometimes called the "Cap Rate"). The
the LTSF assumed to be drawn each year to meet the annual cash need to pay fo
the initial principal of the LTSF equals the annual cash need divided by the Cap R
In calculating the Cap Rate itself, a key concept is that the Cap Rate reflects the
investment portfolio must achieve each year on average over long periods of tim
costs such as investment manager and other administrative fees, but also net of
administrative costs at 1% annually and inflation at 3% annually, a Cap Rate of
returns of at least 7% over time.
Finally, because any Cap Rate necessarily involves assumptions about future exp
that the Cap Rate be aligned with the investment strategy to be employed for th
The IDEA department has worked closely with federal and state permitting agen
development of programs for the receipt, management, investment, and disburs
of IDEA's work in this area include:
Understanding differing agencies' respective risk tolerances for the investment
regimes
Consulting with permitting agencies on the development of investment policy st
parameters determined by the agencies to be appropriate
Working with NFWF's outside investment advisors on the construction of investı
adopted or approved by permitting agencies
Working with both permitting agencies and land stewards on the development
disbursement of funds from LTSFs, including contractual arrangements, automat
systems.
Source:Nationa Fish and Wildlife Foundation (https://www.nfwf.org/whatwe

Tresury Bill Rates 7/26/19					
3 year	5 year	7 year	10 year	20 year	30 year
1.83%	1.85%	1.95%	2.08%	2.38%	2.59%
$ 5,464,481	$ 5,405,405	$ 5,464,481	$ 4,807,692	$ 4,201,681	$ 3,861,004
$ 8,196,721	$ 8,108,108	$ 8,196,721	$ 7,211,538	$ 6,302,521	$ 5,791,506
$ 10,928,962	$ 10,810,811	$ 10,928,962	$ 9,615,385	$ 8,403,361	$ 7,722,008
$ 13,661,202	$ 13,513,514	$ 13,661,202	$ 12,019,231	$ 10,504,202	$ 9,652,510
$ 16,393,443	$ 16,216,216	$ 16,393,443	$ 14,423,077	$ 12,605,042	$ 11,583,012

sk. The risk-free rate represents the interest
d of time.
nt because he will not accept additional risk

nts carry a very small amount of risk. Thus,
r U.S.-based investors.

edo/idea/Pages/long-term-

ss of mitigation funds. These funds
ponent of mitigation that: (1) a parcel of
n purposes; and (2) a funding mechanism
nt or "stewardship" activities on the site,
term stewardship or mitigation

by the IDEA department come into
other governmental approval. Thus, like
s and are therefore significantly different
of this difference, when IDEA receives
scrow provider for the permitting
applied to satisfy the mitigation
tion plans (including long-term land

a particular LTSF is entirely dependent
lying permit and mitigation plan. Those
anagement of the parcel in perpetuity;
riate contingencies to reflect the

We do not know the inputs for the year-by year work items required for long-term management of the preserves. This was a requirement of the Corps permit.

›riate contingencies to reflect the

ıed, the next step is typically to convert
conversion is often accomplished through
ᵋ Cap Rate is essentially the percentage of
ɔr work on the property. As a formula,
ιate.
net amount of gain that the LTSF
ne. "Net" in this sense is not only net of
ᶠ inflation. **Thus, for example, assuming**
ᶠ 3% would require average gross annual

›ected investment returns, it is critical
ıe associated LTSF portfolio.
ıcies for several years on the
sement of LTSFs. Some of the focal areas

ɔf LTSFs exacted under their permitting

:atements (IPSs) to reflect the investment

ment portfolios that align with the IPSs

ɔf mechanisms to provide for the ongoing
ted disbursements, and reporting

ɖo/idea/Pages/long-term-

From:	Ron Miller
To:	Kirby, Robert J CIV USARMY CESAJ (US); Jim Ward
Cc:	Greg Urbancic
Subject:	CREW Meeting Report
Date:	Tuesday, December 17, 2019 8:18:25 AM
Attachments:	CREW Presentation 12-16-2019.pptx

Mr. Kirby, this message will provide a report of the 12/16/2019 meeting with the CREW Executive Committee.

I presented the attached Powerpoint presentation encouraging a CREW acceptance of a Developer offer of the preserves with funding. I will let my Powerpoint presentation speak for itself. Mr. Ed Staley, another CDD resident, joined me.

Taylor Morrison was represented by Mr. Tim Hall of Turrell & Hall. No Taylor Morrison employee was present. Mr. Hall is the individual who has filed a permit modification request with the Corps on behalf of the Developer. He spoke ad hoc, no actual presentation. No actual offer was made to CREW at this meeting.

Among other things, Mr. Hall acknowledged the following;
1) the current permit requires an offer to CREW or other agency,
2) the current permit requires Developer funding of the preserves,
3) he has applied for a permit modification with the Corps for permanent CDD ownership without funding,
4) estimated a permanent fund of $3 to $4 million, Corps files indicate an amount of $7 plus million, nevertheless a significant funding was acknowledged,
5) a majority of the preserves have not yet met the success criteria, yet the CDD is currently paying (Developer controlled Board) for mitigation/maintenance expenses for these preserves, and
6) a minority of the preserves met the success criteria in 2018, yet the CDD commenced paying for mitigation/maintenance expenses for these preserves (Developer controlled Board) in 2015.

Please include this information in the Corps deliberations regarding the permit modification request.

I wish to be transparent. in my opinion, the CREW Executive Committee is not receptive to preserve ownership, even with proper funding. The Developer will likely need to look further for another land conservation agency.

Thank you.

Corkscrew Regional Ecosystem Watershed (CREW) Meeting

December 16, 2019

Ron Miller, Esplanade Resident CDD Board Member

Flow Way CDD Main Preserves

1,089 acres of environmentally sensitive land

- Mixture of uplands, lowlands, wet areas
- Waterfowl feeding and nesting
- Specific Woodstork area
- Animal habitat
- Deer, Bears, Panthers, small animals
- End point of large ecosystem
- Drains into Cocohatchee canal

- Needs Permanent Environmental Protection

History

- Approximately 1,800 total acres
- Various environmental agencies tried to prevent development
- Lengthy litigation of approximately 10 years
- US Court eventually allowed development to proceed
- Development allowed pursuant to permits
- Principally Army Corps and SFWMD permits

History (cont.)

- Permits required 1,089 acres of permanent preserves
- Recognition of critical environment
- Balance of land allowed for development

- Compromise Recognized Critical Environment

Current Situation

Status

- Esplanade development created CDD
- Typical CDD to facilitate development
- Main Preserve lies outside of CDD boundaries
- Currently owned by CDD
- Permits indicate CDD transitory ownership

CDD Mission

- Facilitate development within boundaries
- Not to protect environment
- No mission or expertise in conservation
- No funding
- Permits indicate CDD is not appropriate permanent owner

- CDD is not a party to permit process and not intended as permanent owner

Crew Mission

- Land conservation and management
- Assists with management of approximately 55,000 acres of land/preserves
- Works with partners
- Principally SFWMD
- SFWMD owns conservation easement

- Preserves Meets CREW Mission Criteria

Opportunity

Unique CREW Opportunity

- Permits require developer offer to CREW
- Offer includes non-wasting escrow fund for maintenance
- Enhances CREW portfolio
- Furtherance of mission
- Donation of preserves, no acquisition cost
- Includes comprehensive maintenance fund
- Permits pre-approve CREW Ownership
- Historical correspondence indicated CREW acceptance

Developer Position

It Controls CDD Board

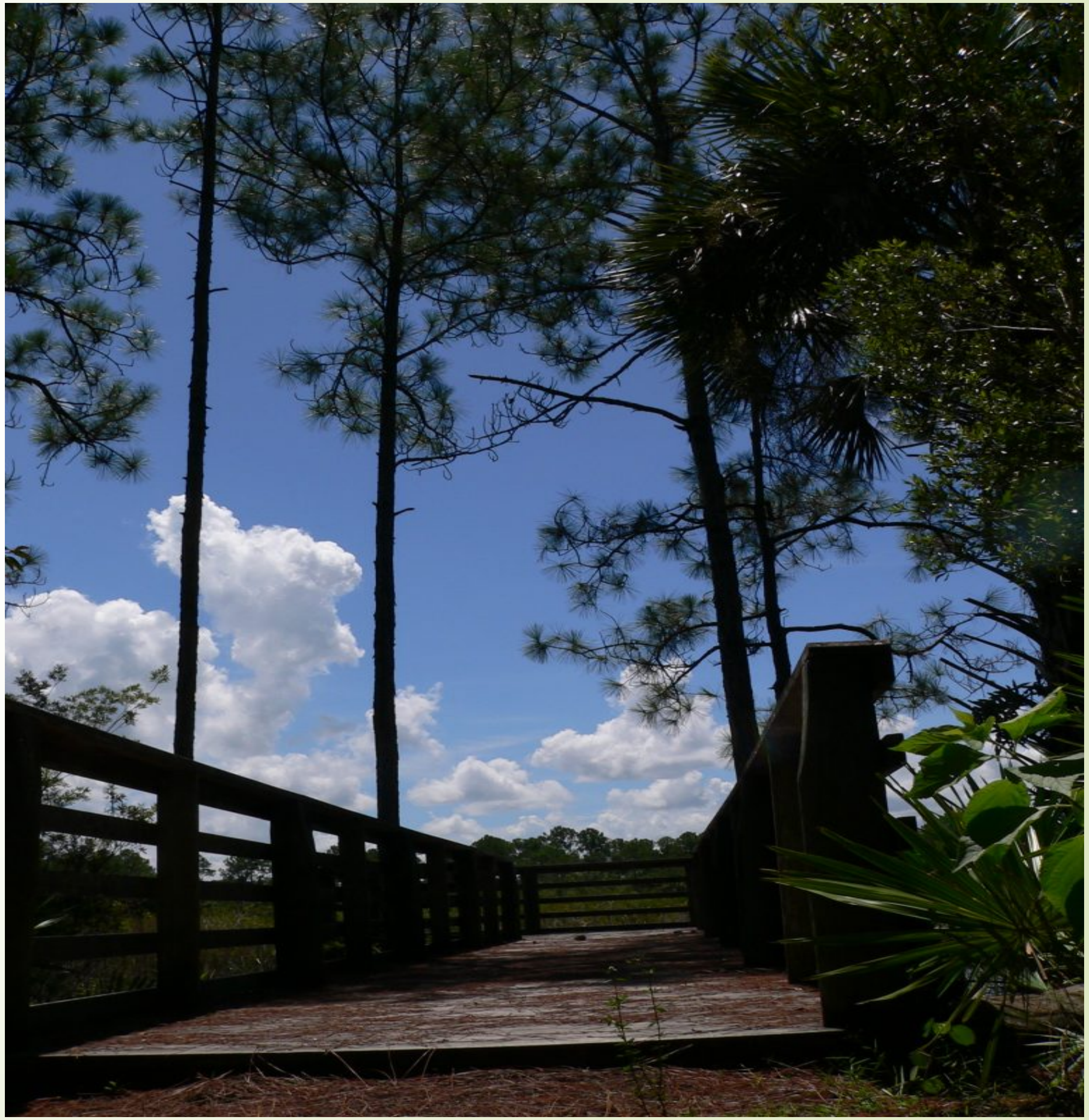
- Has already conveyed preserves to CDD
- No funding
- Intends for CDD to tax residents for developer's permitting obligations
- Current permits have requirements

Developer Intentions

- To Amend permit requirements
- Place permanent ownership with CDD
- No funding will be provided by developer to support in perpetuity as permitted
- Developer Intends to Avoid Original Permit Requirements

CREW Acceptance

- Closes final chapter on preserves
- Permanently protects land
- Provides potential bridge to future land acquisition
- Fulfills original plan of development



Questions?

From: Ron Miller
To: Jim Ward
Subject: Re: Board Meeting
Date: Tuesday, January 7, 2020 4:44:59 PM

Jim, please add the following to the agenda.

Board discussion - Army Corps of Engineers rejection of Taylor Morrison permit modification request.
1) Cites special permit conditions 4 through 9 regarding mitigation and maintenance. All requested modifications rejected.
2) Cites special condition 17 regarding contribution to land conservation agency with funding. Modification rejected.
3) Rejection of modification request in total, no requests approved.
4) Next steps to be taken by the Board to enforce permits.

Board discussion - CDD incurring mitigation and maintenance expenses due to premature transfer of the preserves and the failure of Taylor Morrison to fund the required permanent escrow fund. What action will the Board take to recover these costs?
1) Corps questions to Tim Hall regarding statues of process, Tim Hall replies success criteria not yet met.
2) Tim Hall cover letter accompanying permit modification request - states success criteria not yet met.
3) Tim Hall presentation to CREW Executive Committee - admitting success criteria not yet met.
4) How much has the CDD expended on mitigation and maintenance expenses, by category, by year, since CDD inception?

Board discussion - efficacy of preserve conveyance to the CDD.

Board discussion - request Counsel draft letter to Taylor Morrison inquiring of it's intentions regarding CDD mitigation and maintenance expenses, preserve ownership and timing and amount of funding per the requirements of the permit.

Board discussion - types and limits of insurance maintained by the CDD.

On Tue, Jan 7, 2020 at 2:24 PM <jimward@jpwardassociates.com> wrote:

> Ron,
>
> I am just doing the agenda for January today – send me what you want on the agenda – and will add it – need asap today PLEASE.
>
> Jim.

From: Ron Miller <ronmiller052645@gmail.com>
Sent: Tuesday, January 7, 2020 1:57 PM
To: Jim Ward <jimward@jpwardassociates.com>
Subject: Board Meeting

Jim, is there a scheduled January Board meeting? I wish to submit a few agenda items.

If there is not a scheduled January meeting, I wish to call a meeting and will submit agenda items.