COMPREHENSIVE EVERGLADES RESTORATION PLAN

WINSBERG FARM WETLANDS RESTORATION

DRAFT INTEGRATED PROJECT IMPLEMENTATION REPORT AND ENVIRONMENTAL ASSESSMENT

February 2008

This Report Contains 2 Volumes

You Are Here

Volume 1 – Main Report

- Abstract
- Executive Summary
- Table of Contents
- Section 1 – Introduction
- Section 2 – Existing Conditions / Affected Environment
- Section 3 – Future Without Project Conditions
- Section 4 – Identification of Problems and Opportunities
- Section 5 – Formulation of Alternative Plans
- Section 6 – The Selected Alternative Plan
- Section 7 – Environmental Effects of the Selected Plan
- Section 8 – Plan Implementation
- Section 9 – Summary of Coordination
- Section 10 – Recommendations
- Section 11 – List of Report Preparers
- Section 12 – Index
- Section 13 – Glossary of Terms
- Section 14 – Acronyms
- Section 15 – References

Volume 2 – Annexes and Appendices

- Annex A – U.S. Fish and Wildlife Service Coordination Act Report and Endangered Species Act Compliance
- Annex B – NEPA Information
- Annex C – Analysis Required by Federal and State Law
- Annex D – Draft Project Operating Manual
- Annex E – Project Monitoring Plan
- Annex F – RECOVER Reports
- Appendix A – Engineering
- Appendix B – Cost Estimates
- Appendix C – Environmental and Cultural Resources Information
- Appendix D – Real Estate
- Appendix E – Agency and Public Information
- Appendix F – Plan Formulation and Evaluation
- Appendix G – Economic and Social Considerations
- Appendix H – Recreation

CENTRAL AND SOUTHERN FLORIDA PROJECT
WINSBERG FARM WETLANDS RESTORATION

DRAFT INTEGRATED
PROJECT IMPLEMENTATION REPORT
AND
ENVIRONMENTAL ASSESSMENT

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

PALM BEACH COUNTY WATER
UTILITIES DEPARTMENT

February 2008

This page intentionally left blank.

ANNEX A
U.S. FISH AND WILDLIFE SERVICE COORDINATION ACT REPORT AND ENDANGERED SPECIES ACT COMPLIANCE

This page intentionally left blank

TABLE OF CONTENTS

A Annex A -- Fish And Wildlife Coordination Act And Endangered Species Act Compliance A-1
A.1 Planning Aid Letters A-1
A.1.1 U.S. Fish and Wildlife Service - April 15, 2002 ..... A-1
A.1.1.1 U.S. Fish and Wildlife Service –February 10, 2003 ..... A-6
A.2 Coordination Act Report A-17
A.2.1 USFWS Draft Fish and Wildlife Coordination Act Report-August 26, 2005 .. A-17
A.2.2 Responses to Recommendations in the USFWS Draft Fish and Wildlife Coordination Act Report A-62
A.3 Endangered Species Coordination A-67
A.3.1 List of Threatened and Endangered Species (USFWS facsimile received March 12, 2002) A-67
A.3.2 List of Threatened and Endangered Species (FFWC E-mail received July 6, 2004) A-69
A.3.3 Biological Assessment (Transmitted by letter to USFWS by the USACE August 29, 2005) A-71
A.3.4 Biological Opinion or Concurrence with the USACE Determination (USFWS A-81

This page intentionally left blank

A ANNEX A - FISH AND WILDLIFE COORDINATION ACT AND ENDANGERED SPECIES ACT COMPLIANCE

A.1 PLANNING AID LETTERS

A.1.1 U.S. Fish and Wildlife Service - April 15, 2002

Please see following pages for U.S. Fish and Wildlife Service letter dated April 15, 2002.

United States Department of the Interior

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

April 15, 2002

RECEIVED
APR 19 2002
JACKSONVILLE DISTRICT
USACE

Colonel James G. May
District Engineer
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

RE: Winsberg Farm Wetlands Restoration Project

Dear Colonel May:

The U.S. Fish and Wildlife Service (Service) forwards this Planning Aid Letter (PAL) to your attention regarding the Winsberg Farm Wetlands Restoration Project located in Palm Beach County. This PAL is provided in accordance with the Fish and Wildlife Coordination Act (FWCA)(16 U.S.C. 661 *et seq.*), and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This PAL does not constitute the report of the Secretary of Interior as required by section 2(b) of the FWCA, nor does it constitute a biological opinion under section 7 of the ESA. This PAL provides guidance and recommendations regarding the development of a Hazardous, Toxic, and Radioactive Waste assessment protocol.

I. Review of Phase I and Phase II Environmental Audit document

The Fish and Wildlife Service's Environmental Contaminants staff in Vero Beach has reviewed the "Phase I and Phase II Environmental Audit, Winsberg Farms Property" prepared for the Palm Beach County Water Utilities Department by CH2M HILL in March 1997. The following comments regarding that document are provided to the Corps to assist in the formulation of an Environmental – Hazardous, Toxic, and Radioactive Waste (HTRW) assessment protocol for the Winsberg property:

1. Since the property will be inundated, the assessment must be geared towards evaluating the potential for uptake of contaminants through the aquatic food chain using the protocol that the Service has developed with the South Florida Water Management District. For details regarding the protocol, contact Bob Frakes, Supervisory Ecologist, Environmental Contaminants, at Robert_Frakes@fws.gov, or (772) 562-3909 ext. 242.

2. The assessment should research historical uses of the property through interviews with current and past owners and review of old aerial photographs. The purpose of the historical

Colonel James G. May
April 15, 2002
Page 2

review is to determine what types of agricultural and other land use practices may have taken place there in the past. Since we know that parts of it are currently farmed, there is the potential for pesticide residues in the fields and at mixing/loading/storage facilities. No such facilities were identified in the document. Does that mean that pesticides were not mixed or stored on the property?

3. It should be possible to develop a list of pesticides that were/are applied to the property using pesticide application records.

4. Additional testing should be done to confirm CH2M HILL's determination that the cyanide detected in the groundwater was a laboratory artifact caused by interference from nitrite/nitrate.

5. Nitrate levels were detected that were well above the drinking water standard. Future sampling plans should further investigate nitrate levels.

6. Sample depth in soils was from 0 - 2 ft. For an ecological evaluation of potential soil contaminants, we recommend a sampling depth of 6 inches, or at most 1 ft., as being most relevant to biological receptors. Deeper composite samples may have the effect of diluting contaminants that may be present on the surface.

7. The comparison criteria used for the evaluation of results in this document were Florida Primary and Secondary Drinking Water Standards and Florida Petroleum Contamination Site Cleanup Criteria. For an ecological evaluation, additional assessment guidelines should be used. The Florida Sediment Quality Assessment Guidelines (SQAG) (FDEP, 1994) are the recommended criteria to be used for soil screening values for lands that will be inundated as part of a CERP project. The SQAG are effects-based guidelines that can be used to estimate potential biological impacts of soil contaminants.

8. A total of five soil samples were collected and analyzed, including two in the fields and three targeted at various facilities on the property. Two soil samples in the fields are not enough to characterize a 300-acre property, or even establish the presence or absence of pesticide contamination. For a 300-acre property we recommend 15-20 soil samples scattered more or less uniformly across the fields. These samples are in addition to and separate from any samples taken near suspected facilities.

9. Organochlorine pesticides (EPA Method 8081) were the only pesticides analyzed for in the soil samples. Since this is an active farm and nursery, it is possible that other pesticides are currently being used, or have been used in the past. Establishing a list of chemicals used on the farm (recommended in 3 above) would help to determine which other classes of pesticides to focus on. If a reliable history of pesticide usage cannot be developed, then it will be necessary to analyze soil samples for the full suite of pesticides, including organophosphates, carbamates, pyrethroids, various herbicides and fungicides, and any others that might be associated with the

Colonel James G. May
April 15, 2002
Page 3

crops grown on this property.

II. HTRW Assessment Protocol for Winsberg Farm – Coordination with the Service

Because of the potential risks of contaminant mobilization associated with inundating agricultural lands, the development of an HTRW assessment protocol will be an important step in many Comprehensive Everglades Restoration Plan (CERP) projects. Plan formulation, selection, and project alternative design may be substantially influenced if HTRWs are present in the Winsberg Farm project area. Corps' staff have indicated that their intent is to develop an HTRW assessment protocol for this project that can serve as a prototype for other CERP projects. The Service's Environmental Contaminants staff is available to provide technical assistance related to fish and wildlife resource issues during the development of the HTRW assessment protocol for this project. The Service also recommends that the entire Project Delivery Team (PDT) be given the opportunity to review and comment on the HTRW protocol.

After the PDT's approval of the HTRW assessment protocol, the HTRW analysis should occur as early as possible in the PIR process, and the results presented to the PDT for consideration in plan formulation and alternative selection. The Service's delivery of a Fish and Wildlife Coordination Act Report and completion of ESA Section 7 consultation will be dependent upon the Corps providing the Service with complete HTRW assessment results.

Thank you for the opportunity to provide comments and recommendations related to the development of an HTRW assessment protocol for the Winsberg Farm Wetlands Restoration Project. The Service looks forward to working closely with the Corps during this important step of project planning. Please feel free to contact Sharon Fauver, Supervisory Biologist, Central CERP Team, at (772) 562-3909, extension 281, or Tim Pinion, Fish and Wildlife Biologist, Winsberg Farm Project lead, at extension 294, if you have any questions regarding this letter.

Sincerely yours,

For/James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:
PBCWUD, West Palm Beach, Florida (Hassan Hadjimiry)
FWC, Vero Beach, Florida (Joe Walsh)

Colonel James G. May
April 15, 2002
Page 4

LITERATURE CITED

Florida Department of Environmental Protection (FDEP). 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volumes 1-4. FDEP, Tallahassee, Florida.

A.1.1.1 U.S. Fish and Wildlife Service –February 10, 2003

United States Department of the Interior

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

February 10, 2003

James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32231-0019

Dear Mr. Duck:

The Fish and Wildlife Service (Service) forwards this Planning Aid Letter (PAL) to your attention regarding the Winsberg Farms Wetlands Restoration Project located in Palm Beach County, Florida. This PAL is provided in accordance with the Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (48 Stat. 401; 16 U.S.C., 661 *et seq.*) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884; 16 U.S.C.1531 *et seq.*).

This PAL does not constitute the report of the Secretary of the Interior as required by section 2(b) of the FWCA, nor does it constitute a biological opinion under section 7 of the ESA. This PAL provides recommendations and comments regarding plan formulation and screening criteria, as well as other issues raised during the January 23, 2003, Project Delivery Team (PDT) meeting and in Letter Reports 1, 2, and 3, prepared for the U.S. Army Corps of Engineers (Corps) by CH2MHILL.

Plan Formulation
Initial Screening Process

Appendix D of the Master Program Management Plan (Master PMP) for CERP provides guidance on the format and content for Project Implementation Reports (PIR), including the process for conducting the initial screening of alternatives. The appendix states: "This effort [Initial Screening] in the Project Implementation Report study will involve a qualitative assessment of the plan components and alternative combinations of those components." The decision matrix presented in Exhibit 20 of Letter Reports 2 and 3 begins the process of following this guidance by setting up a scoring scheme based on the objectives and performance measures for Winsberg Farms. However, at the January 23, 2003 PDT meeting, a truncated decision matrix was presented that screened alternatives based solely on cost (the score for the "ecological benefits" category was derived from the cost category: the more money spent on water treatment, the less money available for creating habitat; therefore, there was a direct correlation in the scoring for these two categories).

James C. Duck
February 10, 2003
Page 2

The pretreatment alternatives presented in the Letter Reports and at the PDT meeting actually provide just a single component of what should constitute an alternative plan. Along with pretreatment, the Service would like to see the PDT consider, among other things, general wetland design and options for returning water to the local system.

At this stage of the planning process, the Service recommends that the PDT develop a matrix with the project objectives, performance measures, and constraints listed down the first column (y-axis), and a "menu" of potential project features and components listed across the first row (x-axis). Suggestions for project features are listed below and arranged in general categories. In order to effectively evaluate each of these with respect to project objectives and constraints, some preliminary data will be needed. These data are identified at the end of each category. The Service feels that the level of detail of the data requested is appropriate for the initial screening effort. This will help the PDT document its decision-making process as they formulate a plan for Winsberg Farms restoration.

The following list of features and components is not meant to be complete. Input from other members of the PDT should provide a more comprehensive list of project features for consideration. Once these features are scored with respect to project objectives and constraints, we can begin assembling a final array of alternatives using a combination of the features that perform the best, along with more specific wetland design information. The final screening process would involve a detailed evaluation of these fully assembled alternative plans.

Suggested list of potential project features and components:

Pretreatment process
None
Nitrified secondary effluent from Southern Region Water Reclamation Facility (SRWRF); Denitrification at wetland
Nitrification/denitrification at wetland
Nitrification/denitrification at SRWRF
Route water first through Wakodahatchee Wetlands, then to Winsberg Farms
Other pretreatment options

Information needed for initial screening: estimates of the water quality values that would be achieved by each of these; estimates of the land area needed for treatment wetlands within the larger wetland setting; general description of vegetation and any surface lining associated with treatment wetlands; discussion on how to proceed with evaluation of wetland treatment options with respect to the Phase I and Phase II division of this project (should the PDT be considering wetland treatment options that would have to occur within the Phase I footprint?)

James C. Duck
February 10, 2003
Page 3

Wetland cell configuration
1 cell
2 cells
4 cells

Information needed for initial screening: wetland habitat acreage; total levee area; general description of hydraulic benefit/operational flexibility provided by each configuration

Wetland habitat mosaic
Shallow emergent marsh only
Shallow marsh with deep-water zones
Shallow marsh with upland habitat (tree islands) within deep-water zones

Information needed for initial screening: general description of wildlife benefits, hydraulic performance, and aquifer recharge potential of each mosaic type

Polishing treatment process
None
Polishing cell(s) at downstream end of wetland
Route water from Winsberg Farms to Wakodahatchee Wetlands for additional treatment

Information needed for initial screening: estimates of the water quality values that would be achieved by each of these; land area required for polishing cells

Returning water to the local system
Aquifer recharge
Surface water discharge

Information needed for initial screening: quantify recharge rate per acre or potential surface water discharge volumes; water quality requirements for both options

Comments Regarding Letter Reports Numbers 1, 2, and 3

Letter Report No. 1: Summary of Project Objectives for the Winsberg Farm Wetland Restoration Project

Project Overview

This section of the report lacks any mention of the phased approach for this project. It is important to describe Phase I and Phase II, including the acreage and general location within the project site, as well as identifying the lead agency, or agencies, for each phase.

James C. Duck
February 10, 2003
Page 4

In this section, a bulleted list of the Wakodahatchee Wetland benefits is provided as a standard of performance that the Winsberg project will attempt to meet on a larger scale. The upland habitat provided by the tree islands and vegetated levees serves a very important role in the wetland; however, it seems to be a stretch to describe any of these upland areas as "pine flatwoods habitat."

Winsberg is described as a 175-acre wetland. The actual wetland acreage is around 140 acres.

In the list of "unique advantages" of the Winsberg site, it is stated the property has similar original site conditions to Wakodahatchee; however, Winsberg is currently a row-crop farm, and the Wakodahatchee site was a series of percolation ponds prior to wetland construction. At what point in time does the original site condition refer to? More information would be useful here.

Description of Study Area and Existing Conditions

Because of the potential risks associated with flooding agricultural lands, a discussion of contaminants is a critical part of the existing conditions section for this project. There is readily available information regarding a contaminants assessment on the Winsberg

Farms property in a report entitled "Phase I and Phase II Environmental Audit, Winsberg Farms Property" that was prepared by CH2MHILL for the Palm Beach County Water Utilities Department in March 1997. The Service reviewed the document and provided comments in a Planning Aid Letter to the Corps, dated April 15, 2002. The existing conditions section should also include the results of the Hazardous, Toxic, and Radioactive Waste (HTRW) assessment by the Corps for both the Phase I and Phase II project areas. The Service's Environmental Contaminants Program staff in Vero Beach are available to coordinate with the Corps to assist in the timely completion of an HTRW assessment.

The existing conditions section should also include a discussion of fish and wildlife resources in the study area, including threatened, endangered and state listed species. The Service provided a list of endangered and threatened species that might occur in the project area to the Corps on March, 12, 2002. Information is also readily available for species that use the Wakodahatchee Wetlands, which is in the study area. There is probably some general information available about the types of species that one might expect to find on and around agricultural fields like those on the Winsberg property. There may also be data on the types of fish and wildlife associated with the L-29 and L-30 canals. Please feel free to contact the Service for assistance in gathering this information.

James C. Duck
February 10, 2003
Page 5

Letter Reports 2 and 3: Description of Planning Objectives, Performance Measures, Constraints and Development of Alternative Plans

Objectives and Performance Measures

Objective 2: Decrease local water demand on regional water resources.
Comments: Questions have yet to be resolved about whether the "without project" condition will be a housing development or wetland. Also, the possibility was raised at the last PDT meeting that development credits for this property may have been transferred to another property. This is worth looking into, as there may be no net decrease in the demand on water resources if the houses that might have been built on the Winsberg property are still going to be built somewhere else in the study area.

Objective 3: Optimize wetland functions.
Performance Measure: Establishment of tree island habitat in deep water areas.
Comments: It seems that tree islands should be evaluated here for their effects on the hydraulics and treatment efficiency of the wetland. The next objective provides a logical place for tree islands to be evaluated for their habitat value.

Objective 4: Optimize wildlife benefits.
It is stated here that there will be enhanced productivity through nutrient inputs associated with treated wastewater effluent. Enhanced productivity does not necessarily equate to enhanced wildlife benefits. For example, an unnaturally dense stand or dominance by a few species of emergent vegetation may lower the benefits of the wetland to wildlife.

The performance measure "extend functionality of Wakodahatchee Wetland" seems to have been included to aid in site selection. This performance measure might be used instead to help score an alternative that would route water between Winsberg and Wakodahatchee wetlands and take advantage of the treatment capabilities of both wetlands additively.

Objective 5: Enhance water quality.
Performance Measure: Water quality improvement within Wakodahatchee Wetland.
Comments: This seems to be a good performance measure and should guide the PDT to consider an alternative that would route water from Winsberg to Wakodahatchee (or vice versa), thereby creating a treatment train that would take advantage of the spatial extent of both wetlands additively.

Objective 7: Cost effectiveness.
This objective appears to have been included to aid in the site selection process, rather than the alternative screening process. Is it useful to keep this objective on the list?

James C. Duck
February 10, 2003
Page 6

In the final paragraph of the objectives section, the statement is made that "wetland design *per se* is not an alternative. . ." The Service disagrees with this assertion. The various wetland designs will be an important component of the alternative evaluation

process. For example, alternatives may vary in the number of cells, or the ratio of emergent marsh, deep water, and upland habitats. The performance measures will help the PDT to evaluate the trade-offs between the various alternative designs.

Constraints

The constraint for construction to begin by December 2003 is not applicable to Phase II of this project.

Without Project Condition

Questions remain regarding the without project condition and are mentioned earlier in this list of comments.

Thank you for the opportunity to provide comments and recommendations regarding the plan formulation process for the Winsberg Farms Wetlands Restoration Project. If you have any questions regarding this letter, please feel free to contact Sharon Fauver at (772) 562-3909, extension 281, or Tim Pinion at extension 294.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services

cc:
Corps, Jacksonville, Florida (Jerry Grubb)
Corps, Jacksonville, Florida (Rebecca Weiss)
Corps, Jacksonville, Florida (Bill Gallagher)
FWC, Vero Beach, Florida (Joe Walsh)
PBCWUD, West Palm Beach, Florida (Hassan Hadjimiry)
Service, Jacksonville, Florida (Miles Meyer)

A.1.1.1.1 U.S. Fish and Wildlife Service –June 21, 2004

Rebecca

United States Department of the Interior

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

June 21, 2004

James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

The Fish and Wildlife Service (Service) has prepared this Planning Aid Letter (PAL) for the U.S. Army Corps of Engineers (Corps) regarding the Winsberg Farms Wetlands Restoration Project, a component of the Comprehensive Everglades Restoration Plan (CERP). This PAL is provided in accordance with the Fish and Wildlife Coordination Act of 1958, as amended (FWCA) (48 Stat. 401; 16 U.S.C. 661 *et seq.*), and section 7 of the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). This PAL does not constitute the report of the Secretary of the Interior as required by section 2(b) of the FWCA, nor does it constitute a biological opinion under section 7 of the ESA.

The Service's Environmental Contaminants staff has reviewed the Preliminary Contamination Assessment Report for Winsberg Farms, prepared for the Corps by Taylor Engineering, Incorporated (Ellis et al. 2004). This PAL includes a summary of the findings in the report, and provides recommendations from the Service for additional sampling and analyses.

Winsberg Farms is a 170-acre property located in, and owned by, Palm Beach County, Florida. Primarily operated as a vegetable farm for at least the past 40 years, this property is slated to be converted into a wetland utilizing treated water from the Southern Region Water Reclamation Facility, Palm Beach County Water Utilities Department. It is the understanding of the Service, and is noted within the report, that project construction has commenced on the property.

Groundwater (7 samples), surface water (3 samples), and soils (24 samples) were collected from the site for contaminant analyses. Most groundwater samples were taken near a set of structures located in the south central portion of the property where storage buildings, agrochemical mixing and loading stations, and a fueling facility were located. Surface water samples were collected from locations previously sampled by another contractor (CH2MHill). Soil samples were collected from random locations within the property boundaries from 0 to 6 inches below ground surface and in general accordance with Service sampling guidelines. A single soil sample was also collected near an above-ground storage tank. These samples were analyzed for pesticides, metals, total recoverable petroleum hydrocarbons, and volatile/semi-volatile organics.

TAKE PRIDE IN AMERICA

Pesticides detected in the cultivated area included chlordane, 4,4' dichlorodiphenyldichloroethane (DDD), 4,4'-dichlorodiphenyldichloroethylene (DDE), 4,4'-dichlorodiphenyltrichloroethane (DDT), dieldrin, and endrin. Numerous discrete soil samples contained chlordane, 4,4'-DDD, and 4,4'-DDE at concentrations exceeding their respective Florida Department of Environmental Protection (DEP) sediment quality assessment guideline (SQAG) probable effects concentration (PEC) (DEP 2003) (Table 1). In addition, 4,4'-DDT was detected in five samples at a concentration exceeding its DEP threshold effects concentration (TEC). Endrin and dieldrin were detected in one cultivated area soil sample (SS-10) at a concentration exceeding their respective TECs. The Service calculated property-wide arithmetic means for 4,4'-DDD, 4,4'-DDE, and chlordane as 12.0, 26.7, and 20.1 micrograms per kilogram (ug/kg), respectively, all exceeding their respective TECs.

Table 1. Concentration of contaminants from the Winsberg Farms property (Ellis et al. 2004) that were above the Florida Department of Environmental Protection's sediment quality assessment guideline probable effects concentration (PEC) (DEP 2003).

Site	Constituent Concentrations (ug/kg)		
	chlordane (PEC = 18 ug/kg)	4,4'-DDD (PEC = 28 ug/kg)	4,4'-DDE (PEC = 31 ug/kg)
SS-3			34
SS-7	22		
SS-8	24		
SS-10	30		
SS-11	22		
SS-13		90	88
SS-15		36	58
SS-16			34
SS-18	44		67

Of the metals detected in the cultivated area soil samples (barium, chromium, copper, lead, zinc), only copper was detected at concentrations exceeding its TEC (31.6 milligrams per kilogram [mg/kg]). The Service calculated arithmetic mean for the property was 38.9 mg/kg. With a range of 27 to 50 mg/kg, the copper contamination within the cultivated area is relatively homogeneous.

The environmental assessment report stated that all reportable chlorinated pesticide concentrations fell below the Florida soil clean-up target levels for direct exposure and leachability based on groundwater criteria. It also stated, however, that the detected concentrations may present a long-term risk to wildlife using the land in the future. As a result, the report recommended further interpretation of the soil analytical results by qualified personnel.

Service Comments

Based on DEP SQAG 2003 values, the detected chlorinated pesticide concentrations in the cultivated area indicate potential risk for benthic invertebrates. In addition, food chain modeling, performed by the Service using the above noted property-wide arithmetic means for 4,4'-DDD and 4,4'-DDE, indicate mortality risk for both benthic invertebrates, with a moderate level of certainty, and fish, with a moderate to high level of certainty. The hazard quotients (HQ) for invertebrates were 3.6 (lowest observed adverse effect level [LOAEL] based) and 6.9 (no observed adverse effect level [NOAEL] based), while they ranged from 7.2 to 16 (LOAEL based) and 40.8 to 95.8 (NOAEL based) for fish. The toxicity reference values (TRV) used in the food chain model for assessing risk to invertebrates and fish are based on lethality. These HQ values suggest that only tolerant species will become established in the future wetland, possibly resulting in a less diverse aquatic community.

Avian reproductive risk, with a low to moderate level of certainty, is possible for avian species that may utilize the future wetlands. Food chain modeling, performed by the Service using the earlier noted arithmetic means, resulted in HQs of 1.9 to 3.9 (LOAEL based) and 6.4 to 13 (NOAEL based). These HQ values were based on TRVs from avian reproduction studies. Any predicted reproductive effects on birds would result only if the bird foraged exclusively at the future wetland.

The analytical detection limits (DL) for some chemicals were too high to allow assessment of effects to benthic invertebrates. The detection limits for chlordane (DL = 18 to 99 ug/kg) and toxaphene (DL = 180 to 990 ug/kg) were greater than the updated PECs for chlordane and toxaphene. The DLs for 4,4'-DDD (3.5 to 3.8 ug/kg), dieldrin (3.5 to 19 ug/kg), and endrin (3.5 to 19 ug/kg) were all greater than their updated TECs, which are 4.9, 1.9, 2.2 ug/kg, respectively. In the absence of adequate DLs, a conservative risk assessment would assume contaminant concentrations equal to the DL which, in the case of toxaphene and chlordane, would indicate risk to benthic invertebrates.

Service Recommendations

The DEP SQAG values (DEP 1994) used in the report to determine risk to benthic invertebrates are outdated. The Service recommends using the most recent SQAG values (DEP 2003) in environmental site assessments for assessing risk to benthic invertebrates. Some of these updated values are less than the ones in Table 3.3 in Ellis et al. (2004); others are greater.

Soils around the storage buildings and agrochemical mixing and loading stations on the south-central portion of the property should be sampled for chemicals that have been used on the property. Considering the types of operations that typically occur at these stations, chemical spills and higher concentrations in soils are possible.

Based on the potential risk indicated by limited soil sampling and food chain modeling, and due to the extensive grading and soil movement that has occurred over at least half of the project area

James C. Duck Page 4

to date, the Service recommends that additional sampling be planned after earth-moving activities are completed. A sufficient number of soil samples should be collected from across the project area (1 sample per 15 to 20 acres) and sent to a laboratory with appropriate detection limits for comparison to the updated DEP SQAGs (DEP 2003). The Service would like the opportunity to review and comment on the draft scope of work developed for conducting the additional contaminants survey prior to finalization. Implementation of these recommendations will provide the Service with information necessary to adequately assess the project's impacts to fish and wildlife resources in accordance with the FWCA and ESA.

Thank you for the opportunity to review the contaminants assessment conducted for the Winsberg Farms Wetlands Restoration Project. If you have any questions, please do not hesitate to contact Tim Bargar with the Service's Environmental Contaminants staff at 772-562-3909, extension 315, or Tim Pinion, Fish and Wildlife Biologist, extension 294.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:
Corps, Jacksonville, Florida (Jerry Grubb)
Corps, Jacksonville, Florida (Ernie Clarke)
Corps, Jacksonville, Florida (Mark A. White)
FWC, Vero Beach, Florida (Joseph Walsh)
Palm Beach County Water Utilities Department, West Palm Beach, Florida (Hassan Hadjimiry)
Service, Jacksonville, Florida (Miles Meyer)
South Florida Water Management District, West Palm Beach, Florida (Robert Kukleski)

LITERATURE CITED

Florida Department of Environmental Protection (DEP). 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters. Volume 1. Development and Evaluation of Sediment Quality Assessment Guidelines. Report prepared by MacDonald Environmental Sciences, Ltd.

Florida Department of Environmental Protection (DEP). 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Report prepared by MacDonald Environmental Sciences Ltd., and United States Geological Survey.

Ellis, E.C., L.S. Brownell, and D.M. Setser. 2004. Preliminary Contamination Assessment Report, Green Cay (Winsberg) Farms, Boynton Beach, Palm Beach County, Florida. Prepared for the U.S. Army Corps of Engineers, Jacksonville District, by Taylor Engineering, Inc. Contract number DACW17-01-0012-0014.

A.2 COORDINATION ACT REPORT

A.2.1 USFWS Draft Fish and Wildlife Coordination Act Report-August 26, 2005

United States Department of the Interior

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

August 26, 2005

Stuart J. Appelbaum
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Appelbaum:

The enclosed document is a draft Fish and Wildlife Coordination Act (FWCA) report on the Winsberg Farms Wetlands Restoration Project for your review. This report is provided in accordance with the FWCA of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*) and the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

The Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers (Corps) have enjoyed extensive interagency cooperation in planning this project, and the Service supports the Corps' selected alternative as the Tentatively Selected Plan.

This letter does not constitute a biological opinion as described under section 7 of the ESA. The Corps has not yet submitted a final biological assessment or effects determination for this project as required by the ESA. We anticipate the Project Implementation Report/Environmental Assessment, which will include an analysis of the effects for the Winsberg Farms Wetlands Restoration Project on threatened and endangered species, will be issued before the FWCA report is finalized.

By copy of this letter, the Service is soliciting comments within 45 days from the Florida Fish and Wildlife Conservation Commission (FWC). Comments will be included as an appendix to our final report, which will then constitute the Secretary of the Interior's recommendations for the Winsberg Farms Wetlands Restoration Project, in accordance with section 2(b) of the FWCA. The final FWCA report will be incorporated into the Corps' final Project Implementation Report/Environmental Assessment for public review and comment in accordance with the provisions of the National Environmental Policy Act.

TAKE PRIDE IN AMERICA

Stuart J. Applbaum Page 2

If you or your staff has any questions regarding the findings and recommendations contained in this draft FWCA report, please feel free to contact Tim Pinion at 772-562-3909, extension 294. The cooperation of your staff is greatly appreciated.

Sincerely yours,

James J. Slack For
Field Supervisor
South Florida Ecological Services Office

Enclosure

cc: w/enclosure
Corps/SFRPO, West Palm Beach, Florida (Tori White)
Corps, Jacksonville, Florida (Daphne Ross, Ernie Clarke, Bill Gallagher)
Palm Beach County Water Utilities Department, West Palm Beach, Florida (Hassan Hadjimiry)
DEP, Tallahassee, Florida (Greg Knecht)
DEP, West Palm Beach, Florida (Tim Powell)
DOI, Washington D.C. (Donald Jodrey)
EPA, Jacksonville, Florida (Eric Hughes)
FWC, Vero Beach, Florida (Joe Walsh)
FWC, West Palm Beach, Florida (Chuck Collins)
Service, Jacksonville, Florida (Miles Meyer)
Service, Vero Beach, Florida (Sharon Kocis Fauver)

Draft
Fish and Wildlife
Coordination Act Report

WINSBERG FARMS WETLANDS RESTORATION PROJECT

PALM BEACH COUNTY, FLORIDA

Submitted to:
Jacksonville District
U.S. Army Corps of Engineers
Jacksonville, Florida

Prepared by: Timothy Pinion
Reviewed by: Sharon Fauver and Barry Rosen
Approved by: James J. Slack, Field Supervisor

Fish and Wildlife Service
South Florida Ecological Services Office
Vero Beach, Florida

August 2005

EXECUTIVE SUMMARY

The Tentatively Selected Plan for the Winsberg Farms Wetlands Restoration Project proposes to create approximately 150 acres of wetland habitat on former agricultural lands in a rapidly developing area of Palm Beach County (County) using as a source of water in the secondary treated effluent from the Southern Region Water Reclamation Facility (SRWRF). Currently, secondary treated effluent from the SRWRF is disposed of through both deep-well injection and discharge to the created Wakodahatchee Wetlands. In an effort to reduce the amount of water lost to deep-well injection and to create additional wetland habitat similar to the Wakodahatchee Wetlands, the Winsberg Farms Wetlands Restoration project was included as an "Other Project Element" in the Comprehensive Everglades Restoration Plan (U.S. Army Corps of Engineers [Corps] 1999).

There are four primary purposes for the Winsberg Farms Wetlands Restoration Project. They are to: (1) increase local water resource availability for natural systems and other users; (2) create wetlands; (3) increase spatial extent of wildlife habitat; and (4) create public education and recreational opportunities.

The County, as local sponsor for this project, has purchased over 150 acres of the Winsberg Farms property adjacent to the SRWRF. On the western portion of the property, the County has recently completed construction of approximately 75 acres of wetland habitat, as well as a boardwalk, interpretive facility, and parking lot, and has opened the area to the public as Green Cay Wetlands. The County's work is considered Phase I of the Winsberg Farms project, and Phase II will include the creation of wetland habitat on the remaining 75 acres on the eastern portion of the property purchased by the County.

Four federally listed animal species may potentially be affected by this project. These include the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), endangered wood stork (*Mycteria americana),* threatened bald eagle (*Haliaeetus leucocephalus*), and threatened eastern indigo snake (*Drymarchon corais couperi*). Informal consultation is ongoing for this project. The Corps is currently preparing a draft biological assessment. The information contained in the draft biological assessment will be included in the final Fish and Wildlife Coordination Act (FWCA) report.

The Fish and Wildlife Service (Service) supports the Corps' Tentatively Selected Plan for the Winsberg Farms Wetlands Restoration Project. Potential adverse impacts to fish and wildlife resources may be minimized by incorporating the recommendations made below related to contaminated soils, construction disturbance, and post-construction monitoring. Additional project benefits can be realized by incorporating the recommendations made below related to hydroperiod and the creation of a pretreatment cell.

Contaminants

Minimize the potential negative impacts to fish and invertebrate species diversity and avian reproduction that may result from mobilization of residual contaminants detected in discrete areas on the property by removing the top 6 inches of soil. This soil could be placed in the interior structure of berms constructed around the wetland perimeter and overtopped, or capped, with uncontaminated soils taken from deeper than 6 inches.

Water Quality

Create a pretreatment cell planted with a species such as bulrush (*Scirpus californicus*) to help buffer the impacts of high nutrient effluent on the remaining wetland habitat mosaic.

Hydrology

Conform to a hydrologic regime that will not exceed the depth tolerances of the desired plant and animal communities, and will allow for a natural dry season hydropattern in the shallow emergent marsh zones to improve plant communities and wildlife habitat. Research has shown that emergent marshes in south Florida have hydroperiods ranging from 278 to 346 days and typically do not exceed 1.3 feet in depth.

Threatened and Endangered Species

1. Provide a final biological assessment and conclude section 7 consultation prior to completion of the final FWCA report.
2. Implement protective measures to avoid construction-related disturbance to eastern indigo snakes (Appendix A) and wood storks (Appendix B).

Monitoring

1. Develop a water quality monitoring plan in coordination with members of the Wastewater.
2. Reuse Pilot Project team that includes an adaptive management strategy.
3. Develop a wildlife monitoring plan and adaptive management strategy that includes quarterly surveys from the perimeter of the wetland to document species abundance and diversity. Provide an annual report to the Service for a period of 5 years.

TABLE OF CONTENTS

I. IDENTIFICATION OF PURPOSE, SCOPE, AND AUTHORITY 1
A. Introduction 1
B. Purpose and Scope of Project 1
II. PREVIOUS SERVICE INVOLVEMENT IN THE WINSBERG FARMS WETLANDS RESTORATION PROJECT 1
III. AREA SETTING 4
A. Project Location 5
B. Description of Study Area and Project Site 5
1. Hydrologic Description 5
2. Ecological Description 6
3. Fish and Wildlife Resources 6
IV. FISH AND WILDLIFE RESOURCE CONCERNS 9
A. Introduction 9
B. Resource Concerns 9
C. Summary/Planning Objectives 10
V. EVALUATION METHODOLOGY 10
VI. FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT 11
VII. DESCRIPTION OF RECOMENDED PLAN AND OTHER ALTERNATIVES 12
A. Introduction 12
B. Previously Considered Plans 12
C. Tentatively Selected Plan 14
VIII. POTENTIAL BENEFICIAL AND ADVERSE EFFECTS OF THE PROJECT 15
A. Adverse Impacts 15
B. Beneficial Impacts 19
C. Summary of Consultation under the ESA 19
IX. EVALUATION OF THE PROJECT'S REGIONAL IMPACTS 19
X. RECOMMENDATIONS AND CONSERVATION MEASURES 19
A. Contaminants 19
B. Water Quality 20
C. Hydrology 20
D. Threatened and Endangered Species 21
E. Monitoring Plan 22
XI. SUMMARY OF SERVICE'S POSITION AND RECOMMENDATIONS 22
A. Contaminants 22
B. Water Quality 22
C. Hydrology 22
D. Threatened and Endangered Species 23
E. Monitoring 23
XII. LITERATURE CITED 24
APPENDIX A 27
APPENDIX B 28

LIST OF FIGURES

Figure 1. Map showing the area setting of the Winsberg Farms Wetlands Restoration Project.... 4
Figure 2. Winsberg Farms Wetlands Restoration Project Phase I design..... 14

LIST OF TABLES

Table 1. Winsberg Farms Wetlands Restoration Project alternatives, descriptions, and reasons 13
Table 2. Geometric means for contaminants from the Winsberg Farms property that..... 16
Table 3. Hazard quotients calculated from the geometric mean contaminant..... 17

LIST OF ACRONYMS AND ABBREVIATIONS USED IN THE TEXT

AFB	Alternative Formulation Briefing
LNWR	Arthur R. Marshall Loxahatchee National Wildlife Refuge
C-15	Canal-15
CERP	Comprehensive Everglades Restoration Plan
Corps	U.S. Army Corps of Engineers
County	Palm Beach County
DEP	Florida Department of Environmental Protection
District	South Florida Water Management District
EDC	Endocrine Disrupting Chemical
EPA	U.S. Environmental Protection Agency
EPOC	Emerging Pollutant of Concern
ESA	Endangered Species Act
HTRW	Hazardous, Toxic, and Radioactive Waste
HQ	Hazard Quotient
OC	Organochlorine
PAL	Planning Aid Letter
PDT	Project Delivery Team
Levee	(L)
LWDD	Lake Worth Drainage District
NGVD	National Geodetic Vertical Datum
PEC	Probable Effects Concentration
SQAG	Sediment Quality Assessment Guidelines
SRWRF	Southern Region Water Reclamation Facility
STA	Stormwater Treatment Area
Service	Fish and Wildlife Service
TEC	Threshold Effects Concentration
TSP	Tentatively Selected Plan
TRV	Toxicity Reference Value
WCA	Water Conservation Area

I. IDENTIFICATION OF PURPOSE, SCOPE, AND AUTHORITY

A. Introduction

The Palm Beach County (County) Water Utilities Department's Southern Region Water Reclamation Facility (SRWRF) currently disposes its secondary treated effluent through both deep-well injection and discharge to the created Wakodahatchee Wetlands. In an effort to reduce the amount of water lost to deep-well injection and create additional wetland habitat similar to the Wakodahatchee Wetlands in a rapidly developing area of the County, the Winsberg Farms Wetlands Restoration Project was included as an "Other Project Element" in the Comprehensive Everglades Restoration Plan (CERP (U.S. Army Corps of Engineers [Corps] 1999).

B. Purpose and Scope of Project

According to the Initial Plan Formulation document (CH2MHILL 2003), there are four primary purposes for the Winsberg Farms Wetlands Restoration Project. They are to: (1) increase local water resource availability for natural systems and other users; (2) create wetlands; (3) increase the spatial extent of wildlife habitat; and (4) create public education and recreational opportunities.

For the Winsberg Farms Wetlands Restoration Project, effluent from the SRWRF will be diverted from deep-well injection and used to hydrate wetland habitat created on former agricultural lands. The County, as local sponsor for this project, has purchased over 150 acres of the Winsberg Farms property adjacent to the SRWRF. On the western portion of the property, the County has recently completed construction of approximately 75 acres of wetland habitat, as well as a boardwalk, interpretive facility, and parking lot, and has opened the area to the public as Green Cay Wetlands. The County's work is considered Phase I of the Winsberg Farms Wetlands Restoration Project, and Phase II will include the creation of wetland habitat on 75 acres of the eastern portion of the property purchased by the County. For planning purposes, Phase I is not included in the future-without-project condition.

II. PREVIOUS SERVICE INVOLVEMENT IN THE WINSBERG FARMS WETLANDS RESTORATION PROJECT

On February 7, 2002, the Service attended the kickoff Project Delivery Team (PDT) meeting at the County Water Utilities Department, Southern Region Operations Center in Delray Beach, Florida.

On February 21, 2002, the Service transmitted comments to the Corps on the draft Project Management Plan via facsimile. The comments primarily addressed the Fish and Wildlife Service's (Service) role in the CERP process, and provided recommendations for the Hazardous, Toxic, and Radioactive Waste (HTRW) Assessment for this project.

On March 8, 2002, the Service attended a PDT meeting at the County Water Utilities Department, Southern Region Operations Center in Delray Beach, Florida.

On March 12, 2002, the Service provided to the Corps, via facsimile, a list and description of federally threatened and endangered species that may be present in the project area. These species included: Everglade snail kite (*Rostrhamus sociabilis plumbeus*), wood stork (*Mycteria americana),* bald eagle (*Haliaeetus leucocephalus*), and eastern indigo snake (*Drymarchon corais couperi*).

On March 28, 2002, the Service transmitted a letter to the Corps documenting an agreement to deliver a Planning Aid Letter (PAL) in April 2002.

On April 15, 2002, the Service sent a PAL to the Corps with detailed comments from our review of the "Phase I and Phase II Environmental Audit, Winsberg Farms Property" prepared for the County Water Utilities Department by CH2M HILL in March 1997. The Service recommended that additional HTRW assessment should occur as early as possible in the project planning process, and indicated that the Service's delivery of a Fish and Wildlife Coordination Act report and completion of Endangered Species Act (ESA) section 7 consultation will be dependent upon the Corps providing the Service with complete HTRW assessment results.

On July 2, 2002, the Service visited the Winsberg Farms Project site with representatives from the Corps and U.S. Environmental Protection Agency (EPA) to discuss an HTRW assessment protocol for this project.

On October 24, 2002, the Service sent a letter to the Corps in response to a written notification dated September 20, 2002, which documented the status of the preparation of a biological assessment as required under the ESA. The Service enclosed recommendations to the letter that provided guidance for the format and content of a biological assessment.

On November 20, 2002, the Service attended a PDT meeting at the County Water Utilities Department, Southern Region Operations Center in Delray Beach, Florida.

On January 23, 2003, the Service attended a PDT meeting at the County Water Utilities Department, Southern Region Operations Center in Delray Beach, Florida.

On February 10, 2003, the Service sent a PAL to the Corps providing comments and recommendations on the plan formulation process for the Winsberg Farms Project.

On September 15, 2003, the Service and Corps visited the Winsberg Farms Project site to evaluate baseline ecological conditions, and the Service sent an email to the Corps with comments and recommendations on the preliminary draft Project Implementation Report.

2

On February 2, 2004, the Service sent an email to the Corps with recommendations for a plan formulation strategy for this project. The recommendations included those made in the February 10, 2003, PAL.

On February 26, 2004, the Service and Corps visited alternative project site locations to document baseline ecological conditions to be used in site comparisons.

On April 22, 2004, the Service provided comments and recommendations to the Corps via email regarding HTRW analysis for this project following our review of the "Preliminary Contamination Assessment Report for Winsberg Farms," prepared by Taylor Engineering, Incorporated (Ellis et al. 2004).

On June 21, 2004, the Service sent a PAL to the Corps based on our review of the "Preliminary Contamination Assessment Report for Winsberg Farms," prepared by Taylor Engineering, Incorporated (Ellis et al. 2004). The PAL included a summary of the findings in the report, and provided recommendations from the Service for additional HTRW sampling and analyses.

On June 23, 2004, the Service sent an email to the Corps with draft documentation of the alternative site evaluation methodology used for this project.

On July 28, 2004, the Service sent an email to the Corps as a follow-up to the June 21, 2004, PAL regarding the HTRW assessment on the Winsberg Farms property.

On September 23, 2004, the Service sent an email to the Corps with comments and questions regarding the Alternative Formulation Briefing (AFB) and Independent Technical Review material for this project. The comments primarily addressed the plan formulation and alternative screening methodology for this project.

On November 2, 2004, the Service had a conference call with the Corps to discuss the recommendations included in the June 21, 2004, PAL for additional HTRW sampling and analyses at the project site.

On November 4, 2004, as discussed during the November 2, 2004, conference call, the Service provided additional recommendations to the Corps, via email, for HTRW sampling and analyses at the project site. The email included a document generated by the Service with an HTRW sampling protocol for CERP projects.

On February 14, 2005, the Service provided comments and recommendations to the Corps, via email, on the Scope of Work for additional HTRW sampling and analysis to be conducted on the Winsberg Farms property. The comments primarily addressed sampling locations, sampling constituents, and laboratory detection limits.

On March 7, 2005, the Service participated, by teleconference, in the AFB for the Winsberg Farms project.

3

On June 2, 2005, the Service provided comments, via email, to the Corps regarding preliminary data from a contaminants sampling effort completed on the Winsberg Farms property in April 2005. The Service was satisfied that adequate sampling and analysis had occurred to allow an evaluation of the impact to fish and wildlife resources.

On June 8, 2005, the Service joined representatives from the Corps and County on a visit to the project site.

III. AREA SETTING

Two spatial scales are discussed in the following sections. The "project site" refers specifically to the 175-acre Winsberg Farms property, and the "study area" or "project area" refers to the region within approximately a 4-mile radius of the County Water Utilities Department's SRWRF, which also includes the Winsberg Farms property (Figure 1).

Figure 1. Map showing the area setting of the Winsberg Farms Wetlands Restoration Project.

4

A. Project Location

The study area is located in rapidly developing southeastern Palm Beach County west of the municipalities of Boynton Beach and Delray Beach and east of the Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR). The SRWRF is centrally located in the study area, and State Route 7, the Florida Turnpike, Atlantic Avenue, Boynton Beach Boulevard, and several smaller roads divide the region. The area historically consisted of a mosaic of upland and wetland habitats on the eastern fringe of the greater Everglades system, and much of the area was converted from native habitat to agricultural land use (cropland, plant nurseries, and pasture) in the early and mid 20th century. More recently, agricultural land has been increasingly replaced by residential and commercial development. In contrast to the agricultural and suburban land uses that dominate the region, remnant Everglades's habitat persists to the west of the project area in the LNWR.

The Winsberg Farms Project site is located within the larger study area and is slightly less than 1 mile east of the Florida Turnpike and approximately three miles east of the LNWR in Sections 3 and 4, Township 46 South, Range 42 East. Hagen Ranch Road, Jog Road, and the Lake Worth Drainage District's (LWDD) Levee (L)-29 and L-30 conveyance canals border the site to the west, east, north, and south, respectively. The County's SRWRF is located to the west, directly across Hagen Ranch Road from the project site. A previous wetland creation project completed by the County, Wakodahatchee Wetlands, is located across Jog Road and just southeast of the project site.

Within the study area, the County recognizes two geographic regions, or Tiers, as identified in the 1989 County Comprehensive Plan. The area east of the Florida Turnpike falls within the Urban/Suburban Tier with a development pattern generally characterized as urban or suburban because of its intensity and density. This area includes the Winsberg Farms property and is within the Urban Service Area. The area west of the Florida Turnpike has been designated as an Agricultural Reserve Tier that shall be preserved primarily for agricultural use, reflecting the unique farmlands and wetlands within it. If it cannot be preserved, then it may become an urbanized area developed only at low residential density.

B. Description of Study Area and Project Site

1. Hydrologic Description

The study area is located entirely within the Canal-15 (C-15) drainage basin. The C-15 is the only Central and Southern Florida Project canal in this basin, though a network of LWDD secondary and tertiary canals services an area including the C-15 basin. Water supply to the basin is from local rainfall and water deliveries from LNWR, also known as Water Conservation Area (WCA) 1.

Immediately to the north of the Winsberg Farms property is LWDD's L-29 Canal, which is maintained at an approximate water elevation of 16.5-feet National Geodetic Vertical Datum (NGVD). On the south side of the property, the L-30 Canal is maintained at an average elevation of 15.2-feet NGVD. During regional flood control operations, stages in these canals can rise for short periods of time. However, under non-flood control conditions, the indicated water surface stages are targeted. South Florida's canal systems provide the regional surface water management functions required through operation of water control structures and/or pump stations at strategic locations within the system. During extended periods of drought, water elevations within the canal systems can drop below those that need to be maintained to prevent salt water intrusion at the coastal water control structures. Under those extreme conditions, additional surface waters may be introduced into the system by LWDD pump station and/or water control structure operations that can draw water from the WCAs to the west, including WCA 1.

The Winsberg Farms property is dissected by irrigation ditches running north to south every 50 to 80 feet throughout the property. Each ditch is 8 to 10-feet wide at the crest, and 4 to 6-feet deep. The hydrology on the property has been heavily managed for row crop agricultural production.

2. Ecological Description

With the exception of the eastern edge of LNWR, the study area has few native ecological communities. Much of the western part of the study area is agricultural (row crop and plant nurseries) with a few small isolated stands of cypress (*Taxodium* spp.). The eastern part of the area is medium to high-density residential development.

The Winsberg Farms property is a disturbed agricultural site with no intact native plant communities. A few individual slash pines (*Pinus elliottii*) greater than 30 feet in height are located on the outermost banks of the north and south perimeter ditches, and two live oak trees (*Quercus virginiana*) and a mahogany tree (*Swietenia mahagoni*) were left in place near the southwestern corner of the property.

3. Fish and Wildlife Resources

Federally listed and Candidate Species

Four federally listed animal species may potentially be affected by this project. These include the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), endangered wood stork (*Mycteria americana),* threatened bald eagle (*Haliaeetus leucocephalus*), and threatened eastern indigo snake (*Drymarchon corais couperi*). While there are no documented observations of these species on the project site, they are known to occur in the area in similar habitat types currently existing on the project site or that are proposed for creation on the project site. During a field visit by the Service and the Corps on September 15, 2003, no federally listed plant

species were found in the proposed project area. No designated critical habitat is present for any federally listed threatened or endangered species within the proposed project site, although designated critical habitat for the endangered Everglade snail kite exists 3 miles to the east in LNWR. Details about each species are provided below that demonstrate the potential for their presence on the existing agricultural fields or in the wetlands to be created on the Winsberg Farms property. More comprehensive information about each species is available in the South Florida Multi-Species Recovery Plan (Service 1999).

Everglade Snail Kite

Suitable foraging habitat for the Everglade snail kite is typically a combination of low profile (less than 3 meters [m]) marsh with an interdigitated matrix of shallow (0.2 to 1.3-m deep) open water, which is relatively clear and calm. The interspersed emergent vegetation enables apple snails (*Pomacea paludusa*), the kite's primary food source, to climb near the surface to feed, breathe, and lay eggs. Nearly continuous flooding of wetlands for greater than 1 year is needed to support apple snail populations that sustain foraging by the snail kite (Service 1999). The LNWR, 3 miles west of the Winsberg Farms property, has been designated critical habitat for the Everglades snail kite. During dry years, canals, borrow pits, agricultural fields, pastures, and isolated wetlands in the County provide important drought-related habitat (Takekawa and Beissinger 1989). It is possible that snail kites forage in the canals within and adjacent to the Winsberg Farms agricultural fields, although none were observed during site visits by the Corps and the Service. Snail kites may potentially forage in the wetlands created with this project.

Distribution studies of snail kites have found that individuals frequently move among wetlands throughout their range (Bennetts and Kitchens 1997). Snail kites are not expected to forage exclusively on the Winsberg Farms project site.

Wood Stork

During the non-breeding season, or while foraging, wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the wood stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs (Service 1999). The wood stork has been observed nearby at the Wakodahatchee Wetlands in the same habitat type that is proposed for the Winsberg Farms project site.

Distribution studies of wood storks have found that nesting birds forage in wetlands between 5 and 40 miles from the colony, and utilize between 50 to 200 different feeding sites during the breeding season (Service 1990). Wood storks are not expected to forage exclusively on the Winsberg Farms project site.

Bald Eagle

The bald eagle can be found where there are suitable perch sites near water bodies where the eagles feed on fish and water-dependant birds (Service 1999). Bald eagles have been observed nearby at the Wakodahatchee Wetlands in the same habitat type that is proposed for the Winsberg Farms project site.

Juvenile eagles fledged in Florida are highly migratory and have been found in summering grounds ranging from South Carolina to Prince Edward Island, Canada (Service 1999). Most paired adults remain in south Florida, but the migratory behavior of unpaired birds is largely unknown. Bald eagles are not expected to forage exclusively on the Winsberg Farms project site.

Eastern Indigo Snake

The eastern Indigo Snake is present throughout the State, but is uncommon. Over most of its range, the eastern indigo snake frequents several habitat types, including pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats. Eastern indigo snakes may be present in the Winsberg Farms agricultural fields, although none were observed during site visits by the Corps and the Service. Eastern indigo snakes may utilize the upland berms and tree islands that will be located within the wetlands created for this project.

State-listed Species

In addition to federally listed species, the following species were identified by the Florida Fish and Wildlife Conservation Commission (FWC) as State-listed species that may be affected by the project.

Name	Status
Roseate spoonbill (*Platalea ajaia*)	Special concern
Limpkin (*Aramus guarauna*)	Special concern
Little blue heron (*Egretta caerulea*)	Special concern
Snowy egret (*Egretta thula*)	Special concern
Tricolored heron (*Egretta tricolor*)	Special concern
White ibis (*Eudocimus albus*)	Special concern
Florida sandhill crane (*Grus canadensis pratensis*)	Special concern
Burrowing owl (*Athene cunicularia*)	Special concern
Gopher tortoise (*Gopherus polyphemus*)	Special concern
American alligator (*Alligator mississippiensis*)	Special concern

Other Fish and Wildlife Resources

Fish and wildlife species that are adapted to disturbed agricultural and suburban land use may occur throughout the study area. The agricultural irrigation and drainage systems and adjacent canals are likely to support amphibians, reptiles, fish, and wading birds, although no comprehensive inventory of existing use of the project site or study area by wildlife has been performed. Migratory and resident bird species have been observed flying around the Winsberg Farms property and are likely to utilize the limited habitat available within the study area, such as scattered patches of trees and shrubs, and seasonally flooded agricultural fields. Small to medium sized mammals may also occur within the study area.

IV. FISH AND WILDLIFE RESOURCE CONCERNS

A. Introduction

The impacts to fish and wildlife resources as a result of this project are anticipated to be mostly beneficial through the creation of a mosaic of wetland and upland habitat types. Given the historic land uses and the source of water that will be used to hydrate the wetlands, negative impacts to species may be possible due to residual agricultural contaminants in the soil, or the potential presence of pollutants or excessive nutrient levels in the SRWRF effluent used to hydrate the created wetlands. A general discussion of potential sources of concern is provided below.

B. Resource Concerns

Contaminants

The Winsberg Farms property was until very recently in active agricultural production. Historical management practices, especially those associated with row crop farming, typically involved the frequent application of organochlorine (OC) pesticides for insect control. Most of these pesticides are no longer registered for use in the United States due to environmental concerns. However, from the 1940s to the mid 1980s, frequent applications of 4,4'-dichlorodiphenyltrichloroethane (DDT), chlordane, toxaphene, and other OCs were common in agricultural areas of south Florida, leaving significant residual concentrations of these toxic substances and their degradation by-products bound to and sequestered in the top soil. Conversion of these soils from a dry and frequently disturbed aerobic environment to inundated (perennially or intermittent) relatively undisturbed anaerobic sediments, supporting native submergent and emergent vegetation and periphyton, has the potential to promote the release of these residual pesticides (along with other common contaminants such as mercury, selenium, and copper) into surface waters. Since the mid 1980s, agricultural practices have employed a different suite of pesticides, including organophosphates, carbamates, and a variety of herbicides and fungicides. Although generally not as persistent as OCs, many of these modern pesticides are toxic to wildlife. The potential release of these pesticides and trace metals into wetlands may provide exposure pathways to the fish and wildlife communities in the area (Service 2004).

Water Quality

The Winsberg Farms wetlands will be hydrated with effluent from the County's SRWRF after the water has received secondary treatment with basic disinfection. It is possible that treatment at the SRWRF may not remove all pollutants or reduce nutrients in the wastewater stream that have the potential to impact fish and wildlife species utilizing the Winsberg Farms wetlands. Chemicals may be present in the effluent that is known to potentially affect fish and wildlife species. Elevated nutrient levels in the effluent may also negatively impact aquatic resources through eutrophication. As nutrient levels stimulate plant and algae growth in the wetland, dead macrophytes and phytoplankton will settle to the bottom of the water body where microbial decomposition processes use oxygen from the water. Eventually, if nutrient levels entering the wetland are excessive, dissolved oxygen levels in the water may be depleted.

In addition to the chemicals and nutrients described above, the ecological impact of emerging pollutants of concern (EPOCs) in wastewater effluent has in recent years come to the attention of scientists as well as environmental regulators (Corps and South Florida Water Management District [District] 2002). These EPOCs include: steroids and hormones, veterinary and human antibiotics, prescription drugs, non-prescription drugs, and other compounds at potentially physiologically active concentrations (Kolpin et al. 2002). Of particular concern is wildlife exposure to Endocrine Disrupting Chemicals (EDCs). Many of the effects of EDCs and EPOCs are not well understood at this time.

C. Summary/Planning Objectives

In summary, the Service is interested in the creation of high quality fish and wildlife habitat with minimal negative impacts from sources such as residual agricultural chemicals in the soil or potentially harmful constituents in the wastewater effluent used to hydrate the wetland.

V. EVALUATION METHODOLOGY

The Service utilized several sources of information to evaluate the benefits and impacts of this project to fish and wildlife resources. Service staff made observations of wildlife, vegetation, and existing conditions on the project site during field visits on July 2, 2002, September 15, 2003, and June 8, 2005. Service staff also made multiple visits to the nearby Wakodahatchee Wetlands from 2002 through 2004. Additionally, the Service analyzed the results of three contaminants assessments conducted on the Winsberg Farms property, and reviewed the results of SRWRF effluent water quality sampling conducted in 2002. Additional details are provided below.

Contaminants Assessment

Three contaminants assessments have been conducted on the project site. The first was documented in "Phase I and Phase II Environmental Audit, Winsberg Farms Property" prepared for the County Water Utilities Department by CH2MHILL in March 1997. The Service's

Environmental Contaminants staff reviewed the report and sent comments and recommendations to the Corps in a PAL dated April 15, 2002. Among the recommendations was a need for additional samples to be gathered and evaluated for a greater number of constituents than analyzed for the 1997 report. The Service also recommended that the Florida Sediment Quality Assessment Guidelines (SQAG) be used for ecological evaluations, rather than Florida Primary and Secondary Drinking Water Standards and Florida Petroleum Contamination Site Cleanup Criteria as had been done in the initial report.

The Corps contracted a second contaminant assessment on the project site conducted in early 2004. The results of the assessment are documented in "Preliminary Contamination Assessment Report, Green Cay (Winsberg) Farms," prepared by Taylor Engineering, Incorporated (Ellis et al. 2004). The Service's Environmental Contaminants staff reviewed the report and sent comments and recommendations to the Corps in a PAL dated June 21, 2004. Recommendations were also provided to the Corps in emails dated April 22, 2004, July 28, 2004, November 4, 2004, and February 14, 2005. Among the comments from the Service were recommendations that additional soil samples be taken and analyzed for specific constituents using appropriate detection limits and compared to the most recent SQAG.

The Corps contracted a third contaminant assessment on the project site conducted in April 2005. Results were provided to the Service on July 25, 2005, in the document "Winsberg Farms (Green Cay Wetlands) 2005 Soil Characterization" (PPB Environmental Services, Incorporated 2005).

Water Quality Assessment

Water quality data collected in 2002 from the SRWRF effluent were provided to the Service for review. The EPA has developed criteria that serve as numeric limits on the amounts of certain pollutants that can be present in surface waters without harm to aquatic life (EPA 2004). The Florida Department of Environmental Protection (DEP) has adopted similar standards in "Criteria for Surface Water Quality Classifications" (F.A.C., Section 62-302.530). These criteria are designed to provide protection to aquatic organisms from mortality, and reduced growth and reproduction due to the effects of acute and chronic exposure to potentially harmful chemicals. The Service considered the EPA and DEP criteria when reviewing 2002 water quality data from the SRWRF.

VI. FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

The study area includes a rapidly developing section of the County. Large scale, high-density residential development dominates the area east of the Florida Turnpike, including property in the immediate vicinity of the Winsberg Farms property. Without a wetland construction project on the Winsberg Farms property, the future land use would likely be high-density residential with little to no native habitat for fish and wildlife species. It is worth noting that the County has completed Phase I construction of half of the wetland acreage for this project along with

associated public use facilities on the western portion of the Winsberg Farms property. For planning purposes, the completed work by the County is not being included in the future-without-project condition.

VII. DESCRIPTION OF RECOMENDED PLAN AND OTHER ALTERNATIVES

A. Introduction

In transmittals sent to the Corps in February 2003 and 2004, the Service recommended that, prior to alternative formulation, the PDT should agree upon an assemblage of vegetation, topography, and fluctuating water depths to use for all alternatives, and that different alternatives should be formulated based on location of wetland, source of water, fate of water, and cell configuration.

As a result of the AFB in March 2005, and using the CERP Guidance Memorandum Number 2 (Corps and District 2004), the Corps' headquarters determined that other project sites did not need to be considered and that alternatives could be formulated based on optimizing the design of wetlands on the Winsberg Farms property.

B. Previously Considered Plans

CH2MHILL, under contract to the Corps, prepared a plan formulation document that focused on design optimization for this project (CH2MHILL 2003). In that document, alternatives were formulated using various combinations of management measures that were based largely on the source of water entering the wetland, level of water treatment both before and within the wetland, hydrologic regime and habitat types within the wetland, and the fate of water leaving the wetland. Using project objectives and constraints, the list of initial management measures was screened to a smaller subset. The resulting subset of management measures was used to build 13 project alternatives (Table 1).

Each of the 13 alternatives utilizes water from the SRWRF and has no surface water discharge. One alternative is a "no action" alternative. Three of the alternatives call for additional nutrient removal from the wastewater effluent through treatment at the SRWRF or treatment using pretreatment cells, or Stormwater Treatment Areas (STA), within the project footprint. The remaining nine alternatives call for no additional treatment and are configurations of various habitat types and hydrologic regimes for the eastern and western halves of the wetland.

In CH2MHILL 2003, alternatives were ranked based on the degree to which they met project objectives. The Service has summarized the rationale used to screen and evaluate alternative plans in Table 1.

Table 1. Winsberg Farms Wetlands Restoration Project alternatives, descriptions, and reasons for not being chosen as the Tentatively Selected Plan (TSP).

Alternative	Description of major features	Reason not chosen as TSP
1	No action	Does not meet any project objectives.
2	Interspersed deep water, emergent marsh, and upland tree island habitat: 140 acres. Wetland areas would receive continuous inundation with fluctuating water depths.	Tentatively Selected Plan
3	Short-hydroperiod wetland inundated 240 days per year: 140 acres.	Less wastewater diverted from deep-well injection than longer-hydroperiod wetland.
4	Short-hydroperiod wetland inundated 240 days per year: eastern 70 acres. Long-hydroperiod wetland continuously inundated with fluctuating water depths: western 70 acres.	Less wastewater diverted from deep-well injection than a configuration with greater long-hydroperiod wetland acreage.
5	Long-hydroperiod wetland continuously inundated with fluctuating water depths: western 70 acres. No action: eastern 70 acres.	Less fish and wildlife habitat and less wastewater diverted from deep-well injection than a larger wetland.
6	Short-hydroperiod wetland inundated 240 days per year: western 70 acres. No action: eastern 70 acres.	Less fish and wildlife habitat than a larger wetland and less wastewater diverted from deep-well injection than a larger, longer-hydroperiod wetland.
7	STA: western 85 acres. Long-hydroperiod wetland: eastern 55 acres.	Less wildlife habitat provided by STA acreage than other wetland configurations.
8	Biological Nutrient Removal at the SRWRF. Long-hydroperiod wetland continuously inundated with fluctuating water depths: 140 acres.	Improved wetland habitat due to lower nutrient loads, but $15M cost increase would require additional Congressional authorization.
9	Cattail (*Typha domingensis*) Marsh/STA: 140 acres.	Less wildlife habitat provided by cattail monoculture than other wetland configurations.
10	Short-hydroperiod, wet prairie wetland inundated 240 days per year: 140 acres.	Less wastewater diverted from deep-well injection than a longer-hydroperiod wetland.
11	Deep, open-water zones interspersed with upland tree islands: eastern 70 acres. Long-hydroperiod wetland continuously inundated with fluctuating water depths: western 70 acres.	Estimated to be more expensive than other wetland configurations because of increased earth-moving operations.
12	Single, large island surrounded by deep-water habitat: eastern 70 acres. Long-hydroperiod wetland continuously inundated with fluctuating water depths: western 70 acres.	Less wastewater diverted from deep-well injection than a configuration with greater long-hydroperiod wetland acreage.
13	No public use facilities. Long-hydroperiod wetland continuously inundated with fluctuating water depths: 165 acres.	Maximizes wetland acreage, but does not meet project's education and recreation objectives.

C. Tentatively Selected Plan

Alternative 2 has been chosen as the TSP. This alternative is consistent with the Phase I work completed to date by the County on the western half of the Winsberg Farms property (Figure 2), and is similar to the design of the nearby Wakodahatchee Wetlands.

Figure 2. Winsberg Farms Wetlands Restoration Project Phase I design.

As discussed earlier, the TSP will create approximately 150 acres of wetland habitat hydrated with treated wastewater from the SRWRF. The wetland will be contoured and planted with native species to create a mosaic of open water, emergent marsh, and tree island habitat types. The configuration will include the Phase I design and construction of approximately 75 acres of wetlands on the western half of the Winsberg Farms property already completed by the County and called Green Cay Wetlands. The remaining 75 acres of project area on the east half of the Winsberg Farms property, considered Phase II, will contain the same habitat types as Phase I. The TSP will be configured to have the necessary inflow of water to maintain continuous inundation. Water levels will be allowed to fluctuate seasonally within a 1 to 2-foot range

14

throughout the entire 150 acres in response to natural seasonal variation in rainfall. The project design will largely resemble the vegetation and habitat types found in the nearby Wakodahatchee Wetlands. A sinuous earthen berm, planted with hardwood hammock species, will divide the east and west parcels into north and south cells.

Inflow from the SRWRF effluent currently enters the western half of the project (Phase I). The western half of the project is divided by an internal L, which creates Cell 1 to the north and Cell 2 to the south. The water level in each cell can be independently managed by operation of inflow gate valves and butterfly valves and outflow at control structures. Each cell has a gated control structure with a 24-inch culvert.

The control structure can be operated to:

1 Allow flow to the eastern half of the project (Phase 2);

2. Circulate flow in the western half of the project by a 15-horsepower recirculation pump; or

3. Send flow to deep-well injection by a 250-horsepower discharge pump in the event pool elevations rise beyond a set point due to direct rainfall.

VIII. POTENTIAL BENEFICIAL AND ADVERSE EFFECTS OF THE PROJECT

It is expected that this project will provide benefits for fish and wildlife resources by converting agricultural land into a mosaic of upland, emergent marsh, and open-water habitat. There are several factors, however, that may result in potential negative impacts or a reduction in benefits. These factors are related to soil contaminants, water quality, hydrology, and construction.

A. Adverse Impacts

Contaminants

The results of the two most recent contaminant assessments for the property are found in the "Preliminary Contamination Assessment Report for Winsberg Farms," (Ellis et al. 2004), and "Winsberg Farms (Green Cay Wetlands) 2005 Soil Characterization" (PPB Environmental Services, Incorporated 2005). Details of the reports that are important for evaluating potential impacts to fish and wildlife resources are summarized here.

Groundwater, surface water, and soils were collected from the site for contaminant analyses. Most groundwater samples were taken near a set of structures located in the south-central portion of the property where storage buildings, agrochemical mixing and loading stations, and a fueling facility were located. Surface water samples were collected from locations previously sampled during a preliminary contaminant assessment (CH2MHIll 1997). Soil samples were collected from random locations within the property boundaries from 0 to 6 inches below ground surface

and in general accordance with Service sampling guidelines (Service 2004). These samples were analyzed for pesticides, metals, total recoverable petroleum hydrocarbons, and volatile/semi-volatile organics.

Pesticides detected in the cultivated area included chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, and endrin. Numerous discrete soil samples contained chlordane, 4,4'-DDD, and 4,4'-DDE at concentrations exceeding their respective DEP SQAG probable effects concentration (PEC) (DEP 2003). In addition, 4,4'-DDT was detected in several samples at a concentration exceeding its DEP threshold effects concentration (TEC). Endrin and dieldrin were detected in one cultivated area soil sample at a concentration exceeding their respective TECs. Of the metals detected in the cultivated area soil samples (barium, chromium, copper, lead, zinc), only copper and zinc were detected at concentrations exceeding their respective TECs. The Service has concluded that the metals present minimal risk at the reported concentrations. Two other constituents, acenaphthene and di-n-butyl phthalate, were found in discrete soil samples at concentrations exceeding their respective PECs. The Service has determined that these constituents present minimal risk at the reported concentrations.

For 4,4'-DDD, 4,4'-DDE, 4-4' DDT, and chlordane, the Service calculated geometric mean concentrations for the Phase I and II areas together and separately (Table 2). Discrete soil sample concentrations reported in Ellis et al. (2004) and PPB Environmental Services, Incorporated (2005) were used to calculate the geometric means. Values from the storage and mixing facilities located on the south-central portion of the property are included in the property-wide means, but not in the means for the eastern or western portions.

Table 2. Geometric means for contaminants from the Winsberg Farms property that were used in food chain modeling to determine risk to fish and wildlife resources.

Contaminant and TEC (microgram [µg] / kilograms [kg])	Geometric mean concentration (µg/kg)		
	Property-wide (Phase I and II)	Eastern Portion (Phase II)	Western Portion (Phase I)
4,4'-DDD (TEC = 4.9, PEC = 28.0)	6.8	11.2	7.2
4,4'-DDE (TEC = 3.2, PEC = 31.3)	18.7	28.9	17.1
4,4'-DDT (TEC = 4.2, PEC = 62.9)	3.5	4.5	2.1
Chlordane (TEC = 3.2)	1.6	4.1	2.7

The geometric means for each constituent in Table 2 exceed TEC values on the eastern portion of the property. The concentrations of 4,4-DDD and 4,4'-DDE also exceed TEC values for the entire property and on the western portion of the property.

Based on DEP SQAG 2003 values, the detected chlorinated pesticide concentrations in the cultivated area indicate potential risk for benthic invertebrates. In addition, conservative food chain modeling performed by the Service using the property-wide means from Table 2 indicates a potential risk to benthic invertebrates and fish (Table 3). The toxicity reference values (TRV) used in the food chain model for assessing risk to invertebrates and fish are based on lethality. These hazard quotient (HQ) values suggest that only tolerant species will become established in the future wetland, possibly resulting in a less diverse aquatic community.

Table 3. Hazard quotients calculated from the geometric mean contaminant concentrations as reported in Table 2.

Aquatic organism	Property-wide HQ	Eastern Portion HQ	Western Portion HQ
Invertebrates	2.9 – 5.4	4.4 – 8.3	2.6 – 4.9
Forage fish	5.7 – 34.1	8.7 – 52	5.1 – 30.4
Trophic level (T3) fish	10.2 – 61.4	15.6 – 93.7	9.1 – 54.8
Trophic level (T4) fish	12.5 – 75.3	19.2 - 150	11.2 – 67.2

Conservative food chain modeling performed by the Service also showed a low risk to avian reproduction. Any predicted reproductive effects on birds would result only if an individual foraged exclusively at the future wetland. As mentioned previously, the endangered Everglade snail kite, endangered wood stork, and threatened bald eagle are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants. The food chain modeling resulted in HQs of 1.5 to 3.1 (based on lowest observed adverse effect level concentrations) and 5.0 to 10.3 (based on no adverse effect level concentrations). These HQ values were based on TRVs from avian reproduction studies.

In summary, contaminant levels on the property indicate a level of risk to fish and invertebrate species that may reduce species diversity in the wetland. Conservative food chain modeling also indicates a low risk of potential negative impacts on bird reproduction for individuals foraging exclusively in the wetlands created for this project. The endangered Everglade snail kite, endangered wood stork, and threatened bald eagle are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants.

Water Quality

Water quality data collected in 2002 from the SRWRF effluent were reviewed by Service staff to determine if contaminants were present that may negatively impact fish and wildlife species that may utilize the wetland. The results from an organic sample analysis conducted in February and March 2002, by ASCI Corporation, Environmental Quality Laboratory, were received from the County Water Utilities Department. These data show that a comprehensive list of organic

parameters was analyzed using appropriate detection limits. Constituents detected were trihalomethanes (disinfection byproducts), and di(2-ethylhexyl)phthalate. These constituents are common in wastewater effluent and present only a low level risk to fish and wildlife resources at the reported concentrations.

A second set of data collected in August and September 2002, was received by the Service from the Corps, which contained an analysis of SRWRF effluent with respect to primary and secondary drinking water standards. These data did not contain constituent concentrations that indicated a high risk of adverse impacts to fish and wildlife resources.

A third set of data collected over 10 sampling events in August and September 2002, are presented in Exhibit 2-10 of CH2MHILL 2003. These data show mean ortho-phosphate levels of 0.11 milligram per liter (mg/L). Long-term eutrophication may occur if ortho-phosphate levels are above 0.05 mg/L (Osmond et al. 1995).

The potential for adverse impacts from EDCs and other EPOCs that may be present in the SRWRF wastewater effluent are not well understood at this time. In recent years, new concerns have arisen regarding the presence of EPOCs, such as undegraded pharmaceuticals, in treated wastewater at potentially physiologically active concentrations (Kolpin et al. 2002). However, analytical methods approved by the EPA for ultra-trace analysis in wastewater and environmental media are not yet available at the low detection limits required for many of the EPOCs (Corps and District 2002). Such pollutants include natural and synthetic hormones and synthetic organic compounds that mimic, amplify, or interfere with the action of natural hormones. Concentrations of concern in water, sediment, and fish are not yet discernable for most of these substances, and the definition of what to include as an EPOC is still evolving. However, the 1996 amendments to the Safe Drinking Water Act require the characterization of endocrine disruptors in drinking water supplies, irrespective of the evolving technical and regulatory state-of-the-art (Corps and District 2002). Data for EPOCs are not currently available for the SRWRF effluent.

In summary, the high phosphorus levels in the SRWRF have the potential to reduce wetland benefits as a result of eutrophication. Other pollutants have not been reported at concentrations of concern for fish and wildlife resources.

Hydrology

The selected alternative will have nearly permanent inundation with dry-downs occurring only for occasional maintenance of the native plant communities (supplemental plantings and control of exotic species). Without seasonal dry-downs, native plant regeneration rates will be reduced, muck and flock will remain unconsolidated allowing for more rapid soil accretion rates, and fish will remain dispersed throughout the marsh thereby decreasing the foraging efficiency of wading birds. The benefits from seasonal dry-drowns must be balanced with the potential risk of re-suspending possible soil contaminants upon rewetting.

Construction

During construction of the wetlands, there may be disturbance to wildlife occurring on the Winsberg Farms property. Although no listed species have been observed on the property, it is possible that eastern indigo snakes occur in the construction area. Additionally, wood storks may be found foraging in remnant irrigation canals on the property.

B. Beneficial Impacts

This project is expected to provide benefits to fish and wildlife species by creating a mosaic of upland, emergent marsh, and open-water habitat types in a rapidly developing area of the County. Over 140 species of birds have been observed at the nearby created Wakodahatchee Wetlands in the same habitat mosaic that is planned for the Winsberg Farms project. Because it will be possible to manage the water levels on the project site throughout the year and during regional drought conditions, the wetlands may provide valuable wading bird foraging habitat during low-water conditions occurring in other wetlands in the area.

C. Summary of Consultation under the ESA

Informal consultation is ongoing for this project. On March 12, 2002, the Service provided the Corps with a list and description of federally threatened and endangered species that may be present in the project area. These species included: Everglade snail kite, wood stork, bald eagle, and eastern indigo snake. On October 24, 2002, the Service sent a letter to the Corps in response to a written notification dated September 20, 2002, which documented the status of a biological assessment as required under the ESA. The Service enclosed recommendations to the letter that provided guidance for the format and content of a biological assessment. On July 22, 2005, the Corps notified the Service that a biological assessment with effects determination was being drafted. The information contained in the draft biological assessment will be included in the final FWCA report.

IX. EVALUATION OF THE PROJECT'S REGIONAL IMPACTS

Due to the small size and hydrologic isolation of the project, no significant impacts to the regional water management system are anticipated. As mentioned previously, the project may provide beneficial habitat for wide-ranging wading birds that also utilize other wetlands in south Florida. Because the hydrology of the proposed project can be managed throughout the year, the created wetland may provide valuable foraging habitat during drought conditions in other regional wetlands.

X. RECOMMENDATIONS AND CONSERVATION MEASURES

A. Contaminants

In order to maximize fish and invertebrate species diversity and minimize the potential risk of negative reproductive impacts to avian species for Phase II, the Service recommends that contaminated soils be removed from the portion of the property that will be inundated. This removal may largely be achieved by utilizing the top 6 inches of soil on-site to create the interior structure of the earthen berms that will be constructed around the perimeter of the wetland, and overtopping, or capping, the berms with other on-site soils from depths greater than 6 inches. This configuration may reduce the potential mobilization of contaminants from the soil into the wetland surface water.

B. Water Quality

Given the potential negative impacts of excessive nutrients on aquatic resources, the Service recommends that a pretreatment cell be included in the design of the selected plan for this project. Similar recommendations were provided to the Corps from the Service on September 17, 2003, and February 2, 2004. A pretreatment cell could be densely planted with a species such as bulrush (*Scirpus californicus*) to buffer the impacts that nutrient-rich effluent from the SRWRF could have on the remaining wetland area created for wildlife habitat. Algal blooms resulting from nutrient enrichment will decay and can reduce the oxygen in the water to levels harmful to fish. Eutrophication has also been shown to increase the density of emergent vegetation making it difficult for snail kites to locate prey (Service 1999). The Service recommends that prior to the final design of the TSP, the Winsberg Farms project team should model various buffer cell sizes based on different target levels of phosphorus and nitrogen reduction (75 percent, 50 percent, 25 percent, etc.) to optimize the acreage of pretreatment cell required for each. A pretreatment cell, or STA, of 85 acres (Alternative 7), or 140 acres (Alternative 9), may be too large to adequately meet our objective of maximizing wildlife habitat and the associated recreational opportunities, but the Service would prefer that a smaller buffer cell be incorporated in the design of the TSP. The Service recommends that a 15-acre buffer (approximately 10 percent of the wetland area) be considered as a starting point for modeling nutrient removal rates. The Service recognizes that the County has completed Phase I work on the western half of the wetland, which receives effluent from the SRWRF, without a pretreatment cell.

The Service also recommends that a monitoring plan be established to ensure that the wastewater effluent from the SRWRF meets all applicable water quality standards, including those established by the EPA to protect aquatic life (EPA 2004). The monitoring plan should address EDCs and EPOCs. Additionally, the monitoring plan should be used to determine if agrochemicals are being mobilized from the soils into the surface water at levels of concern. The Service recommends that the Winsberg Farms project team work collaboratively with

members of the Wastewater Reuse Pilot Project team to develop a water quality monitoring plan. If contaminants are found at levels of concern during project monitoring, the Corps should implement an adaptive management strategy coordinated with the Service and other stakeholders.

C. Hydrology

The created wetland should conform to a hydrologic regime that will not exceed the depth tolerances of the desired plant and animal communities, and will allow for natural dry season hydropatterns in the shallow emergent marsh zones to enhance plant communities and wildlife habitat. Natural dry season hydropatterns will help with native plant regeneration, muck and flock consolidation to slow soil accretion rates, and will concentrate fish in sloughs and deep water areas to enhance wading bird foraging. There may be a trade-off between natural dry season hydropatterns and the rate of groundwater recharge, but enhancing the habitat through natural hydropatterns helps achieve all of the other objectives for this project. In a review of

previous wetland hydrology studies, the District has documented that the maximum hydroperiods for different types of emergent marshes range from 278 to 346 days per year. This hydroperiod includes a duration of approximately 2 weeks to 3 months per year when water levels fall below the marsh surface (District 1995). Deep-water areas of the wetland could remain continuously inundated. The same District report shows that depths of emergent marsh communities did not exceed 1.3 feet.

For CERP projects that include reservoirs and STAs, the Service has recommended against dry-outs due to the potential negative impacts to water quality from nutrients or mercury entering the surface water upon rewetting. The Winsberg Farms project differs from other CERP projects as there will be no surface water discharge and associated water quality targets, and there is no data to suggest that mercury will present a significant risk for this project. The creation of wildlife habitat is one of the primary project objectives rather than water quality improvement. For the Winsberg Farms project, the Service is recommending occasional dry-outs in the emergent marsh zone to improve wildlife habitat. In conjunction with emergent marsh dry-outs, the Service recommends that the water quality monitoring and adaptive management plan includes sampling before and after dry-outs to ensure that potential soil contaminants have not entered the surface water at concentrations of concern.

D. Threatened and Endangered Species

The Service recommends that section 7 consultation activities for this project be concluded prior to the completion of the final FWCA report. The Corps has shared a preliminary draft biological assessment with the Service, and informal consultation is ongoing.

The endangered eastern indigo snake may be present in and around the construction area for this project. In order to not likely to adversely affect this species, the Corps should comply with the Standard Protection Measures created for the eastern indigo snake (Appendix A). Standard

Protection Measures include the development and implementation of an eastern indigo snake protection/education plan for all construction personnel to follow. This plan should be submitted to the Service for review and approval at least 30 days prior to the commencement of any construction activity. Informational signs should also be posted throughout the construction site and along any proposed access roads to alert construction personnel to the likely presence of this species. These signs should contain a description of the snake, its habits and protection under Federal law; instruction not to injure, harm, harass or kill this species; directions to cease activity to allow the snake sufficient time to move away from the activity; and telephone numbers of pertinent agencies to be contacted if a dead snake is encountered. If a dead snake is found, it should be covered in water and then frozen. In addition to the protection and education plan, an eastern indigo snake monitoring program should be submitted to the Service's South Florida Ecological Services Office in Vero Beach, within 60 days of the conclusion of clearing activities. This report should be submitted whether or not eastern indigo snakes are encountered.

The endangered wood stork may forage in agricultural ditches and canals within and adjacent to the Winsberg Farms property, and should be avoided during construction activity. The Service recommends that the project sponsors adhere to the guidelines found in *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Ogden 1990) (Appendix B). Specifically, there should be no disturbance to feeding sites when storks are present. Human activity should be no closer than 300 feet when a solid vegetation screen is present and no closer than 750 feet when there is no vegetation screen.

E. Monitoring Plan

In addition to the water quality monitoring recommendations made above related to contaminants, wastewater effluent, and the effects of hydrology, the Service recommends that a wildlife monitoring plan and adaptive management strategy be developed and implemented for this project. The monitoring plan should include quarterly wildlife surveys conducted from the wetland perimeter to document wildlife abundance, species diversity, and nesting activity. An annual report should be provided to the Service for a 5-year period.

XI. SUMMARY OF SERVICE'S POSITION AND RECOMMENDATIONS

The Service supports the Corps' TSP for the Winsberg Farms Wetlands Restoration Project. Potential adverse impacts to fish and wildlife resources may be minimized by incorporating the recommendations made below related to contaminated soils, construction disturbance, and post-construction monitoring. Additional project benefits can be realized by incorporating the recommendations made below related to hydroperiod and the creation of a pretreatment cell.

A. Contaminants

Minimize the potential negative impacts to fish and invertebrate species diversity and avian reproduction that may result from mobilization of residual contaminants detected in discrete

XII. LITERATURE CITED

Bennetts, R.E. and W.M. Kitchens. 1997. The demography and movements of snail kites in Florida. Technical report number 56. U.S. Geological Survey, Biological Resources Division, Florida Cooperative Fish and Wildlife Research Unit, Gainesville, Florida.

CH2MHILL. 1997. Phase I and Phase II environmental audit, Winsberg Farms property. Prepared for the Palm Beach County Water Utilities Department.

CH2MHILL. 2003. Initial plan formulation for the Winsberg Farms Wetland Restoration Project, Palm Beach County, Florida. Prepared for the U.S. Army Corps of Engineers, Jacksonville District. Contract number DACW17-001-D-0014.

Ellis, E.C., L.S. Brownell, and D.M. Setser. 2004. Preliminary contamination assessment report, Green Cay (Winsberg) Farms, Boynton Beach, Palm Beach County, Florida. Prepared for the U.S. Army Corps of Engineers, Jacksonville District, by Taylor Engineering, Incorporated. Contract number DACW17-01-0012-0014.

Florida Department of Environmental Protection (DEP). 2003. Development and evaluation of numerical sediment quality assessment guidelines for Florida inland waters. Report prepared by MacDonald Environmental Sciences Limited and U.S. Geological Survey.

Kolpin, D.W., E.T. Furlong, M.T. Meyer, E.M. Thurman, S.D. Zaugg, L.B. Barber, and H.T. Buxton. 2002. Pharmaceuticals, hormones, and other organic wastewater contaminants in United States streams, 1999-2000: A national reconnaissance. Environmental Science Technology. 36:1202-1211.

Ogden, J.C. 1990. Habitat management guidelines for the wood stork in the southeast region. Prepared for the U.S. Fish and Wildlife Service, Atlanta, Georgia.

Osmond, D.L., D.E. Line, J.A. Gale, R.W. Gannon, C.B. Knott, K.A. Bartenhagen, M.H. Turner, S.W. Coffey, J. Spooner, J. Wells, J.C. Walker, L.L. Hargrove, M.A. Foster, P.D. Robillard, and D.W. Lehning. 1995. WATERSHEDSS: Water, Soil and Hydro-Environmental Decision Support System, http://www.water.ncsu.edu/watershedss/info/phos.html.

PPB Environmental Services, Incorporated. 2005. Winsberg Farms (Green Cay Wetlands) 2005 soil characterization. Prepared for the U.S. Army Corps of Engineers, Jacksonville District. Contract Number DACW17-03-D-0016.

South Florida Water Management District (District). 1995. Technical support for development of wetland drawdown criteria for Florida's lower west coast, part 1, results of literature review, modeling studies, and expert opinion. Preliminary draft report July 27, 1995.

Takekawa, J.E., and S.R. Beissinger. 1989. Cyclic drought, dispersal, and the conservation of the snail kite in Florida: lessons in critical habitat. Conservation Biology 3:302-311.

U.S. Army Corps of Engineers (Corps). 1999. Central and South Florida project comprehensive review study. Final integrated feasibility report and programmatic environmental impact statement. Jacksonville District Office, Jacksonville, Florida.

U.S. Army Corps of Engineers and South Florida Water Management District (Corps and District). 2002. Monitoring approach, wastewater reuse pilot project, part 1, west Miami-Dade. Jacksonville District Office, Jacksonville, Florida.

U.S. Army Corps of Engineers and South Florida Water Management District (Corps and District). 2004. Central and Southern Florida project, comprehensive Everglades restoration plan, programmatic regulations, six program-wide guidance memoranda, November 2004 draft. Jacksonville District Office, Jacksonville, Florida.

U.S. Environmental Protection Agency (EPA). 2004. National recommended water quality criteria. Office of Water, Office of Science and Technology. 4304T.

U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. Atlanta, Georgia.

U.S. Fish and Wildlife Service (Service). 2004. Contaminants strategy for CERP land acquisition. Pages 42-52 in Multi-species conservation under the Comprehensive Everglades Restoration Plan, part 2, initial CERP update modeling analysis and related fish and wildlife resource issues, draft planning aid report. Atlanta, Georgia.

APPENDIX A

Standard Protection Measures for the Eastern Indigo Snake

1 An eastern indigo snake protection/education plan shall be developed by the applicant or requestor for all construction personnel to follow. The plan shall be provided to the Service for review and approval at least 30 days prior to any clearing activities. The educational materials for the plan may consist of a combination of posters, videos, pamphlets, and lectures (*e.g.*, an observer trained to identify eastern indigo snakes could use the protection/education plan to instruct construction personnel before any clearing activities occur). Informational signs should be posted throughout the construction site and along any proposed access road to contain 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 cease clearing activities and allow the eastern indigo snake sufficient time to move away from the site on its own before resuming clearing; and,

d. Telephone numbers of pertinent agencies to be contacted if a dead eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water and then frozen.

2. If not currently authorized through an Incidental Take Statement in association with a Biological Opinion, only individuals who have been either authorized by a section 10(a)(1)(A) permit issued by the Service, or by the State of Florida through the Florida Fish Wildlife Conservation Commission (FWC) for such activities, are permitted to come in contact with an eastern indigo snake.

3. An eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not eastern indigo snakes are observed. The report should contain the following information:

a. Any sightings of eastern indigo snakes and

b. Other obligations required by the FWC, as stipulated in the permit.

Revised February 12, 2004

26

APPENDIX B

Habitat Management Guidelines for the Work Stork in the Southeast Region

27

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Prepared by

John C. Ogden
Acting Program Manager
Wildlife Research
Everglades National Park

for the

Southeast Region
U.S. Fish and Wildlife Service

Cover design by
Florida Power & Light Company
Miami, Florida

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

A number of Federal and state laws and/or regulations prohibit, cumulatively, such acts as harrassing, disturbing, harming, molesting, pursuing, etc., wood storks, or destroying their nests (see Section VII). Although advisory in nature, these guidelines represent a biological interpretation of what would constitute violations of one or more of such prohibited acts. Their purpose is to mainain and/or improve the environmental conditions that are required for the survival and well-being of wood storks in the southeastern United States, and are designed essentially for application in wood stork/human activity conflicts (principally land development and human intrusion into stork use sites). The emphasis is to avoid or minimize detrimental human-related impacts on wood storks. These guidelines were prepared in consultations with state wildlife agencies and wood stork experts in the four southeastern states where the wood stork is listed as Endangered (Alabama, Florida, Georgia, South Carolina).

General

The wood stork is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks, often in association with other species of long-legged water birds. Storks that nest in the southeastern United States appear to represent a distinct population, separate from the nearest breeding population in Mexico. Storks in the southeastern U.S. population have recently (since 1980) nested in colonies scattered throughout Florida, and at several central-southern Georgia and coastal South Carolina sites. Banded and color-marked storks from central and southern Florida colonies have dispersed during non-breeding seasons as far north as southern Georgia, and the coastal counties in South Carolina and southeastern North Carolina, and as far west as central Alabama and northeastern Mississippi. Storks from a colony in south-central Georgia have wintered between southern Georgia and southern Florida. This U.S. nesting population of wood storks was listed as endangered by the U.S. Fish and Wildlife Service on February 28, 1984 (*Federal Register* 49(4):7332-7335).

Wood storks use freshwater and estuarine wetlands as feeding, nesting, and roosting sites. Although storks are not habitat specialists, their needs are exacting enough, and available habitat is limited enough, so that nesting success and the size of regional populations are closely regulated by year-to-year differences in the quality and quantity of suitable habitat. Storks are especially sensitive to environmental conditions at feeding sites; thus, birds may fly relatively long distances either daily or between regions annually, seeking adequate food resources.

All available evidence suggests that regional declines in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat. An understanding of the qualities of good stork habitat should help to focus protection efforts on those sites

1

that are seasonally important to regional populations of wood storks. Characteristics of feeding, nesting, and roosting habitat, and management guidelines for each, are presented here by habitat type.

I. **Feeding habitat.**

A major reason for the wood stork decline has been the loss and degredation of feeding habitat. Storks are especially sensitive to any manipulation of a wetland site that results in either reduced amounts or changes in the timing of food availability.

Storks feed primarily (often almost exclusively) on small fish between 1 and 8 inches in length. Successful foraging sites are those where the water is between 2 and 15 inches deep. Good feeding conditions usually occur where water is relatively calm and uncluttered by dense thickets of aquatic vegetation. Often a dropping water level is necessary to concentrate fish at suitable densities. Conversely, a rise in water, especially when it occurs abruptly, disperses fish and reduces the value of a site as feeding habitat.

The types of wetland sites that provide good feeding conditions for storks include: drying marshes or stock ponds, shallow roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, and depressions in cypress heads or swamp sloughs. In fact, almost any shallow wetland depression where fish tend to become concentrated, either through local reproduction or the consequences of area drying, may be used by storks.

Nesting wood storks do most of their feeding in wetlands between 5 and 40 miles from the colony, and occasionally at distances as great as 75 miles. Within this colony foraging range and for the 110-150 day life of the colony, and depending on the size of the colony and the nature of the surrounding wetlands, anywhere from 50 to 200 different feeding sites may be used during the breeding season.

Non-breeding storks are free to travel much greater distances and remain in a region only for as long as sufficient food is available. Whether used by breeders or non-breeders, any single feeding site may at one time have small or large numbers of storks (1 to 100+), and be used for one to many days, depending on the quality and quantity of available food. Obviously, feeding sites used by relatively large numbers of storks, and/or frequently used areas, potentially are the more important sites necessary for the maintenance of a regional population of birds.

Differences between years in the seasonal distribution and amount of rainfall usually mean that storks will differ between years in where and when they feed. Successful nesting colonies are those that have a large number of feeding site options, including sites that may be suitable only in years of rainfall extremes. To maintain the wide range of feeding site options requires that many different wetlands, with both relatively short and long annual hydroperiods, be preserved. For example, protecting only the larger wetlands, or those with longer annual hydroperiods, will result in the eventual loss of smaller, seemingly less important wetlands. However, these small scale wetlands are crucial as the only available feeding sites during the wetter periods when the larger habitats are too deeply flooded to be used by storks.

II. Nesting habitat.

Wood storks nest in colonies, and will return to the same colony site for many years so long as that site and surrounding feeding habitat continue to supply the needs of the birds. Storks require between 110 and 150 days for the annual nesting cycle, from the period of courtship until the nestlings become independent. Nesting activity may begin as early as December or as late as March in southern Florida colonies, and between late February and April in colonies located between central Florida and South Carolina. Thus, full term colonies may be active until June-July in south Florida, and as late as July-August at more northern sites. Colony sites may also be used for roosting by storks during other times of the year.

Almost all recent nesting colonies in the southeastern U.S. have been located either in woody vegetation over standing water, or on islands surrounded by broad expanses of open water. The most dominant vegetation in swamp colonies has been cypress, although storks also nest in swamp hardwoods and willows. Nests in island colonies may be in more diverse vegetation, including mangroves (coastal), exotic species such as Australian pine (*Casuarina*) and Brazilian Pepper (*Schinus*), or in low thickets of cactus (*Opuntia*). Nests are usually located 15-75 feet above ground, but may be much lower, especially on island sites when vegetation is low.

Since at least the early 1970's, many colonies in the southeastern U.S. have been located in swamps where water has been impounded due to the construction of levees or roadways. Storks have also nested in dead and dying trees in flooded phosphate surface mines, or in low, woody vegetation on mounded, dredge islands. The use of these altered wetlands or completely "artificial" sites suggests that in some regions or years storks are unable to locate natural nesting habitat that is adequately flooded during the normal breeding season. The readiness with which storks will utilize water impoundments for nesting also suggests that colony sites could be intentionally created and maintained through long-term site management plans. Almost all impoundment sites used by storks become suitable for nesting only fortuitously, and therefore, these sites often do not remain available to storks for many years.

In addition to the irreversible impacts of drainage and destruction of nesting habitat, the greatest threats to colony sites are from human disturbance and predation. Nesting storks show some variation in the levels of human activity they will tolerate near a colony. In general, nesting storks are more tolerant of low levels of human activity near a colony when nests are high in trees than when they are low, and when nests contain partially or completely feathered young than during the period between nest construction and the early nestling period (adults still brooding). When adult storks are forced to leave their nests, eggs or downy young may die quickly (<20 minutes) when exposed to direct sun or rain.

Colonies located in flooded environments must remain flooded if they are to be successful. Often water is between 3 and 5 feet deep in successful colonies during the nesting season. Storks rarely form colonies, even in traditional nesting sites, when they are dry, and may abandon nests if sites become dry during the nesting period. Flooding in colonies may be most important as a defense against mammalian predators. Studies of stork colonies in Georgia and

Florida have shown high rates of raccoon predation when sites dried during the nesting period. A reasonably high water level in an active colony is also a deterrent against both human and domestic animal intrusions.

Although nesting wood storks usually do most feeding away from the colony site (>5 miles), considerable stork activity does occur close to the colony during two periods in the nesting cycle. Adult storks collect almost all nesting material in and near the colony, usually within 2500 feet. Newly fledged storks, near the end of the nesting cycle, spend from 1-4 weeks during the fledging process flying locally in the colony area, and perched in nearby trees or marshy spots on the ground. These birds return daily to their nests to be fed. It is essential that these fledging birds have little or no disturbance as far our as one-half mile within at least one or two quadrants from the colony. Both the adults, while collecting nesting material, and the inexperienced fledglings, do much low, flapping flight within this radius of the colony. At these times, storks potentially are much more likely to strike nearby towers or utility lines.

Colony sites are not necessarily used annually. Regional populations of storks shift nesting locations between years, in response to year-to-year differences in food resources. Thus, regional populations require a range of options for nesting sites, in order to successfully respond to food availability. Protection of colony sites should continue, therefore, for sites that are not used in a given year.

III. Roosting habitat.

Although wood storks tend to roost at sites that are similar to those used for nesting, they also use a wider range of site types for roosting than for nesting. Non-breeding storks, for example, may frequently change roosting sites in response to changing feeding locations, and in the process, are inclined to accept a broad range of relatively temporary roosting sites. Included in the list of frequently used roosting locations are cypress "heads" or swamps (not necessarily flooded if trees are tall), mangrove islands, expansive willow thickets or small, isolated willow "islands" in broad marshes, and on the ground either on levees or in open marshes.

Daily activity patterns at a roost vary depending on the status of the storks using the site. Non-breeding adults or immature birds may remain in roosts during major portions of some days. When storks are feeding close to a roost, they may remain on the feeding grounds until almost dark before making the short flight. Nesting storks traveling long distances (>40 miles) to feeding sites may roost at or near the latter, and return to the colony the next morning. Storks leaving roosts, especially when going long distances, tend to wait for mid-morning thermals to develop before departing.

IV. Management zones and guidelines for feeding sites.

To the maximum extent possible, feeding sites should be protected by adherence to the following protection zones and guidelines:

A. There should be no human intrusion into feeding sites when storks are present. Depending upon the amount of screening vegetation, human activity should be no closer than between 300 feet (where solid vegetation screens exist) and 750 feet (no vegetation screen).

4

B. Feeding sites should not be subjected to water management practices that alter traditional water levels or the seasonally normal drying patterns and rates. Sharp rises in water levels are especially disruptive to feeding storks.

C. The introduction of contaminants, fertilizers, or herbicides into wetlands that contain stork feeding sites should be avoided, especially those compounds that could adversely alter the diversity and numbers of native fishes, or that could substantially change the characteristics of aquatic vegetation. Increase in the density and height of emergent vegetation can degrade or destroy sites as feeding habitat.

D. Construction of tall towers (especially with guy wires) within three miles, or high power lines (especially across long stretches of open country) within one mile of major feeding sites should be avoided.

V. Management zones and guidelines for nesting colonies.

A. Primary zone: This is the most critical area, and must be managed according to recommended guidelines to insure that a colony site survives.

1. Size: The primary zone must extend between 1000 and 1500 feet in all directions from the actual colony boundaries when there are no visual or broad aquatic barriers, and never less than 500 feet even when there are strong visual or aquatic barriers. The exact width of the primary zone in each direction from the colony can vary within this range, depending on the amount of visual screen (tall trees) surrounding the colony, the amount of relatively deep, open water between the colony and the nearest human activity, and the nature of the nearest human activity. In general, storks forming new colonies are more tolerant of existing human activity, than they will be of new human activity that begins after the colony has formed.

2. Recommended Restrictions:

a. Any of the following activities within the primary zone, at any time of the year, are likely to be detrimental to the colony:

(1) Any lumbering or other removal of vegetation, and

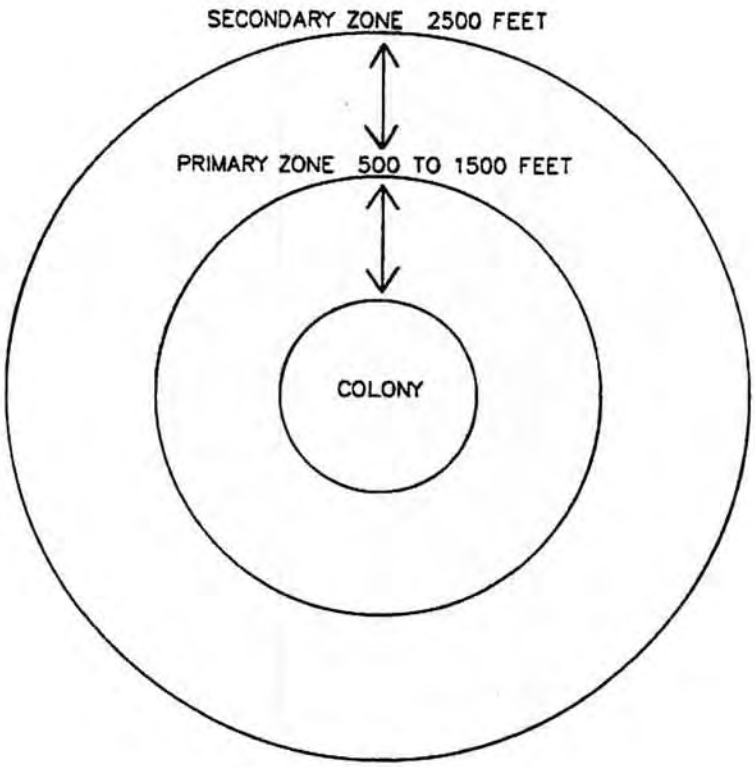
(2) Any activity that reduces the area, depth, or length of flooding in wetlands under and surrounding the colony, except where periodic (less than annual) water control may be required to maintain the health of the aquatic, woody vegetation, and

(3) The construction of any building, roadway, tower, power line, canal, etc.

b. The following activities within the primary zone are likely to be detrimental to a colony if they occur when the colony is active:

(1) Any unauthorized human entry closer than 300 feet of the colony, and

5


SECONDARY ZONE 2500 FEET
PRIMARY ZONE 500 TO 1500 FEET
COLONY

6

(2) Any increase or irregular pattern in human activity anywhere in the primary zone, and

(3) Any increase or irregular pattern in activity by animals, including livestock or pets, in the colony, and

(4) Any aircraft operation closer than 500 feet of the colony.

B. Secondary Zone: Restrictions in this zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The secondary zone may be used by storks for collecting nesting material, for roosting, loafing, and feeding (especially important to newly fledged young), and may be important as a screen between the colony and areas of relatively intense human activities.

1. Size: The secondary zone should range outward from the primary zone 1000-2000 feet, or to a radius of 2500 feet of the outer edge of the colony.

2. Recommended Restrictions:

a. Activities in the secondary zone which may be detrimental to nesting wood storks include:

(1) Any increase in human activities above the level that existed in the year when the colony first formed, especially when visual screens are lacking, and

(2) Any alteration in the area's hydrology that might cause changes in the primary zone, and

(3) Any substantial (>20 percent) decrease in the area of wetlands and woods of potential value to storks for roosting and feeding.

b. In addition, the probability that low flying storks, or inexperienced, newly-fledged young will strike tall obstructions, requires that high-tension power lines be no closer than one mile (especially across open country or in wetlands) and tall trans-mission towers no closer than 3 miles from active colonies. Other activities, including busy highways and commercial and residential buildings may be present in limited portions of the secondary zone at the time that a new colony first forms. Although storks may tolerate existing levels of human activities, it is important that these human activities not expand substantially.

VI. Roosting site guidelines.

The general characteristics and temporary use-patterns of many stork roosting sites limit the number of specific management recommendations that are possible:

A. Avoid human activities within 500-1000 feet of roost sites during seasons of the year and times of the day when storks may be present. Nocturnal activities in active roosts may be especially disruptive.

7

B. Protect the vegetative and hydrological characteristics of the more important roosting sites--those used annually and/or used by flocks of 25 or more storks. Potentially, roosting sites may, some day, become nesting sites.

VII. Legal Considerations.

A. Federal Statutes

The U.S. breeding population of the wood stork is protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act). The population was listed as endangered on February 28, 1984 (49 Federal *Register* 7332); wood storks breeding in Alabama, Florida, Georgia, and South Carolina are protected by the Act.

Section 9 of the Endangered Species Act of 1973, as amended, states that it is unlawful for any person subject to the jurisdiction of the United States to take (defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.") any listed species anywhere within the United States.

The wood stork is also federally protected by its listing (50 CFR 10.13) under the Migratory Bird Treaty Act (167 U.S.C. 703-711), which prohibits the taking, killing or possession of migratory birds except as permitted.

B. State Statutes

1. State of Alabama

Section 9-11-232 of Alabama's Fish, Game, and Wildlife regulations curtails the possession, sale, and purchase of wild birds. "Any person, firm, association, or corporation who takes, catches, kills or has in possession at any time, living or dead, any protected wild bird not a game bird or who sells or offers for sale, buys, purchases or offers to buy or purchase any such bird or exchange same for anything of value or who shall sell or expose for sale or buy any part of the plumage, skin, or body of any bird protected by the laws of this state or who shall take or willfully destroy the nests of any wild bird or who shall have such nests or eggs of such birds in his possession, except as otherwise provided by law, shall be guilty of a misdemeanor...

Section 1 of the Alabama Nongame Species Regulation (Regulation 87-GF-7) includes the wood stork in the list of nongame species covered by paragraph (4). " It shall be unlawful to take, capture, kill, possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value, the following nongame wildlife species (or any parts or reproductive products of such species) without a scientific collection permit and written permission from the Commissioner, Department of Conservation and Natural Resources,..."

2. State of Florida

Rule 39-4.001 of the Florida Wildlife Code prohibits "taking, attempting to take, pursuing, hunting, molesting, capturing, or killing (collectively defined as "taking"), transporting, storing, serving, buying, selling,

8

possessing, or wantonly or willingly wasting any wildlife or freshwater fish or their nests, eggs, young, homes, or dens except as specifically provided for in other rules of Chapter 39, Florida Administrative Code.

Rule 39-27.011 of the Florida Wildlife Code prohibits "killing, attempting to kill, or wounding any endangered species." The "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida" dated 1 July 1988, includes the wood stork, listed as "endangered" by the Florida Game and Fresh Water Fish Commission.

3. State of Georgia

Section 27-1-28 of the Conservation and Natural Resources Code states that "Except as otherwise provided by law, rule, or regulation, it shall be unlawful to hunt, trap, fish, take, possess, or transport any nongame species of wildlife..."

Section 27-1-30 states that, "Except as otherwise provided by law or regulation, it shall be unlawful to disturb, mutilate, or destroy the dens, holes, or homes of any wildlife;

Section 27-3-22 states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof...".

The wood stork is listed as endangered pursuant to the Endangered Wildlife Act of 1973 (Section 27-3-130 of the Code). Section 391-4-13-.06 of the Rules and Regulations of the Georgia Department of Natural Resources prohibits harassment, capture, sale, killing, or other actions which directly cause the death of animal species protected under the Endangered Wildlife Act. The destruction of habitat of protected species on public lands is also prohibited.

4. State of South Carolina

Section 50-15-40 of the South Carolina Nongame and Endangered Species Conservation Act states, "Except as otherwise provided in this chapter, it shall be unlawful for any person to take, possess, transport, export, process, sell, or offer of sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on any of the following lists: (1) the list of wildlife indigenous to the State, determined to be endangered within the State...(2) the United States' List of Endangered Native Fish and Wildlife... (3) the United States' List of Endangered Foreign Fish and Wildlife ..."

A.2.2 Responses to Recommendations in the USFWS Draft Fish and Wildlife Coordination Act Report

1. To maximize fish and invertebrate species diversity and minimize the potential risk of negative reproductive impacts to avian species for Phase II, the U.S. Fish and Wildlife Service (USFWS, or the Service) recommends that contaminated soils be removed from the portion of the property that will be inundated. This removal may largely be achieved by utilizing the top six inches of soil on site to create the interior structure of the earthen embankments that will be constructed around the perimeter of the wetland, and overtopping, or capping, the embankments with other on-site soils from depths greater than six inches. This configuration may reduce the potential mobilization of contaminants from the soil into the wetland surface water.

Response: Concur with your comment. The top six inches of soil will be excavated and used in the construction of tree islands or exterior ditches/embankments. The excavated soil will be capped with a minimum of six inches of uncontaminated soil obtained from a deeper stratum to prevent exposure of residual contaminants to wildlife species.

2. Given the potential negative impacts of excessive nutrients on aquatic resources, the Service recommends that a pretreatment cell be included in the design of the selected plan for this project. The USFWS provided similar recommendations to the U.S. Army Corps of Engineers (USACE) on September 17, 2003, and February 2, 2004. A pretreatment cell could be densely planted with a species, such as bulrush (*Scirpu califomicus)* to buffer the impacts that nutrient-rich effluent from the Southern Region Water Reclamation Facility (SRWRF) could have on the remaining wetland areas created for wildlife habitat. Algal blooms resulting from nutrient enrichment will decay and can reduce the oxygen in the water to levels harmful to fish. Eutrophication has also been shown to increase the density of emergent vegetation making it difficult for snail kites to locate prey (USFWS, 1999).

Response: USACE concurs that an appropriately sized pre-treatment cell (quasi STA) could serve to improve the quality of water to be released into wetland areas created for wildlife habitat. However, the current Project Delivery Team (PDT) position is that areas used for direct surficial recharge should be maximized, as opposed to compromising the use of surface area for possible horizontally oriented treatment of the water column. Furthermore, the PDT has determined that the design layout does not allow for enough land area such that a wetland treatment area could appreciably treat effluent in a cost-efficient manner.

3. The USFWS recommends that prior to the final design of the tentatively selective plan (TSP), the Winsberg Farm project team should model various buffer cell sizes based on different target levels of phosphorus and nitrogen reduction (75 percent, 50 percent, 25 percent, etc.) to optimize the acreage of pretreatment cell required for each. A pretreatment cell, or Stormwater Treatment Area (STA), of 85 acres (Alternative 7), or 140 acres (Alternative 9), may be too large to adequately meet the objective of maximizing wildlife habitat and the associated recreational opportunities, but the USFWS would prefer that a smaller buffer cell be incorporated in the TSP design. The USFWS recommends that a 15-acre buffer (about 10 percent of the wetland area) be considered as a starting point for modeling nutrient-removal rates. The USFWS recognizes that the county has completed Phase I work on the western half of the wetland, which receives effluent from the SRWRF without a pretreatment cell.

Response: The USFWS's request is a reasonable one. USACE would be interested in conducting such an analysis if both funds and schedule time are made available during the preconstruction engineering and design phase (PED). Whether or not such an activity occurs will be Project Management's call.

4. The USFWS also recommends that a monitoring plan be established to ensure that wastewater effluent from the SRWRF meets all applicable water quality standards, including those established by the U.S. Environmental Protection Agency (USEPA) to protect aquatic life (EPA, 2004). The monitoring plan should address endocrine disrupting chemicals (EDCs) and emerging pollutants of concern (EPOCs -- pharmaceuticals, hormones, antibiotics, etc). Additionally, the monitoring plan should be used to determine if agrochemicals are being mobilized from the soils into the surface water at current levels of concern.

Response: A permitted monitoring plan has been established that requires SFWRF effluent to meet state and federal surface-water quality standards. Plan parameters and frequencies will be compared to the referenced standards established for the protection of aquatic life to determine regulatory applicability and cost practicality. EDCs and EPOCs are legitimate constituents that lie beyond the scope of monitoring explicitly required for regulatory purposes. In areas where there's a history of application of problematic agrochemicals to the soil, a representative suite of chemicals will be included among the parameters to be monitored.

5. The USFWS recommends that the Winsberg Farm Project Team work collaboratively with members of the Wastewater Reuse Pilot Project Team to develop a water-quality monitoring plan. If contaminants are found at levels of concern during project monitoring, USACE should implement an adaptive management strategy coordinated with the USFWS and other stakeholders.

Response: Concur with the notion of collaborating with the Wastewater Reuse Pilot Project Team to develop the water quality monitoring plan. "Levels of concern" would need to be defined and accepted by USACE legal counsel.

6. The created wetlands should conform to a hydrologic regime that will not exceed depth tolerances of the desired plant and animal communities, and will allow for natural dry season hydropatterns in the shallow emergent marsh zones to enhance plant communities and wildlife habitat. Natural, dry-season hydropatteerns will help with native-plant regeneration, muck and flock consolidation to slow soil accretion rates, and will concentrate fish in sloughs and deepwater areas to enhance wading bird foraging. There may be a trade-off between natural, dry-season hydropatterns and the rate of groundwater recharge, but enhancing the habitat through natural hydropatterns helps achieve all other project objectives. In a review of previous wetland hydrology studies, the South Florida Water Management District (SFWMD, or the District) has documented that the maximum hydroperiods for different types of emergent marshes range from 278 to 346 days per year. This hydroperiod includes a duration of about two weeks to three months per year when water levels fall below the marsh surface (District, 1995),and when deepwater areas of the wetland might remain continuously inundated. The same District report shows that depths of emergent marsh communities did not exceed 1.3 feet.

Response: Concur. The constructed wetland will be managed to uphold a hydrological regime appropriate for the desired plant community. As indicated in the Draft Operating Manual (Annex D), water levels between six inches and one foot will ideally be maintained in the emergent marsh zone.

7. For CERP projects that include reservoirs and STAs, the USFWS has recommended against dry-outs due to the potential negative impacts to water quality from nutrients or mercury entering the surface water upon rewetting. The Winsberg Farm project differs from other CERP projects as there will be no surface-water discharge and associated water-quality targets, and there is no data to suggest that mercury will present a significant risk for this project. The creation of wildlife habitat is one of the primary project objectives rather than water-quality improvement. For the Winsberg Farm project, the USFWS is recommending occasional dry-outs in the emergent marsh zone to improve wildlife habitat. In conjunction with emergent marsh dry-outs, the USFWS recommends that the water-quality monitoring and adaptive management plan include sampling before and after dry-outs to ensure that potential soil contaminants have not entered the surface water at concentrations of concern.

Response: Occasional dry-outs of the emergent marsh zone may occur as maintenance work is done in the emergent marsh zone.

8. The USFWS recommends that Section 7 consultation activities for this project be concluded prior to completion of the final Fish and Wildlife Coordination Act (FWCA) report. USACE has shared a preliminary draft biological assessment with the USFWS, and an informal consultation is ongoing.

Response: Concur. USACE submitted a biological assessment (BA) to the USFWS on August 29, 2005, with the determination that the Winsberg Farm plan may affect, but is not likely to adversely affect, the endangered snail kite, endangered wood stork, threatened eastern indigo snake, and threatened bald eagle. USACE is awaiting the USFWS's response to the submitted BA.

9. The endangered eastern indigo snake may be present in and around the construction area for this project. To minimize any adversely impact on this species, USACE should comply with the standard protection measures created for the eastern indigo snake (Appendix A). Standard protection measures include the development and implementation of an eastern indigo snake protection and education plan for all construction personnel to follow. This plan should be submitted to the Service for review and approval at least 30 days prior to the commencement of any construction activity. Informational signs should also be posted throughout the construction site and along any proposed access roads to alert construction personnel to the likely presence of this species. These signs should contain a description of the snake, its habits and protection under federal law; instruction not to injure, harm, harass or kill this species; directions to cease activity to allow the snake sufficient time to move away from the activity; and telephone numbers of pertinent agencies to be contacted if a dead snake is encountered. If a dead snake is found, it should be covered in water and then frozen. In addition to the protection and education plan, an eastern indigo snake monitoring program should be submitted to the USFWS's South Florida Ecological Services Office in Vero Beach within 60 days of the conclusion of clearing activities. This report should be submitted whether or not eastern indigo snakes are encountered.

Response: Concur. Standard protection measures for the eastern indigo snake are included in the environmental commitments. USACE will integrate these guidelines into the plans and specifications for the Winsberg Farm project.

10. The endangered wood stork may forage in agricultural ditches and canals within and adjacent to the Winsberg Farm property, and should be avoided during construction activity. The USFWS recommends that project sponsors adhere to the guidelines found in Habitat Management Guidelines for the Wood Stork in the Southeast Region (Ogden, 1990) (Appendix B). Specifically, there should be no disturbance to feeding sites when storks are present. Human

activity should be no closer than 300 feet when a solid vegetation screen is present and no closer than 750 feet when there is no vegetation screen.

Response: Concur. Habitat Management Guidelines for the wood stork are included in the environmental commitments. USACE will integrate these guidelines into the plans and specifications for the Winsberg Farm project.

11. In addition to the water quality monitoring recommendations made above related to contaminants, wastewater effluent, and the effects of hydrology, the USFWS recommends that a wildlife monitoring plan and adaptive management strategy be developed and implemented for this project. The monitoring plan should include quarterly wildlife surveys conducted from the wetland perimeter to document wildlife abundance, species diversity, and nesting activity. An annual report should be provided to the USFWS for a five-year period.

Response: Concur. Wildlife surveys have been included in the Draft Project Monitoring Plan (Annex E).

A.3 ENDANGERED SPECIES COORDINATION

A.3.1 List of Threatened and Endangered Species (USFWS facsimile received March 12, 2002)

MAILED MARCH 12, 2002

To: Rebecca Weiss, U.S. Army Corps of Engineers
Fax: 904-899-5095
Phone: 904-899-5025

From: Tim Pinion, U.S. Fish and Wildlife Service
Fax: 772-562-4288
Phone: 772-562-3909

This information on Federally listed species is provided in response to a NEPA scoping letter dated February 7, 2002, requesting that the Service identify species or critical habitat that may be within the Winsberg Farm Wetlands Restoration project area. Additional detailed information regarding fish and wildlife resources will be provided in a forthcoming Planning Aid Letter.

The following species may be found within or affected by the Winsberg Farm Wetlands Restoration Project:

Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*); Endangered.
Suitable foraging habitat for the snail kite is typically a combination of low profile (< 3 m) marsh with an interdigitated matrix of shallow (0.2-1.3 m deep) open water, which is relatively clear and calm. The interspersed emergent vegetation enables apple snails, the kites primary food source, to climb near the surface to feed, breathe, and lay eggs. Nearly continuous flooding of wetlands for > 1 year is needed to support apple snail populations that sustain foraging by the snail kite (U.S. Fish and Wildlife Service 1999). The nearby A.R.M. Loxahatchee National Wildlife Refuge has been designated critical habitat for the Everglades Snail Kite. During dry years, canals, borrow pits, agricultural fields, pastures, and isolated wetlands in Palm Beach County provide important drought-related habitat (Takekawa and Beissinger 1989).

Wood Stork (*Mycteria americana*); Endangered.
During the nonbreeding season or while foraging, wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the Wood Stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs (U.S. Fish and Wildlife Service 1999). The Wood Stork has been observed nearby at the Wakodahatchee wetland in the same habitat type that will be created at the Winsberg Farm site.

Bald Eagle (Haliaeetus leucocephalus); Threatened.
The Bald Eagle can be found where there are suitable perch sites near water bodies where the eagles feed on fish and water-dependant birds (U.S. Fish and Wildlife Service 1999). Bald Eagles have been observed nearby at the Wakodahatchee wetland in the same habitat type that will be created at the Winsberg Farm site.

Eastern Indigo Snake (Drymarchon corais couperi); Threatened.
The Eastern Indigo Snake is present throughout the state, but its abundance is reduced to a point where it is uncommon. Its habitat includes edges of freshwater marshes and human altered habitats, among others. The Service will provide standard operating procedures for the protection of indigo snakes during construction of the Winsberg Farm wetland.

Literature Cited

Takekawa, J. E., and S. R. Beissinger. 1989. Cyclic drought, dispersal, and the conservation of the snail kite in Florida: lessons in critical habitat. Conservation Biology 3:302-311.

U.S. Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan. Southeast Region. Atlanta, GA.

A.3.2 List of Threatened and Endangered Species (FFWC E-mail received July 6, 2004)

MAILED MARCH 12, 2002

To: Rebecca Weiss, U.S. Army Corps of Engineers
Fax: 904-899-5095
Phone: 904-899-5025

From: Tim Pinion, U.S. Fish and Wildlife Service
Fax: 772-562-4288
Phone: 772-562-3909

This information on Federally listed species is provided in response to a NEPA scoping letter dated February 7, 2002, requesting that the Service identify species or critical habitat that may be within the Winsberg Farm Wetlands Restoration project area. Additional detailed information regarding fish and wildlife resources will be provided in a forthcoming Planning Aid Letter.

The following species may be found within or affected by the Winsberg Farm Wetlands Restoration Project:

Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*); Endangered.
Suitable foraging habitat for the snail kite is typically a combination of low profile (< 3 m) marsh with an interdigitated matrix of shallow (0.2-1.3 m deep) open water, which is relatively clear and calm. The interspersed emergent vegetation enables apple snails, the kites primary food source, to climb near the surface to feed, breathe, and lay eggs. Nearly continuous flooding of wetlands for > 1 year is needed to support apple snail populations that sustain foraging by the snail kite (U.S. Fish and Wildlife Service 1999). The nearby A.R.M. Loxahatchee National Wildlife Refuge has been designated critical habitat for the Everglades Snail Kite. During dry years, canals, borrow pits, agricultural fields, pastures, and isolated wetlands in Palm Beach County provide important drought-related habitat (Takekawa and Beissinger 1989).

Wood Stork (*Mycteria americana*); Endangered.
During the nonbreeding season or while foraging, wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the Wood Stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs (U.S. Fish and Wildlife Service 1999). The Wood Stork has been observed nearby at the Wakodahatchee wetland in the same habitat type that will be created at the Winsberg Farm site.

Bald Eagle (Haliaeetus leucocephalus); Threatened.
The Bald Eagle can be found where there are suitable perch sites near water bodies where the eagles feed on fish and water-dependant birds (U.S. Fish and Wildlife Service 1999). Bald Eagles have been observed nearby at the Wakodahatchee wetland in the same habitat type that will be created at the Winsberg Farm site.

Eastern Indigo Snake (Drymarchon corais couperi); Threatened.
The Eastern Indigo Snake is present throughout the state, but its abundance is reduced to a point where it is uncommon. Its habitat includes edges of freshwater marshes and human altered habitats, among others. The Service will provide standard operating procedures for the protection of indigo snakes during construction of the Winsberg Farm wetland.

Literature Cited

Takekawa, J. E., and S. R. Beissinger. 1989. Cyclic drought, dispersal, and the conservation of the snail kite in Florida: lessons in critical habitat. Conservation Biology 3:302-311.

U.S. Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan. Southeast Region. Atlanta, GA.

A.3.3 Biological Assessment (Transmitted by letter to USFWS by the USACE August 29, 2005)

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Planning Division
Environmental Branch

Mr. James J. Slack
Field Supervisor
US Fish and Wildlife Service
P1339 20th Street
Vero Beach, Florida 32960-3559

Dear Mr. Slack:

Pursuant to the Endangered Species Act (ESA), enclosed for your review is the Biological Assessment (BA) for the Winsberg Farm Wetland Restoration Project (project). This project involves the construction of a 150-acre wetland system on an agricultural site in Palm Beach County, Florida.

The U.S, Army Corps of Engineers (CORPS) has determined that the plan identified in the BA may have the following effects on federally listed species:

a. May affect, but is not likely to adversely affect the endangered snail kite (*Rostrhamus socialbilis plumbeus*);

b. May affect, but is not likely to adversely affect the endangered wood stork (*Mycteria Americana*);

c. May affect, but is not likely to adversely affect the threatened eastern indigo snake (*Drymarchon corais couperi*);

d. May affect, but is not likely to adversely affect the threatened bald eagle (*Haliaeetus leucocephalus*).

We request your concurrence with our determination pursuant to ESA. If you have any questions concerning this project or our determination, please contact Mr. Ernie Clarke at (904)232-1199.

Sincerely,

Stuart J. Appelbaum
Chief, Planning Division

Enclosure

ENDANGERED SPECIES ACT
BIOLOGICAL ASSESSMENT
Winsberg Farm Wetland Restoration Project

1.0 INTRODUCTION

The purpose of a Biological Assessment is to evaluate the potential effects of a Federal action on listed and proposed species and designated and proposed critical habitat and to determine whether the continued existence of any such species or habitat are likely to be adversely affected by the Federal action. The Biological Assessment is also used to determine whether formal consultation or a conference is necessary.

The Jacksonville District of the Army Corps of Engineers (Corps) acknowledges the possibility that four federally listed threatened and endangered species utilize habitat within the boundaries of the Winsberg Farm Wetland Restoration project area. Based on available information, it is evident that the endangered snail kite (*Rostrhamus socialbilis plumbeus*), endangered wood stork (*Mycteria americana*), threatened eastern indigo snake (*Drymarchon corais couperi*), and threatened bald eagle (*Haliaeetus leucocephalus*) may travel, reside, and/or forage within the project area. The Corps further recognizes that critical habitat for the snail kite is present approximately 3 miles west of the project site in Arthur R. Loxahatchee National Wildlife Refuge (a.k.a., ARM-LNWR, LNWR, the Refuge, or Water Conservation Area–1 or WCA-1).

2.0 PROJECT INFORMATION

2.1 LOCATION

The approximately 150-acre Winsberg Farm Wetland Restoration Project site (project site) is located in southeastern Palm Beach County, Florida (Figure 1) (Sections 3 and 4; Township 46 South; Range 42 East). Hagen Ranch Road, Jog Road and the Lake Worth Drainage District's (LWDD) L-29 and L-30 conveyances border the site. The region is dominated by suburban development, but agricultural tracts similar to the project site are present. Noteworthy features (with approximate distance and direction from the site) in the project vicinity include:

- Palm Beach County Water Utility Department's (PBCWUD) Southern Region Water Reclamation Facility (SRWRF) (adjacent to the west);
- PBCWUD Wakodahatchee Wetlands (1/4 mile to the southeast);
- The Florida Turnpike (1/2 mile to the west);
- LNWR (3 miles to the west).

2.2 SITE DESCRIPTION

The project site has been used to grow peppers, beans and corn since the mid-1900s (New South Associates 2003). The site consists of cultivated fields crossed by shallow ditches. Weedy vegetation (e.g. Brazilian pepper, Australian pine) dominates the margin of the site. Few native trees and no intact native plant communities exist on site. Given the agricultural land use of the project site and the surrounding suburban development, the site provides limited wildlife habitat.

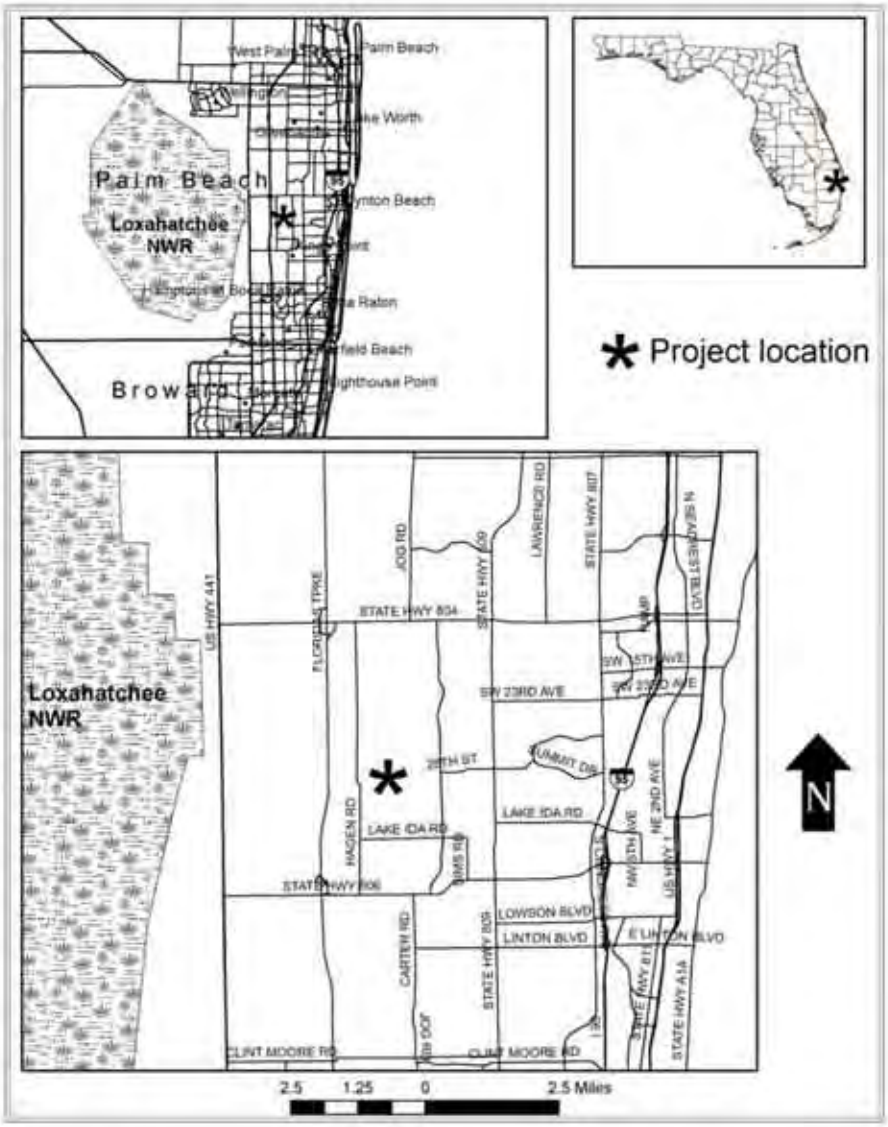


Figure 1. Site location map.

2

2.3 PROJECT DESCRIPTION

The Winsberg Farm Wetland Restoration Project is an element of the Comprehensive Everglades Restoration Plan (CERP). The overarching objective of CERP is the restoration, preservation, and protection of the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection (Corps 1999). The specific aim of Winsberg Farm Wetland Restoration Project is to create a wetland hydrated with treated wastewater from the SRWRF that would normally be lost to deep well injection. In addition to reducing deep well injection, such a created wetland system will increase the spatial extent of freshwater wetland habitat, producing wildlife habitat and increasing local surficial aquifer recharge.

The anticipated Winsberg Farm Wetland Restoration Project involves the creation of an approximately 150 acre constructed wetland system. The project is modeled after Wakodahatchee Wetlands, a nearby wetland system also constructed by PBCWUD and hydrated with SRWRF wastewater. The project will be constructed in two phases, approximately 75-acre apiece, and will include a mixture of freshwater marsh, tree islands, and deepwater zones. All plantings will be typical of wetlands found in the region. Phase I, located on the western part of the project site and depicted in Figure 2, has already been constructed by the non-Federal sponsor (PBCWUD). Phase II, planned for the eastern part of the project site, is envisioned to contain the same habitat types as Phase I.

Figure 2. Phase I Wetland Design. Depiction of the already completed phase (Phase I) of the Winsberg Farm Wetland Restoration Project showing freshwater marsh (light blue), tree islands (light green), forested wetlands (dark green) and deepwater zones (dark blue). Phase II will be constructed using a similar habitat mosaic and be located east of Phase I.

The proposed constructed wetland is configured to maintain continuous inundation. Water levels will be allowed to fluctuate seasonally in response to natural variation in rainfall. Inflow from the SRWRF will enter the western half of the project, and will ultimately discharge to the eastern half of the project after Phase II is created. Each phase will be divided by internal levees, creating a total of four wetland cells.

Alternatives considered for the project include constructed wetland systems of a similar size with different inundation patterns, habitat mosaics and plantings.

2.4 POTENTIAL CONCERNS FOR FISH AND WILDLIFE

Residual soil contaminants linked to previous agricultural land use of the project site and the quality of the wetland source water (SRWRF effluent) raise potential concerns for fish and wildlife species utilizing the proposed constructed wetland.

2.4.1 RESIDUAL SOIL CONTAMINANTS

The project site has been used to grow agricultural crops since the mid-1900s, raising concern that chemicals used on site and residing in the soils could impact fish and wildlife. A recent soil characterization indicated the presence of pesticides, semi-volatile compounds and zinc in quantities greater than the Sediment Quality Assessment Guidelines (PPB Environmental Services, Inc. 2005). The Draft Fish and Wildlife Coordination Act Report (DCAR) (USFWS 2005) for the project states:

> contaminant levels on the property indicate a level of risk to fish and invertebrate species that may reduce species diversity in the wetland. Conservative food chain modeling also indicates a low risk of potential negative impacts on bird reproduction for individuals foraging exclusively in the wetlands created for this project.

In accordance with recommendations outlined in the DCAR, Phase II of the project will be constructed to minimize the potential negative fish and wildlife impacts associated with residual contaminants by using the top six inches of soil in the interior of berms.

2.4.2 SRWRF EFFLUENT

The proposed constructed wetland will be hydrated with SRWRF effluent that has received secondary treatment with basic disinfection. As indicated in the DCAR, it is possible that treatment at the SRWRF may not remove all pollutants or reduce nutrients in the wastewater stream that have the potential to impact fish and wildlife species utilizing the constructed wetlands (USFWS 2005). The DCAR further states that high phosphorus levels in the SRWRF have the potential to reduce wetland benefits as a result of eutrophication, but that other pollutants have not been reported at concentrations of concern for fish and wildlife resources.

3.0 SPECIES EVALUATIONS

As mentioned in Section 1.0, the project site contains potential habitat for four federally listed threatened and endangered species. Descriptions, potential effects, conservation measures, and effects determinations for each species follow. This information was developed primarily by reviewing relevant literature and soliciting views of recognized experts on the species. No comprehensive endangered species surveys have been conducted on the project site in conjunction with this project. However, Corps U.S. Fish and Wildlife Service (USFWS) biologists have visited the site on a few occasions in part to assess the presence of or suitability for protected species. Site visits are summarized in the DCAR (USFWS 2005).

3.1 WOOD STORK

3.1.1 DESCRIPTION

Wood storks, one of two species of storks that breed in North America, are found in Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas, and only known to nest in

Florida, Georgia, and South Carolina. The U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) currently list wood storks as endangered. No critical habitat has been designated for the species (USFWS 1999).

Wood storks are wetland dwellers and use fresh, brackish, and saltwater habitats for feeding, sheltering, and nesting. Feeding takes place in shallow ponds, tidal pools, swamps, and marshes. Nesting occurs in cypress, hardwood, and mangrove swamps. Until the last few decades, wood storks were a common sight in Florida wetlands. However, between the 1930s and 1960s, there was a serious decline in this species. One reason for the decline in population has been the changes in the hydrologic regime of the Everglades, which affected its foraging habitat and food production (USFWS 1999).

Wood storks were observed adjacent to but not on the Winsberg Farm during site visits (Ernie Clarke personal observation). Regardless, it is assumed that wood storks forage in poor habitat (e.g. drainage ditches, canals, and retention ponds) found both on the project site and in the surrounding area. Somewhat improved wood stork foraging habitat is found in the neighboring Wakodahatchee Wetlands, a created freshwater marsh visited by storks. Still more valuable nesting and foraging habitat are found in the LNWR, located approximately three miles west of the project site. According to LNWR Comprehensive Conservation Plan (USFWS 2000), the Refuge has appropriate nesting habitat for wood storks and some impoundments located on the Refuge could be managed for optimal foraging year-round. While few wood stork nests have been recorded on the Refuge (USFWS 2000), wood storks have initiated nesting within in the Refuge as recently as 2004 (Crozier 2004).

3.1.2 POTENTIAL EFFECTS

Since wood storks probably feed on or near the project site, individual birds may be disturbed during the construction of the proposed wetland. In the long-term, the conversion of the agricultural project site to a constructed wetland is expected to provide additional foraging habitat for wood storks and other wading birds nesting in LNWR. Wood storks are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants (USFWS 2005). Based on the relatively small size of the site, the lack of stands of tall trees, and the surrounding land use, it is considered unlikely that the proposed constructed wetland will be will utilized by wood storks for nesting purposes.

3.1.3 CONSERVATION MEASURES

In accordance with USFWS recommendations (USFWS 2005), wood storks found within or adjacent to the project area will be avoided during construction activity. The Corps agrees to adhere to the guidelines found in "Habitat Management Guidelines for the Wood Stork in the Southeast Region" (USFWS 1990) during construction.

3.1.4 EFFECTS DETERMINATION

Since the project will increase the foraging area available to wood storks, and given the construction-related protection measures adopted, it is expected that the proposed wetland construction project may affect, but is not likely to adversely affect the wood stork.

3.2 EVERGLADE SNAIL KITE

3.2.1 DESCRIPTION

The Everglade snail kite is a sub-tropical and tropical New World raptor, with a distribution in the United States limited to southern Florida. The USFWS and FWC currently list the snail kite as endangered. Critical habitat was designated for the snail kite in 1977 and includes LNWR, which is located approximately 3 miles west of the project site (USFWS 1999).

Snail kites inhabit relatively open freshwater marshes and shallow vegetated lake edges. Nesting occurs in small trees, shrubs, or herbaceous vegetation, generally over open water. This medium-sized raptor has a highly specific diet composed almost entirely of Florida apple snails (*Pomacea paludosa*), which are found in palustrine, emergent, long hydroperiod wetlands. The snail kite's survival is dependent on the hydrology and water quality of the apple snail's habitat (USFWS 1999).

Snail kites were not observed on or adjacent to the project site during site visits. Based on habitat requirements described in the South Florida Multi-Species Recovery Plan (USFWS 1999), no suitable nesting or foraging habitat for snail kite currently exists on the agricultural project site. However, apple snails have been observed in adjacent LWDD canals (Tim Pinion personal communication), raising the possibility that snail kite could forage in the vicinity. The closest known snail kite nests have been located 3 miles west of the project site in LNWR, where the species forages but has had poor nesting success (USFWS 2000).

3.2.2 POTENTIAL EFFECTS

It is possible that the apple snail will inhabit the freshwater marsh established by the project, providing additional foraging habitat for the Everglade snail kite. Snail kites are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants (USFWS 2005). Based on the relatively small size of the site, the lack of contiguous foraging habitat, and the surrounding land use, it is considered unlikely that the proposed constructed wetland will be utilized by snail kite for nesting purposes. Construction activities are not expected to impact snail kite.

3.2.3 CONSERVATION MEASURES

No conservation measures are proposed for this species.

3.2.4 EFFECTS DETERMINATION

Since the project may increase the foraging area available to snail kite, it is expected that the proposed wetland construction project may affect, but is not likely to adversely affect the Everglades snail kite.

3.3 BALD EAGLE

3.3.1 DESCRIPTION

Bald eagles were historically found throughout the United States, principally in association with large water bodies. Bald eagles were designated as endangered by the USFWS in March 1967. The USFWS upgraded the species' status to threatened in 1995, which is also the species' status

as designated by the FWC. USFWS guidelines for maintaining and improving the bald eagle populations specify the establishment of primary and secondary management zones for protection of nest trees with specific restrictions on human activities within these zones. No critical habitat has been designated for this species (USFWS 1999).

Bald eagles are found in a variety of habitats but usually nest in older, taller trees and feed in areas that are in close proximity to large bodies of water used for foraging. Earlier population declines associated with the bioaccumulation of pesticides have been reversed. Habitat alteration presents a current threat to bald eagles in Florida (USFWS 1999).

Bald eagles were not observed on or adjacent the project site during site visits. According to FWC records, the closest recorded bald eagle nest in 2003 was approximately 10 miles northeast of the project site (FWC 2005), placing Winsberg Farm well outside the primary and secondary zones recommended by USFWS. However, bald eagles have been observed at the nearby Wakodahatchee Wetlands.

3.3.2 POTENTIAL EFFECTS

The deepwater areas created as part of the wetland creation are expected to provide bald eagle foraging habitat. Bald eagles are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants (USFWS 2005). Bald eagles are not expected to nest on the constructed wetland site due to lack of suitable nest trees. Construction activities are not expected to impact bald eagles.

3.3.3 CONSERVATION MEASURES

No conservation measures are proposed for this species.

3.3.4 EFFECTS DETERMINATION

Since the project may increase the foraging area available to bald eagle, it is expected that the proposed wetland construction project may affect, but is not likely to adversely affect the bald eagle.

3.4 EASTERN INDIGO SNAKE

3.4.1 DESCRIPTION

Eastern indigo snakes once occurred in Florida, Georgia, Alabama, Mississippi and possibly South Carolina, and are now restricted to Florida and Georgia. Indigo snakes have been classified as threatened by the USFWS since 1978 and by the FWC since 1971. No critical habitat has been designated for this species (USFWS 1999).

Indigo snakes are found in several habitat types including pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats. Indigo snakes range over large areas and into various habitats throughout the year. Historic decline of the species was associated with habitat loss, over-collecting for the pet trade, and mortality from gassing gopher tortoise burrows to collect rattlesnakes (USFWS 1999).

No indigo snakes were observed on the Winsberg Farm during site visits. However, it is considered possible that they occupy the project site and adjacent areas.

3.4.2 POTENTIAL EFFECTS

Since indigo snakes may already inhabit the project site, temporary impacts to the indigo snake may occur during construction. It is possible that eastern indigo snakes will inhabit upland berms and tree islands associated with the constructed wetland project.

3.4.3 CONSERVATION MEASURES

Standard construction precautions for eastern indigo snakes will be incorporated into construction specification if the proposed project is implemented.

3.4.4 EFFECTS DETERMINATION

Since the project may provide indigo snake habitat, and given the construction-related protection measures adopted, it is expected that the proposed wetland construction project may affect, but are not likely to adversely affect eastern indigo snakes.

4.0 SUMMARY OF CONSERVATION MEASURES

In recognition of the potential use by and occurrence of the previously discussed threatened and endangered species within the project areas, the Corps agrees to implement protective measures to avoid construction-related disturbance to eastern indigo snakes and wood storks.
Additionally, the Corps agrees that Phase II of the project will be constructed to minimize the potential negative fish and wildlife impacts associated with residual contaminants by using the top six inches of soil in the interior of berms.

5.0 CONCLUSION

As a result of implementation of the above conservation measures, it is the determination of this Biological Assessment that the proposed project may affect but is not likely to adversely affect the endangered snail kite, the endangered wood stork, the threatened eastern indigo snake, and threatened bald eagle. The Corps will continue discussions with the USFWS in the event of project design or operational modifications. This document is being submitted for informal consultation with the USFWS pursuant to Section 7 of the Endangered Species Act.

6.0 COORDINATION

Coordination and contacts were made with the following people during preparation of this Biological Assessment.

Preparer/Coordination Contacts	Discipline and Agency
Ernie Clarke	Biologist U.S. Army Corps of Engineers
Mike Dupes	Biologist U.S. Army Corps of Engineers
Tim Pinion	Fish and Wildlife Biologist U.S. Fish and Wildlife Service
Marilyn Stoll	Sr. Fish and Wildlife Biologist U.S. Fish and Wildlife Service

7.0 REFERENCES/LITERATURE CITED

Crozier, Gaea E. and Mark I. Cook. 2004. South Florida Wading Bird Report Volume 10. South Florida Water Management District, West Palm Beach, Florida.

Florida Fish and Wildlife Conservation Commission (FWC). 2005. Eagle Nest Locator. http://wildflorida.org/eagle/eaglenests/Default.asp#latlonlocator (Date accessed 7/22/2005).

New South Associates. 2003. Phase I Cultural Resources Survey of the Winsberg Farm Wetlands Restoration. Prepared for the US Army Corps of Engineers, Jacksonville District. Contract Number DACW17-19-D0021.

PPB Environmental Services, Inc. 2005. Winsberg Farms (Green Cay Wetlands) 2005 Soil Characterization. Prepared for the US Army Corps of Engineers, Jacksonville District. Contract Number DACW17-03-D0016.

U.S. Army Corps of Engineers (Corps). 1999. Central and South Florida Project Comprehensive Review Study. Final Integrated Feasibility Report and Programmatic Environmental Impact Statement. Jacksonville District Office, Jacksonville, Florida.

U.S. Fish and Wildlife Service (USFWS). 1990. Habitat Management Guidelines for the Wood Stork in the Southeast Region. Atlanta, Georgia.

U.S. Fish and Wildlife Service (USFWS). 1999. South Florida Multi-Species Recovery Plan. Atlanta, Georgia.

U.S. Fish and Wildlife Service (USFWS). 2000. A.R.M. Loxahatchee National Wildlife Refuge Comprehensive Conservation Plan. Boynton Beach, Florida.

U.S. Fish and Wildlife Service (USFWS). 2005. Draft Fish and Wildlife Coordination Act Report, Winsberg Farms Wetlands Restoration Project. Vero Beach, Florida.

A.3.4 Biological Opinion or Concurrence with the USACE Determination (USFWS)

United States Department of the Interior

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

December 5, 2005

RECEIVED
PD-E 13 Dec 05

Stuart J. Appelbaum
Chief, Planning Division
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Log No.: 4-1-04-CERP-8824
Date Received: September 1, 2005
Project: Winsberg Farms Wetlands Restoration Project (CERP)
County: Palm Beach

Dear Mr. Appelbaum:

This letter responds to your request received by the U.S. Fish and Wildlife Service (Service) on September 1, 2005, for concurrence under section 7 of the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*) for the Winsberg Farms Wetlands Restoration Project.

PROJECT LOCATION AND DESCRIPTION

The Winsberg Farms Wetlands Restoration Project site is located in southeastern Palm Beach County, Florida (Figure 1), on lands currently owned by Palm Beach County (County) (Sections 3 and 4; Township 46 South; Range 42 East). Hagen Ranch Road, Jog Road and the Lake Worth Drainage District's (LWDD) L-29 and L-30 conveyance canals border the site. The region is dominated by suburban development, with some agricultural tracts remaining in the area. Palm Beach County Water Utility Department's (PBCWUD) Southern Region Water Reclamation Facility (SRWRF) is adjacent to the west of the project site. PBCWUD Wakodahatchee Wetlands are located 1/4 mile to the southeast of the project site. The Florida Turnpike is located 1/2 mile to the west. The Arthur R. Marshall Loxahatchee National Wildlife Refuge (A.R.M. LNWR) is located 3 miles to the west of the project site.

The project site has been used to grow peppers, beans and corn since the mid-1900s (New South Associates 2003). The site consists of cultivated fields crossed by shallow irrigation ditches. Weedy vegetation such as Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (*Casuarina equisetifolia*) dominates the margin of the site. Few native trees and no intact native plant communities exist on site. Given the agricultural land use of the project site and the surrounding suburban development, the site provides limited wildlife habitat.

TAKE PRIDE IN AMERICA

The Winsberg Farm Wetlands Restoration Project is part of the Comprehensive Everglades Restoration Plan (CERP). The overarching objective of CERP is the restoration, preservation, and protection of the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection (Corps 1999). The specific aim of Winsberg Farm Wetlands Restoration Project is to create a wetland using treated wastewater from the SRWRF that would normally be disposed of through deep well injection. In addition to reducing water lost to deep well injection, the created wetland will provide wildlife habitat and increase local surficial aquifer recharge.

The anticipated Winsberg Farm Wetland Restoration Project involves the creation of approximately 150 acres of constructed wetland habitat. The project is modeled after Wakodahatchee Wetlands, a nearby wetland system constructed by the County and hydrated with SRWRF wastewater. On the western portion of the Winsberg Farms property, the County has recently completed construction of approximately 75 acres of wetland habitat, as well as a boardwalk, interpretive facility, and parking lot, and has opened the area to the public as Green Cay Wetlands (Figure 2). The wetland habitat has been planted with native species and includes a mixture of freshwater marsh, tree islands, and deepwater zones. The County's work is considered Phase I of the Winsberg Farms project, and Phase II will include the creation of similar wetland habitat on the remaining 75 acres on the eastern portion of the property.

The proposed constructed wetland will be operated to maintain continuous inundation. Water levels will be allowed to fluctuate seasonally in response to natural variation in rainfall. Inflow from the SRWRF will enter the western half of the project, and will ultimately discharge to the eastern half of the project when Phase II is completed. Each phase will be divided by an internal levee, creating a total of four wetland cells.

The project site has been used to grow agricultural crops since the mid-1900s, raising concern that chemicals used onsite and residing in the soils could impact fish and wildlife. A recent soil characterization indicated the presence of pesticides, semi-volatile compounds and zinc in quantities greater than the Sediment Quality Assessment Guidelines (PPB Environmental Services, Inc. 2005). The Draft Fish and Wildlife Coordination Act (FWCA) Report for the project states that contaminant levels on the property indicate a level of risk to fish and invertebrate species that may reduce species diversity in the wetland, and that conservative food chain modeling indicates a low risk of potential negative impacts on bird reproduction for individuals foraging exclusively in the wetlands created for this project (Service 2005).

In accordance with recommendations outlined in the draft FWCA report, Phase II of the project will be constructed to minimize the potential negative fish and wildlife impacts associated with residual contaminants by using the top six inches of soil from the agricultural fields to create the interior structure of berms, thereby reducing the potential for remobilization of constituents from the soil into the surface water.

The proposed constructed wetland will be hydrated with SRWRF effluent that has received secondary treatment with basic disinfection. As indicated in the draft FWCA report, it is possible that treatment at the SRWRF may not remove all pollutants or reduce nutrients in the wastewater stream that have the potential to impact fish and wildlife species utilizing the constructed wetlands (Service 2005). The draft FWCA report further states that high phosphorus levels in the SRWRF have the potential to reduce wetland benefits as a result of eutrophication, but that other pollutants have not been reported at concentrations of concern for fish and wildlife resources.

THREATENED AND ENDANGERED SPECIES

Your letter received on September 1, 2005, provided determinations that the Winsberg Farms Wetlands Restoration Project "may affect, but is not likely to adversely affect" the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), endangered wood stork (*Mycteria americana*), threatened bald eagle (*Haliaeetus leucocephalus*), and threatened eastern indigo snake (*Drymarchon corais couperi*). While there are no documented observations of these species on the project site, they are known to occur in the area in similar habitat types currently existing on the project site or that are proposed for creation on the project site.

Following is a summary of the potential effects that the proposed project may have on threatened or endangered species potentially present in the project area, as well as the Corps' determinations for each species that may be affected.

Everglade snail kite

Snail kites were not observed on or adjacent to the project site during site visits, and based on habitat requirements described in the South Florida Multi-Species Recovery Plan (Service 1999), no suitable nesting or foraging habitat for snail kites currently exists on the agricultural project site. However, apple snails have been observed in adjacent LWDD canals, raising the possibility that snail kites could forage in the vicinity. The closest known snail kite nests have been located 3 miles west of the project site in LNWR, where the species forages but has had poor nesting success (Service 2000).

It is possible that the apple snail will inhabit the freshwater marsh established by the project, providing foraging habitat for the Everglade snail kite. Snail kites are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants (Service 2005). Based on the relatively small size of the site and the surrounding land use, it is considered unlikely that the proposed constructed wetland will be utilized by snail kites for nesting purposes. Construction activities are not expected to impact snail kites.

Since the project may increase the foraging area available to snail kite, the Corps has determined that the proposed wetland construction project may affect, but is not likely to adversely affect the Everglade snail kite.

Wood stork

Wood storks were observed adjacent to but not on the Winsberg Farm site during site visits (Ernie Clarke, Corps, personal observation). Regardless, it is assumed that wood storks forage in the highly disturbed habitat (e.g. drainage ditches, canals, and retention ponds) found both on the project site and in the surrounding area. Somewhat improved wood stork foraging habitat is found in the neighboring Wakodahatchee Wetlands, a created freshwater marsh where wood storks have been observed. Valuable nesting and foraging habitat are found in the A.R.M. LNWR, located approximately three miles west of the project site. According to the A.R.M. LNWR Comprehensive Conservation Plan (Service 2000), the Refuge has appropriate nesting habitat for wood storks and some impoundments located on the Refuge could be managed for optimal foraging year-round. While few wood stork nests have been recorded on the Refuge (Service 2000), wood storks have initiated nesting within in the Refuge as recently as 2004 (Crozier and Cook 2004).

Since wood storks probably feed on or near the project site, individual birds may be disturbed during the construction of the proposed wetland. In the long-term, the conversion of the agricultural project site to a constructed wetland is expected to provide additional foraging habitat for wood storks and other wading birds nesting in A.R.M. LNWR. Wood storks are not expected to forage exclusively on the project site and, therefore, are not likely to be adversely affected by residual soil contaminants (Service 2005). Based on the relatively small size of the site, the lack of stands of tall trees, and the surrounding land use, it is considered unlikely that the proposed constructed wetland will be utilized by wood storks for nesting purposes.

In accordance with Service recommendations (Service 2005), wood storks found within or adjacent to the project area will be avoided during construction activity. The Corps agrees to adhere to the guidelines found in "Habitat Management Guidelines for the Wood Stork in the Southeast Region" (Ogden 1990) during construction.

Since the project will increase the foraging area available to wood storks, and given the construction-related protection measures that will be adopted, the Corps has determined that the proposed wetland construction project may affect, but is not likely to adversely affect the wood stork.

Bald eagle

Bald eagles were not observed on or adjacent to the project site during site visits. According to Florida Fish and Wildlife Conservation Commission (FWC) records, the closest recorded bald eagle nest in 2003 was approximately 10 miles northeast of the project site (FWC 2005), placing Winsberg Farms well outside the primary and secondary zones recommended by the Service. However, bald eagles have been observed at the nearby Wakodahatchee Wetlands.

The deepwater areas created as part of the wetland creation are expected to provide bald eagle foraging habitat. Bald eagles are not expected to forage exclusively on the project site and,

Stuart J. Appelbaum Page 5

therefore, are not likely to be adversely affected by residual soil contaminants (Service 2005). Bald eagles are not expected to nest on the constructed wetland site due to lack of suitable nest trees. Construction activities are not expected to impact bald eagles.

Since the project may increase the foraging area available to bald eagles, the Corps has determined that the proposed wetland construction project may affect, but is not likely to adversely affect the bald eagle.

Eastern indigo snake

No indigo snakes were observed on the Winsberg Farms property during site visits. However, since indigo snakes may be found in a variety of habitat types including agricultural fields and human-altered habitats, it is considered possible that they occupy the project site and adjacent areas.

Since indigo snakes may already inhabit the project site, temporary impacts to the indigo snake may occur during construction. Standard construction precautions for eastern indigo snakes will be incorporated into construction specifications as the proposed project is implemented.

Since the project may provide indigo snake habitat through the creation of upland berms and tree islands, and given the construction-related protection measures adopted, the Corps has determined that the proposed wetland construction project may affect, but is not likely to adversely affect eastern indigo snake.

Based on the information presented above, the Service concurs with the Corps' determination that the Winsberg Farms Wetlands Restoration Project may affect, but is not likely to adversely affect the Everglade snail kite, wood stork, bald eagle, or eastern indigo snake.

If modifications are made to the project, or if additional information involving potential effects to listed species becomes available, reinitiation of consultation may be necessary. Please contact Tim Pinion at 772-562-3909, extension 294, if you have any questions regarding this letter. The cooperation of your staff is greatly appreciated.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:
Corps, Jacksonville, Florida (Daphne Ross, Ernie Clarke, Bill Gallagher)
Palm Beach County Water Utilities Department, West Palm Beach, Florida (Hassan Hadjimiry)
DEP, Tallahassee, Florida (Greg Knecht)
DEP, West Palm Beach, Florida (Dianne Crigger)
EPA, Jacksonville, Florida (Eric Hughes)
FWC, Vero Beach, Florida (Joe Walsh)
Service, Jacksonville, Florida (Miles Meyer)
Service, Vero Beach, Florida (Sharon Kocis Fauver)

LITERATURE CITED

Crozier, G.E. and M.I. Cook. 2004. South Florida wading bird report, volume 10. South Florida Water Management District, West Palm Beach, Florida.

Florida Fish and Wildlife Conservation Commission (FWC). 2005. Eagle nest locator. http://wildflorida.org/eagle/eaglenests/Default.asp#latlonlocator (Date accessed 7/22/2005).

New South Associates. 2003. Phase I cultural resources survey of the Winsberg Farm Wetlands Restoration. Prepared for the US Army Corps of Engineers, Jacksonville District. Contract Number DACW17-19-D0021.

Ogden, J.C. 1990. Habitat management guidelines for the wood stork in the southeast region. Prepared for the U.S. Fish and Wildlife Service, Atlanta, Georgia.

PPB Environmental Services, Inc. 2005. Winsberg Farms (Green Cay Wetlands) 2005 soil characterization. Prepared for the US Army Corps of Engineers, Jacksonville District. Contract number DACW17-03-D0016.

U.S. Army Corps of Engineers (Corps). 1999. Central and South Florida project comprehensive review study. Final integrated feasibility report and programmatic environmental impact statement. Jacksonville District Office, Jacksonville, Florida.

U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. Atlanta, Georgia.

U.S. Fish and Wildlife Service (Service). 2000. A.R.M. Loxahatchee National Wildlife Refuge comprehensive conservation plan. Boynton Beach, Florida.

U.S. Fish and Wildlife Service (Service). 2005. Draft Fish and Wildlife Coordination Act Report, Winsberg Farms Wetlands Restoration Project. Vero Beach.

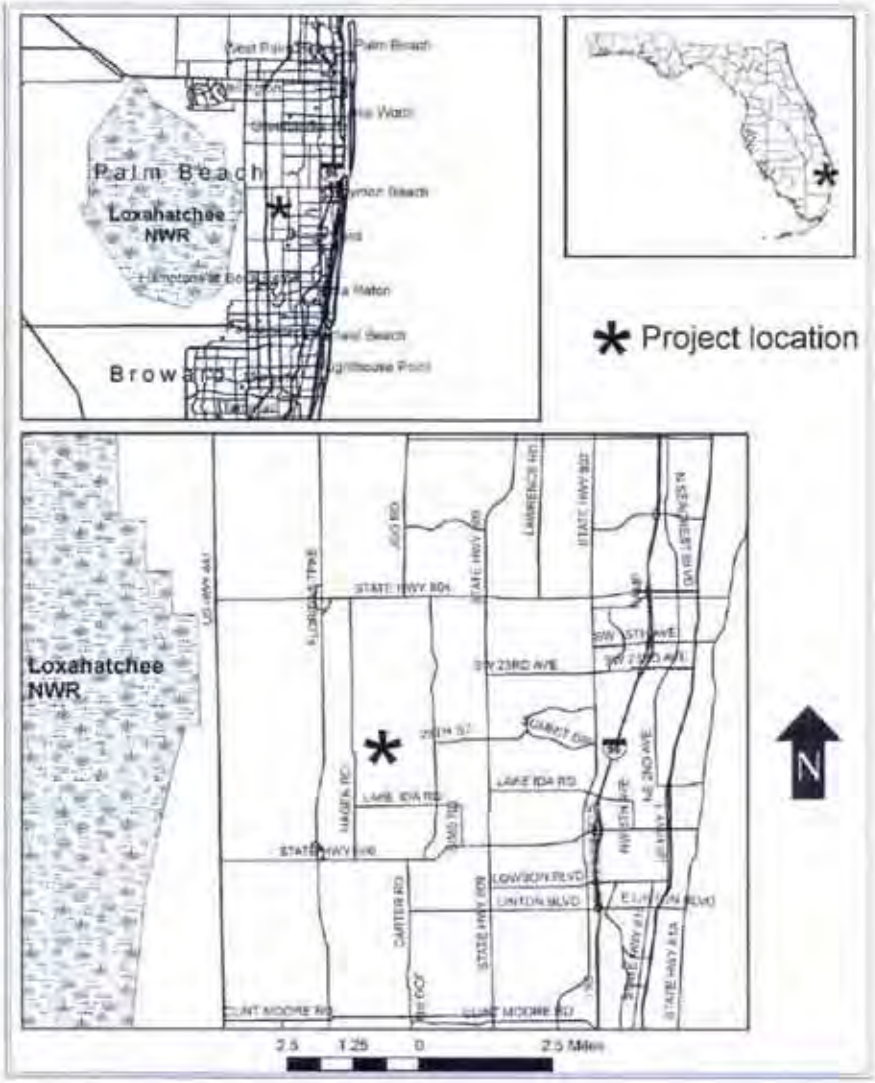


Figure 1. Winsberg Farms Wetlands Restoration Project site location map.

Figure 2. Depiction of Phase I of the Winsberg Farms Wetlands Restoration Project showing freshwater marsh (light blue), tree islands (light green), forested wetlands (dark green) and deepwater zones (dark blue). Phase II will be constructed using a similar habitat mosaic and be located east of Phase I.

This page intentionally left blank

ANNEX B
NEPA INFORMATION

This page intentionally left blank

TABLE OF CONTENTS

B ANNEX B - NEPA INFORMATION B-1
B.1 ENVIRONMENTAL COMPLIANCE MATRIX B-1
B.2 COMPLIANCE WITH ENVIRONMENTAL LAWS B-3
B.2.1 National Environmental Policy Act of 1969 ..... B-3
B.2.2 Endangered Species Act of 1973 ..... B-3
B.2.3 Fish and Wildlife Coordination Act of 1958 ..... B-4
B.2.4 National Historic Preservation Act of 1966 (Inter Alia [PL 89-665], The Archaeology and Historic Preservation Act [PL 93-291], and Executive Order 11593) B-4
B.2.5 Clean Water Act of 1972 ..... B-4
B.2.6 Clean Air Act of 1972 ..... B-5
B.2.7 Coastal Zone Management Act of 1972 ..... B-5
B.2.8 Farmland Protection Policy Act of 1981 ..... B-5
B.2.9 Wild and Scenic River Act of 1968 ..... B-5
B.2.10 Marine Mammal Protection Act of 1972 ..... B-6
B.2.11 Estuary Protection Act of 1968 ..... B-6
B.2.12 Federal Water Project Recreation Act B-6
B.2.13 Fishery Conservation and Management Act of 1976 ..... B-6
B.2.14 Submerged Lands Act of 1953 ..... B-6
B.2.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990 ..... B-6
B.2.16 Rivers and Harbors Act of 1899 ..... B-6
B.2.17 Anadromous Fish Conservation Act B-6
B.2.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act B-7
B.2.19 Marine Protection, Research and Sanctuaries Act B-7
B.2.20 Resource Conservation and Recovery Act of 1976 ..... B-7
B.2.21 Toxic Substances Control Act of 1976 ..... B-7
B.2.22 Magnuson-Stevens Fishery Conservation and Management Act B-7
B.2.23 Executive Order 11990, Protection of Wetlands B-7
B.2.24 Executive Order 11988, Flood Plain Management B-7
B.2.25 Executive Order 12898, Environmental Justice B-8
B.2.26 Executive Order 13089, Coral Reef Protection B-8
B.2.27 Executive Order 13112, Invasive Species B-8
B.3 PERTINENT CORRESPONDENCE B-8
B.4 PUBLIC/AGENCY COMMENTS FROM DRAFT REPORT B-85
B.5 OVERVIEW OF THE PROGRAMMATIC EIS IN THE YELLOW BOOK (EXECUTIVE SUMMARY FROM THE YELLOW BOOK) B-85
B.6 RECIPIENTS OF THE DRAFT PROJECT IMPLEMENTATION REPORT B-105

LIST OF TABLES

Table B-1: Environmental Compliance Matrix B-1
Table B-2: City Recipients.....B-105
Table B-3: Congressional Recipients.....B-105
Table B-4: Environmental Recipients.....B-105
Table B-5: News Agency Recipients.....B-105
Table B-6: Library Recipients B-105
Table B-7: County Recipients.....B-106
Table B-8: State Agency Recipients.....B-106
Table B-9: Federal Recipients B-107
Table B-10: Tribal Organization Recipients.....B-107
Table B-11: Private Recipients.....B-108
Table B-12: State Legislator Recipients B-108

B ANNEX B - NEPA INFORMATION

B.1 ENVIRONMENTAL COMPLIANCE MATRIX

TABLE B-1: ENVIRONMENTAL COMPLIANCE MATRIX

Law, Regulation or Policy	Status* FC, PC, NC, NA	Comments	Last Coordinated	Full Compliance Expected
National Environmental Policy Act of 1969	PC	Draft PIR/EA in circulation.	Scoping letter sent out February 2002.	Full compliance upon coordination of the final PIR/EA.
Endangered Species Act of 1973	FC	FWS concurred with "may affect, not likely to adversely affect" determination. NOAA does not require analysis due to distance from coast.	Biological Assessment sent to FWS in August 2005. Concurrence letter received from FWS in December 2005.	Full compliance.
Fish and Wildlife Coordination Act of 1958	PC	Funds transferred annually to FWS; PALs received June 2004, February 2003, April 2002; FWS is active team participant providing input on fish and wildlife elements.	Ongoing. Draft FWCA report received September 2005.	Full compliance with issuance of the Final FWCA report, scheduled for 2006.
National Historic Preservation Act of 1966	FC	Phase I survey was conducted; SHPO concurred with no effect determination.	February 2003.	Full compliance.
Clean Water Act of 1972	PC	Modified SRWRF discharge permit for Phase 1 received. Phase 2 permit will be required. Corps issued a no permit for Winsberg Farm based on no wetlands impacted.	Modified discharge permit issued March 2004.	Full compliance upon receipt of discharge permit for Phase 2.
Clean Air Act of 1972	PC	PIR/EA will be coordinated with public agencies.	February 2002 scoping letter.	Compliance with Section 309 of CAA will occur with the coordination and review of the PIR/EA by EPA.
Coastal Zone Management Act of 1972	PC	The state has determined that, at this stage, the project is consistent with the Florida Coastal Management Program.		Additional consistency review by the state will occur during coordination of the draft and final PIR/EA. Full compliance will occur with issuance of the WQC by the state.
Farmland Protection Policy Act of 1981	PC	Form AD-1006 completed by USACE and submitted to NRCS February 2004.	July and September 2003. February 2004.	Full compliance after review of the final PIR/EA by NRCS.
Wild and Scenic River Act of 1968	NA	There are no designated wild and scenic rivers in vicinity of the study area.		
Marine Mammal Protection Act of 1972	NA	Due to inland location and small project footprint, marine mammals are not impacted.		
Estuary Protection Act of 1968	NA	No estuary would be impacted by project implementation.		
Federal Water Project Recreation Act	FC	Recreational features are being considered for cost-sharing.		Full compliance
Fishery Conservation and Management Act of 1976	PC	The draft and final PIR/EA will be coordinated with NMFS.	February 2002 scoping letter.	Full compliance after review of the final PIR/EA by NMFS.
Submerged Lands Act of 1953	NA	No submerged lands would be impacted by project implementation.		

Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990	NA	There are no designated coastal barrier resources in the project area that would be affected by this project.		
Rivers and Harbors Act of 1899	FC	The proposed work would not obstruct U.S. navigable waters. The proposed action has been subject to the public notice and other evaluations normally conducted for activities subject to the Act.	February 2002 scoping letter.	Full compliance.
Anadromous Fish Conservation Act	FC	Anadromous fish species would not be affected by project implementation.	February 2002 scoping letter.	Full compliance after review of the final PIR/EA by NMFS.
Migratory Bird Treaty Act and Migratory Bird Conservation Act	FC	The project will moderately improve habitat for migratory bird foraging and nesting.		Full compliance.
Marine Protection, Research and Sanctuaries Act	NA	The term "dumping" as defined in the Act (3[33 U.S.C. 1402] (f)) does not apply to this project. Therefore the MPRSA does not apply to this project.		
RECRA, CERCLA, Toxic Substances Control Act	PC	Federal evaluation of potential for action-level items is ongoing; site is potentially below federal action levels for all contaminants.	February 2002 scoping letter.	Full compliance by completion of the draft PIR/EA. If action-level contamination is identified, site will be avoided.
Magnuson-Stevens Fishery Conservation and Management Act	PC	Inland project is not expected to adversely affect Essential Fish Habitat. The EA will be coordinated with NMFS as the EFH assessment.	February 2002 scoping letter.	Full compliance after review of the draft PIR/EA by NMFS.
E.O. 11990 Protection of Wetlands	FC	The project is creating wetlands.	February 2002 scoping letter.	Full compliance.
E.O. 11988 Floodplain Management	FC	Impacts associated under this EO were assessed during the Savings Clause analysis.	February 2002 scoping letter.	Full compliance.
E.O. 12898 Environmental Justice	PC	This E.O. requires consideration of, and avoidance of, disproportionately adverse effects on minority and low-income populations. No such areas were identified in the project vicinity.	February 2002 scoping letter.	Will assure no adverse impacts prior to coordination of PIR.
E.O. 13089, Coral Reef Protection	NA	The resources targeted by this EO will not be impacted by project implementation.	February 2002 scoping letter.	
E.O. 13112, Invasive Species	FC	Project will control invasive plant species in the project area.	February 2002 scoping letter.	Full compliance.

* FC: Complies fully; PC: Partial Compliance due to plan development; NC: Non-Compliant; NA: Not Applicable.

B.2 COMPLIANCE WITH ENVIRONMENTAL LAWS

B.2.1 National Environmental Policy Act of 1969

The scoping process for the Winsberg Farm Wetlands Restoration project was initiated on February 13, 2002, by mailing a scoping letter to federal, state and local agencies; Native-American tribes; private organizations; and interested parties to solicit their views, comments and information about resources, study objectives, alternatives and important features within the study area. Comments received were reviewed and incorporated in project planning. Preliminary assessments on the level of potential impacts to the environment resulting from the operation of this project are anticipated to be negligible. This determination is based on resource agency discussions and coordination with the U.S. Fish and Wildlife Service, Palm Beach County Department of Environmental Resources Management, and the Florida Department of Environmental Protection. Present evaluations have indicated that the Winsberg Farm Wetlands Restoration Project, as envisioned, is expected to result in an impact level of insignificant, and will ultimately provide an opportunity to increase the spatial extent of wetland habitat. This NEPA effort, therefore, will be contained in an Environmental Assessment (EA), which will cover uncontroversial actions not likely to lead to significant environmental impacts.

The draft EA is integrated with the draft Project Implementation Report (PIR). Copies of the draft report and notices of its availability will be mailed to agencies, private groups and individuals, and stakeholders. The project is in compliance with the National Environmental Policy Act.

B.2.2 Endangered Species Act of 1973

Consultation for Threatened and Endangered Species was initiated with the USFWS on February 7, 2002, and with the Florida Fish and Wildlife Conservation Commission on May 27, 2004. Additional guidance was also provided to USACE in a facsimile from the USFWS on March 12, 2002, which identified federally listed species potentially affected by the project. The FFWCC identified state listed species potentially affected by the project in May 2004. In a Biological Assessment dated August 2005 (Annex A), the US Army Corps of Engineers determined that the proposed action may affect, but is not likely to adversely affect the Everglade snail kite, wood stork, bald eagle, or eastern indigo snake. The USFWS concurred with this determination in a letter dated December 2005 (Annex A). This project is in full compliance with the Act.

B.2.3 Fish and Wildlife Coordination Act of 1958

This project has been coordinated with the USFWS and the Florida Fish and Wildlife Conservation Commission (FFWCC). The USFWS provided Planning Aid Letters (PALs) on April 15, 2002; February 10, 2003; and June 21, 2004, concerning Hazardous, Toxic and Radioactive Waste (HTRW) issues and plan formulation. A USFWS representative has taken part in PDT meetings, as well as project planning, development and evaluation. The Draft Fish and Wildlife Coordination Act Report of August 2005 (Annex A of the EA) indicates Department of the Interior support of the selected plan and compliance with the Fish and Wildlife Coordination Act. We continue to coordinate with USFWS and FFWCC. This project is in full compliance with the Act.

B.2.4 National Historic Preservation Act of 1966 (Inter Alia [PL 89-665], The Archaeology and Historic Preservation Act [PL 93-291], and Executive Order 11593)

A cultural resources assessment has been conducted for the Winsberg Farm Wetlands Restoration Project Area, Palm Beach County, Florida (Quad. University Park SE: T46S/R42E, Sections 3 and 4), in accordance with procedures contained in Section 106 of the National Historic Preservation Act of 1966 (Public Law 96-665) as amended in 1992; and 36 C.F.R., Part 800: Protection of Historic Properties; the National Environmental Policy Act of 1969 as amended; Chapter 267, Florida Statutes; Florida's Coastal Management Program; and other implementing state regulations to evaluate the impact and actual/potential adverse effects to listed or eligible historic properties on the National Register of Historic Places.

Based on initial consultation with the State Historic Preservation Officer (SHPO), USACE contracted with New South Associates to conduct a Phase I survey of the Winsberg Farm property. Based on the findings of that survey, it was USACE's determination that the Winsberg Farm Wetlands Restoration Project will have no effect on cultural resources eligible for listing on the National Register of Historic Places, or otherwise of historical or archaeological value. In a letter dated February 11, 2003, the SHPO concurred with this determination and found the Phase I report to be complete and in accordance with Chapter 1A-46, Florida Administrative Code. Site-specific assessments have not been conducted for alternative properties. If a site other than the Winsberg Farm property is selected, additional evaluation and coordination with the SHPO will be required.

B.2.5 Clean Water Act of 1972

All state water-quality standards will be met. A “no permit” was issued for Winsberg Farm based on the reasoning that no wetlands will be impacted nor

any other U.S. waters. A Section 404(b)(1) evaluation will not be applicable or required for this project. The project is in compliance with this Act.

B.2.6 Clean Air Act of 1972

Given the fact that no-to-little pumping capacity is to be added as part of the wetlands restoration project, such a permit may not be required. However, in the event that pumping capacity is added, the co-sponsor will be responsible for determining if an air general permit (operating license) will need to be acquired from the Palm Beach County Health Department's (PBCHD) air pollution permitting section -- the environmental health and engineering section for compliance with Section 309 of the Clean Air Act. If the application needs to be made for a PBCHD operating license, the co-sponsor will be required to apply for a Title V Source air permit either immediately before or following completion of construction. Odor is an air quality concern typically associated with wastewater treatment. This secondary parameter will be controlled to satisfy state and local requirements, in accordance with the existing Domestic Wastewater Permit (No. FLA041424, March 2004). PBCHD's engineering section has been contacted, and currently there are no air-quality concerns pertaining to the Winsberg Farm Restoration Project. No air-quality permits are expected to be required for this project.

B.2.7 Coastal Zone Management Act of 1972

A federal consistency determination, in accordance with 15 CFR 930 Subpart, is included in the draft PIR/EA. The consistency review, delegated to the state of Florida, will be performed during the coordination of the draft PIR/EA.

B.2.8 Farmland Protection Policy Act of 1981

This project has been coordinated with the Natural Resources Conservation Service (NRCS), in accordance with the Farmland Protection Policy Act of 1981. In a letter dated September 3, 2003, the NRCS determined that Winsberg Farm, having been farmed over the past five years, is considered unique farmland and would be taken out of production if the project were implemented. USACE will continue to provide requested information to the NRCS when the recommended plan is selected. The project is in compliance with the Act.

B.2.9 Wild and Scenic River Act of 1968

No designated Wild and Scenic River reaches would be affected by project-related activities. Therefore, this Act is not applicable.

B.2.10 Marine Mammal Protection Act of 1972

Marine mammals will not be impacted by implementation of this project. Therefore, this Act is not applicable.

B.2.11 Estuary Protection Act of 1968

No estuary will be impacted by implementation of this project. This project is in full compliance with the Act.

B.2.12 Federal Water Project Recreation Act

The principles of the Federal Water Project Recreation Act (Public Law 89-72), as amended, have been fulfilled by complying with the recreation cost-sharing criteria as outlined in Section 2(a), paragraph (2).

B.2.13 Fishery Conservation and Management Act of 1976

The project will be coordinated with the National Marine Fisheries and is in compliance with the Act.

B.2.14 Submerged Lands Act of 1953

The project would not occur on submerged lands of the state of Florida, and thus this Act is not applicable.

B.2.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts are not applicable.

B.2.16 Rivers and Harbors Act of 1899

The proposed work will not obstruct navigable waters of the United States. The proposed action has been subject to public notice and other evaluations normally conducted for activities subject to the Act. The project is in full compliance.

B.2.17 Anadromous Fish Conservation Act

Anadromous fish species would not be affected. The project has been coordinated with the National Marine Fisheries Service and is in compliance with the Act.

B.2.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act

No migratory birds would be affected by project activities. The project is in compliance with these Acts. The project will be beneficially improving/increasing habitat for migratory bird foraging and nesting.

B.2.19 Marine Protection, Research and Sanctuaries Act

The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to this project. Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. Disposal activities addressed in this document will be evaluated under **Section** 404 of the Clean Water Act.

B.2.20 Resource Conservation and Recovery Act of 1976

No substances regulated under this Act and related laws have been identified in project lands at this stage. The project is in compliance.

B.2.21 Toxic Substances Control Act of 1976

The most prevalent chemicals known to have been applied to the project area are pesticides, which are exempted from regulation by the Toxic Substances Control Act. With regard to other chemicals, no substances regulated under this Act and related laws have been identified in project lands. The project is in compliance.

B.2.22 Magnuson-Stevens Fishery Conservation and Management Act

There are no designated Essential Fish Habitat (EFH) or federally managed fisheries in the project area. The integrated PIR/EA will serve as an EFH assessment, fully coordinated with NMFS. The project is in compliance with the Act.

B.2.23 Executive Order 11990, Protection of Wetlands

Winsberg Farm will be converted from an agricultural upland site into a constructed, multi-functional wetland. Therefore, this project is expected to establish wetland habitat and function in an area where these are absent. The design will include features such as vegetated littoral shelves and deep-water refugia. This project is in compliance with the goals of this executive order.

B.2.24 Executive Order 11988, Flood Plain Management

The project has been evaluated in accordance with this executive order and is in compliance.

B.2.25 Executive Order 12898, Environmental Justice

This executive order requires the federal government to achieve environmental justice by identifying and addressing disproportionately high adverse effects of its activities on minority or low-income populations, and by involving potentially affected minorities in the public coordination process. Winsberg Farm is currently in agricultural production and the surrounding areas are not low-income or minority as defined by the USEPA Region 4 categories for environmental justice. Outreach in this project has not discovered any concerns from local citizens regarding impacts to low-income and minority populations. Staff members working on this project also do not envision any potential for such impacts. Therefore, Winsberg Farm Wetlands Restoration has fulfilled the requirements of Presidential Executive Order 12898, and there is not a high, adverse or disproportionate impact to low-income or minority populations.

B.2.26 Executive Order 13089, Coral Reef Protection

This executive order applies to coastal projects that might directly or indirectly impact coral reefs, and refers to "those species, habitats, and other natural resources associated with coral reefs." This project will not impact coral reefs or coral reef resources; therefore, this executive order is not applicable.

B.2.27 Executive Order 13112, Invasive Species

The proposed project has a 165-acre footprint mostly comprised of agricultural fields. Most of the plants are exotic, and these will be replaced by appropriate native species if the wetland is constructed. This project will not authorize, fund or carry out any action that might spread or introduce invasive species. Therefore, this project complies with the goals of this executive order.

B.3 PERTINENT CORRESPONDENCE

Please see following pages for pertinent correspondence.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

7 FEB 2005

Mr. Warren Henderson
Natural Resources Conservation Service
Soils Section
2614 NW 43rd Street
Gainesville, Florida 32606-6611

Dear Mr. Henderson:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is resubmitting the Farmland Conversion Impact Rating form (Form AD-1006) for Winsberg Farms. We have completed Parts VI, VII, and VIII as requested.

The Winsberg Farms project is part of the Comprehensive Everglades Restoration Project (CERP) authorized by the Water Resources Development Act of 2000. The chosen location for the Winsberg Farms created wetland is a 200-acre agricultural field in Boynton Beach, Palm Beach County, Florida.

If you have any questions, suggestions, or require more information please contact Ms. Carrie Bond at 904-232-1061 or by electronic mail at Carrie.L.Bond@saj02.usace.army.mil. Your assistance has been greatly appreciated.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

Enclosure

U.S. DEPARTMENT OF AGRICULTURE

Form AD-1006

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	1. Date of Land Evaluation Request 21-Julyr-2003	2. Sheet _1_ of __1__
3. Name of Project Winsberg Farms Wetland Restoration	4. Federal Agency Involved US Army Corps of Engineers	
5. Proposed Land Use Created wetland/treatment cells	6. County and State Palm Beach County, FL	7. Type of Project: Corridor ☐ Other X
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS 7-03 WJH	2. Person Completing this NRCS parts of this form Warren Henderson
3. Does the site or corridor contain prime, unique, statewide or local important farmland? Yes ☒ No ☐ (If no, the FPPA does not apply. Do not complete additional parts of this form)		4. Acres Irrigated / 5. Average Farm Size 835 Acres
6. Major Crop(s) Vegetable	7. Farmable Land in Government Jurisdiction Acres: 402,000 ac	8. Amount of Farmland As Defined in FPPA Acres: 402,000 ac
9. Name of Land Evaluation System Used Soil Potential	10. Name of Local Site Assessment System	11. Date Land Evaluation Returned by NRCS 9-3-03 WJH

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	140 acres			
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0 acres			
C. Total Acres in Site	200 acres			
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime and Unique Farmland	±140			
B. Total Acres Statewide and Local Important Farmland	0			
C. Percentage of Farmland in County or Local Govt. Unit to be Converted	<0.1%			
D. Percentage of Farmland in Govt. Jurisdiction with Same or Higher Relative Value	11%			
PART V *(To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	77			

PART VI *(To be completed by Federal Agency) Corridor or Site Assessment Criteria (These criteria are explained in 7 CFR 558.5(b & c))*	Max. Points Corridor	Max. Points Other	Site A	Site B	Site C	Site D
1. Area in Nonurban Use	15	15	6			
2. Perimeter in Nonurban Use	10	10	0			
3. Percent of Site Being Farmed	20	20	20			
4. Protection Provided by State and Local Government	20	20	0			
5. Distance from Urban Built-up area	0	15	0			
6. Distance to Urban Support Services	0	15	0			
7. Size of Present Farm Unit Compared to Average	10	10	0			
8. Creation of Non-Farmable Farmland	25	10	0			
9. Availability of Farm Support Services	5	5	5			
10. On-Farm Investments	20	20	20			
11. Effects of Conversion on Farm Support Services	25	10	0			
12. Compatibility with Existing Agricultural Use	10	10	0			
TOTAL CORRIDOR OR SITE ASSESSMENT POINTS	160		51			
PART VII *(To be completed by Federal Agency)*						
Relative Value of Farmland (from Part V above)	100		77			
Total Corridor or Site Assessment (From Part VI above or a local site assessment)	160		51			
TOTAL POINTS *(Total of above 2 lines)*	260		128			

PART VIII *(To be completed by Federal Agency after final alternative is chosen)*

1. Corridor or Site Selected: Winsberg Farms (Site A)	2. Date of Selection: Jan. 2005	3. Was A Local Site Assessment Used? Yes ☒ No ☐

4. Reason For Selection: preferred site of sponsor Palm Beach County Water Utilities Department (PBCWUD) and Yellow Book plan selected site

Signature of person completing the Federal Agency parts of this form: Carie L. Boyd — DATE 1-28-05

Wisconsin substitute form AD-1006 6-9-97 Completion instructions: http://www.wi.nrcs.usda.gov/soil/prime/primotes.html

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 7

To TIM PINION	From ERNIE CLARKE
Dept./Agency USFWS	Phone # 904 232 1199
Fax # 772 562 4288	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

ening & Alt. Formulation Outline

ns

3. Pretreatment.
4. Wetland design.
    a. Number of cells.
    b. Depth of cells.
    c. Wetland hydroperiod.
    d. Habitat mosaic.
5. Discharge.
6. Education/recreation.

Options explored for each group & results of initial screening

Options considered for each of these six groups are listed below. Options carried forward to alternative formulation are **in bold**. When an option was rejected prior to alternative formulation, the reason for dismissal follows the option *in italics*.

Site location. Prior to the FSM, the team tried to limit the alternatives to the locally preferred Winsberg site based on the expense of moving SRWRF water elsewhere. HQ requested alternative sites & scales.

1. **Winsberg.**
2. **Alternatives 1 - 7.**

Water source.

1. Surface water (LWDD canal). Included with the hope of reducing the amount of water lost to tide through the canal system. *Reason for dismissal – costly & impractical since it would require an impoundment to regulate input to the wetland system.*
2. Surficial aquifer. *Reason for dismissal – incompatible with the objective of increasing the availability of freshwater for the region.*
3. Rainfall. *Reason for dismissal – incompatible with the objective of increasing the availability of freshwater for the region.*
4. SRWRF water.
    a. **Directly from the facility.**
    b. Via the Wakodahatchee Wetlands. *Reasons for dismissal – 1) Wakodahatchee was not designed to hydraulically pass the estimated volumes of water needed, requiring costly modifications or resulting in stress to an otherwise functioning system; 2) a modification to the existing Wakodahatchee permit would be required, likely requiring additional monitoring & a system re-design (i.e., capacity increase); & 3) it is uncertain whether any water quality improvement to additional flow would occur.*

Page 1 3/18/2004

Winsberg Farms Initial Screening & Alt. Formulation Outline

Pretreatment. Potentially allow for discharge to surface water (↑ water returned to the local system) & to ↓ potential for harm to fish & wildlife from constituents in the SRWRF water (none thus far identified)

1. On-site STA. *Reasons for dismissal – 1) reduction of available space for maximizing wildlife use (objective); & 2) the need for physical maintenance of the STA (translating to increased costs).*
2. Additional pretreatment at the SRWRF. *Reasons for dismissal – 1) space limitations; & 2) cost.*

Wetland design.

1. Number of cells. *Reason for dismissal – will be addressed during the design phase.*
2. Depth of cells. *Reason for dismissal – will be addressed in the context of habitat mosaics.*
3. Wetland hydroperiod.
   a. **Long-hydroperiod. (same as a "Wakodahatchee" type hydroperiod?)**
   b. Short-hydroperiod. *Reason for dismissal – less water could be delivered to a short-hydroperiod wetland, limiting project benefits .*
4. Habitat mosaic. *Reason for dismissal – will follow FWS recommendations & consider design limitations in developing habitat mosaic.*

Discharge. Considered to maximize the amount of water returned to the local system.

1. Deep well injection. *Reason for dismissal – activity that the project is specifically trying to reduce.*
2. Surface water.
   a. Wakodahatchee Wetlands. *Reasons for dismissal – 1) permit restrictions for Wakodahatchee; & 2) to avoid disrupting an already functioning system.*
   b. LWDD canal. *Reasons for dismissal – 1) water quality constraints in the receiving basin; & 2) permitting limitations.*
3. **Surficial aquifer.**

Education/recreation. Will be part of the local sponsor plan.

Reason for dismissal –educational/recreational benefits will be considered secondary. Therefore alternatives will not be produced based on recreational management measures.

Options carried forward to alternative formulation

In summary, alternatives will:

1. Be based on alternative sites in the SRWRF area including the locally preferred Winsberg Farm.
2. Be scaled from a minimum size of 75-acres to a maximum of 640-acres.
3. Utilize water directly from the SRWRF as a source.
4. Exhibit a "Wakodahatchee" type hydroperiod.
5. Discharge to the surficial aquifer.
6. Follow FWS recommendations & consider design limitations in developing habitat mosaics.

Also, number & depth of cells will be addressed indirectly in project planning or through project design.

Page 2 3/18/2004

DRAFT Management Measure Screening & Alternative Plan Formulation Strategy

Strategy

In accordance with Corps planning guidance, alternative plans for the Winsberg Farm Wetland Restoration were formulated to meet the project objectives (increase local water resource availability for the natural systems and other users, create wetlands, increase wildlife habitat, and provide public education and recreational opportunities) while avoiding project constraints (no elimination or transfer, maintenance of flood protection, no effect on tribal compact, no adverse effect on listed species, meet surface and ground water discharge regulations).

Alternative plans were formulated by combining the structural (features) and non-structural (activities) management measures suggested by the Winsberg Farm Wetland Restoration Project Delivery Team (PDT). The initial measures fell into six general groups, i.e. those that dealt with site location, water source, pretreatment, wetland design, discharge, and education/recreation (see Table 1). Wetland design management measures were further divided to address such considerations as the number and depth of cells, wetland hydroperiod, and habitat mosaic. Certain measures included in this initial listing were screened out prior to alternative development, as discussed below.

Potential Management Measures and Initial Screening

The following is a broad description of the management measures considered by the PDT, with measures grouped in six areas described above. The rationale for eliminating certain measures prior to alternative formulation is included where appropriate.

Site location Alternative sites were considered within roughly a 4-mile radius of the Southern Region Water Reclamation Facility (SRWRF), an area that included that facilities' mandatory reuse zone (Figure 1). The search was limited in this manner in order to pursue sites in closest proximity to the SRWRF and thereby limit costs associated with piping reuse water, which were estimated at approximately $600,000/mile. To assess different project scales, the PDT identified sites between 75 and 1000 acres within the study area. A total of seven potential sites were considered, including the Winsberg site.

Sites within this area were initially screened based on the suitability of the current land use for wetland restoration or construction. Agricultural or undeveloped parcels were considered to be compatible with the project purpose and scope, while parcels containing commercial and/or residential development were discounted as incompatible. Also, the locations of other CERP projects, most importantly the Agricultural Reserve Reservoir, were considered unavailable to this project. This reduced the potential list of sites to three (Winsberg, ARR east, County).

The remaining sites were further evaluated based on per acre land values, the distance of pipe required to deliver water to the site from the SRWRF, and such ecological considerations as historical vegetation and soil types, the presence of degraded wetlands, and proximity to existing natural areas [Loxahatchee National Wildlife Refuge (LNWR) and, to a lesser extent, the Wakodahatchee Wetlands]. In general, land values fell into three categories, with prices highest east of the Florida Turnpike (approximately $120 – 170,000/acre), decreasing significantly west of the Florida Turnpike (approximately $60,000/acre), and decreasing further still west of State

DRAFT Management Measure Screening & Alternative Plan Formulation Strategy

Route 7 (approximately $20 - $40,000/acre). Conversely, ecological values increased in the western portion of the search area due principally to two factors: the proximity to LNWR and the fact that wetlands were historically more prevalent in that area. The combination of lower land prices and higher ecological values make the western portion of the range more attractive for wetland restoration or construction. However, as indicated above, transmission costs do increase with distance from the SRWRF, so properties in the western portion of the search area do involve greater piping costs (piping distances were based on hypothetical right-of-ways along the L-29 and L-30 canals for east-west transmission, and along roads like Route 7 for north-south transmission). A summary of this information collected in the alternative site analysis is presented in Table 2.

The alternative site review yielded several attractive properties west of the Florida Turnpike. Also, the site preferred by the local sponsor (Winsberg Farm) was included as a potential alternative site. Therefore, several sites remain for alternative plan composition.

Source water Several potential water sources exist for the constructed wetland system: surface water [Lake Worth Drainage District (LWDD) canal], the surficial aquifer, rainfall, or the SRWRF (directly from the facility or via the Wakodahatchee Wetlands). While each of these options demonstrates potential for use in wetland creation/restoration, all but the concept of delivering SRWRF water directly to the wetland site were dismissed prior to formulation of alternatives. Rehydration of the proposed wetland with either rainfall or the surficial aquifer was rejected as incompatible with the objective of increasing the availability of freshwater for the region. While the use of surface water currently lost to tide would be compatible with aforementioned objective, this option was discounted as costly and impractical since it would require an impoundment to regulate input to the wetland system throughout the year.

The possibility of delivering water to wetland creation/restoration site from the SRWRF via the Wakodahatchee Wetlands was included on the notion that the receiving system would benefit from water quality improvement realized at Wakodahatchee. This concept was ultimately rejected for several reasons. First, the Wakodahatchee Wetlands site was not designed to hydraulically pass the volumes of water estimated as needed to meet the an approximately 150-acre wetland system, the minimum size project the PDT was considering. The size and design of Wakodahatchee would therefore have to be modified (which translates into a cost increase), or the biological system would be overstressed and result in virtually untreated flow. Furthermore, a modification to the existing Wakodahatchee permit would be required. Such a modification would likely require additional monitoring and a system re-design (i.e., capacity increase). Importantly, it's questionable whether, or not, any water quality improvement to additional flow would occur.

Pretreatment Two options were explored for additional treatment of the water from the SRWRF prior to discharge to the created/restored wetlands: the inclusion of an on-site stormwater treatment area (STA) designed for water quality improvement in the project area or additional pretreatment at the SRWRF. In general, the advantage to additionally treating the water would be that the effluent would be less likely to adversely impact impaired canal surface waters (if discharge to surface water was desired) or wildlife on the project site. Also, recharge water would undergo additional solids and nutrient removal. However, each treatment option was

ultimately rejected. The inclusion of an STA was dismissed because of the resulting reduction of available space for maximizing wildlife use (a project objective), and the need for physical maintenance of the STA (translating to increased costs). Additional pretreatment at the SRWRF was rejected for two reasons: space limitations and cost. A cursory examination indicated the SRWRF lacks sufficient land to add pretreatment facilities. System augmentation would involve providing facilities for further nitrification and denitrification, requiring significant capital outlays for the facility (in the millions of dollars).

Wetland design Assorted management measures associated with the design of the wetland system were discussed by the PDT, including varying the number and depth of cells, the hydroperiod of the wetland, and the habitat mosaic.

Cell number The PDT recognized that multiple cell use allows for operational flexibility and, with regards to water quality, this flexibility allows the operator to maintain optimal water stages that promote better contaminant settling in the water column and entrapment at the sediment layer. However, it was determined that since this factor would not significantly impact the projects ability to meet objectives it would be more appropriately addressed during project design rather than planning. Variations in cell numbers were therefore not factored into the alternatives formulated.

Cell depth Water levels, largely resulting from the depth of the wetland cell(s), will impact plant community establishment and composition, wildlife usage, water quality improvement processes, and the amount of water delivered to the site (and consequently the amount of water returned to the local system). However, it was recognized that variations in cell depth would be addressed indirectly through the PDTs effort to evaluate combinations of deep water, wetland, and upland habitats for the system (i.e. habitat mosaics). Therefore, to avoid duplication, it was determined that cell depth would be more appropriately addressed in the context of alternative habitat mosaics (below).

Wetland hydroperiod The hydroperiod of the wetland system, like water level, will have implications for the plant community establishment and composition, wildlife usage, water quality improvement, and the amount of water delivered to the site. The PDT explored the using long- and/or short-hydroperiod wetlands in system design. Long-hydroperiod wetlands were included to reflect the hydrologic regime of the Wakodahatchee Wetlands, a nearby, functioning, wetland constructed by Palm Beach County. Short-hydroperiod wetlands were considered because they are perhaps more representative of the wetland communities that existed in the project vicinity prior to human disturbance. However, considerably less water could be delivered to a short-hydroperiod wetland, limiting project benefits. Short-hydroperiod wetlands were therefore removed from future consideration.

DRAFT Management Measure Screening & Alternative Plan Formulation Strategy

Habitat mosaic As discussed above, the mosaic of upland, wetland and deepwater habitats will depend on cell depth, and will influence plant community establishment and composition, wildlife usage, water quality improvement, and the amount of water delivered to the site. Various combinations of habitat types were included in alternatives. Will follow FWS recommendations and consider design limitations….

Discharge Several options were considered regarding the destination of water from the wetland creation/restoration site, including releasing water to a deep injection well, to surface water (Wakodahatchee Wetlands or a LWDD canal), or to the surficial aquifer (through seepage). The PDT recognized that discharge would have important implications for the projects ability to positively influence the regional hydrologic condition, and therefore attempted to consider a range of possibilities. As it turned out, the combination of the project objectives and water quality constraints leads to the rapid dismissal of two of the discharge options considered. First, deep injection was rejected as an option since it is an activity that the project is specifically trying to reduce. Second, while benefits of discharging to the Wakodahatchee Wetlands potentially exist (discharge to an established system, one discharge zone for the surrounding area), this option was discarded due to permit restrictions for that site (discharge limitations, Safe Drinking Water Act MCLs, new monitoring requirements), and to avoid disrupting an already functioning system.

Discharge to a LWDD canal was likewise rejected as unfeasible due to water quality constraints in the receiving basin and limitations presented in getting the project permitted. The Florida Department of Environmental Protection (DEP) viewed surface discharges to LWDD canals as unlikely to be allowable because these canals are considered "water quality impaired" from pollutants present in runoff from the highly urbanized land areas in this basin. Though the proposed project does not currently consist of an alternative that includes surface water discharge, it should be noted that the L-30 conveyance, located on the southern boundary of the Winsberg property, has been 303d-listed (as Segment E-3) as an impaired water body (reference Impaired Waters Rule, 62-303 FAC). The parameters of concern for which the L-30 has been listed are Coliforms, Nutrients, and DO. Since Total Maximum Daily Loads (TMDLs) have not been calculated for the E-3 segment, the CERP general policy of not degrading receiving water bodies would be adhered to for design and operations development purposes. With regard to the permitting approach, the local sponsor's position was that the nearby Wakodatchee Wetland set a precedent for an acceptable regulatory approach. Ample groundwater monitoring records are available for the Wakodahatchee Wetland site to document that use of secondary effluent from the SRWRF for wetland rehydration has had no negative impact on the surficial aquifer at this location, and local sponsor has proposed permitting of the current project under the same rules and regulations as were applied to the Wakodahatchee Wetland site (Chapter 62-600, Florida Administrative Code [FAC]). All further planning is based on the presumption that FDEP is in agreement with this regulatory approach. No surface discharge of water from the wetland will be allowed; all waters introduced to the site will leave either through infiltration to groundwater or through evapotranspiration.

With regard to surficial aquifer discharge, the possibility of lining the wetland was explored.

DRAFT Management Measure Screening & Alternative Plan Formulation Strategy

Education/recreation Increasing the availability of educational and recreational opportunities is a stated project objective. To address this objective, the PDT has considered such things as providing access to the interior of the site (on levee trails or boardwalks) and constructing a nature center on site. However, educational/recreational benefits will be considered secondary, and therefore alternatives will not be produced based on recreational management measures.

Results of the Initial Screening of Management Measures

The above planning decisions reduced the list of candidate management measures to a manageable number. The following measures will be considered in alternative formulation:

Site location: 1. Winsberg Farm
2. Alternative A, B, C…
Source water: 1. Directly from the SRWRF
Pretreatment: 1. None
Wetland design: 1. Long-hydroperiod wetlands
2. FWS recommendations on habitat mosaic
Discharge: 1. Groundwater (look at levels of discharge with levels of lining?)
Education: 1. Not formulating for education

E. Clarke Page 5 3/18/2004

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
PALM BEACH GARDENS REGULATORY OFFICE
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

October 3, 2003

Regulatory Division
South Permits Branch
200306753(NW-TKW)

Palm Beach County Board of County Commisioners
C/o Hazen and Sawyer
2101 Corporate Boulevard, Suite 301
Boca Raton, Florida 33431

Gentlemen:

Reference is made to your Department of the Army permit application for the Winsberg Farms Wetlands Restoration Project. The project is located in Sections 3 and 4, Township 46 south, Range 42 east, Palm Beach County, Florida. The project has been assigned file number 200306753(NW-TKW). Please refer to this number in future correspondence.

The application has been reviewed and is not sufficient for us to evaluate your proposal. In order for us to review your proposal and/or circulate a public notice, the information indicated on the enclosed checklist(s) is needed. In addition, we are coordinating the proposal with the Jacksonville District's Comprehensive Everglades Restoration Project (CERP) project manager for review and comment.

As the application is considered incomplete, no action will be taken on it until the requested information has been received. We request you provide this information within 45 days of the date of this letter. If no response is received by then, we will assume you have no further interest in obtaining a Department of the Army permit and the application will be deactivated.

Any questions concerning this letter should be directed to Tori White at the letterhead address or by telephone at 561-472-3517.

Sincerely,

Tori White

Tori White
Team Leader,
South Permits Section

Enclosures

Copy Furnished:
Gary Dernlan, Palm Beach County Water Utilities Department, 2065 Prairie Road, W Palm Beach, FL 33416
Rebecca Weiss, USACE, PO Box 4970, Jacksonville, FL 32232-0019

2

FILE #: 200306753 Project Name: Winsberg Farms

Section 404

Additional information is necessary to process your Department of the Army permit application. The necessary information is identified by a checkmark on items listed below:

Baseline Information	☐	Please provide the names, addresses, and zipcodes of property owners whose property directly adjoins the project.
	☐	Please provide names, phone numbers and complete addresses of all applicants, agents acting on behalf of the applicants and other involved persons.
	☐	Please provide the Section, Township and Range of the project.
	☐	Please provide a copy of the completed Joint Environmental Resource Permit Application for this project.
	☐	Please describe in general terms the proposed work, system, or activity.
	☐	Please provide legible 8 1/2" x 11" plan-view and cross-sectional drawings depicting the jurisdictional limits, the proposed fill and/or excavation, and the proposed site plan with all existing and proposed structures.
	☐	Please provide a recent photograph of the shoreline at the project site, an aerial photograph of the project site or any GIS maps that you may have.
	☐	Has the proposed dredge area been dredged before? If so, please provide the date(s).
	☐	Has a Corps jurisdictional determination been conducted? If so, please provide a copy of the jurisdictional documents. If not, it will be necessary for you to conduct a jurisdictional determination in accordance with the Army Corps of Engineers 1987 Wetland Delineation Manual.
	☐	Please provide a copy of all previous DA permits issued for project at this address.
	☐	Please provide a list of any State and local permits or approvals applied for this project.
	☐	If your proposed project has more than one phase, please provide our office with plans and drawings that will show all phases planned for possible future construction.
	☐	What are the latitude and longitude coordinates of the project site?
	☐	Please include a map indicating the exact location of your property in relation to a major road or water body.
	☐	Please describe the vegetation communities within the project site.
	☐	Please provide a wildlife survey for the project site.
	☐	The permit application indicates that fill will be placed in Waters of the United States. Please indicate the exact acreage of the proposed fill.
	☐	What is the total amount (cubic yards, square feet, and acreage) of fill and excavation proposed?
Avoidance	☐	Please demonstrate measures taken to avoid and/or minimize impacts to aquatic resources.
	☐	Please provide an alternative site analysis of other sites considered (see attached guidelines)
	☐	Once avoidance and minimization have been addressed, you will be required to provide in-kind mitigation for any unavoidable impacts to aquatic resources. Please provide a compensatory plan that will outweigh the proposed impacts.
	☐	Please provide functional assessments for proposed impacts to wetlands and proposed mitigation for those impacts.

United States Department of Agriculture

USDA

NRCS Natural Resources Conservation Service

2614 N.W. 43rd Street
Gainesville, FL 32606
Phone: 352-338-9533

http://www.fl.nrcs.usda.gov

P.O. Box 141510
Gainesville, FL 32614
Fax: 352-338-9578

September 3, 2003

Mr. James C. Duck
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

RE: Winsberg Farm Wetland Restoration Project

Dear Mr. Duck:

Enclosed is Form AD-1006 with Parts II, IV, and V completed for the referenced project. The areas which are currently being farmed or have been farmed over the past five years are considered unique farmland, which is defined by the Farmland Protection Policy Act (FPPA). Completion of the project would take this farmland out of production. According to the FPPA, if the Federal Agency involved decides to fund the projects, Parts VI and VII of the form should be completed and returned to this office.

If there are any questions, please contact me.

Sincerely,

Warren Henderson

Warren Henderson
State Soil Scientist

Enclosure

cc: Gregorio Cruz, DC, West Palm Beach Service Center

The Natural Resources Conservation Service works in partnership with the American people to conserve and sustain natural resources on private lands.

An Equal Opportunity Employer

U.S. DEPARTMENT OF AGRICULTURE

Form AD-1006

FARMLAND CONVERSION IMPACT RATING

PART 1 *(To be completed by Federal Agency)*	1. Date of Land Evaluation Request 21-Julyr-2003	2. Sheet _1_ of ___1__
3. Name of Project Winsberg Farms Wetland Restoration	4. Federal Agency Involved US Army Corps of Engineers	
5. Proposed Land Use Created wetland/treatment cells	6. County and State Palm Beach County, FL	7. Type of Project: Corridor ☐ Other X
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS 7-03 WJH	2. Person Completing the NRCS parts of this form Warren Henderson
3. Does the site or corridor contain prime, unique, statewide or local important farmland? Yes ☑ No ☐ (If no, the FPPA does not apply - Do not complete additional parts of this form)		4. Acres Irrigated / 5. Average Farm Size 835 Acres
6. Major Crop(s) Vegetable	7. Farmable Land in Government Jurisdiction Acres: 402,000 %	8. Amount of Farmland As Defined in FPPA Acres: 402,000 %
9. Name of Land Evaluation System Used Soil Potential	10. Name of Local Site Assessment System	11. Date Land Evaluation Returned by NRCS 9-3-03 WJH

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	140 acres			
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0 acres			
C. Total Acres In Site	200 acres			
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime and Unique Farmland	±140			
B. Total Acres Statewide and Local Important Farmland	0			
C. Percentage of Farmland in County or Local Govt. Unit to be Converted	<0.1%			
D. Percentage of Farmland in Govt. Jurisdiction with Same or Higher Relative Value	11%			
PART V *(To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland to be Serviced or Converted (Scale of 0 - 100 Points)*	77			

PART VI *(To be completed by Federal Agency) Corridor or Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b & c))*	Max. Points Corridor	Max. Points Other	Site A	Site B	Site C	Site D
1. Area in Nonurban Use	15	15				
2. Perimeter in Nonurban Use	10	10				
3. Percent of Site Being Farmed	20	20				
4. Protection Provided by State and Local Government	20	20				
5. Distance from Urban Built-up area	0	15				
6. Distance to Urban Support Services	0	15				
7. Size of Present Farm Unit Compared to Average	10	10				
8. Creation of Non-Farmable Farmland	25	10				
9. Availability of Farm Support Services	5	5				
10. On-Farm Investments	20	20				
11. Effects of Conversion on Farm Support Services	25	10				
12. Compatibility with Existing Agricultural Use	10	10				
TOTAL CORRIDOR OR SITE ASSESSMENT POINTS	160					
PART VII *(To be completed by Federal Agency)*						
Relative Value of Farmland (from Part V above)	100					
Total Corridor or Site Assessment (From Part VI above or a local site assessment)	160					
TOTAL POINTS *(Total of above 2 lines)*	260					

PART VIII *(To be completed by Federal Agency after final alternative is chosen)*

1. Corridor or Site Selected:	2. Date of Selection:	3. Was A Local Site Assessment Used? Yes ☐ No ☐

4. Reason For Selection:

Signature of person completing the Federal Agency parts of this form:	DATE

Wisconsin substitute form AD-1006 6-9-97 Completion instructions: http://www.wi.nrcs.usda.gov/soil/prime/primotes.html

22 JUL 2008

Planning Division
Environmental Branch

Mr. Warren Henderson
Natural Resources Conservation Service
Soils Section
2614 NW 43rd Street
Gainesville, Florida 32606-6611

Dear Mr. Henderson:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, under the Farmland Protection Policy Act of 1972, is requesting your assistance in examining the effects to unique or prime farmland to be addressed in a draft Environmental Assessment being prepared for the Winsberg Farm Wetlands Restoration Project. The project is part of the Comprehensive Everglades Restoration Project (CERP) authorized by the Water Resources Development Act of 2000. The proposed location for the Winsberg Farms created wetland is a 200-acre agricultural field in Boynton Beach, Palm Beach County, Florida (map enclosed).

The proposed project consists of the construction of approximately 140 acres of wetland and open water habitat east of the Loxahatchee Wildlife Preserve in Palm Beach County. After earth grading for the wetland is complete, 1.5 to 2.0 million gallons per day of treated and recycled reuse water from the Southern Region Water Reclamation Facility are proposed to rehydrate the constructed area. The wetland would then be planted with a variety of native wetland plants and created habitat for various species of wildlife.

The Corps requests your expertise in identifying any prime or unique farmland that may be within the project area or affected by the activities of the project. Enclosed is a map with the location of the Winsberg Farm project area for your use (Figure 1). The wetland features would be 140 acres within the 200 acres outlined.

-2-

If you have any questions, suggestions, or require more information, please contact Mrs. Rebecca Weiss at 904-232-1577 or by electronic mail at rebecca.j.weiss@usace.army.mil. Your assistance is greatly appreciated.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Weiss/CESAJ-PD-ES/1577/nia/7/21/03
Cintron/CESAJ-PD-ES
Mason/CESAJ-PD-E 7/21/03
Grubb/CESAJ-DR-S 7/21/03
Dick/CESAJ-PD

L: group/pdes/weiss/NRCS-winsberg

Weiss, Rebecca J SAJ admin copy

From: Timothy_Pinion@fws.gov
Sent: Tuesday, March 04, 2003 4:36 PM
To: Weiss, Rebecca J
Cc: Sharon_Fauver@fws.gov
Subject: Re: FW: Winsberg Farms Wetland Restoration -- Phase I/II Completion D raft SOW

Wins_HTRW_PAL_4-02.doc

Hi, Rebecca.

The Service's Environmental Contaminants staff have reviewed the Phase I / II Scope of Work for Winsberg Farms and provide these brief comments:

1. The size of the parcel dictates that there should be 15 or more soil samples collected. The SOW only mentions 4. This will be insufficient to determine background. Note that the 15 are on top of any point source samples.

2. Appendix 2 includes sections of a draft document prepared by the Service. Please remove "T. Pinion" from the reference.

I've also attached our Planning Aid Letter dated April 15, 2002, which contains the Service's comments related to the original Environmental Audit conducted on Winsberg Farms.

Thanks for the opportunity to review the Scope of Work. Please forward these comments to Mark White as I do not have his e-mail address. Feel free to contact me with any questions.

Talk to you soon.
--Tim

(See attached file: Wins_HTRW_PAL_4-02.doc)

Tim Pinion
US Fish and Wildlife Service
South Florida Ecological Services
1339 20th Street
Vero Beach, FL 32960
phone: 561-562-3909
fax: 561-562-4288 or 561-564-7393

Rebecca.J.Weiss@saj02.usa

1

FLORIDA DEPARTMENT OF STATE
Kenneth W. Detzner
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Jacksonville District US Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

February 11, 2003

Re: DHR No. 2002-11320B / Additional Information Received: February 10, 2003
Phase I Cultural Resources Survey of the Winsberg Farm Wetlands Restoration, Palm Beach County, Florida (New South Associates 2002) - Draft Report

Dear Mr. Duck:

Our office has received the requested photographs of the Winsberg Farm (8PB11808), as well as the site form and site description. It is the opinion of New South Associates that development of the subject parcel will have no effect on any historic properties eligible for listing in the *National Register of Historic Places*, or otherwise of historical or archaeological value. Based on the information provided, this office concurs with this determination and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*.

If you have any questions concerning our comments, please contact Alissa Slade, Historic Sites Specialist, at amslade@mail.dos.state.fl.us or (850) 245-6333. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO
for Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

Xc: Mr. Charles Cantley, New South Associates

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6435
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☑ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476
☐ St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044
☐ Tampa Regional Office (813) 272-3843 • FAX: 272-2340

FLORIDA DEPARTMENT OF STATE
Kenneth W. Detzner
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James Duck, Chief
Planning Division, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

January 15, 2003

RE: DHR No. 2002-11604 / Received by DHR: December 13, 2002
Project Name: *Winsberg Farms Wetland Restoration Project*
Palm Beach County, Florida

Dear Mr. Duck:

Our office received and reviewed the above referenced project in accordance with *National Environmental Policy Act of 1969*, and Section 106 of the *National Historic Preservation Act of 1966*, as amended. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing the project's effects, and considering alternatives to avoid or reduce the project's effect on such properties.

We have reviewed sections 3.16, 4.34 and 4.7 of the referenced Final Environmental Impact Statement concerning Cultural Resources. Based on the information provided, it is the opinion of this office that the proposed undertaking will have no effect on historic properties.

If you have any questions concerning our comments, please contact Janice Maddox, Historic Sites Specialist, by electronic mail at jmaddox@mail.dos.state.fl.us, or by phone at 850/245-6333 or 800/847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO

for Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ **Director's Office** (850) 245-6300 • FAX: 245-6435
☐ **Archaeological Research** (850) 245-6444 • FAX: 245-6436
☑ **Historic Preservation** (850) 245-6333 • FAX: 245-6437
☐ **Historical Museums** (850) 245-6400 • FAX: 245-6433
☐ **Palm Beach Regional Office** (561) 279-1475 • FAX: 279-1476
☐ **St. Augustine Regional Office** (904) 825-5045 • FAX: 825-5044
☐ **Tampa Regional Office** (813) 272-3843 • FAX: 272-2340

DIVISIONS OF FLORIDA DEPARTMENT OF ST
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Jacksonville District US Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

December 11, 2002

Re: DHR No. 2002-11320 / Date Received by DHR: December 5, 2002
Phase I Cultural Resources Survey of the Winsberg Farm Wetlands Restoration, Palm Beach County, Florida (New South Associates 2002) - Draft Report

Dear Mr. Duck:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties listed or eligible for listing in the *National Register of Historic Places*, assessing effects upon them, and considering alternatives to avoid or minimize adverse effects.

Results of the survey indicate one archaeological occurrence and one farm complex (8PB11808) were identified in the subject parcel. The archaeological occurrence, described as an Albany-slip, saltglaze stoneware sherd, lacks substantive research potential and is considered ineligible for listing in the *National Register of Historic Places*. The Winsberg Farm (8PB11808), while representative of mid-twentieth century truck farming in Palm Beach County, is not an exceptional example of such an operation. Therefore, property 8PB11808 (ca. 1961) is considered ineligible for listing in the *National Register* due to insufficient age. It is the opinion of New South Associates that the proposed wetland restoration project will have no effect on any historic properties eligible for listing in the *National Register*. Based on the information provided, this office concurs with these determinations. In order for the final report to be considered complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*, original photographs of property 8PB11808 must be included.

If you have any questions concerning our comments, please contact Mary Beth Fitts, Historic Sites Specialist, at mbfitts@mail.dos.state.fl.us or (850) 245-6333. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO

Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

Xc: Mr. Charles Cantley, New South Associates

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ **Director's Office** (850) 245-6300 • FAX: 245-6435
☐ **Archaeological Research** (850) 245-6444 • FAX: 245-6436
☒ **Historic Preservation** (850) 245-6333 • FAX: 245-6437
☐ **Historical Museums** (850) 245-6400 • FAX: 245-6433
☐ **Palm Beach Regional Office** (561) 279-1475 • FAX: 279-1476
☐ **St. Augustine Regional Office** (904) 825-5045 • FAX: 825-5044
☐ **Tampa Regional Office** (813) 272-3843 • FAX: 272-2340

Planning Division
Environmental Branch

DEC 0 3 2002

Dr. Janet Snyder Matthews
Director, Division of Historical Resources
State Historic Preservation Officer
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Dr. Matthews:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects of the proposed construction of a wetland system with educational facilities as part of the Winsberg Farms Wetland Restoration Project. The project area is located in Section 04, Township 46 south, Range 42 east, illustrated on the University Park Quadrangle, in Boynton Beach, Palm Beach County, Florida. Consultation in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties,* between your office and the Corps in March 2002, DHR 2002-2570 and DHR 2002-1546, recommended a systematic professional cultural resource survey.

The Corps contracted with New South Associates to conduct a phase I survey of the project area. A draft copy of their report, *Phase I Cultural Resources Survey of the Winsberg Farm Wetlands Restoration Palm Beach County, Florida,* is enclosed. This survey consisted of both surface and subsurface survey including 969 shovel tests across the 140-acre project area, as well as inspection of architectural structures on site. It resulted in the identification of one archeological occurrence in the project boundary and no historical sites. The one archeological occurrence within the project area is a single Albany-slip, saltglaze stoneware sherd.

Considering the past disturbances and management practices of the property and the results of additional shovel tests at the occurrence site, it is unlikely that the project will affect significant cultural resources. Therefore, it is the Corps' determination that the Winsberg Farm Wetland Restoration Project

-2-

will have no effect on cultural resources eligible for listing on the National Register of Historic Places.

Based on this evaluation, I request your written concurrence with my determination that the construction of the Winsberg Farm Wetland Restoration Project will have no effect on historic properties eligible to the National Register of Historic Places. If there are any questions, please contact Rebecca Weiss at 904-899-5025 or by e-mail at Rebecca.j.weiss@usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Weiss/CESAJ-PD-ES/5025 12-3-07
Dupes/CESAJ-PD-ES
Cintron/CESAJ-PD-ES
Mason/CESAJ-PD-E
Grubb/CESAJ-DR-S
Duck/CESAJ-PD

L: group/pdes/weiss/winsbergfarm/winsbergCR/winsbergSHPO2

United States Department of the Interior

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

October 24, 2002

James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Attention: Rebecca Weiss

Re: Winsberg Farms Wetlands Restoration Project

Dear Mr. Duck:

The Fish and Wildlife Service (Service) has prepared this letter in response to a written notification from the U.S. Army Corps of Engineers (Corps) dated September 20, 2002, documenting a delay in the preparation of a biological assessment as required under the Endangered Species Act of 1973, as amended, for the Winsberg Farms Wetlands Restoration Project. The Service understands that as a result of a delay in the schedule of the project, several tasks and deliverables have not yet been completed, including those necessary for the Corps to complete a biological assessment of potential project effects on federally listed threatened and endangered species. We recommend that the Corps contact the Service within 180 days prior to the finalization of the biological assessment for this project to confirm that the threatened and endangered species list provided on March 12, 2002, is current and complete, in accordance with 50 CFR 402.12 (e). Additionally, to aid in the consultation process, guidance is enclosed with this letter that outlines the Service's recommendations for the format and content of a biological assessment. We are also available to provide technical assistance which may be of aid in preparation of your assessment.

The Service looks forward to continuing to coordinate with you on the Winsberg Farms Wetlands Restoration Project. If you have any questions, please contact Tim Pinion, Fish and Wildlife Biologist, at 772-562-3909, ext. 294.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

Enclosure

OUTLINE EXAMPLE FOR A
BIOLOGICAL ASSESSMENT OR A BIOLOGICAL EVALUATION

A. **Cover letter** - Include purpose of consultation, project title, and consultation number (if available). A determination needs to be made for each listed species and designated critical habitat. There are three options: 1) making a "no effect" determination (requesting Service concurrence is optional), 2) requesting Service concurrence with a "may affect, is not likely to adversely affect" determination, or 3) requesting formal consultation with the Service for a "may affect, is likely to adversely affect" determination. If proposed species or critical habitat are included, state whether the project "is likely to jeopardize the continued existence" of a proposed species or "adversely modify" proposed critical habitat.

B. **Project description** - Describe the project area and proposed action, including interrelated and interdependent actions. Be specific and quantify whenever possible. Include maps, drawings, photographs, and any other materials that may help a reviewer understand project.

C. **Species, suitable habitat, and critical habitat description(s)** -
for each species:
1. Describe the affected environment (quantify whenever possible)
2. Describe the species biology
3. Describe current conditions for each species
    a. Rangewide
    b. In the project area
    c. Cumulative effects of State and private actions in the project area
    d. The effects of other Federal actions in the area that have completed consultation
4. Describe critical habitat (if applicable)

D. **Effects of the proposed action** - Describe effects of the proposed action on each species and/or designated critical habitat, including:
1. Direct effects
2. Indirect effects
3. Effects of interrelated and interdependent actions
4. Cumulative effects
5. Quantity of incidental take

E. **Conservation measures** - Describe conservation measures that will be taken to benefit or promote the recovery of listed species that are included as an integral part of the proposed action (protective measures to minimize or compensate for effects to each species).

F. **Conclusion(s)** - Provide effect determinations for each species and/or critical habitat.

G. **Literature Cited** - Provide a list of literature cited or data referenced.

H. **List of Preparers** - Provide a list of preparers and contacts, as well as their affiliations and qualifications.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Planning Division
Environmental Branch

SEP 20 2002

Mr. James J. Slack
South Florida Ecological Services Office
U.S. Fish & Wildlife Service
Attn: Mr. Timothy Pinion
1339 20th Street
Vero Beach, Florida 32960

Dear Mr. Slack:

The purpose of this letter is to document a delay in preparing a Biological Assessment as required under the Endangered Species Act for the Winsberg Farm Restoration Project. Due to a delay in schedule of the entire project and a stopage of tasks conducted under an early start memorandum, deliverables for the Winsberg Farm Wetland Restoration Project have fallen behind. This includes project conditions, proposed management activities, and site assessments necessary to make a determination in a Biological Assessment. As a new project schedule is developed, the U.S. Army Corps of Engineers will coordinate with the U.S. Fish and Wildlife Service to determine a mutually acceptable time to prepare the appropriate coordination documents.

If you have any questions, please feel free to contact Rebecca Weiss at 904-899-5025.

Sincerely,

James C. Duck
Chief, Planning Division

RCVD PDES
20 may 2002

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Dedicated to making Florida a better place to call home"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary

May 15, 2002

Mr. James C. Duck
Department of the Army
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Department of the Army - District Corps of Engineers (CORPS) - Scoping Notice
Winsberg Farm Wetland Restoration Project - Boynton Beach, Palm Beach County, Florida
SAI: FL200202191549C

Dear Mr. Duck:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4231, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

The South Florida Water Management District (SFWMD) notes that the generalized location map provided with the scoping notice did not identify the exact location of the site. However, SFWMD has outlined general comments which should help the Corps in the project design. Also, permits will be required from SFWMD prior to the initiation of any work on this site. Please refer to the enclosed SFWMD comments for further details.

The Florida State Historic Preservation Officer (SHPO) is concerned that project activities could disturb significant archaeological or historic sites. Therefore, the SHPO recommends that a systematic archaeological and historical survey be conducted within the project area. The Corps should contact the SHPO office early in the process for information regarding the recommended survey. Please refer to the enclosed SHPO comments for further details.

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.dca.state.fl.us

CRITICAL STATE CONCERN FIELD OFFICE
2796 Overseas Highway, Suite 212
Marathon, FL 33050-2227
(305) 289-2402

COMMUNITY PLANNING
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-2356

EMERGENCY MANAGEMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 413-9969

HOUSING & COMMUNITY DEVELOPMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-7956

Mr. James C. Duck
May 15, 2002
Page Two

Based on the information contained in the scoping notice and the enclosed comments provided by our reviewing agencies, the state has determined that, at this stage, the above-referenced action is consistent with the Florida Coastal Management Program (FCMP). All subsequent environmental documents prepared for this project must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews.

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Jasmin Raffington at (850) 922-5438.

Sincerely,

Shirley W. Collins, Acting Administrator
Florida Coastal Management Program

SWC/dc

Enclosures

cc: Janet Snyder Matthews, SHPO, Division of Historical Resources
James J. Golden, South Florida Water Management District

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

March 18, 2002

Mr. Michael Murray
Florida State Clearinghouse
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

RE: DHR Project File Number: 2002-1546
Received by DHR: February 19, 2002
SAI Application Number: FL200202191549C
Project Name: Winsberg Farm Wetland Restoration Project
Palm Beach County, Florida

Dear Mr. Murray:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing effects upon them, and considering alternatives to avoid or reduce the project's effect on them.

Our review of the Florida Master Site File indicates that there are no archaeological or historic sites currently recorded within the project area. However, the lack of recorded historic properties is not considered significant because the area has never been subjected to a systematic, professional survey to locate such properties. Data from environmentally similar areas indicate that archaeological and historic sites, especially the former, are likely to occur in the study area. It is, therefore, the opinion of this office that there is a reasonable probability of project activities impacting historic properties potentially eligible for listing in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value.

Since potentially significant archaeological and historic sites may be present, it is our recommendation that the area should be subjected to a systematic, professional archaeological and historical survey. The purpose of this survey will be to locate and assess the significance of historic properties present. The resultant survey report shall conform to the specifications set forth in Chapter 1A-46, *Florida Administrative Code*, and will need to be forwarded to this agency in order to complete the process of reviewing the impact of this proposed project on historic properties

The results of the investigations will determine if significant historic properties would be disturbed by this project. In addition, if significant remains are located, the data described in the report and the consultant's conclusions will assist this office in determining measures that must be taken to avoid, minimize, or mitigate adverse impacts to historic properties listed, or eligible for listing in the *National Register of Historic Places*, or otherwise of historical or architectural significance.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6435
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☑ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476
☐ St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044
☐ Tampa Regional Office (813) 272-3843 • FAX: 272-2340

Mr. Michael Murray
March 18, 2002
Page 2

Because this letter and its contents are a matter of public record, consultants who have knowledge of our recommendations may contact the project applicant. This should in no way be interpreted as an endorsement by this agency. The *Registry of Professional Archaeologists* (RPA) is the national certifying organization for archaeologists. A listing of archaeologists who are RPA members living or working in Florida can be accessed at http://dhr.dos.state.fl.us/bhp/compliance. In addition, the complete RPA Directory of Certified Professional Archaeologists is available at www.rpanet.org.

If there are any questions concerning our comments, please contact Allison McCarthy, Historic Sites Specialist, by electronic mail at amccarthy@mail.dos.state.fl.us or at 850-245-6333 or 800-847-7278. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske, Deputy SHPO

Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

MAR-25-2002 14:04 P.05

DRAFT
Subject to Modifications

TREASURE COAST REGIONAL PLANNING COUNCIL
INTERGOVERNMENTAL COORDINATION AND REVIEW LOG

TCRPC NUMBER: 02-FL-02-10 SAI# FL200202191549C

APPLICANT: United States Army Corps of Engineers (USACE)

PROJECT DESCRIPTION: Request for Comments for Winsberg Farm Wetland Restoration Project

The USACE requests comments to define issues and concerns to be addressed in a National Environmental Policy Act document being prepared for the Winsberg Farm Wetland Restoration Project that is part of the Comprehensive Everglades Restoration Project. The proposed Winsberg Farm Wetland Restoration Project is to convert a 200-acre agricultural field to a wetland. The proposed project is located east of the Loxahatchee Wildlife Preserve near the City of Boynton Beach in western Palm Beach County. Approximately 1.5 to 2 million gallons of treated and recycled reuse water from the Southern Region Water Reclamation Facility is proposed to hydrate the area. The USACE proposes to construct a berm to retain the water, and water levels would be maintained through a series of weirs at one foot except for the deeper water habitat. The wetland would not connect to the adjacent canal system. The USACE proposes to plant a variety of native wetland plants to create habitat for wildlife. The USACE also proposes to construct a boardwalk and educational facilities.

FUNDING AGENCY: None

PROJECT COSTS: N/A

RECOMMENDATIONS: The proposed project is not in conflict with the goals and policies of the **SRPP**. The project furthers **Regional Goal 6.9** that calls for the protection and sustainability of the Everglades ecosystem.

AGENCIES CONTACTED: City of Boynton Beach
Village of Wellington
City of West Palm Beach
Palm Beach County

MAR-25-2002 14:04 P.06

RECEIVED
MAR 13 2002
TREASURE COAST
REGIONAL PLANNING COUNCIL

March 4, 2002

Department of Planning, Zoning & Building
100 Australian Avenue
West Palm Beach, FL 33406
(561) 233-5000
Planning Division 233-5300
Zoning Division 233-5200
Building Division 233-5100
Code Enforcement 233-5500
Contractor's Certification 233-5525
Administration Office 233-5005
Executive Office 233-5003
www.pbcgov.com/pzb

Palm Beach County Board of County Commissioners
Warren H. Newell, Chairman
Carol A. Roberts, Vice Chair
Karen T. Marcus
Mary McCarty
Burt Aaronson
Tony Masilotti
Addie L. Greene

County Administrator
Robert Weisman

"An Equal Opportunity Affirmative Action Employer"

printed on recycled paper

Wynsum Hatton, ICR Coordinator
Treasure Coast Regional Planning Council
301 East Ocean Boulevard, Suite 300
Stuart, FL 34994

Reference: United States Army Corps of Engineers request for Comments for Winsberg Farm Wetland Restoration Project. TCRPC Reference #02-FL-02-10
SAI# FL20020219549C

Dear Mr. Wynsum:

The project of the reference is consistent with policies in the Conservation and Utility Element of Palm Beach County's Comprehensive Plan.

Objectives and policies in the Conservation Element require the protection and maintenance of freshwater and marine wetlands, and support wetland creation, restoration, enhancement and preservation. These policies are reflected in the Wetland Protection Section of the County's land development code.

Utility Element policies encourage and promote the use of innovative alternative technologies to augment water resources, including the construction of created wetlands and/or the restoration of wetlands.

In addition, Palm Beach County supports the Comprehensive Everglades Restoration Plan (CERP), and is an active participant on diverse Everglades and ecosystem restoration initiatives and projects.

The proposed wetland restoration project would complement the success and functions of the Wakodahatchee Wetlands located next to the County's Southern Reclamation Facilities.

Please do not hesitate to call Isaac Hoyos at (561) 233-5347 if you have any questions or need further information.

Sincerely,

M Bello

Maria Bello, AICP
Interim Planning Director

Cc Files

TOTAL P.06

Add Agency Comments

Page 1 of 1

MyFlorida.com

Clearinghouse

Home
My In-Box
New Project
Search Project
DB Maintenance
Help

Public Area

Brochure
Manual

GO help | 411 | feedback | directory

email Governor Jeb Bush
Gov. Bush's E-Newsletter

STATE CLEARINGHOUSE

Home > My In-Box > Search Project > **Add Agency Comments**

User: CINDY CRANICK, , Clearinghouse

Project Information

Project:	FL200202191549C
Description:	U.S. Department of the Army - District Corps of Engineers - Scoping Notice - To Define Issues and Concerns to be Addressed in a National Environmental Policy Act Document Being Prepared for the Winsberg Farm Wetland Restoration Project - Boynton Beach, Palm Beach County, Florida.
Keywords:	ACOE - Scoping Notice - Winsberg Farm Restor-PB Co
Program:	

Review Comments 1/12

Agency:	AGRICULTURE
Date:	03/21/2002 (mm/dd/yyyy)
Description:	No Comment
Comment Type:	Draft Final

Save

Copyright© 2000 State Of Florida
Privacy Statement

Add Agency Comments Page 1 of 1

MyFlorida.com

Clearinghouse

Home
My In-Box
New Project
Search Project
DB Maintenance
Help

Public Area
Brochure
Manual

GO help | 411 | feedback | directory

email Governor Jeb Bush
Gov. Bush's E-Newsletter

STATE CLEARINGHOUSE

Home > My In-Box > Search Project > **Add Agency Comments**

User: CINDY CRANICK, , Clearinghouse

Project Information

Project:	FL200202191549C
Description:	U.S. Department of the Army - District Corps of Engineers - Scoping Notice - To Define Issues and Concerns to be Addressed in a National Environmental Policy Act Document Being Prepared for the Winsberg Farm Wetland Restoration Project - Boynton Beach, Palm Beach County, Florida.
Keywords:	ACOE - Scoping Notice - Winsberg Farm Restor-PB Co
Program:	

Review Comments 3/12

Agency:	ENVIRONMENTAL PROTECTION
Date:	03/08/2002 (mm/dd/yyyy)
Description:	No comment.
Comment Type:	Draft Final

Save

Copyright© 2000 State Of Florida
Privacy Statement

Add Agency Comments

Page 1 of 1

MyFlorida.com

GO help | 411 | feedback | directory

email Governor Jeb Bush

Gov. Bush's E-Newsletter

Clearinghouse

Home

My In-Box

New Project

Search Project

DB Maintenance

Help

Public Area

Brochure

Manual

STATE CLEARINGHOUSE

Home > My In-Box > Search Project > **Add Agency Comments**

User: CINDY CRANICK, , Clearinghouse

Project Information

Project:	FL200202191549C
Description:	U.S. Department of the Army - District Corps of Engineers - Scoping Notice - To Define Issues and Concerns to be Addressed in a National Environmental Policy Act Document Being Prepared for the Winsberg Farm Wetland Restoration Project - Boynton Beach, Palm Beach County, Florida.
Keywords:	ACOE - Scoping Notice - Winsberg Farm Restor-PB Co
Program:	

Review Comments 4/12

Agency:	FISH and WILDLIFE COMMISSION
Date:	04/16/2002 (mm/dd/yyyy)
Description:	NC by Steve Lau.
Comment Type:	Draft Final

Save

Copyright© 2000 State Of Florida
Privacy Statement

MAR-25-2002 16:10 SFWMD 15616826896 P.01/04

COUNTY: PALM BEACH

DATE: 2/19/02
COMMENTS DUE DATE: 3/21/02
CLEARANCE DUE DATE: 4/20/02

Message:

SAI#: FL200202191549C

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNITS
AGRICULTURE COMMUNITY AFFAIRS FISH and WILDLIFE COMMISSION STATE TRANSPORTATION ENVIRONMENTAL PROTECTION	X SOUTH FLORIDA WMD	ENVIRONMENTAL POLICY UNIT RECEIVED FEB 22 2002 ERR - 4210

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

— Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

— Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

— Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

U.S. Department of the Army - District Corps of Engineers - Scoping Notice - To Define Issues and Concerns to be Addressed in a National Environmental Policy Act Document Being Prepared for the Winsberg Farm Wetland Restoration Project - Boynton Beach, Palm Beach County, Florida.

To: **Florida State Clearinghouse**
AGENCY CONTACT AND COORDINATOR (SCH)
2555 SHUMARD OAK BLVD
TALLAHASSEE, FLORIDA 32399-2100
(850) 414-6580 (SC 994-6580)
(850) 414-0479

EO. 12372/NEPA
- ☐ No Comment
- ☒ Comment Attached
- ☐ Not Applicable

Federal Consistency
- ☐ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From:
Division/Bureau: ERR
Reviewer: JIM GOLDEN
Date: 3/25/02

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

GOV 04-12

March 25, 2002

Ms. Cindy Cranick
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Dear ~~Ms. Cranick~~ Cindy:

Subject: Winsberg Farm Wetland Restoration Project
U.S. Army Corps of Engineers Scoping Notice
SAI#: FL200202191549C

In response to your request, South Florida Water Management District (SFWMD) staff has reviewed the Scoping Notice for the above-referenced proposal for consistency with the Florida Coastal Zone Management Program (FCMP). The proposed project is part of the Comprehensive Everglades Restoration Plan (CERP) authorized by the Water Resources Development Act of 2000. The proposed location is a 200 acre agricultural field in the Boynton Beach area of Palm Beach County, east of the Loxahatchee Wildlife Preserve. The project consists of the construction of approximately 140 acres of wetland and open water habitat. After earth grading for the wetland is complete, 1.5 to 2.0 million gallons per day of treated and recycled reuse water from the Southern Region Water Reclamation Facility are proposed to rehydrate the constructed area. The wetland would then be planted with a variety of native wetland plants and created habitat for various species of wildlife. Part of the proposal also includes construction of a boardwalk and educational facilities to provide a recreational area for the public.

Projects reviewed by the SFWMD pursuant to the Florida Coastal Management Program (FCMP) are reviewed for consistency with the provisions of Chapter 373, F.S. (Florida Water Resources Act of 1972, as amended), as well as the programs and regulations developed thereunder. Chapter 373, F.S. authorizes the SFWMD to regulate the withdrawal, diversion, storage, and consumptive uses of water, the construction and operation of stormwater management systems, and work in, on, or over surface waters or wetlands. Chapter 373, F.S. also authorizes the SFWMD to acquire and manage land, to conduct research and investigations into all aspects of water resource management, and to disseminate information relating to the water resources of the state to public and private users.

After review of the Scoping Notice, SFWMD staff offers the following comments:

GOVERNING BOARD
Trudi K. Williams, P.E., *Chair*
Lennart E. Lindahl, P.E., *Vice-Chair*
Pamela Brooks-Thomas
Michael Collins
Hugh M. English
Gerardo B. Fernández
Patrick J. Gleason, Ph.D., P.G.
Nicolás J. Gutiérrez, Jr., Esq.
Harkley R. Thornton

EXECUTIVE OFFICE
Henry Dean, *Executive Director*

Ms. Cindy Cranick
March 25, 2002
Page 2

(1) Prior to the initiation of any work on this site, the applicant must obtain the appropriate SFWMD permits and must meet all applicable SFWMD permitting criteria. Aerial photographs of the project site and plans showing details of the project design are necessary in order for staff to provide specific comments regarding the proposed project.

(2) The generalized location map provided in the Scoping Notice did not identify the exact location of the site. As a result, a more precise location map is required in order for staff to comment on site-specific conditions. However, a March 15, 2002 staff site inspection of the general area indicates that the site has been under agricultural use and farmed for row crops. While it does not appear that the site contains any existing wetlands, more detailed information is necessary in order for staff to fully evaluate the site.

(3) An ongoing monitoring program should be implemented to gauge water quality and ecosystem functioning. Inflows should be adequately monitored to ensure that adequate pretreatment occurs, particularly with respect to nitrogen and phosphorous levels. BOD, DO and pH should also be monitored to ensure that the wetland system is in balance and functioning properly.

(4) The wetland system should be designed to provide a variety of habitats to optimize wildlife. The design should incorporate both herbaceous marsh areas in conjunction with areas of forested wetlands as well as shallow and slightly deeper water areas to enhance habitat diversity for wildlife.

(5) Water level monitoring should be implemented to ensure that adequate wetland hydroperiods are met.

(6) Plants should be selected based on their ability to tolerate anticipated conditions and to assist in further water quality treatment.

(7) Discharge into the constructed wetland should be designed to prevent erosive velocities.

(8) Appropriate turbidity control measures should be implemented during construction to ensure that turbidity levels that exceed state water quality standards do not occur in adjacent surface waters as a result of project-related construction activity.

(9) Since the project involves wastewater reuse, pathogens should be monitored for adequate disease control.

Ms. Cindy Cranick
March 25, 2002
Page 3

If any of the above requires additional clarification or if I can be of further assistance, please do not hesitate to contact me at (561) 682-6862.

Sincerely,

Jim

James J. Golden, AICP
Senior Planner
Environmental Resource Regulation

/jjg

c: James C. Duck, USACOE
Richard Walesky, P.B. County DERM

United States Department of the Interior

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

March 28, 2002

Colonel James G. May
District Engineer
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Attention: Rebecca Weiss

Dear Colonel May:

The purpose of this letter is to document an agreement between your planning staff and my biologists as to a change in the schedule of deliverables as outlined in the Scope of Work for Winsberg Farm Wetlands Restoration Project. Our objective is to provide input in as timely a manner as possible, but we recognize that a certain amount of flexibility in project scheduling is to be expected. In the case of this project, the Scope of Work calls for a Planning Aid Letter (PAL) to be delivered to you in March 2002; however, your staff and mine have determined that providing a PAL would be premature at this time. The current project schedule has been delayed by four months as compared to the original Scope of Work. It appears that a PAL would be more appropriate and useful pending further discussion of ecosystem issues such as water quality and fish and wildlife resources. These discussions will occur during April 2002, at which point pertinent guidance will be provided in a PAL.

If you have any questions, please feel free to contact Tim Pinion at 772-562-3909, ext. 294.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:
PBCWUD, West Palm Beach, Florida (Hassan Hadjimiry)
FWC, Vero Beach, Florida (Joe Walsh)

DIVISIONS OF FLORIDA DEPARTMENT OF STA
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Planning Division, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

March 27, 2002

RE: DHR Project File Number: 2002-2570
Received by DHR: March 13, 2002
Project: Winsberg Farm Wetland Restoration Project
Palm Beach County, Florida

Dear Mr. Duck:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing effects upon them, and considering alternatives to avoid or reduce the project's effect on them.

Our review of the Florida Master Site File indicates that there are no archaeological or historic sites currently recorded within the project area. However, the lack of recorded historic properties is not considered significant because the area has never been subjected to a systematic, professional survey to locate such properties. Data from environmentally similar areas indicate that archaeological and historic sites, especially the former, are likely to occur in the study area. It is, therefore, the opinion of this office that there is a reasonable probability of project activities impacting historic properties potentially eligible for listing in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value.

Since potentially significant archaeological and historic sites may be present, it is our recommendation that the area should be subjected to a systematic, professional archaeological and historical survey. The purpose of this survey will be to locate and assess the significance of historic properties present. The resultant survey report shall conform to the specifications set forth in Chapter 1A-46, *Florida Administrative Code*, and will need to be forwarded to this agency in order to complete the process of reviewing the impact of this proposed project on historic properties

The results of the investigations will determine if significant historic properties would be disturbed by this project. In addition, if significant remains are located, the data described in the report and the consultant's conclusions will assist this office in determining measures that must be taken to avoid, minimize, or mitigate adverse impacts to historic properties listed, or eligible for listing in the *National Register of Historic Places*, or otherwise of historical or architectural significance.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6435
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☐ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476
☐ St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044
☐ Tampa Regional Office (813) 272-3843 • FAX: 272-2340

Mr. Duck
March 27, 2002
Page 2

Because this letter and its contents are a matter of public record, consultants who have knowledge of our recommendations may contact the project applicant. This should in no way be interpreted as an endorsement by this agency. The *Registry of Professional Archaeologists* (RPA) is the national certifying organization for archaeologists. A listing of archaeologists who are RPA members living or working in Florida can be accessed at http://dhr.dos.state.fl.us/bhp/compliance. In addition, the complete RPA Directory of Certified Professional Archaeologists is available at www.rpanet.org.

If there are any questions concerning our comments, please contact Allison McCarthy, Historic Sites Specialist, by electronic mail at amccarthy@mail.dos.state.fl.us or at 850-245-6333 or 800-847-7278. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske, Deputy SHPO

for Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

GOV 04-12

March 25, 2002

Ms. Cindy Cranick
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Dear ~~Ms. Cranick~~ Cindy:

Subject: Winsberg Farm Wetland Restoration Project
U.S. Army Corps of Engineers Scoping Notice
SAI#: FL200202191549C

In response to your request, South Florida Water Management District (SFWMD) staff has reviewed the Scoping Notice for the above-referenced proposal for consistency with the Florida Coastal Zone Management Program (FCMP). The proposed project is part of the Comprehensive Everglades Restoration Plan (CERP) authorized by the Water Resources Development Act of 2000. The proposed location is a 200 acre agricultural field in the Boynton Beach area of Palm Beach County, east of the Loxahatchee Wildlife Preserve. The project consists of the construction of approximately 140 acres of wetland and open water habitat. After earth grading for the wetland is complete, 1.5 to 2.0 million gallons per day of treated and recycled reuse water from the Southern Region Water Reclamation Facility are proposed to rehydrate the constructed area. The wetland would then be planted with a variety of native wetland plants and created habitat for various species of wildlife. Part of the proposal also includes construction of a boardwalk and educational facilities to provide a recreational area for the public.

Projects reviewed by the SFWMD pursuant to the Florida Coastal Management Program (FCMP) are reviewed for consistency with the provisions of Chapter 373, F.S. (Florida Water Resources Act of 1972, as amended), as well as the programs and regulations developed thereunder. Chapter 373, F.S. authorizes the SFWMD to regulate the withdrawal, diversion, storage, and consumptive uses of water, the construction and operation of stormwater management systems, and work in, on, or over surface waters or wetlands. Chapter 373, F.S. also authorizes the SFWMD to acquire and manage land, to conduct research and investigations into all aspects of water resource management, and to disseminate information relating to the water resources of the state to public and private users.

After review of the Scoping Notice, SFWMD staff offers the following comments:

GOVERNING BOARD
Trudi K. Williams, P.E., *Chair*
Lennart E. Lindahl, P.E., *Vice-Chair*
Pamela Brooks-Thomas
Michael Collins
Hugh M. English
Gerardo B. Fernández
Patrick J. Gleason, Ph.D., P.G.
Nicolás J. Gutiérrez, Jr., Esq.
Harkley R. Thornton

EXECUTIVE OFFICE
Henry Dean, *Executive Director*

Ms. Cindy Cranick
March 25, 2002
Page 2

(1) Prior to the initiation of any work on this site, the applicant must obtain the appropriate SFWMD permits and must meet all applicable SFWMD permitting criteria. Aerial photographs of the project site and plans showing details of the project design are necessary in order for staff to provide specific comments regarding the proposed project.

(2) The generalized location map provided in the Scoping Notice did not identify the exact location of the site. As a result, a more precise location map is required in order for staff to comment on site-specific conditions. However, a March 15, 2002 staff site inspection of the general area indicates that the site has been under agricultural use and farmed for row crops. While it does not appear that the site contains any existing wetlands, more detailed information is necessary in order for staff to fully evaluate the site.

(3) An ongoing monitoring program should be implemented to gauge water quality and ecosystem functioning. Inflows should be adequately monitored to ensure that adequate pretreatment occurs, particularly with respect to nitrogen and phosphorous levels. BOD, DO and pH should also be monitored to ensure that the wetland system is in balance and functioning properly.

(4) The wetland system should be designed to provide a variety of habitats to optimize wildlife. The design should incorporate both herbaceous marsh areas in conjunction with areas of forested wetlands as well as shallow and slightly deeper water areas to enhance habitat diversity for wildlife.

(5) Water level monitoring should be implemented to ensure that adequate wetland hydroperiods are met.

(6) Plants should be selected based on their ability to tolerate anticipated conditions and to assist in further water quality treatment.

(7) Discharge into the constructed wetland should be designed to prevent erosive velocities.

(8) Appropriate turbidity control measures should be implemented during construction to ensure that turbidity levels that exceed state water quality standards do not occur in adjacent surface waters as a result of project-related construction activity.

(9) Since the project involves wastewater reuse, pathogens should be monitored for adequate disease control.

Ms. Cindy Cranick
March 25, 2002
Page 3

If any of the above requires additional clarification or if I can be of further assistance, please do not hesitate to contact me at (561) 682-6862.

Sincerely,

Jim

James J. Golden, AICP
Senior Planner
Environmental Resource Regulation

/jjg

c: James C. Duck, USACOE
Richard Walesky, P.B. County DERM

DIVISION OF FLORIDA DEPARTMENT OF STA
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Planning Division, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32399-0250

March 18, 2002

RE: DHR Project File Number: 2002-1546
Received by DHR: February 18, 2002
Project Name: Winsberg Farm Wetland Restoration Project
Palm Beach County

Dear Mr. Duck:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing effects upon them, and considering alternatives to avoid or reduce the project's effect on them.

Our review of the Florida Master Site File indicates that there are no archaeological or historic sites currently recorded within the project area. However, the lack of recorded historic properties is not considered significant because the area has never been subjected to a systematic, professional survey to locate such properties. Data from environmentally similar areas indicate that archaeological and historic sites, especially the former, are likely to occur in the study area. It is, therefore, the opinion of this office that there is a reasonable probability of project activities impacting historic properties potentially eligible for listing in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value.

Since potentially significant archaeological and historic sites may be present, it is our recommendation that the area should be subjected to a systematic, professional archaeological and historical survey. The purpose of this survey will be to locate and assess the significance of historic properties present. The resultant survey report shall conform to the specifications set forth in Chapter 1A-46, *Florida Administrative Code*, and will need to be forwarded to this agency in order to complete the process of reviewing the impact of this proposed project on historic properties

The results of the investigations will determine if significant historic properties would be disturbed by this project. In addition, if significant remains are located, the data described in the report and the consultant's conclusions will assist this office in determining measures that
must be taken to avoid, minimize, or mitigate adverse impacts to historic properties listed, or eligible for listing in the *National Register of Historic Places*, or otherwise of historical or architectural significance.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ **Director's Office** (850) 245-6300 • FAX: 245-6435
☐ **Archaeological Research** (850) 245-6444 • FAX: 245-6436
☑ **Historic Preservation** (850) 245-6333 • FAX: 245-6437
☐ **Historical Museums** (850) 245-6400 • FAX: 245-6433
☐ **Palm Beach Regional Office** (561) 279-1475 • FAX: 279-1476
☐ **St. Augustine Regional Office** (904) 825-5045 • FAX: 825-5044
☐ **Tampa Regional Office** (813) 272-3843 • FAX: 272-2340

r. James C. Duck
March 18, 2002
Page 2

Because this letter and its contents are a matter of public record, consultants who have knowledge of our recommendations may contact the project applicant. This should in no way be interpreted as an endorsement by this agency. The *Registry of Professional Archaeologists* (RPA) is the national certifying organization for archaeologists. A listing of archaeologists who are RPA members living or working in Florida can be accessed at http://dhr.dos.state.fl.us/bhp/compliance. In addition, the complete RPA Directory of Certified Professional Archaeologists is available at www.rpanet.org.

If there are any questions concerning our comments, please contact Allison McCarthy, Historic Sites Specialist, by electronic mail at amccarthy@mail.dos.state.fl.us or at 850-245-6333 or 800-847-7278. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Janet Snyder Matthews

Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

Planning Division
Environmental Division

MAR 11 2002

Dr. Janet Snyder Matthews
Director, Division of Historical Resources
State Historic Preservation Officer
500 South Bronough Street
Tallahassee, Florida 32399

Dear Dr. Matthews:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects of the proposed Winsberg Farm Wetland Restoration Project, a component of the Comprehensive Everglades Restoration Plan (CERP) authorized by the Water Resources Development Act of 2000. The proposed location for the Winsberg Farm created wetland is a 200-acre agricultural field in Section 04, Township 46 south, Range 42 east, illustrated on the University Park Quadrangle, in Boynton Beach, Palm Beach County, Florida (maps enclosed).

Due to the need for local aquifer recharge, additional water sources and wildlife habitat, construction of a wetland recharge area is proposed. Construction would include the earth movement and regrading of 175 acres of agricultural field to create 140 acres of open water habitat and associated levees. Part of the proposal also includes construction of a boardwalk and educational facilities to provide a recreational area for the public. The proposed project site is currently in agricultural production for pepper and herb crops. Prior to agricultural development, the site was associated with the wetlands of the Loxahatchee slough/preserve.

An examination of the Florida Site files indicate no known cultural resources in the project location. Due to the history of farming practices on the property and the former wetland designation, the area has a minimal potential for containing prehistoric cultural resources. However, based on an initial site inspection by my staff and a review of photographs documenting structures and use of the property, it appears that there may be historic agricultural resources on the proposed project site that could be affected by the project activities.

-2-

Further evaluation to determine the historical nature of the structures is needed.

In accordance with the National Historic Preservation Act and its implementing regulations 36CFR800, I am requesting your comments or concurrence with my recommendation of additional evaluation. For your convenience, a signature line is provided below. If there are any questions, please contact Rebecca Weiss at 904-899-5025, or by electronic mail at rebecca.j.weiss@usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

DHR Project File No._____ Date: _____

I concur that further evaluation for historical resources is needed.

_____
Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

Weiss/CESAJ-PD-ES/5025/ 3-5-02
Caulk/CESAJ-PD-EA
Dupes/CESAJ-PD-ES
Dugger/CESAJ-PD-E
Grubb/CESAJ-DR-S
Duck/CESAJ-PD

L:group/pdes/weiss/winsberg/winsberg cr

FACSIMILE TRANSMISSION

U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

Telephone: (561) 562-3909
Facsimile: (561) 562-4288 or (561) 564-7393

To: Jerry Grubb **Fax No.:** 904-899-5001
COE **Tel. No.:** 904-232-2771
Date: Thursday, 2-21-02

From: Tim Pinion **Tel No.:** 561-562-3909 x294

Notes:

Jerry,
Here are comments on the Winsberg Farm Draft PMP. Please call with any questions. Thanks!
Tim

⇒ electronic copy on floppy disk is in the mail

Number of pages to follow this cover page: 8

To report any problems with this facsimile transmission, please call (561) 562-3909.

CommentsDraftPMP.doc
FWS, T. Pinion
2/21/2002

Comments on Winsberg Farm Wetlands Restoration Project
DRAFT PMP
U.S. Fish and Wildlife Service, Vero Beach, FL

1. **Section 2.2 Description.** In the first paragraph, the project is described as a 175-acre wetland. Subsequent paragraphs and sections indicate that the wetland restoration area is 120 acres. Distinction should be made in the first paragraph between total project acreage and actual wetland acreage.

   Southern Water Reclamation Facility should be called Southern Region Water Reclamation Facility.

   In the second paragraph, more detail would be appreciated for "highly treated water," (i.e. "secondary-treated").

2. Loxahatchee Wildlife Preserve should be referred to first as "A.R.M. Loxahatchee National Wildlife Refuge." Subsequent reference to the Refuge could be abbreviated LNWR.

3. **Section 2.3 Differences from Comprehensive Plan.** If the Project Delivery Team is to consider alternatives that might allow for surface water discharge, this section should be changed so that it does not restrict the project to groundwater percolation only.

4. **Section 2.4 Authority/Authorization.** It appears that this section was copied directly from the ACME Basin B Discharge Project and includes information pertaining specifically to that project

5. **Section 3.0 Project Scope.** A section should be added to discuss **Project Constraints and Assumptions,** including, but not limited to those related to the land acquisition contract.

6. Clarification is needed in **Section 5.0 Scheduling.** The first paragraph explains that in the CERP Final Feasibility Report, there is a projected construction schedule of 12/03-12/05. After proposing that this schedule be improved upon, the section goes on to state that "The local sponsor has requested a project construction schedule of 12/04-12/05." This does not seem to be an improvement of the original schedule. Also, important information is missing from the sentence in the first paragraph that refers to the timeline set forth in the land acquisition contract.

7. **Section 3.1 Statement of Project Scope.** Since alternatives are to be considered in the planning process, the first sentence in the fourth paragraph should be changed from:

1

CommentsDraftPMP.doc
FWS, T. Pinion
2/21/2002

"Upon confirmation of performance objectives, the wetlands plan, which has been developed, will be analyzed to assure the best method for biologically treating and storing water for indirect aquifer recharge."

to: "Upon identification of performance objectives, alternatives will be developed and analyzed to assure the best method for biologically treating and storing water for indirect aquifer recharge."

The first sentence in the fifth paragraph should refer to the "selected" plan rather than the "established" plan.

8. Section 7.0 Functional Area Plans
Fish and Wildlife Service Coordination and the CERP Process

The Service provides the following text (developed in conjunction with Corps staff) for inclusion in the subsection of the Functional Area Plans dealing with the Fish and Wildlife Service:

I. Fish and Wildlife Service Coordination and the CERP Process

The U.S. Fish and Wildlife Service (Service) is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people. The agency enforces Federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, and conserves and restores wildlife habitat such as wetlands. Natural resource protection legislation relevant to the projects authorized under the CERP that affect the Service's trust resource responsibilities include the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*), the Fish and Wildlife Coordination Act, as amended (FWCA) (16 U.S.C. 661 *et seq.*), the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 *et seq.*), the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Estuary Protection Act (16 U.S.C. 1221-1226), and the Coastal Zone Management Act of 1972 (16 U.S.C. 1451-1464). In addition, several Executive Orders have also established guidance to Federal agencies, including the Service, relative to fish and wildlife protection and conservation. For CERP projects authorized under the Water Resources Development Act, the Endangered Species Act and the Fish and Wildlife Coordination Act represent the primary authorities under which the Service cooperates and coordinates with project sponsors.

II. Federal Activities and Responsibilities under the Endangered Species Act

A. Informal Consultation Process

The Army Corps of Engineers (Corps) will consult or confer with the Service(s) (the Fish and Wildlife Service and the National Marine Fisheries Service)

2

regarding federally listed and candidate species. Within 30 days of receipt of the notification of, or request for, a species list, the FWS will either concur with or revise the list, or advise the Corps, based on the best scientific and commercial data available, whether any listed or proposed species or designated or proposed critical habitat may be present in the action area. Informal consultation determines the likelihood of adverse effects on a listed species or critical habitat. Informal consultations: (1) clarify whether and what listed, proposed, and candidate species or designated or proposed critical habitats may occur in the action area; (2) determine what effect the action may have on these species or critical habitats; (3) explore ways to modify the action to reduce or remove adverse effects to the species or critical habitats; (4) determine the need to enter into formal consultation for listed species or designated critical habitats, or conference for proposed species or proposed critical habitats; and (5) explore the design or modification of an action to benefit the species.

If informal consultation occurs early in the planning process (*i.e.*, prior to the development of project alternatives), it may avoid the need for formal consultation and greatly increase the potential for project success.

B. Biological Assessments

The Corps is required under the ESA to provide the best scientific and commercial data available concerning the effects of the proposed project on listed species or designated critical habitat. This may require the preparation of a Biological Assessment (BA) by the Corps, which would have to be submitted within 180 calendar days of receipt of a species list from the Service(s). The BA would describe the project, project area (with relevant maps), proposed management activities, and may include supporting documents, particularly those that provide an assessment of the proposed site. It would indicate the listed species that may occur in the project area, including past surveys for such species. The BA would also evaluate how the project may affect listed species or critical habitat that occurs in the project area. This will include direct, indirect, and cumulative effects. The BA would describe measures to avoid, reduce, or eliminate adverse effects or enhance beneficial effects to the species, and would state the Corps' decision.

The Corps will provide to the Service(s) its decision as to the effects to listed species as follows: "no effect" means that there are absolutely no effects of the project, positive or negative. If effects are insignificant (in size) or discountable (extremely unlikely), a "may affect, but not likely to adversely affect" determination is appropriate. These determinations require written concurrence from the Service(s). "May affect, likely to adversely affect" means that all adverse effects cannot be avoided. This requires formal consultation with the Service(s). A fourth finding is possible for proposed species or proposed critical habitat - "is likely to jeopardize/adversely modify proposed species/critical habitat," which is the appropriate conclusion if the Corps identifies situations in

which the proposed action is likely to jeopardize the proposed species, or destroy or adversely modify the proposed critical habitat. In this case, conference will be required.

C. Formal Consultation Process

Formal consultation will be necessary if: (1) the Corps requests consultation after determining the proposed action may affect listed species or critical habitat, or (2) the Service(s), through informal consultation, do not concur with the action agency's finding that the proposed action is not likely to adversely affect the listed species or critical habitat.

Through the formal consultation process, the Service(s) responsibilities include: (1) review of all relevant information provided by the Corps or otherwise available, (2) evaluation of the current status of the listed species or critical habitat, and (3) evaluation of the effects of the action and cumulative effects on the listed species or critical habitat. The Service(s) then formulates a biological opinion as to whether the action, taken together with cumulative effects is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The Service(s) determines the amount or extents of anticipated incidental take in an incidental take statement included in the biological opinion. Formal consultation is concluded within 90 days after its initiation unless extended in accordance with the provisions of 50 CFR § 402.14. Within 45 days after concluding formal consultation, the Service(s) delivers its biological opinion. For more detailed information on the consultation process required by the ESA, see the Endangered Species Consultation Handbook (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998), which is posted on the World Wide Web at http://endangered.fws.gov/consultations/s7hndbk/s7hndbk.htm.

III. Federal Activities and Responsibilities under the Fish and Wildlife Coordination Act (FWCA)

The central objective of the FWCA is to allow for equal consideration of wildlife conservation with other features of water resource development programs. Under provisions of the FWCA, the Service has the authority to investigate and report on all proposals for work and/or other related activities in or affecting the waters of the United States that are sanctioned, permitted, assisted, or conducted by the Federal government. Section 2(b) of the FWCA allows the Service to make recommendations to the Corps that establish measures to prevent loss of or damage to wildlife resources, as well as to provide concurrently for the development and improvement of such resources.

CommentsDraftPMP.doc
FWS, T. Pinion
2/21/2002

The Corps and the Service have established coordination procedures and policy for funding of Service involvement. The Corps provides transfer funds to support the activities of the Service as set forth in a Scope of Work (SOW). The SOW includes provisions for the Service's attendance at meetings scheduled in conjunction with the Corps' planning process, and for the Service's provision of timely letters or longer reports containing Service recommendations. The SOW also defines the Corps' responsibilities.

As determined in the SOW, the Service will provide Planning Aid Letters (PALs) or Planning Aid Reports (PARs) to the Corps. The purpose of PALs and PARs is to identify problems and opportunities related to the conservation and enhancement of fish and wildlife resources. The Service may review conceptual alternatives, provide recommendations for development of new conceptual alternatives, and recommend the course for future coordination. Key objectives for these reporting documents are to ensure that a process for promoting conservation and restoration of "unique or scarce" resources and/or habitats is introduced early in the planning process and carried through detailed design, construction, and post-construction monitoring.

The purpose of the 2(b) Report (FWCA report) is to provide the views and recommendations of the Secretary of the Interior in his/her report to Congress prior to Congressional authorization and funding. The report should document the results and findings of the Service's studies, planning, and coordination. It should recommend those actions considered necessary by the Service to accomplish the fish and wildlife conservation goal of the FWCA. The 2(b) Report addresses those alternatives evaluated in the Project Implementation Report (PIR), but focuses on the selected plan. A draft 2(b) Report is generally provided to the Corps early enough such as to influence and be attached to the PIR submitted to Division. The draft 2(b) Report and its findings and recommendations are then available for public release during the public comment period. To the extent that the selected plan is modified as a result of the public review process, the draft 2(b) Report is revised and finalized early enough to be made an integral part of the final EIS and PIR.

9. Environmental – Hazardous, Toxic, and Radioactive Waste (E-HTRW) Assessment

Because of the potential risks associated with flooding agricultural lands, the Service would like to see a thorough discussion of HTRW activities in the PMP. These activities should include communication and coordination with the Service's Environmental Contaminants Program staff in Vero Beach, who are able to provide technical assistance and are working on a protocol for contaminants evaluation on CERP-related lands. The text included below was taken and modified from the Draft PMP for EAA Storage Resevoir, Part 1, 20 August 2001.

5

CommentsDraftPMP.doc
FWS, T. Pinion
2/21/2002

Environmental – Hazardous, Toxic, and Radioactive Waste (E-HTRW) Assessment

The objective of this activity is to identify, investigate, and assess Environmental - Hazardous Toxic and Radioactive Waste (E-HTRW) and its potential impacts in the study area. The results of the assessment conducted during the PIR will provide rationale for proceeding into the next phase.

Civil works project funds are not to be employed for E-HTRW related activities except as provided in ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects, or otherwise specifically provided in law. E-HTRW sites should be avoided whenever practicable during project implementation. This can be accomplished by early identification of E-HTRW sites and potential E-HTRW impacts.

Plan formulation, selection, and project alternative design may be substantially influenced by the presence of E-HTRW in the Winsberg Farm project area. It is therefore imperative that E-HTRW assessment be conducted early in the PIR phase in order to facilitate plan formulation and selection. Alternative plans should consider avoidance of E-HTRW as a possible response. At least one alternative plan should be formulated to avoid E-HTRW sites to the maximum extent possible, consistent with the Winsberg Farm Wetlands Restoration project objectives. A preliminary cost estimate of required E-HTRW response actions will be needed for each alternative plan in order to make a reasoned choice among alternative plans.

In general, E-HTRW assessment involves the following components: (1) archive research and site reconnaissance to identify and select E-HTRW sites in the Winsberg Farm project area which could potentially impact project implementation; (2) water quality and site characterization to assess the nature and extent of E-HTRW contamination at select E-HTRW sites to the degree necessary to determine potential water quality and E-HTRW impacts on project implementation; (3) risk assessment of potential impacts to human health and fish and wildlife resources in the absence of response action, to the degree necessary to determine potential impacts to project implementation; (4) E-HTRW response alternatives analysis; (5) E-HTRW response cost estimate; (6) coordination with the local sponsor; and (7) preparation of the E-HTRW appendix to the PIR. The following paragraphs describe each of these main components.

Archive Research & Site Reconnaissance - Identification of E-HTRW sites in the Winsberg Farm project area will require archival research and site reconnaissance. This may involve database searches or interviews with Federal agencies (EPA, USACE), State agency (FDEP), or local regulatory agencies (SFWMD, County Environmental and Health Departments, etc.). This may also involve analysis of aerial photographs, field reconnaissance, site inspection, and analysis of building and utility layouts. Once E-HTRW sites within the study area

6

have been identified as those sites which could potentially impact project implementation, some of the factors which will be taken into consideration include: location of the E-HTRW site within the study area (close in proximity to land associated with project alternatives or critical project areas, or remote location); status of the E-HTRW site (has the site already been investigated, characterized, remediated, etc.); and the degree of risk that the E-HTRW site may pose to human health and fish and wildlife resources.

Site Characterization - To determine the potential impact that an E-HTRW site may have on project implementation, an assessment of the nature and extent of contamination may be necessary. This may include review and analysis of available site documentation (environmental impact statements, environmental assessment reports, etc.), study of the site's physical characteristics (topography, geology, hydrology, hydrogeology), sampling (soil, groundwater, sediment, surface water), and identification of source areas. The level of detail will be sufficient to determine the extent of E-HTRW contaminants in relation to alternative plan features and adjacent lands potentially impacted by these features. Site characterization studies should involve coordination with the U.S. Fish and Wildlife Service's Environmental Contaminants Program staff. To avoid potentially high costs of site characterizing through multiple sample collections and laboratory analyses, available site data will be researched and utilized to the highest degree possible. Depending on the type and status of a given E-HTRW site, a sampling program may already be planned or underway under the authority of a non-Civil Works program.

Risk Analysis - To determine potential impacts to human health and fish and wildlife resources at sites determined to potentially impact project implementation, a risk analysis may be necessary. Components of risk analysis include determination of contaminant release mechanisms, mobility of contaminants, pathways and exposure routes, toxicity of contaminants, potentially exposed populations, as well as a determination of the risk or potential adverse health effects for the identified potential receptors. Risk assessment should also involve coordination with the U.S. Fish and Wildlife Service's Environmental Contaminants Program staff.

E-HTRW Response Alternatives Analysis - This analysis will identify and evaluate alternatives to respond to verified E-HTRW contamination that cannot be avoided in the project design. Activities conducted may include additional sampling and analysis to further characterize a site if needed, identification of potential response alternatives, screening of response alternatives, and cost analysis of response alternatives. Examples of types of response alternatives are; no further action, monitoring only, institutional controls, source removal, containment or immobilization of E-HTRW, or treatment. During screening and analysis of the proposed response alternatives, a comparative evaluation will be conducted using the following criteria: (1) technical feasibility; (2) public health effects; (3) environmental effects; (4) institutional effects (e.g., effects of Federal,

State and local standards); and (5) cost. The recommended response action for a given E-HTRW site in the study area will be selected by determining which response alternative best meets each of the five evaluation criteria. The response action will be selected with full coordination with the appropriate Federal, State, and local regulatory agencies. The evaluation and selection of the response action will be documented as an appendix to the PIR. The appendix will document how each alternative weighs against the evaluation criteria, and how the selected response action best meets the evaluation criteria.

E-HTRW Response (RD, RA, O&M) Cost Estimate – A cost estimate will be developed for performing remedial design (RD), remedial action (RA), and Operation and Maintenance (O&M) for the response action(s) selected during in the E-HTRW Response Alternatives phase. RD, RA, and O&M cost estimates will be developed to the same level of detail as other project features, utilizing existing site data to the degree possible.

Coordination with the local sponsor - Scoping, execution, and findings of the E-HTRW assessments conducted during the PIR phase will be coordinated with the local sponsor. Should there be a known E-HTRW problem identified by the assessment, a letter of intent for the local sponsor to fund the response action alternative will be initiated. The letter will state that the local sponsor has been designated as the "responsible party" and as such is responsible for all costs associated with the remediation of the E-HTRW. The project authorization document and the post-PIR PMP should include language describing how E-HTRW response actions will be coordinated with project construction. Construction should not be undertaken on land in the E-HTRW impacted area until response actions have been completed.

E-HTRW Appendix - The results of the E-HTRW assessment will be fully documented in the E-HTRW Appendix to the PIR. This includes documentation of (1) E-HTRW characterization and assessment, (2) E-HTRW risk analysis, (3) E-HTRW response alternative analysis, (4) E-HTRW cost estimate, and (5) coordination with the local sponsor. If E-HTRW is identified, the PIR will describe actions taken toward avoidance or response, and what non-Federal landowner is named the "responsible party", if applicable. Documents for innocent landowner defense will be retained.

sent to printing
and mail room 2-13-02

Planning Division
Environmental Branch

FEB 13 2002

TO WHOM IT MAY CONCERN:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is requesting your assistance in gathering information that will help define issues and concerns to be addressed in a National Environmental Policy Act (NEPA) document being prepared for the Winsberg Farm Wetland Restoration Project. The project is part of the Comprehensive Everglades Restoration Project (CERP) authorized by the Water Resources Development Act of 2000. The proposed location for the Winsberg Farms created wetland is a 200-acre agricultural field in Boynton Beach, Palm Beach County, Florida (map enclosed).

The proposed project consists of the construction of approximately 140 acres of wetland and open water habitat east of the Loxahatchee Wildlife Preserve in Palm Beach County. After earth grading for the wetland is complete, 6 1.5 2.0 to ~~8~~ million gallons per day of treated and recycled reuse water from the Southern Region Water Reclamation Facility are proposed to rehydrate the constructed area. The wetland would then be planted with a variety of native wetland plants and created habitat for various species of wildlife. Part of the proposal also includes construction of a boardwalk and educational facilities to provide a recreational area for the public.

Due to the water shortages in Florida, there is a need for alternative water sources for recharge to the Florida aquifer to sustain ecological and human water requirements. Anticipated benefits of the proposed project include additional water recharge to local aquifer system that normally would be lost to deep well injection, reduction of dependence on supplies of water from the Everglades ecosystem and Lake Okeechobee, creation of additional wildlife habitat and green space, and the creation of a public recreational area.

Consideration will be given to the proposed project effects on environmental resources including fish and

-2-

wildlife habitat, water quality, water supply, endangered and threatened species, aesthetics, and recreational use of proposed wetland and adjacent canals. Additional considerations that will be taken into account are costs and compatibility with ongoing programs involved in the Comprehensive Everglades Restoration Program.

We welcome your views, comments, concerns and information about resources and important features within the area shown as well as any suggested improvements. If you know others who may wish to comment on this activity, please advise them of this request for public comments. Letters of comment or inquiry should be addressed to the attention of Planning Division, Environmental Branch, South Florida Section, and be received by this office within 30 days of the date of this letter. If you have any questions, please contact Mrs. Rebecca Weiss by telephone at 904-899-5025, or by electronic mail at rebecca.j.weiss@usace.army.mil

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Weiss/CESAJ-PD-ES/5025
Dupes/CESAJ-PD-ES
Cintron/CESAJ-PD-ES
Dugger/CESAJ-PD-E
Fischer/CESAJ-PD-R
Reed/CESAJ-PD-R
Grubb/CESAJ-DR-S
Duck/CESAJ-PD

L: group/pdes/weiss/winsberg-scoping

South Atlantic Division U.S. Army Corps of Engineers ATTN: Mr. Frank McGovern 60 Forsyth Street S.W. Room 9M15 Atlanta, Georgia 303045 (5 CYS)	Mr. Heinz Mueller, Chief Environmental Policy Section EPA, Region IV 61 Forsythe Street ~~100 Alabama St.,~~ SW Atlanta, GA 30303-3104 (5 CYS)	Mr. Jonathan Deason, Director Office of Environmental Affairs Department of the Interior, (M.S. 2340) 1849 C Street, NW Washington, DC 20240
Director Office of Federal Activities (2252-A) Environmental Protection Agency 1200 Pennsylvania Avenue, NW Washington, DC 20044 (2 CYS)	Mr. Sam D. Hamilton Regional Director U.S. Fish and Wildlife Service 1875 Century Blvd. Atlanta, GA 30345-3301	Mr. James Slack South Florida Ecosystem Office U.S. Fish and Wildlife Service ~~P.O. Box 2676~~ 1339 20th Street Vero Beach, FL ~~32961-2676~~ (4 CYS) 32960-3559
Regional Director National Park Service 100 Alabama Street SW 1924 Bldg Atlanta GA 30303	Mr. Gregg Chappell Federal Emergency Management Administration 500 C Street, SW (Rm 714) Washington, DC 20472	Ms Nancy Thompson National Marine Fisheries Service Southeast Fisheries Science Center 75 Virginia Beach Drive Miami FL 33149
Regional Environmental Clearance Officer U.S. Department of Housing and Urban Development 75 Spring St.,SW (Rm 600-C) Atlanta, GA 30303-3388 (5 CYS)	Mr. Bill Reck Natural Resources Conservation Service U.S. Department of Agriculture P. O. BOX 141510 Gainesville, FL 32614-1510	Director Office of Environmental Compliance Department of Energy, Room 4G064 1000 Independence Ave., SW Washington, DC 20585 (2 CYS)
Division Administrator Federal Highway Adminisration 227 N. Bronough St. (Rm 2015) Tallahassee, FL 32301	T. Neal McAililey Trial Attorney U.S. Department of Justice Environment and Natural Resources Division 99 N.E. 4th Street Miami, FL 33132-2111	Bureau of Indian Affairs Attn: Joe Frank, Acting Superintendent 6075 Stirling Road Hollywood, FL 33024
National Marine Fisheries Service Chief, Protected Species Branch 9721 Executive Center Dr. N. St. Petersburg, FL 33702-2449	~~John Hankinson Jr.~~ James I Palmer Jr U.S. EPA, Region 4 ~~345 Courtland Street, NE~~ 61 Forsyth Street Atlanta, GA ~~30365~~ 30303	Mr. Carl Goodwin US Geological Survey Florida District Chief 227 N. Bronough St., Suite 3015 Tallahassee, FL 32301
Mr. Richard Harvey U.S. Environmental Protection Agency South Florida Field Office 400 N. Congress Avenue Suite 120 West Palm Beach, FL 33401	Water Resources Divison US Geological Survey 9100 NW 36th Street Suite 106 Miami, FL 33178	Mr. Ron Smola U.S. Department of Agriculture NRCS 3301 Gun Club Road West Palm Beach, FL 33416
Karen Estock USACE, Area Engineer South Florida Operations Office 525 Ridge Lawn Road Clewiston, FL 33440-5399	Diane Conway U.S.D.A. 609 SW Park Street Okeechobee, FL 34972	Ms. Pamela Telis US Geological Survey P O Box 4970 Jacksonville FL 32232-0019

Mr. Tim Pinion US Fish & Wildlife Service 1339 20th Street Vero Beach, FL 32960	Ms Sharon Fauver US Fish & Wildlife Service 1339 20th Street Vero Beach, FL 32960	**Col. Terrence C. Salt** S. Fl. Ecosystem Restoration Task Force Florida National University University Park Campus OE Building, Room 148 Miami, FL 33199
	Ms. Dianne K. Crigger Ecosystem Management Coordinator Florida Dept of Environmental Protection P.O. Box 15425 West Palm Beach, FL 33416	**Mr. Mark Musaus** Arthur R. Marshall Loxahatchee NWR U.S. Fish and Wildlife Service 10216 Lee Road Boynton Beach, FL 33437-4796
Ms. Lorriane Heisler Fish & Wildlife Services 1339 20th Street Vero Beach, FL 32960-3559	**Mr. Bruce Arrington** US Fish & Wildlife Service 10216 Lee Road Boynton Beach, FL 33437	**Ms. Maureen Finnerty** Everglades National Park U.S. Department of the Interior 40001 State Road 9336 Homestead, FL 33034-6733
Mr. Herbert H. Zebuth Southeast District Florida Department of Environmental Protection 400 N. Congress Street West Palm Beach, FL 33401	Mr Eric Hughes U S Environmental Protection Agency P O Box 4970 Jacksonville FL 32232-0019	Biscayne Bay National Park Ms. Linda Canzanelli, Superintendent 9700 SW 328 ST Homestead FL 33033-5634
Mr. Mark Bradford Bureau of Indian Affairs (BIA) Office of Trust Responsibilities 1849 C St. NW, MS 4513 Main Interior Building Washington, DC 20240	Ms. Christine Coffin US Department of Agriculture 15600 SW 288th Street , Suite 402 Homestead FL 33033	Ms. Diane Conway US Department of Agriculture 609 SW Park Street Okeechobee, FL 34972
US Department of Commerce 14th and Constitution Ave NW Washington, DC 20230 (5 CYS)	US DOI Office of Environmental Policy and Compliance 1849 "C" St., NW - Room 2340 Washington DC 20240 (18 CYS)	John Folks Florida Department of Agriculture Rm. 171 C-28 3128 Conner Blvd. Tallahassee, FL 32399-1650
State Historic Preservation Officer Division of Historical Resources R. A. Gray Building 500 South Bronough St. Tallahassee, FL 32399-0250	**G. Ronnie Best** US Geological Survey Coordinator, Greater Everglades Science Program 15631 SW 48 Street Miami, FL 33185	Florida Fish and Wildlife Conservation Commission Everglades Region Mark Robson, Regional Director 8535 Northlake Blvd. West Palm Beach FL 33412

State Agencies

Executive Director South Florida Water Management District . P.O. Box 24680 West Palm Beach, FL 33416-4680	Mr. Max Day South Florida Water Management District 3301 Gun Club Road West Palm Beach, FL 33416-4680 (15 CYS)	South Florida Water Management District P.O. Box 24680 West Palm Beach, FL 33416-4680 Attn: Damon Meiers
Ms. Sally Bradshaw Office of the Governor of Florida The Capitol, Room 1501 Tallahassee, FL 32399	Mr. Richard Dent Executive Director Loxahatchee River Env. Control District 2500 Jupiter Park Drive Jupiter, FL 33458	Dr. John Arthur Florida Geological Survey 903 W. Tennessee Street Tallahassee, FL 32304-7700
Florida State Clearinghouse Department of Community Affairs 2555 Shumard Oak Boulevard Tallahassee, FL 32399-2100 (16 CYS)	Mr. Ernie Barnett, Director Office of Ecosystem Planning Florida Department of Environmental Protection 3900 Commonwealth Blvd. MS 45 Tallahassee, FL 32399-3000	Bureau of Wetlands Resource Management Florida Department of Environmental Protection 2600 Blair Stone Rd. Tallahassee, FL 32399-2400
Mr. Herbert H. Zebuth Southeast District Florida Department of Environmental Protection 1900 S. Congress Ave. (Suite A) ? West Palm Beach, FL 33406	Executive Director Florida Fish & Wildlife Conservation Commission 620 S. Meridian St. Tallahassee, FL 32399-1600	Everglades Protection and Restoration Program Florida Fish & Wildlife Conservation Commission 255 154th Avenue Vero Beach, FL 32968-9041
Bonnie Kranzer Governor's Commission 1550 Madruga Avenue, Suite 220 Coral Gables, FL 33146	Commissioner Bob Crawford Department of Agriculture and Consumer Services 3125 Conner Blvd. Room 269 Tallahassee, FL 32399-1650	Ms. Ana Gannon Florida Department of Transportation 3400 West Commercial Boulevard Fort Lauderdale, FL 33309 (2 CYS)
Mr Jose Calas PE FL Department of Environmental Protection 400 N. Congress Avenue, Suite 120 West Palm Beach, FL 33401-5116	**Mr. Richard Smith, Sr.** Governmental Analyst Office of the Governor of Florida Address ?	Ms. Florette Braun Florida Power & Light PO Box 14000 North Palm Beach, FL 33408
Ms. Linda McCarthy FL Dept. of Agriculture & Community Services PO Box 24680 West Palm Beach, FL 33416-4680	**Ms. Melissa Meeker** Southeast District Florida Department of Environmental Protection Address ? 1900 S. Congress Ave. (Suite A) West Palm Beach, FL 33406	John Folks Florida Department of Agriculture Rm. 171 C-28 3128 Conner Blvd. Tallahassee, FL 32399-1650
Florida Department of Environmental Protection Mr. David Struhs, Secretary 3900 Commonwealth Blvd. M.S. 49 Tallahassee FL 32399	**Mr. Al Rothman** Florida Department of Transportation 3400 West Commercial Boulevard Fort Lauderdale, FL 33309	Ms. Linda McCarthy Florida Dept. of Agriculture and Community Services P. O. Box 24680 West Palm Beach, FL 33416 duplicate

duplicate ?

Associations

Mr. Mark Kraus National Audubon Society 444 Brickell Ave. #850 Miami, FL 33131	Mr. Davod Balman Everglades Coordinating Council 3845 SW 103rd Avenue Miami, FL 33165	National Resources Defense Council 40 West 20th Street, 11th Floor New York, NY 10011
Herbert W. Kale II, Ph.D. Florida Audubon Society 460 Hwy 436 Suite 200 Casselberry, FL 32707-4939	Mr. Michael Chenoweth Friends of Everglades 7800 Red Road, Ste 215K Miami, FL 33143	The Arthur R. Marshall Foundation and Florida Environmental Institute, Inc. Post Office Box 2621 Palm Beach, FL 33480
Ms. Erin Deady Audobon of Florida 444 Brickell Ave., Ste. 850 Miami, FL 33131	Mr. Wayne Nelson FADE P.O. Box 16061 West Palm Beach, FL 33416	Mr. Andrew Schock National Wildlife Federation 1330 West Peachtree St. (Su. 475) Atlanta, GA 30309
Mr. Manley Fuller, III Florida Wildlife Federation P.O. Box 6870 Tallahassee, FL 32314-6870	Mr. Robert Bendick, State Director The Nature Conservancy 222 S. Westmonte Dr. (Su 300) Altamonte Springs, FL 32714-4269	Mr. Richard Grosso Env. & Land Use Law Center 3305 College Avenue Davie, FL 33314
Dr. Stuart Strahl National Audubon Society 444 Brickell Ave. #850 Miami, FL 33131	Mr. Doug Coward 1000 Friends of Florida 1833 SE Hideaway Circle Port St. Lucie, FL 34952	Mrs. Rosa Durando Audubon Society of the Everglades 10308 Heritage Farms Road Lake Worth, FL 33467
Mr. Karsten A. Rist Tropical Audubon Society, Inc. 5530 Sunset Dr. Miami, FL 33143	Mr. Roderick Tirrell Sierra Club Florida Chapter 2101 NE 55 Ct. Ft. Lauderdale, FL 33308-3111	Ms. Shannon Estenoz World Wildlife Fund P.O. Box 19630 Plantation, FL 33318
Ms. Elaine Usherson Sierra Club, Loxahatchee 298 NW 11th St. Boca Raton, FL 33432	Dr. Jerome Lorenz National Audubon Society 115 Indian Mound Trail Tavernier, FL 33070	Ms Mary Munson Defenders of Wildlife 1101 14th Street NW Washington, DC 20005
Mr. Craig Diamond Sierra Club 1307 Leewood Tallahasee FL 32312	National Parks and Conservation Association Attn: Ms. Kim Swatland 1546 Polk Street Hollywood, FL 33020-5426	National Sierra Club 544 Fernwood Road Key Biscayne, FL 33149

Mr. Robert Dendick The Nature Conservancy – Florida Chapter 222 S. Westmonte Drive Altomomte Springs, FL 32714	Mr. John Marshall 525 S Flagler Drive, Apt. 10C West Palm Beach, FL 33401	

Native American Tribes

Mr. Gene Duncan Miccosukee Tribe of Indians P.O. Box 440021 Tamiami Station Miami, FL 33144	Mr. Craig Tepper Seminole Tribe of Florida 6073 Stirling Rd. Hollywood, FL 33024	Mr. Dexter Lehtinen Miccosukee Tribe of Indians 7700 N. Kendall Drive Suite 303 Miami, FL 33126
Mr. James Billie, Chairman Seminole Tribe of Florida 6300 Stirling Road Hollywood, FL 33024-2198	Mr. Billy Cypress, Chairman Miccosukee Tribe of Indians of Florida P.O. Box 440021, Tamiami Station Miami, FL 33144	Dr. Terry Rice Miccosukee Tribe of Indians 7700 N. Kendall Drive Suite 303 Miami, FL 33126

FLORIDA AND FEDERAL LEGISLATIVE OFFICES

House Environmental Protection Committee Rm. 220 House Office Building 402 South Monroe Street Tallahassee, FL 32399-1300	Governmental Responsibility Council Rm. 228 House Office Building 402 South Monroe Street Tallahassee, FL 32399-1300	Legislative Library 701 The Capitol Tallahassee, FL 32399-1300
The Honorable Steve Geller 400 South Federal Highway Suite 204 Hallandale, FL 33009	The Honorable Tom Rossin 503 Royal Palm Beach Blvd. Royal Palm Beach, FL 33411	The Honorable Ron Klein 3333 South Congress Ave. Suite 305A Delray Beach, FL 33445
The Honorable Debby Sanderson 4800 NE 20th Terrace, #401 Ft. Lauderdale, FL 33308	The Honorable Bill Andrews 33 NE 4th Avenue Delray Beach, FL 33483	The Honorable James Harper, Jr. 2620 Australian Avenue, #106 West Palm Beach, FL 33407
The Honorable Irving Slosberg 9045 La Fontana Blvd., B-17 Boca Raton, FL 33434	The Honorable Connie Mack 2601 E. Oakland Park Blvd., #204 Ft. Lauderdale, FL 33306	The Honorable Richard Machek 5353 W. Atlantic Ave., Suite 402A Delray Beach, FL 33284
The Honorable Anna Gannon 302 SE 2nd Street Delray Beach, FL 33483	The Honorable Joe Negron 2400 S. Federal Highway, #250 Stuart, FL 34994	The Honorable Susan Bucher 1660 Southern Blvd., Suite P West Palm Beach, FL 33406

The Honorable Jeff Atwater 824 US Highway One, Suite 260 North Palm Beach, FL 33408	The Honorable Lois Frankel 1645 Palm Beach Lakes Blvd. Suite 290 West Palm Beach, FL 33401	The Honorable Alcee L. Hastings US House of Representatives 2235 Rayburn Office Building Washington, DC 20515
The Honorable Robert Wexler US House of Representatives 213 Cannon House Office Building Washington, DC 20515	The Honorable E. Clay Shaw, Jr. US House of Representatives 2408 Rayburn House Office Building Washington, DC 20515	The Honorable Mark Foley US House of Representatives 104 Cannon House Office Building Washington, DC 20515

The Honorable Bill Nelson United States Senate 517 Hart Senate Office Bldg Washington, DC 20510	The Honorable Bob Graham United States Senate 524 Hart Senate Office Bldg Washington, DC 20510	

AGRICULTURE INTERESTS

Mr. Thomas MacVicar MacVicar, Frederico & Lamb, Inc. 4524 W. Gun Club Road, Suite 201 West Palm Beach, FL 33415		Dr. Peter Rosendahl Flo-Sun, Inc. 316 Royal Poinciana Plaza Palm Beach, FL 33480

Counties

Mr. Larry Johnson, P.E. Assistant Director PBC Water Utilities Department 2065 Prairie Road West Palm Beach, FL 33406	**Mr. Richard Walesky, Director** Palm Beach County Environmental Resources Management 3323 Belvedere Road, Building 502 West Palm Beach, FL 33406	**Dennis Eshleman, Director** Palm Beach County Parks & Recreation Department 2700 Sixth Avenue South Lake Worth, Florida 33461
IFAS – Agricultural Research & Education PO Drawer 8003 Belle Glade, FL 33430	**Mr. Allen Trefry** Environmental Director Palm Beach County Env. Resources Mgt. 3323 Belvedere Road, Bldg. 502 West Palm Beach, FL 33405	**Mr. Frank M. Duke, PhD** Director Palm Beach County Planning Department 100 Austrailian Avenue, 5th Floor West Palm Beach, FL 33406
Mr. Ken Todd Water Resource Manager Palm Beach County 301 N. Olive Avenue, Suite 1101 West Palm Beach, FL 33401	**Mr. Fred Rapach, R.E.P.** Policy/Program Coordinator PBC Water Utilities Department 2065 Praire Road West Palm Beach, FL 33406	**Ms. Dianna Ackerman-White** Director of Communications Lake Worth Drainage District 13081 Military Trail Delray Beach, FL 33484
Hassan Hadjimiry, P.E. Project Manager PBC Water Utilities Department 2065 Prairie Road West Palm Beach, FL 33406	Mr. Peter Pimentel North Palm Beach Improvement District 357 Hiatt Drive Palm Beach Gardens, FL 33418	Mr. Allen Trefry Palm Beach ERM duplicate 3323 Belvedere Road Bldg. 502 West Palm Beach, FL 33405
Mr. Umesh Asrani Palm Beach County Health Department D.O.H 901 Evernia Street West Palm Beach, FL 33401	South Florida Regional Planning Council 3440 Hollywood Blvd Hollywood, FL 33021	Mr. Jerry W. Brownlee Director Palm Beach County Library System 3650 Summit Blvd. West Palm Beach, FL 33406-4198
Mr. Robert Weisman County Administrator Palm Beach County Administration 301 N. Olive Ave. West Palm Beach, FL 33401-4705	Mr. Brian Gentry Water Resources Palm Beach County 3323 Belevedere Rd. West Palm Beach FL 33406	

Mailed out
2-7-02

Planning Division
Environmental Branch

FEB 07 2002

Mr. Jay Slack
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960-3559

Dear Mr. Slack:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is requesting your assistance in gathering information that will help define issues and concerns to be addressed in a National Environmental Policy Act (NEPA) document being prepared for the Winsberg Farm Wetland Restoration Project. The project is part of the Comprehensive Everglades Restoration Project (CERP) authorized by the Water Resources Development Act of 2000. The proposed location for the Winsberg Farms created wetland is a 200-acre agricultural field in Boynton Beach, Palm Beach County, Florida (map enclosed).

The proposed project consists of the construction of approximately 140 acres of wetland and open water habitat east of the Loxahatchee Wildlife Preserve in Palm Beach County. After wetland grading, 6 to 8 million gallons per day of treated and recycled reuse water from the Southern Region Water Reclamation Facility are proposed to rehydrate the constructed area. The wetland would then be planted with a variety of native wetland plants and created habitat for various species of wildlife. Part of the proposal also includes construction of a boardwalk and educational facilities to provide a recreational area for the public.

Anticipated benefits of the proposed project include additional water recharge to local aquifer system that normally would be lost to deep well injection, reduction of dependence on supplies of water from the Everglades ecosystem and Lake Okeechobee, creation of additional wildlife habitat and green space, and the creation of a public recreational area.

-2-

The Corps requests your expertise in identifying any critical fish and wildlife habitat and any threatened or endangered species that may be within the project area or affected by the activities of the project. Enclosed is a map with the location of the Winsberg Farm wetland creation area for your use.

If you have any questions, suggestions, or require more information, please contact Mrs. Rebecca Weiss at 904-899-5025 or by electronic mail at rebecca.j.weiss@usace.army.mil. Your assistance is greatly appreciated.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Weiss/CESAJ-PD-ES/5025 | als 1-29-08
Dupes/CESAJ-PD-ES
Cintron/CESAJ-PD-ES
Dugger/CESAJ-PD-E
Fischer/CESAJ-PD-R
Reed/CESAJ-PD-R
Grubb/CESAJ-DR-S
CESAJ-PD

L: group/pdes/weiss/winsberg-fws

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

JAN 2 2 2002

Programs and Project Management Division
Project Management Branch

Mr. Gary D. Dernlan, P.E.
Director, Water Utilities Department
Palm Beach County
2065 Prairie Road, Building K
West Palm Beach, Florida 33406

Dear Mr. Dernlan:

In accordance with the terms of the Design Agreement executed between Palm Beach County (PBC) and the U.S. Army Corps of Engineers (Corps) for Design of the Winsberg Farm Wetland Restoration Project for the Comprehensive Everglades Restoration Plan (CERP), this shall serve as notification that we are initiating National Environmental Policy Act (NEPA) and Federal law compliance activities to run concurrently with the preparation of the Project Management Plan (PMP). These work efforts will be described, scheduled and cost-estimated in the PMP for this project. I understand that Corps and PBC Project Managers have agreed that it is necessary to initiate this work prior to approval of the PMP in order to meet project design and construction schedule commitments.

The NEPA and Federal law compliance activities will cost approximately $243,000 (for Corps in-house and contract work) and will be completed within 18 months. All expenditures are subject to review and audit in accordance with the terms of the Design Agreement.

If you have any additional questions or need additional information, please call me or have your staff contact Mr. Richard E. Bonner, Deputy District Engineer for Project Management, at 904-232-2586.

Sincerely,

James G. May
Colonel, U.S. Army
District Engineer

JACKSONVILLE DISTRICT
STAFF SUMMARY

NAME: Gerald K. Grubb DATE: 01/18/2002 SUSPENSE:
OFFICE SYMBOL: CESAJ-DR-S
TELEPHONE: x2771

			Concur (initials)				Concur (initials)
☑	DE	COMMANDER		☐	IM	INFORMATION MGMT	
☑	DD	DEPUTY COMMANDER	P	☐	IR	INTERNAL REVIEW	
☐	DS	DEP CDR, ANTILLES		☐	LM	LOGISTICS	
☐	DP	DEP DIST ENGR (PM)		☐	OC	OFFICE OF COUNSEL	
☑	DX	EXECUTIVE ASSISTANT		☐	PA	PUBLIC AFFAIRS	
☐	DB	SMALL BUSINESS		☐	PD	PLANNING	
☐	CO	CON-OPS		☐	PM	SECURITY	
☐	CP	CIVILIAN PERSONNEL		☐	RE	REAL ESTATE	
☐	CT	CONTRACTING		☐	RD	REGULATORY	
☐	EE	EEO		☐	RM	RESOURCE MGMT	
☐	EN	ENGINEERING		☐	SO	SAFETY OFFICE	

Purpose:

The purpose of this letter is to notify Palm Beach County that the Corps is initiating NEPA activities to run concurrently with the preparation of the PMP for the Winsberg Farm Wetland Restoration, CERP project.

Background:

The project sponsor, Palm Beach County, has made construction schedule commitments to Mr. Ted Winsberg, who essentially donated his farmland to the benefit of the county. In order to meet the schedule commitments, the Corps must run as many activities concurrently as possible. Due to the fact that the county has prepared 50% P&S, the project design has proceeded to the point that the Corps may initiate NEPA and other Federal law compliance activities without significant risk of lost effort.

Discussion:

☐ Action	☐ Approval	☐ As Requested	☐ Comment
☐ FYI	☐ Note and Return	☐ Per Conversation	☐ Signature

CESAJ FORM 1259, NOV 97

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

PALM BEACH COUNTY
WATER UTILITIES DEPARTMENT
P.O. BOX 16097
WEST PALM BEACH, FLORIDA 33416

January 18, 2002

Ecosystem Restoration Division
South Florida Restoration Branch

Subject: Invitation to Participate on the Project Delivery Team for the Winsberg Farm Wetland Restoration Project Implementation Report

TO: SEE DISTRIBUTION LIST

The Jacksonville District U.S. Army Corps of Engineers (USACE) and the Palm Beach County Water Utilities Department (PBCWUD) are initiating the Winsberg Farm Wetland Restoration Project Implementation Report (PIR) component of the Comprehensive Everglades Restoration Plan (CERP). The Winsberg Farm Wetland project provides for the construction of approximately 140 acres of wetlands on the Winsberg Farm property located in Palm Beach County. The project consists of creating a series of wetland impoundments of approximately 1-6 feet in depth. The source of water is effluent from Palm Beach County's Southern Region Water Reclamation Facility. The project will provide indirect aquifer recharge and increased wetland habitat.

The USACE and the PBCWUD are forming a Project Delivery Team (PDT) that will be developing the products (reports, design documents, plans and specifications, etc.) necessary to complete the PIR and Design phases of the project. The purpose of this letter is to invite your organization to participate in the implementation of this project. Please note that, in general, participation on the PDT will be the financial responsibility of the participating organization. This multi-agency concept is similar to the approach used for the Central and Southern Florida Project Comprehensive Review (Restudy) team. We expect that this effort will take approximately 18 months to complete, and project meetings will be scheduled as needed during implementation. We intend to continue to have an open and public process during the development of these products that will include periodic review of project implementation by the Restoration, Coordination and Verification (RECOVER) Team.

Additionally, we will also provide periodic updates to the South Florida Ecosystem Restoration Task Force Working Group and the Governor's Commission for the Everglades. Your agency's involvement combined with other organizations, will provide skill and experience vital for successful project development, will facilitate the flow of information, and will help achieve concurrence and ownership by key organization stakeholders throughout project implementation.

-2-

The initial PDT meeting will be held on February 7, 2002, from 9:00 a.m. until 4:30 p.m. at the PBCWUD Southern Region Operations Center (SROC), located at 13026 Jog Road, Delray Beach, Florida. The day will be divided into two sessions. The morning session will provide an overview of the process for development and implementation of a CERP project. The afternoon session will discuss the scope and tasks associated with developing a Project Management Plan (PMP) for this project. We will distribute the agenda, directions, and project information approximately 1 week prior to the meeting.

Please identify the person(s) that you would like to participate in this CERP component representing your organization. To facilitate the timely distribution of materials to your organization, it would be appreciated if you would send an e-mail to Jerry Grubb at Gerald.K.Grubb@usace.army.mil with the name, address, phone number and the e-mail address of your organization's representative by January 29, 2002. Should you have any questions you may contact the USACE Project Manager, Mr. Jerry Grubb at (904) 232-2771 or the PBCWUD Project Manager, Mr. Hassan Hadjimiry at (561) 434-5359. Thank you for your cooperation.

Richard E. Bonner, P.E.
Deputy District Engineer for
Project Management
Jacksonville District
U.S. Army Corps of Engineers

Gary D. Dernlan, P.E.
Director, Water Utilities Department
Palm Beach County

Winsberg Farm Restoration Project
Project Delivery Team
Mailing List

Ms. Dianna Ackerman-White
Director of Communications
Lake Worth Drainage District
13081 Military Trail
Delray Beach, FL 33484

Mr. Umesh Asrani
Palm Beach County Health Department
D.O.H
901 Evernia Street
West Palm Beach, FL 33401

Mr. Bruce Arrington
US Fish & Wildlife Service
10216 Lee Road
Boynton Beach, FL 33437

Mr. Ernest Barnett
Director of Ecosystem Planning & Coordination
Florida DEP
3900 Commonwealth Boulevard, MS 45
Tallahassee, FL 32399-3000

G. Ronnie Best
US Geological Survey
Coordinator, Greater Everglades Science Program
15631 SW 48 Street
Miami, FL 33185

Mr. James Billie, Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024-2198

Mr. Mark Bradford
Bureau of Indian Affairs (BIA)
Office of Trust Responsibilities
1849 C St. NW, MS 4513 Main Interior Building
Washington, DC 20240

Ms. Cindy Brashear
U.S. Fish & Wildlife Service
Loxahatchee National Wildlife Refuge
10216 Lee Road
Boynton Beach, FL 33437-4796

Ms. Linda Canzanelli
Biscayne National Park
9700 SW 328th Street
Homestead, FL 33033-5634

Mr. Bob Crawford
Director, Florida Department of Agriculture
and Consumer Affairs
The Capitol, Room LL-29
Tallahassee, FL 32399-0810

Ms. Dianne K. Crigger
Ecosystem Management Coordinator
Florida Dept of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Mr. Billy Cypress, Chairman
Miccosukee Tribe of Indians of Florida
P.O. Box 440021, Tamiami Station
Miami, FL 33144

Carol Degraffenreidt Esq.
U.S. Attorney's Office
Civil Division
99 NE 4th Street, Room 330
Miami, FL 33132-2111

Mr. Richard Dent
Executive Director
Loxahatchee River Env. Control District
2500 Jupiter Park Drive
Jupiter, FL 33458-8964

Mr. Frank M. Duke, PhD
Director
Palm Beach County Planning Department
100 Austrailian Avenue, 5th Floor
West Palm Beach, FL 33406

Ecosystem Management Coordinator
Florida Dept of Environmental Protection
400 N. Congress Avenue
West Palm Beach, FL 33416

Dennis Eshleman, Director
Palm Beach County
Parks & Recreation Department
2700 Sixth Avenue South
Lake Worth, Florida 33461

Ms. Maureen Finnerty
Superintendent
Everglades National Park
U.S. Department of the Interior
40001 State Road 9336
Homestead, FL 33034-6733

Mr. Steve Forsythe
Florida State Supervisor
U.S. Fish and Wildlife Service
U.S. Department of the Interior
P.O. Box 2676
Jupiter, FL 33458-8964

Mr. Carl Goodwin
US Geological Survey
Florida District Chief
227 N. Bronough St., Suite 3015
Tallahassee, FL 32301

Jerry Grubb
Project Manager
U.S. Army Corps of Engineers
CESAJ-DR-S Room 464
400 West Bay Street
Jacksonville, FL 32202

Hassan Hadjimiry, P.E.
Project Manager
PBC Water Utilities Department
2065 Prairie Road
West Palm Beach, FL 33406

Mr. Richard Harvey
Director, South Florida Field Office
Region 4/Water Management Division
U.S. Environmental Protection Agency
400 N. Congress Avenue, Suite 120
West Palm Beach, FL 33401-5116

Ms. Lorriane Heisler
Fish & Wildlife Services
1339 20th Street
Vero Beach, FL 32960-3559

Mr. Larry Johnson, P.E.
Assistant Director
PBC Water Utilities Department
2065 Prairie Road
West Palm Beach, FL 33406

IFAS - Agriculture Research & Education
P.O. Drawer 8003
Belle Glade, FL 33430

Bonnie Kranzer, PhD
Governor's Commission for the Everglades
1550 Madruga Avenue, Suite 412
Coral Gables, FL 33146

Neal McAliley Esq.
U.S. Attorney's Office
Civil Division
99 NE 4th Street, Room 330
Miami, FL 33132-2111

Ms. Melissa Meeker
Florida Dept of Environmental Protection
400 N. Congress Avenue
West Palm Beach, FL 33406

Director of District Management, SE District
Florida Dept of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416-5425

Mr. Damon Meiers
South Florida Water Management District
REG
3301 Gun Club Road
West Palm Beach, FL 33406

Mr. Mark Musaus
Project Leader
Arthur R. Marshall Loxahatchee NWR
U.S. Fish and Wildlife Service
10216 Lee Road
Boynton Beach, FL 33437-4796

Mr. Timothy Pinion
Florida Fish and Wildlife Conservation Commission
Office of Environmental Services
255 154th Avenue
Vero Beach, FL 32968-9041

Ms. Mary Ann Poole
Biological Administrator II
Florida Fish and Wildlife Conservation Commission
Office of Environmental Services
255 154th Avenue
Vero Beach, FL 32968-9041

Mr. Fred Rapach, R.E.P.
Policy/Program Coordinator
PBC Water Utilities Department
2065 Praire Road
West Palm Beach, FL 33406

Mr. Al Rothman
Florida Department of Transportation
3400 West Commercial Boulevard
Fort Lauderdale, FL 33309

Col. Terrence C. (Rock) Salt
Executive Director
S. Fl. Ecosystem Restoration Task Force
Florida National University
University Park Campus
OE Building, Room 148
Miami, FL 33199

Mr. Ron Smola
Environmental Liaison
USDA Natural Resources Conservation Service
U.S. Department of Agriculture
3301 Gun Club Road, MS 6221
West Palm Beach, FL 33406

Mr. Richard Smith, Sr.
Governmental Analyst
Office of the Governor of Florida
The Capitol, Room 1501
Tallahassee, FL 32399

Susan Teel
US EPA
No Address

Pamela A. Telis
USGS Liaison with USACE
U.S. Geological Survey
400 W. Bay Street
Jacksonville, FL 32202

Mr. Ken Todd
Water Resource Manager
Palm Beach County
301 N. Olive Avenue, Suite 1101
West Palm Beach, FL 33401

Ms. Nancy Thompson
Acting Director
National Marine Fisheries Service, NOAA
Southeast Fisheries Science Center
75 Virginia Beach Drive, Room 207
Miami, FL 33149-1003

Mr. Allen Trefry
Environmental Director
Palm Beach County Env. Resources Mgt.
3323 Belvedere Road, Bldg. 502
West Palm Beach, FL 33405

Mr. Richard Walesky, Director
Palm Beach County
Environmental Resources Management
3323 Belvedere Road, Building 502
West Palm Beach, FL 33406

Mr. Herb Zebuth
Environmental Coordinator
Florida Dept of Environmental Protection
Southeast District
P.O. Box 15425
West Palm Beach, FL 33416

Environmental Coordinator
Florida Dept of Environmental Protection
400 N. Congress Avenue
West Palm Beach, FL 33401

This page intentionally left blank.

B.4 PUBLIC/AGENCY COMMENTS FROM DRAFT REPORT

Public and Agency comments will be provided in the Final Project Implementation Report.

B.5 OVERVIEW OF THE PROGRAMMATIC EIS IN THE YELLOW BOOK (EXECUTIVE SUMMARY FROM THE YELLOW BOOK)

Please see the following pages for an overview of the programmatic EIS in the Yellow Book.

CENTRAL AND SOUTHERN FLORIDA PROJECT
COMPREHENSIVE REVIEW STUDY

FINAL
INTEGRATED FEASIBILITY REPORT
AND
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Responsible Agencies: The responsible lead agency is the U.S. Army Corps of Engineers, Jacksonville District. The responsible cooperating agencies are the South Florida Water Management District, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the National Park Service, the Florida Game and Fresh Water Fish Commission, the U.S. Geological Survey, the Natural Resources Conservation Service, and the Florida Department of Environmental Protection.

Abstract: The south Florida ecosystem is a nationally and internationally unique and important natural resource. It is also a resource in peril, having been severely impacted by human activities for over a hundred years. This report recommends a comprehensive plan for the restoration, protection, and preservation of the water resources of central and southern Florida, including the Everglades. This is a final integrated feasibility report and Programmatic Environmental Impact Statement, which identifies and discusses the plan's proposed project features, its beneficial effects and potential impacts on existing resources. The recommended Comprehensive Plan contains over sixty project features. Principal features of the plan are the creation of approximately 217,000 acres of new reservoirs and wetlands based water treatment areas. These features vastly increase storage and water supply for the natural system, as well as for urban and agricultural needs, while maintaining current Central and Southern Florida Project purposes. The recommended Comprehensive Plan achieves the restoration of more natural flows of water, including sheetflow, improved water quality, and more natural hydroperiods in the south Florida ecosystem. Improvements to native flora and fauna, including threatened and endangered species, will occur as a result of the restoration of hydrologic conditions.

THE OFFICIAL CLOSING DATE FOR THE RECEIPT OF COMMENTS IS 30 DAYS FROM THE DATE ON WHICH THE NOTICE OF AVAILABILITY OF THIS FINAL PROGRAMATIC EIS APPEARS IN THE FEDERAL REGISTER.

If you require further information on this document, contact:

Mr. Russell Reed
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019
Telephone: (904) 232-3967

NOTE: This report includes an integrated Programmatic Environmental Impact Statement (PEIS) within the final feasibility report; sections required for compliance with the National Environmental Policy Act (NEPA) are noted by an asterisk in the Table of Contents.

CENTRAL AND SOUTHERN FLORIDA PROJECT COMPREHENSIVE REVIEW STUDY

FINAL INTEGRATED FEASIBILITY REPORT AND PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

SUMMARY

The recommended Comprehensive Plan contained within this report will, when implemented, restore, protect, and preserve a natural resource treasure – the south Florida ecosystem. The greater Everglades ecosystem is nationally significant and unique in the world. If actions are not taken now, irretrievable loss of this extraordinary resource will occur. The Comprehensive Plan affords the opportunity to reverse the course of declining ecosystem health and leave an Everglades legacy for generations to come.

The Central and Southern Florida (C&SF) Project, first authorized by Congress in 1948, is a multi-purpose project that provides flood control, water supply for municipal, industrial, and agricultural uses, prevention of saltwater intrusion, water supply for Everglades National Park, and protection of fish and wildlife resources. The primary system includes about 1,000 miles each of levees and canals, 150 water control structures, and 16 major pump stations.

The C&SF Project Comprehensive Review Study, known as the Restudy, is authorized by Section 309(l) of the Water Resources Development Act of 1992 (P.L.102-580). This study is also authorized by two resolutions of the Committee on Transportation and Infrastructure, United States House of Representatives, dated September 24, 1992. Section 528 of the Water Resources Development Act of 1996 provides specific direction and guidance for the Restudy.

The purpose of this study was to reexamine the C&SF Project to determine the feasibility of modifying the project to restore the south Florida ecosystem and to provide for the other water-related needs of the region. Specifically, as required by the authorizing legislation, the study investigated making structural or operational modifications to the C&SF Project for improving the quality of the environment; protecting water quality in the south Florida ecosystem; improving protection of the aquifer; improving the integrity, capability, and conservation of urban and agricultural water supplies; and improving other water-related purposes.

The following principles guided the development of the recommended Comprehensive Plan:

- The overarching objective of the Comprehensive Plan is the restoration, preservation and protection of the south Florida ecosystem while providing for other water related needs of the region;
- The Comprehensive Plan will be based on the best available science, and independent scientific review will be an integral part of its development and implementation;
- The Comprehensive Plan will be developed through an inclusive and open process that engages all stakeholders;
- All applicable Federal, tribal, state, and local agencies will be full partners and their views will be considered fully; and
- The Comprehensive Plan must be a flexible plan that is based on the concept of adaptive assessment – recognizing that modifications will be made in the future based on new information.

Although this document meets the requirements of Section 404 (r) of the Clean Water Act (Public Law 92-500, as amended), as addressed in Annex C, the Corps will request a Section 401 State water quality certificate during subsequent phases of this project.

The final integrated feasibility report and Programmatic Environmental Impact Statement is being transmitted through the Division Engineer and the Washington-level Federal report review process, which will include reviews by the Chief of Engineers and the Secretary of the Army. The Assistant Secretary of the Army for Civil Works, representing the Secretary of the Army, will coordinate the documents with the Office of Management and Budget, and send them to Congress. The study authority states that the Secretary shall transmit the Comprehensive Plan to Congress not later than July 1, 1999.

MAJOR CONCLUSIONS

The Everglades has molded the regional character of central and southern Florida and sustains the economic and cultural growth of the region. The Everglades has influenced the regional mosaics of space and landscape patterns - urban, agricultural and natural. As such, it epitomizes the region's sense of definition and place. As importantly, the Everglades is unlike any other place in the world.

The remaining Everglades and other natural ecosystems in south Florida no longer exhibit the functions, richness, and spatial extent that defined the pre-drainage systems. There have been substantial and irreversible reductions in the

spatial extent of the wetland systems (including an approximately 50 percent reduction in the extent of the true Everglades) and in the total water storage, timing, and flow capacities of these systems. These natural systems will not recover their defining characteristics under current conditions and will not be sustained into the future. Indeed, the health of the ecosystem will continue to decline unless corrective actions are taken. For example, wading birds, whose numbers have already decreased by 85-90 percent, are key indicators of broad, regional patterns of aquatic production. There is a continuing reduction in the total number of birds initiating breeding in south Florida. Fisheries, including economically important recreational and commercial species, continue to decline steadily in many areas of south Florida, affecting the natural and the human environment.

Several of the major unintended impacts to the natural system attributed to the C&SF Project in south Florida include the following:

- extreme fluctuations in high and low water levels in Lake Okeechobee have a major adverse impact on the lake's littoral and pelagic zones and fish and wildlife habitats;
- extreme fluctuations between too much and too little freshwater discharge into the Caloosahatchee and St. Lucie estuaries result in detrimental salinity conditions and physical alterations of fish and wildlife habitat;
- detrimental hydrologic conditions in freshwater wetland habitats cause major adverse impacts on plant and animal communities of the native Everglades; and
- unsuitable freshwater flows to Florida and Biscayne bays and Lake Worth Lagoon adversely impact salinity and physically alter fish and wildlife habitat.

Water quality throughout south Florida has also deteriorated over the past 50 years since construction started on the C&SF Project. Many wetlands that acted as natural filters and retention areas either can no longer serve these purposes or have been lost to drainage or development. Urban and agricultural development and drainage systems result in the rapid discharge of runoff containing pollutants into south Florida's water bodies. As a result, many water bodies throughout south Florida presently do not meet water quality standards. Untreated urban and agricultural storm water that does not meet water quality standards is sometimes sent to natural areas. Excessive nutrients entering the Everglades have led to an overabundance of cattails, a visible sign of unfavorable water quality conditions and a potential decline in ecological productivity. Flood control releases from Lake Okeechobee and runoff discharged via secondary drainage canals in the St. Lucie River Basin have been linked to fish lesions and a decline in estuarine productivity, resulting in substantial ecological and economic impacts.

Adequately and reliably meeting water supply for all sectors is also a problem. Historically, most rainwater soaked into the ground in the region's vast wetlands. As south Florida developed, the canal network worked too effectively and drained too much water off the land too quickly. The result is that not enough water is stored for all uses. Water shortages that occur today are expected to become more frequent without any changes to the water management system. Without the steps outlined in this Comprehensive Plan, conflicts over the allocation of water needed for natural, agricultural, and urban areas will only increase.

Flooding is also a problem. Florida is a low-lying, flat, and wet state. Today, the Project provides flood protection on a regional basis for south Florida, supported by many locally operated canal networks. The Comprehensive Plan will maintain, and in some situations improve, this important protection from flooding.

Altogether, these problems seriously threaten the natural and human environment of the south Florida ecosystem.

What Is Expected to Happen Without the Recommended Comprehensive Plan

Although some level of ecological improvement will occur in the south Florida ecosystem as a result of implementation of projects currently planned outside of the Restudy, the cumulative, regional benefits from these projects would not result in a sustainable south Florida ecosystem. Specifically, based on an evaluation of conditions in the year 2050 without the recommended Comprehensive Plan, it was determined that the overall health of the ecosystem will have substantially deteriorated. This type of assessment was carried out for all planning alternatives evaluated during the course of the Restudy. The analyses show that making modifications to only some portions of the C&SF Project in order to achieve sustainable natural systems will not succeed. Conditions predicted in 2050 fail to meet the basic needs of the south Florida ecosystem.

Demands placed on Lake Okeechobee result in damaging water levels and extreme harm to the littoral zone. Damaging fresh water discharges into the Caloosahatchee and St. Lucie estuaries result in major harm to fisheries. Damaging high flows alter salinity balances in Lake Worth Lagoon. Hydropatterns predicted for the Water Conservation Areas are harmful to tree islands. Everglades National Park does not receive enough freshwater flow to maintain important aquatic habitat in Shark River Slough. Low flows to Florida and Biscayne bays also result in harm to the resources in these areas. These ecological problems would not be corrected solely by implementation of currently planned or ongoing projects.

Relatively greater levels of improvement were identified for water quality conditions in the future compared to existing conditions in south Florida. It is expected that state, tribal, regional, and local programs to improve water quality

will be implemented to varying degrees throughout the study area during the next 50 years. Ongoing restoration projects in the Kissimmee River watershed are expected to beneficially affect water quality. Current efforts to reduce inputs of excessive nutrients into the Everglades through the Everglades Construction Project should substantially slow the spread of cattails and other plants with high nutrient tolerances and result in a slow recovery of natural vegetation patterns in some nutrient-stressed parts of the system. Proposed modifications to the Lake Okeechobee regulation schedule and water quality improvement projects suggested by the South Florida Ecosystem Restoration Working Group's Lake Okeechobee, St. Lucie, and Caloosahatchee Issue Teams should improve water quality conditions in those water bodies. Nonetheless, the future without plan condition, while resulting in water quality improvements over existing conditions in certain subregions of the Restudy area, was still determined by the Restudy's water quality team to be unacceptable for sustainable ecosystems.

The future demand for suitable water is expected to exceed the limits of readily available sources. Predictions of water restrictions in the future indicate serious – and probably unacceptable – levels of water supply cutbacks. Modeling of the future "without plan" condition shows that for the Lake Okeechobee Service Area, 24 percent of water supply demands could not be met over a 30-year period. This translates into water supply restrictions every other year. In the Lower East Coast, water restrictions would be expected to occur every other year in Palm Beach, Miami-Dade, and the Florida Keys portion of Monroe County. In Broward County water restrictions would occur on nearly an annual basis. The ability to sustain the region's natural resources, economy, and quality of life depends, to a great extent, on the success of the efforts to enhance, protect, and better manage the region's water resources.

A major advantage of the Comprehensive Review Study is that it has used tools and methods to evaluate the entire C&SF Project area together as an integrated system. Thus, the effects of making modifications in one area on another area were able to be seen and then used to develop a plan that maximized positive system-wide benefits. The South Florida Water Management Model is the tool that demonstrates the hydrologic effects of changes in one region on other regions. The Restudy Team developed measures to evaluate an alternative plan's effect on the entire C&SF Project area. The use of system-wide tools and a science-based analytical approach supports the conclusion, as shown in the following table, that the future without plan condition is not favorable - nor is it sustainable - for the south Florida ecosystem.

PERFORMANCE OF THE COMPREHENSIVE PLAN COMPARED TO THE NO-ACTION ALTERNATIVE

Area	Future Without Plan	Future With Plan
Lake Okeechobee	Y	G
Caloosahatchee Estuary	R	G
St Lucie Estuary	R	G
Lake Worth Lagoon	Y	Y
Holey Land & Rotenberger WMA	Y	G
Loxahatchee National Wildlife Refuge	Y	G
Water Conservation Area 2A	R	G/Y
Water Conservation Area 2B	R	R
Northwestern Water Conservation Area 3A	R	G
Northeastern Water Conservation Area 3A	R	Y
Eastern Water Conservation Area 3A	R	Y
Central & Southern Water Conservation Area 3A	R	G/Y
Water Conservation Area 3B	R	Y
Everglades National Park – Shark River Slough	R	G
Everglades National Park – Rockland Marl Marsh	R	Y
Florida Bay	R	G
Biscayne Bay	Y	G
Model Lands	R	G
Big Cypress National Preserve	Y	G
Lake Okeechobee Service Area	R	G
Urban Lower East Coast	R	G

Green (G) - predicted hydrologic performance will result in recovery and long-term sustainability of ecological or water supply objectives.

Yellow (Y) -marginal or uncertain ability to achieve long-term sustainability of ecological or water supply objectives.

Red (R) - ecological or water supply objectives are not be met.

How the Restudy Team Developed the Recommended Comprehensive Plan

A multi-agency, multidisciplinary team was created to develop plans that addressed the problems within the study area. This team included biologists, ecologists, economists, engineers, geographic information system specialists, hydrologists, planners, public involvement specialists, and real estate specialists from a number of Federal, state, tribal, and local government agencies.

Between September 1997 and June 1998, alternative comprehensive plans were formulated and evaluated. Beginning with a "Starting Point" alternative and continuing until the recommended plan was chosen, each iterative formulation and evaluation cycle built upon the strengths of the previous alternative plan while addressing its shortfalls. The Alternative Evaluation Team, a subgroup of the Restudy Team, evaluated each alternative based on modeling results and comments received from the entire team as well as the general public. The Alternative Development Team, another Restudy subgroup, then used that evaluation to design a better alternative. All modeling results and evaluations were posted on the Restudy web site for the team and general public to review.

Because of its fundamental importance to restoration, much of the emphasis early in the plan formulation process was on increasing regional storage capacity and increasing water management flexibility to meet water quantity objectives. Later iterations addressed the restoration objectives of greater system connectivity (decompartmentalization) and sheetflow. Throughout the formulation and evaluation period, many different decompartmentalization scenarios were modeled. These scenarios gave the team feedback on how the system responded under different conditions. This knowledge was valuable in the effort to improve conditions in the remaining Everglades in the final alternative, which became the basis of the recommended Comprehensive Plan.

The Restudy Team recognized that water quality standards were not being met in many water bodies in the study area. The team recognized the changes in flow patterns, even though beneficial hydrologically, might adversely affect water quality conditions in downstream water bodies. To address this problem, several water quality treatment facilities were included in the recommended Comprehensive Plan to ensure water quality standards would be met. Future implementation of the features of the Comprehensive Plan, including detailed planning and design, will take into account water quality restoration targets as they are developed for specific water bodies in south Florida.

Major Features of the Recommended Comprehensive Plan

The Restudy Team formulated and evaluated 10 alternative comprehensive plans and more than 25 intermediate computer simulations. Alternative D-13R was selected as the Initial Draft Plan. Alternative D-13R along with the series of Other Project Elements, Critical Projects, water quality treatment facilities, and other modifications that further improve performance of the plan, comprise the recommended Comprehensive Plan. The estimated first cost of the recommended Comprehensive Plan is $7.8 billion; and the annual operation and maintenance costs, including adaptive assessment and monitoring, are $182 million. The plan includes the following structural and operational changes to the existing C&SF Project:

Surface Water Storage Reservoirs. A number of water storage facilities are planned north of Lake Okeechobee, in the Caloosahatchee and St. Lucie basins, in the Everglades Agricultural Area, and in the Water Preserve Areas of Palm Beach, Broward and Miami-Dade counties. These areas will encompass approximately 181,300 acres and will have the capacity to store 1.5 million acre-feet of water.

Water Preserve Areas. Multipurpose water management areas are planned in Palm Beach, Broward and Miami-Dade counties between the urban areas and the eastern Everglades. The Water Preserve Areas will have the ability to treat urban runoff, store water, reduce seepage, and improve existing wetland areas.

Manage Lake Okeechobee as an Ecological Resource. Lake Okeechobee is currently managed for many, often conflicting, uses. The lake's regulation schedule will be modified and plan features constructed to reduce the extreme high and low levels that damage the lake and its shoreline. Management of intermediate water levels will be improved, while allowing the lake to continue to serve as an important source for water supply. Several plan components and Other Project Elements are included to improve water quality conditions in the lake. A study is recommended to evaluate in detail the dredging of nutrient-enriched lake sediments to help achieve water quality restoration targets, important not only for the lake, but also for downstream receiving bodies.

Improve Water Deliveries to Estuaries. Excess stormwater that is discharged to the ocean and the gulf through the Caloosahatchee and St. Lucie rivers is very damaging to their respective estuaries. The recommended Comprehensive Plan will greatly reduce these discharges by storing excess runoff in surface and underground water storage areas. During times of low rainfall, the stored water can be used to augment flow to the estuaries. Damaging high flows will also be reduced to the Lake Worth Lagoon.

Underground Water Storage. Wells and associated infrastructure will be built to store water in the upper Floridan aquifer. As much as 1.6 billion gallons a day may be pumped down the wells into underground storage zones. The injected fresh water, which does not mix with the saline aquifer water, is stored in a "bubble" and can be pumped out during dry periods. This approach, known as aquifer storage and recovery, has been used for years on a smaller scale to augment municipal water supplies. Since water does not evaporate when stored underground and less land is required for storage, aquifer storage and recovery has some advantages over surface storage. The recommended Comprehensive Plan includes aquifer storage and recovery wells around Lake Okeechobee, in the Water Preserve Areas, and the Caloosahatchee Basin.

Treatment Wetlands. Approximately 35,600 acres of manmade wetlands, known as stormwater treatment areas, will be built to treat urban and agricultural runoff water before it is discharged to the natural areas throughout the system. Stormwater treatment areas are included in the recommended Comprehensive Plan for basins draining to Lake Okeechobee, the Caloosahatchee River Basin, the St. Lucie Estuary Basin, the Everglades, and the Lower East Coast. These are in addition to the over 44,000 acres of stormwater treatment areas already being constructed pursuant to the Everglades Forever Act to treat water discharged from the Everglades Agricultural Area.

Improve Water Deliveries to the Everglades. The volume, timing, and quality of water delivered to the south Florida ecosystem will be greatly improved. The Comprehensive Plan will deliver an average of 26 percent more water into

Northeast Shark River Slough over current conditions. This translates into nearly a half million acre-feet of additional water reaching the slough, and is especially critical in the dry season. More natural refinements will be made to the rainfall-driven operational plan to enhance the timing of water sent to the Water Conservation Areas, Everglades National Park, and the Holey Land and Rotenberger Wildlife Management Areas.

Remove Barriers to Sheetflow. More than 240 miles of project canals and internal levees within the Everglades will be removed to reestablish the natural sheetflow of water through the Everglades. Most of the Miami Canal in Water Conservation Area 3 will be removed and 20 miles of the Tamiami Trail (U.S. Route 41) will be rebuilt with bridges and culverts, allowing water to flow more naturally into Everglades National Park, as it once did. In the Big Cypress National Preserve, a north-south levee will be removed to restore more natural overland water flow.

Store Water in Existing Quarries. Two limestone quarries in northern Miami-Dade County will be converted to water storage reservoirs to supply Florida Bay, the Everglades, Biscayne Bay, and Miami-Dade County residents with water. The 11,000-acre area will be ringed with an seepage barriers to ensure that stored water does not leak or adjacent groundwater does not seep into the area. A similar facility will be constructed in northern Palm Beach County.

Reuse Wastewater. The recommended Comprehensive Plan includes two advanced wastewater treatment plants in Miami-Dade County capable of making more than 220 million gallons a day of the county's treated wastewater clean enough to discharge into wetlands along Biscayne Bay and for recharging the Biscayne Aquifer. This reuse of water will improve water supplies to south Miami-Dade County as well as reducing seepage from the Northeast Shark River Slough area of the Everglades. Given the high cost associated with using reuse to meet the ecological goals and objectives for Biscayne Bay, other potential sources of water to provide freshwater flows to the central and southern bay will be investigated before pursuing reuse.

Pilot Projects. A number of technologies proposed in the Comprehensive Plan have uncertainties associated with them -- either in the technology itself, its application, or in the scale of implementation. While none of the proposed technologies are untested, what is not known is whether actual performance will measure up to that anticipated in the Comprehensive Plan. The pilot projects, which include wastewater reuse, seepage management, Lake Belt technology, and three aquifer storage and recovery projects are recommended to address uncertainties prior to full implementation of these components.

Improve Fresh Water Flows to Florida Bay. Improved water deliveries to Shark River Slough, Taylor Slough, and wetlands to the east of Everglades National Park

will in turn provide improved deliveries of fresh water flows to Florida Bay. A feasibility study is also recommended to evaluate additional environmental restoration needs in Florida Bay and the Florida Keys.

Southwest Florida. There are additional water resources problems and opportunities in southwest Florida requiring studies beyond the scope of the Restudy recommended Comprehensive Plan. In this regard, a feasibility study for Southwest Florida is being recommended to investigate the region's hydrologic and ecological restoration needs.

Comprehensive Integrated Water Quality Plan. The recommended Comprehensive Plan includes a follow-on feasibility study to develop a comprehensive water quality plan to ensure that the Comprehensive Plan leads to ecosystem restoration throughout south Florida. The water quality feasibility study would include evaluating water quality standards and criteria from an ecosystem restoration perspective and recommendations for integrating existing and future water quality restoration targets for south Florida water bodies into future planning, design, and construction activities to facilitate implementation of the recommended Comprehensive Plan. Further, water quality in the Keys is critical to ecosystem restoration. The Florida Keys Water Quality Protection Plan includes measures for improving wastewater and stormwater treatment within the Keys. Implementation of the Keys Water Quality Protection Plan is critical for restoration of the south Florida ecosystem.

Overall, the recommended Comprehensive Plan will capture and store much of the water that is now lost to the ocean and gulf. This will provide enough water in the future for both the ecosystem, as well as urban and agricultural users. It will continue to provide the same level of flood protection as it does at present, if not more, for south Florida. The Comprehensive Plan is a system-wide solution for ecosystem restoration, water supply, and flood damage reduction. It is a necessary step towards a sustainable south Florida.

What the Comprehensive Plan Will Accomplish

Implementation of the recommended Comprehensive Plan will result in the recovery of healthy, sustainable ecosystems throughout south Florida. It is a plan that will lead to a much improved environment, for people and for the plants and animals that depend upon the natural system for their survival. The Comprehensive Plan contains all of the essential components to achieve this goal. There are many reasons for having confidence that it will be successful. No other plan, especially one on a smaller scale or one lacking the appropriate balance between ecosystem restoration and future urban and agricultural water supply objectives, would achieve a similar level of success.

The Comprehensive Plan does not provide all the answers – no plan could. The plan, however, contains an aggressive adaptive assessment strategy that includes independent scientific peer review and a process for identifying and resolving uncertainties. Because it is acknowledged that all the answers cannot be known at this time, and that inaction is not an option, adaptive assessment provides the means to allow restoration to move forward. A major strength of the current plan is that its flexibility allows for efficient and successive opportunities to make further improvements as we refine our plans and obtain new information.

The focus of the recommended Comprehensive Plan has been on recovering the defining ecological features of the original Everglades and other south Florida ecosystems. What made these ecosystems unique was their topographic flatness and expansiveness, and that they formed hydrologically integrated systems from boundary to boundary. What this means in a healthy ecosystem is that water patterns in one part of the system could be used to predict the patterns throughout the system. Animals living in the Everglades would "read" the water patterns, and "know" where to go to find the food and water that they needed for successful reproduction and survival under a range of natural conditions. It was the combination of connectivity and space that created the range of habitats needed for the diversity of plants and animals. The construction of the many levees and dikes designed to compartmentalize the Everglades and separate Lake Okeechobee from its natural overflow, and the canals that drained water to the coast, disrupted these natural patterns, and destroyed the ability of many animals to find the dependable habitat needed for their survival at the right time.

The recommended Comprehensive Plan, by removing over 240 miles of internal levees in the Everglades, and approaching recovery of the natural volume of water in the remaining wetlands, will restore these essential defining features of the pre-drainage wetlands over large portions of the remaining system. The plan also includes water storage and water quality treatment areas that will improve water quality conditions in the south Florida ecosystem. In response to this substantial improvement, the characteristic animals of these ecosystems will show dramatic and positive responses. At all levels in the aquatic food chains, the numbers of such animals as crayfish, minnows, sunfish, frogs, alligators, herons, ibis, and otters, will markedly increase. Equally important, animals will respond to the recovery of more natural water patterns by returning to their traditional distribution patterns.

The recommended Comprehensive Plan will support the return of the large nesting "rookeries" of wading birds to Everglades National Park, and the recovery of several endangered species to more certain and optimistic futures. Wading birds, e.g., herons, egrets, ibis and storks, are symbolic of the overall health of the Everglades. As recently as the 1950s and 1960s, large "super colonies" of nesting waders remained in the park; none have been there since. Wading birds, perhaps

more than any other animal, assess the quality of habitats over the entire basin of south Florida wetlands, before making "decisions" about where and when, or even whether, to nest. The recovery of the super colonies will be a sure sign that the entire ecosystem has made substantial progress towards recovery. Of the endangered species, the wood stork, snail kite, Cape Sable seaside sparrow, and American crocodile, among others, will benefit and increase. Undoubtedly, implementation of the recommended Comprehensive Plan will once again allow us to witness what is now only a fading memory of the former abundance of wildlife in the Everglades.

It is important to understand that the "restored" Everglades of the future will be different from any version of the Everglades that has existed in the past. While it certainly will be vastly superior to the current ecosystem, it will not completely match the pre-drainage system. This is not possible, in light of the irreversible physical changes that have made to the ecosystem. It will be an Everglades that is smaller and somewhat differently arranged than the historic ecosystem. But it will be a successfully restored Everglades, because it will have recovered those hydrological and biological patterns which defined the original Everglades, and which made it unique among the world's wetland systems. It will become a place that kindles the wildness and richness of the former Everglades.

Lake Okeechobee will once again become a healthy lake. The littoral and pelagic zones within the lake, essential to the lake's commercial and recreational fishery and other aquatic species, will be greatly enhanced by the water levels projected in the recommended Comprehensive Plan. Water quality will also be improved significantly. The lake provides huge regional benefits to wildlife, including waterfowl, other birds, and mammals.

The Comprehensive Plan provides major benefits to the Caloosahatchee and St. Lucie estuaries, and Lake Worth Lagoon. The plan eliminates almost all the damaging fresh water releases to the Caloosahatchee and most detrimental releases to the St. Lucie. The plan makes substantial improvements to Lake Worth Lagoon. As a result, grassbeds and other submerged aquatic vegetation will benefit and thus provide abundant favorable habitat for the many aquatic species that depend on these areas for food, shelter, and breeding grounds, thereby enhancing the productivity and economic viability of estuarine fisheries. The recommended Comprehensive Plan also includes several water storage and treatment areas to improve water quality conditions in the Indian River Lagoon and the St. Lucie and Caloosahatchee estuarine systems.

The recommended Comprehensive Plan makes improvements in fresh water deliveries to Florida and Biscayne bays. These bays will benefit from more natural water deliveries. Appropriate fresh water regimes will result in substantial improvements in aquatic and semi-aquatic habitats; fish and wildlife will respond

favorably to these beneficial changes. Mangroves, coastal marshes, and seagrass beds interacting together to produce food, shelter, and breeding and nursery grounds will support more balanced, productive fish, shellfish, and wildlife communities.

South Florida does not have to follow the fate of some states that suffer severe water shortages, creating tension between natural resource protection and water supply. The recommended Comprehensive Plan expands the storage capability of the C&SF Project, enabling the system to better meet ecosystem and urban water supply needs in the future. Frequency of water restrictions expected with the recommended Comprehensive Plan are greatly reduced compared to the Without Plan Condition. This will be accomplished by more effectively providing adequate flows from the regional system to recharge the surficial aquifer. This will help offset withdrawals from public water supply wellfields and other users in the urbanized Lower East Coast Region. Such recharge also protects the surficial aquifer from saltwater intrusion, allowing it to remain a productive source of fresh water in the future.

The recommended Comprehensive Plan will significantly increase the capability to supply water from the regional system to agricultural users. This will provide better protection from economically harmful water supply cutbacks and allow agriculture to remain productive. Storage facilities associated with Lake Okeechobee such as those north of the lake, and Lake Okeechobee aquifer storage and recovery will enable the lake to remain an important source of water supply while keeping lake stages at more ecologically desirable levels. Additional storage facilities built throughout the system will diversify sources of water for many users and enable recycling of water within a basin to meet dry season demands, significantly improving the reliability of agricultural water supply in the future.

The recommended Comprehensive Plan also assures that the quality of south Florida's water bodies will be restored to achieve overall ecosystem restoration. The recommended Comprehensive Plan includes many features to assure that water quality standards will be met and water quality conditions are improved or not degraded. The Comprehensive Plan includes the development of a comprehensive integrated water quality plan, which will lead to recommendations for water quality remediation programs and the integration of water quality restoration targets into future design, construction, and operation activities as features of the recommended Comprehensive Plan are implemented.

How the Comprehensive Plan Will Be Implemented

No plan can anticipate fully the uncertainties that are inherent in predicting how a complex ecosystem will respond during restoration efforts. For example, the remaining Everglades are only one-half as large as the original and current

boundaries do not logically follow natural ground elevations or habitat patterns. For these and many other reasons, the ways in which this ecosystem will respond to the recovery of more natural water patterns almost certainly will include some surprises. The recommended Comprehensive Plan anticipates such surprises and is designed to facilitate project modifications that take advantage of what is learned from system responses, both expected and unexpected, and from future restoration targets as those become more refined. For example, future water quality restoration targets will be integrated into the detailed design, construction, and future operation of all recommended Comprehensive Plan features.

A new type of reporting document will be prepared as the implementation process begins. Project Implementation Reports will bridge the gap between the Comprehensive Plan and the detailed design necessary to proceed to construction. In addition to supplemental National Environmental Policy Act documentation, the Project Implementation Report process will allow for continuing public participation on each feature. In this more detailed phase of analysis, Comprehensive Plan components will be further investigated and appropriate actions recommended.

The Comprehensive Plan includes an aggressive adaptive assessment strategy. This strategy ensures that new information about the natural system, learned from continuing research and from measuring responses to implementation of plan components, can be used to increase the ultimate level of success of the overall restoration program. Specifically, adaptive assessment uses a well focused, regional monitoring program to measure how well each component of the plan accomplishes its objectives. This, in turn, sets up opportunities for refinement of succeeding components. Such adaptive assessment and regional monitoring are essential features of the recommended Comprehensive Plan and ensure its overall success. Independent scientific peer review is an integral part of this process.

Pilot projects to demonstrate the effectiveness of technologies such as aquifer storage and recovery, seepage management, and wastewater reuse are a part of the implementation strategy. Three new feasibility studies, Florida Bay and the Florida Keys, Southwest Florida, and a comprehensive integrated water quality plan, will also be undertaken to assure that full implementation of the Comprehensive Plan leads to overall ecosystem restoration in south Florida. The use of the best available science and extensive outreach and public involvement, both of which have been an essential part of the Restudy, will continue during the implementation process.

The recommended Comprehensive Plan described in this report will serve as a framework and guide for modifications to the Central and Southern Florida Project. The pilot projects and a set of specific key components are recommended for initial authorization. The estimated total cost of these initial features are $1,198,000,000 (October 1999 price levels) and an annual cost of $20,000,000 for operation and maintenance. The estimated Federal cost is $599,000,000 with

estimated annual operation and maintenance costs of $10,000,000; and the estimated non-Federal cost is $599,000,000 with estimated annual operation and maintenance costs of $10,000,000.

Further, the Water Resources Development Act of 1996 provided authorization for Critical Restoration Projects in order to expedite implementation of the restoration effort. A similar programmatic authority is recommended to help expedite implementation of some components in the recommended Comprehensive Plan. This programmatic authority would be limited to those components of the Comprehensive Plan that have a total project cost of $70,000,000 with a maximum Federal cost of $35,000,000.

Authorization for the remaining components of the Comprehensive Plan will be sought after completion of more detailed planning and submission of Project Implementation Reports to Congress. Each Project Implementation Report will also contain an analysis of the Comprehensive Plan and any recommendations concerning modifications to the plan.

AREAS OF CONTROVERSY AND UNRESOLVED ISSUES

During the course of the Restudy, a number of important issues have emerged. Many have been resolved, but some remain. For example:

Scientific Models. Many scientific and engineering models were used in developing the recommended Comprehensive Plan. The models employed in the Restudy are state-of–the-art, and represent the best understanding of the hydrology of both the pre-drainage and current C&SF system (Natural System Model and South Florida Water Management Model) as well as species responses to hydrology (Across Trophic Landscape System Simulation). But by their very nature, models are uncertain because they are simplifications of reality. The South Florida Water Management Model and the Natural System Model have undergone technical peer review. The conclusions that can be drawn from them are only as good as the basic understandings and information that are the foundations of the models. Most importantly, such conclusions must be understood in the context of model uncertainty and appropriateness of scale, and are best utilized to compare performance among alternative plans. The Natural System Model, for example, depicts the hydrologic response of the pre-drained system to rainfall and other hydrologic conditions of the period from 1965 through 1995. It does not depict the conditions of the pre-drained Everglades system, although there is a misconception that it does; such data does not exist. This model was used to help define performance measures for the natural system and to evaluate the performance of different alternative plans. However, defining acceptable performance of any

particular alternative plan by ridged adherence to outs from the Natural System Model is an improper use of such output.

Water Quality Restoration Targets. Many water bodies in south Florida are not currently meeting water quality standards. The State of Florida and the Miccosukee and Seminole Tribes are required under the Federal Clean Water Act to identify those water bodies periodically. Total maximum daily loads for those pollutants causing those water bodies to not meet standards and remediation programs to assure that standards will be met must be developed. The current schedule for developing these standards has the potential to delay implementation of certain features of the recommended Comprehensive Plan until those targets are developed and remediation programs are implemented. In addition to this program, several water bodies have been prioritized by the state's Surface Water Improvement and Management Program, including the development of pollutant load reduction goals. There is some concern as to the degree to which remediation programs have been limited, and that some load reduction goals may not be protective enough to achieve ecosystem restoration. The comprehensive integrated water quality plan feasibility study included in the recommended Comprehensive Plan will include prioritizing the development of both water quality standards and pollution load reduction goals consistent with the Restudy implementation schedule. Recommendations will be made for optimizing the design, construction, and operation of plan features to assure that water quality restoration targets are achieved. Existing water quality criteria will be reviewed, and additional water quality criteria may be developed to complement future detailed planning and design activities undertaken to implement recommended Comprehensive Plan components.

Technology Uncertainties. Most of the recommended Comprehensive Plan's features are tested and proven reliable means to manage water. However some of the facilities proposed such as aquifer storage and recovery and seepage control have not been implemented on such a large scale. A series of pilot projects are proposed in the recommended Comprehensive Plan to address the uncertainties of these technologies. Results from these studies will help direct future detailed planning and design related to implementation of these types of facilities.

This Comprehensive Plan makes no claim that all the questions have been answered, that all the uncertainties have been addressed, or that all the issues have been resolved. No plan could do all these things. We have improved our understanding of this complex system and know that there is much more to learn. The Comprehensive Plan is a roadmap -- and a very important one -- that provides critical direction and organizational structure for restoring and protecting the south Florida ecosystem. The Implementation Plan contained in this Comprehensive Plan recommends a phased approach to project construction that provides for substantial region-wide benefits and a feedback mechanism through adaptive assessment to

ensure that implementation of project features continues to achieve desired objectives. The adaptive assessment and monitoring process, including independent scientific peer review, will serve as a system "check" as projects are constructed and operated. Enough flexibility has been built into the Implementation Plan such that project design and sequencing will take into account system responses and new information as it becomes available.

WHY RESTORE THE EVERGLADES?

Why restore the Everglades? The answers to this question are overwhelming. The Everglades is to south Florida what the Rockies are to many western states; the old growth forests are to the Pacific northwest; the Adirondack, White and Green Mountains are to the northeast; and the Mississippi River is to the nation's heartland. The Everglades epitomizes the region's sense of definition and place, both substantially and spiritually (by providing clean water and recreation and by providing a sense of hope for the quality of the region's future). The Everglades is unlike any other place in the world. It attracts the eyes of the world.

We are now at an important crossroad in our efforts to restore this internationally important ecosystem. If we act now with courage and vision to implement this technically sound comprehensive restoration plan, we will be successful and we will leave a proud Everglades legacy. If we fail to act, our legacy will be one of lost opportunities for all future generations. The world is indeed watching as we make this choice.

This page intentionally left blank.

B.6 RECIPIENTS OF THE DRAFT PROJECT IMPLEMENTATION REPORT

TABLE B-2: CITY RECIPIENTS

City Manager City of Delray Beach Delray Beach, Florida	Mayor City of Delray Beach Delray Beach, Florida
Commissioner City of Delray Beach Delray Beach, Florida	

TABLE B-3: CONGRESSIONAL RECIPIENTS

The Honorable Alcee L. Hastings U.S. House of Representatives Fort Lauderdale, Florida	The Honorable E. Clay Shaw, Jr. U.S. House of Representatives Fort Lauderdale, Florida
The Honorable Robert Wexler U.S. House of Representatives Boca Raton, Florida	The Honorable Mel Martinez United States Senate Coral Gables, Florida
The Honorable Bill Nelson United States Senate Orlando, Florida	The Honorable Lincoln Diaz-Balart U.S. House of Representatives Miami, Florida
The Honorable Mark Foley U.S. House of Representatives Palm Beach Gardens, Florida	The Honorable Kendrick Meek U.S. House of Representatives Pembroke Pines, Florida
The Honorable Debbie Wasseman Schultz U.S. House of Representatives Pembroke Pines, Florida	

TABLE B-4: ENVIRONMENTAL RECIPIENTS

Committee Chairman Environmental Action Committee West Palm Beach, Florida

TABLE B-5: NEWS AGENCY RECIPIENTS

Palm Beach Post West Palm Beach, Florida

TABLE B-6: LIBRARY RECIPIENTS

Delray Beach Public Library Delray Beach, Florida	West Atlantic Avenue Library Delray Beach, Florida
Palm Beach County Library West Palm Beach, Florida	

TABLE B-7: COUNTY RECIPIENTS

Director of Community Affairs Lake Worth Drainage District Delray Beach, Florida	Director of Engineering Lake Worth Drainage District Delray Beach, Florida
Palm Beach County Commissioner Palm Beach County Commission West Palm Beach, Florida	Legislative Affairs Director Palm Beach County West Palm Beach, Florida
Water Resource Manager Palm Beach County West Palm Beach, Florida	Chair Palm Beach County Commission West Palm Beach, Florida
County Administrator Palm Beach County Commission West Palm Beach, Florida	Vice Chair Palm Beach County Commission West Palm Beach, Florida
County Commissioner Palm Beach County Commission West Palm Beach, Florida	Director, Regulatory Compliance Palm Beach County Water Utilities Department West Palm Beach, Florida
Director, Engineering Palm Beach County Water Utilities Department West Palm Beach, Florida	Regulatory and Legislative Liaison Palm Beach County Water Utilities Department West Palm Beach, Florida
Construction Services Manager Palm Beach County Water Utilities Department West Palm Beach, Florida	

TABLE B-8: STATE AGENCY RECIPIENTS

Chief of Staff Governor's Office Tallahassee, Florida	Executive Director PBC Legislative Delegation West Palm Beach, Florida
Executive Director South Florida Water Management District West Palm Beach, Florida	Executive Director Florida Fish and Wildlife Conservation Commission Tallahassee, Florida
Florida Department of Transportation Tallahassee, Florida	Environmental Manager Florida Department of Transportation District 6 Miami, Florida
Florida Department of Agricultural and Consumer Affairs West Palm Beach, Florida	Clearinghouse Coordinator Florida State Clearinghouse, FDEP Tallahassee, Florida
Florida Department of Environmental Protection Tallahassee, Florida	Florida Department of Environmental Protection West Palm Beach, Florida

TABLE B-9: FEDERAL RECIPIENTS

Office of the Director Center for Env Health, CDC Atlanta, Georgia	Regional Director, Ins & Mitigation Div Federal Emergency Management Agency Atlanta, Georgia
Director Federal Maritime Commission Washington, D.C.	Superintendent NOAA/Florida Keys National Marine Sanctuary Marathon, Florida
Regional Env Officer U.S. Department of Housing and Urban Development Atlanta, Georgia	Regional Env Officer U.S. DOI Office of Environmental Policy and Compliance Atlanta, Georgia
Southeast Fisheries Science Center NOAA/National Marine Fisheries Service Miami, Florida	Assistant RA for Protected Resources NOAA/National Marine Fisheries Service St. Petersburg, Florida
Assistant RA for Habitat Conservation NOAA/National Marine Fisheries Service St. Petersburg, Florida	Regional Director National Park Service Atlanta, Georgia
Superintendent Everglades National Park Homestead, Florida	Superintendent Biscayne National Park Homestead, Florida
Acting Superintendent Bureau of Indian Affairs Hollywood, Florida	Office of Trust Responsibilities Bureau of Indian Affairs Washington, D.C.
South Florida Office Army Corps of Engineers West Palm Beach, Florida	Environmental Policy Section U.S. Environmental Protection Agency Atlanta, Georgia
State Conservationist U.S. Department of Agriculture - NRCS Gainesville, Florida	Coordinator U.S. Geological Survey Jacksonville, Florida
Florida District Chief U.S. Geological Survey Tallahassee, Florida	Coordinator, Greater Everglades Science Program U.S. Geological Survey Miami, Florida
Florida Division Office Federal Highway Administration Tallahassee, Florida	Director, Dept of Energy Office of Environmental Compliance Washington, D.C.
NEPA Coordinator U.S. Department of Commerce/NOAA Silver Spring, Maryland	

TABLE B-10: TRIBAL ORGANIZATION RECIPIENTS

Water Resources Director Miccosukee Tribe of Indians Miami, Florida	Chairman Seminole Tribe of Florida Hollywood, Florida

TABLE B-11: PRIVATE RECIPIENTS

Applied Environmental Services Athens, Georgia	Rinker Materials Corporation West Palm Beach, Florida
Lewis, Longman & Walker, PA West Palm Beach, Florida	Florida Power and Light North Palm Beach, Florida
MacVicar Federico and Lamb West Palm Beach, Florida	

TABLE B-12: STATE LEGISLATOR RECIPIENTS

The Honorable Jeff Atwater Florida State Senate North Palm Beach, Florida	The Honorable Ron Klein Florida State Senate Delray Beach, Florida
The Honorable Mandy Dawson Florida State Senate Fort Lauderdale, Florida	The Honorable Adam Hasner Florida House of Representatives Delray Beach, Florida
The Honorable Anne Gannon Florida House of Representatives Delray Beach, Florida	The Honorable Richard Machek Florida House of Representatives Delray Beach, Florida
The Honorable Larcenia Bullard Florida State Senate Miami, Florida	The Honorable Ken Pruitt Florida State Senate Port St. Lucie, Florida
The Honorable Wibert Holloway Florida House of Representatives Miami Gardens, Florida	The Honorable Susan Bucher Florida House of Representatives West Palm Beach, Florida
The Honorable Shelley Vana Florida House of Representatives West Palm Beach, Florida	The Honorable Priscilla A. Taylor Florida House of Representatives Riviera Beach, Florida
The Honorable Joe Negron Florida House of Representatives Stuart, Florida	The Honorable Irving Slosberg Florida House of Representatives Boca Raton, Florida
The Honorable David Rivera Florida House of Representatives Miami, Florida	The Honorable Mary Brandenburg Florida House of Representatives Palm Beach, Florida
The Honorable Rafael Arza Florida House of Representatives Hialeah, Florida	

ANNEX C
ANALYSIS REQUIRED BY FEDERAL AND STATE LAW

This page intentionally left blank

TABLE OF CONTENTS

C LEGISLATIVE AND STATUTORY REQUIRMENTS C-1
C.1 SUMMARY OF PROJECT-SPECIFIC ASSURANCES AND SAVINGS CLAUSE REQUIREMENTS C-1
C.1.1 Background C-1
C.1.2 Water Resources Development Act C-1
C.1.2.1 Project-Specific Assurances C-2
C.1.2.2 Savings Clause C-3
C.1.3 Programmatic Regulations C-4
C.1.3.1 Pre-CERP Baseline C-4
C.1.3.2 Identification of Water for the Natural System C-5
C.1.3.3 Identification of Water for Other Water-Related Needs C-5
C.1.3.4 Elimination or Transfer of Existing Legal Sources C-5
C.1.3.5 Flood Protection C-5
C.1.3.6 Operating Manual C-6
C.1.4 State of Florida Statutory Requirements C-6
C.1.4.1 Review and Approval of Project Implementation Reports C-6
C.1.4.2 Water Reservations C-8
C.1.5 State and Federal Assurances C-8
C.1.6 Identifying System-Wide and Project-Level Effects C-10
C.1.6.1 System-Wide Effects C-10
C.1.6.2 Project-Level Effects C-11
C.2 PRINCIPLES AND METHODS FOR IDENTIFYING WATER FOR THE NATURAL SYSTEM C-12
C.2.1 Concept of Beneficial Water for the Natural System C-12
C.2.1.1 Beneficial Water Made Available by the Project C-12
C.2.2 Quantity, Timing and Distribution of Water and Water Quality C-13
C.2.3 Volume Probability Curves C-14
C.2.4 Identification of Water to be Reserved or allocated C-14
C.3 PRINCIPLES AND METHODS FOR IDENTIFYING WATER FOR OTHER WATER RELATED NEEDS OF THE REGION C-15
C.3.1 Principles C-15
C.3.2 Methods C-15
C.3.3 Quantification of Water for Other Water-Related Needs C-16
C.4 PRINCIPLES AND METHODS FOR IDENTIFYING PROJECT EFFECTS ON EXISTING LEGAL SOURCES OF WATER C-16
C.4.1 Principles C-16
C.4.1.1 Pre-CERP Baseline C-17
C.4.1.2 Water Quality Improvements C-18
C.4.1.3 Implementation Plan C-18
C.4.1.4 Winsberg Farm Wetlands Restoration Project Effects C-18
C.5 PRINCIPLES AND METHODS FOR IDENTIFYING PROJECT EFFECTS ON EXISTING LEVELS OF SERVICE FOR FLOOD PROTECTION C-18
C.5.1 Principles C-18

C.5.1.1 Project-Level and System-Wide Evaluations C-19
C.5.2 Water Made Available by the Project for the Natural System.....C-20
C.5.2.1 System-Wide Effects C-20
C.5.3 Project Effects on Existing Legal Sources of Water.....C-20
C.5.3.1 Sources for Urban and Agricultural Water Supply.....C-20
C.5.3.2 Sources for the Seminole Tribe of Florida.....C-21
C.5.3.3 Sources for the Miccosukee Tribe of Indians of Florida C-21
C.5.3.4 Sources for Everglades National Park and Fish and Wildlife.....C-21
C.5.4 Project Effects on Level of Service for Flood Protection.....C-21
C.5.4.1 Modeling.....C-21
C.5.4.2 Maintenance of Flood Protection Modeling C-22

C LEGISLATIVE AND STATUTORY REQUIRMENTS

C.1 SUMMARY OF PROJECT-SPECIFIC ASSURANCES AND SAVINGS CLAUSE REQUIREMENTS

C.1.1 Background

As a result of laws and regulations passed by the federal government and the state of Florida, Comprehensive Everglades Restoration Plan (CERP) Project Implementation Reports are required to provide that certain assurances are adequately addressed by the project being recommended for approval and implementation. The following sections summarize the federal project-specific assurance and Savings Clause requirements and the evaluations performed to address those requirements.

C.1.2 Water Resources Development Act

Congress enacted the Water Resources Development Act of 2000, Title VI, Comprehensive Everglades Restoration (WRDA 2000) approving the CERP "*as a framework for modifications and operational changes to the Central and Southern Florida (C&SF) Project that are needed to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection.*" Section 601(h) of WRDA 2000, entitled "*Assurance of Project Benefits*" establishes programmatic and project-specific assurances to be addressed as part of CERP implementation.

Section 601(h)(1) of WRDA 2000 provides:

> *"IN GENERAL - The overarching objective of the Plan is the restoration, preservation, and protection of the South Florida Ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Plan shall be implemented to ensure the protection of water quality in, the reduction of the loss of fresh water from, the improvement of the environment of the South Florida Ecosystem and to achieve and maintain the benefits to the natural system and human environment described in the Plan, and required pursuant to this section, for as long as the project is authorized."*

This report addresses project-specific assurances and WRDA 2000 Savings Clause requirements.

C.1.2.1 Project-Specific Assurances

Section 601(h)(4)(A) of WRDA 2000, entitled "*Project-Specific Assurances*", contains the following requirements for project implementation reports:

> *(A) PROJECT IMPLEMENTATION REPORTS. –*
>
> *(i) IN GENERAL. The Secretary (of the Army) and the non-federal sponsor shall develop project implementation reports in accordance with Section 10.3.1 of the Plan.*
>
> *(ii) COORDINATION. In developing a project implementation report, the Secretary and the non-federal sponsor shall coordinate with appropriate federal, state, tribal, and local governments.*
>
> *(iii) REQUIREMENTS. A project implementation report shall –*
>
> *(I) be consistent with the Plan and the programmatic regulations promulgated under paragraph (3);*
>
> *(II) describe how each of the requirements stated in paragraph (3)(B)[sic] is satisfied;*
>
> *(III) comply with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.);*
>
> *(IV) identify the appropriate quantity, timing and distribution of water dedicated and managed for the natural system;*
>
> *(V) identify the amount of water to be reserved or allocated for the natural system necessary to implement under state law, subclauses (IV) and (VI);*
>
> *(VI) comply with applicable water quality standards and applicable water quality permitting requirements under subsection (b)(2)(A)(ii);*
>
> *(VII) be based on the best available science; and*
>
> *(VIII) include an analysis concerning the cost-effectiveness and engineering feasibility of the project.*

Section II of this report contains a description of the basic principles and methodologies for identifying water for the natural system. Section III contains a description of the basic principles and methodologies for identifying water made available by the project for other water-related needs of the region. These basic principles and methodologies used to identify water were based on the procedures and guidance contained in draft Programmatic Regulations Guidance Memorandum 4 ("*Identifying Water Needed to Achieve the Benefits of the Plan*") available at the time this PIR was being developed. Section VI of this report summarizes the results of these analyses, including identifying the amount of water made available by the project for the natural system to be reserved or allocated by the state of Florida and the amount of water made available for other water-related needs.

C.1.2.2 Savings Clause

Section 601(h)(5) of WRDA 2000, entitled "*Savings Clause*," requires an analysis of each project's effects on legal sources of water that were in existence on the date of enactment of WRDA 2000 (i.e., December 2000) and effects on levels of service of flood protection in existence on the date of enactment of WRDA 2000. Section 601(h)(5) of WRDA 2000 states:

> *(A) NO ELIMINATION OR TRANSFER. Until a new source of water supply of comparable quantity and quality as that available on the date of enactment of this Act is available to replace the water to be lost as a result of implementation of the Plan, the Secretary and the non-federal sponsor shall not eliminate or transfer existing legal sources of water, including those for:*
>
> > *(i) an agricultural or urban water supply;*
> > *(ii) allocation or entitlement to the Seminole Indian Tribe of Florida under Section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e);*
> > *(iii) the Miccosukee Tribe of Indians of Florida;*
> > *(iv) water supply for Everglades National Park; or*
> > *(v) water supply for fish and wildlife.*
>
> *(B) MAINTENANCE OF FLOOD PROTECTION. Implementation of the Plan shall not reduce levels of service for flood protection that are:*
>
> > *(i) in existence on the date of enactment of this Act; and*
> > *(ii) in accordance with applicable law.*
>
> *(C) NO EFFECT ON TRIBAL COMPACT. Nothing in this section amends, alters, prevents or otherwise abrogates rights of the Seminole Indian Tribe of Florida under the compact among the Seminole Tribe of Florida, the state, and the South Florida Water Management District, defining the scope and use of water rights of the Seminole Tribe of Florida, as codified in Section 7 of the Seminole Indian Land Claims Act of 1987 (25 U.S.C. 1772e).*

Section 4 of this report contains a description of the basic principles and methodologies for identifying project effects on existing legal sources of water as of the date of enactment of WRDA 2000 on the user categories listed in Section 601(h)(5)(A) of WRDA 2000. The basic principles and methodologies used for this analysis were based on the procedures and guidance developed for draft Programmatic Regulations Guidance Memorandum 3 ("*Savings Clause Requirements*") at the time this PIR was being developed. Section 6 of this report summarizes the results of these analyses.

Section 5 of this report contains a description of the basic principles and methodologies for identifying project effects on levels of service of flood

protection as required by WRDA 2000. The basic principles and methodologies used for this analysis were based on the procedures and guidance developed for the draft Programmatic Regulations Guidance Memorandum 3 ("*Savings Clause Requirements*") at the time this PIR was developed.

C.1.3 Programmatic Regulations

C.1.3.1 Pre-CERP Baseline

33 CFR Part 385, Section 385.35(a) of the Programmatic Regulations provides that a pre-CERP baseline be developed to aid the U.S. Army Corps of Engineers (USACE) and the South Florida Water Management District (SFWMD) when implementing the Savings Clause to determine if existing legal sources of water will be eliminated or transferred. The Programmatic Regulations also provide that each Project Implementation Report consider the operational conditions developed in the pre-CERP baseline to demonstrate that flood protection levels of service in existence on the date of WRDA 2000 enactment and in accordance with applicable law will not be reduced by project implementation.

Pre-CERP baseline water availability for agricultural and municipal supplies, allocations or entitlement to the Seminole Indian Tribe, the Miccosukee Indian Tribe, water supply for Everglades National Park, and water supply for fish and wildlife is to be identified by USACE and the SFWMD, in consultation with federal, state, tribal and local agencies. The pre-CERP baseline water availability is to be identified to evaluate whether elimination or transfer of existing legal sources for the above-listed categories will occur as a result of CERP project implementation. Each PIR is required to take into account the estimated total quantity of water necessary for the restoration of those areas of the natural system that are the focus of the project.

The final draft Pre-CERP Baseline document was issued by USACE and the SFWMD in April 2005. In accordance with the programmatic regulations, the final draft Pre-CERP Baseline document will be submitted to the Secretary of the Army for approval and concurrence by the Secretary of the Interior and the Florida Governor. As of the date of this draft PIR, final approval of and concurrence on the Pre-CERP Baseline have not yet occurred; nevertheless, for the Broward County Water Preserve Areas project, the baseline assumptions included in the April 2005 final draft Pre-CERP Baseline document were used to simulate conditions in existence as of the date of WRDA 2000 enactment (December 2000) in accordance with the Savings Clause.

C.1.3.2 Identification of Water for the Natural System

Section 385.35(b) of the Programmatic Regulations requires that each PIR identify the quantity, timing and distribution of water to be dedicated and managed for the natural system necessary to meet the restoration goals of the CERP (the Plan). This evaluation considers the availability of Pre-CERP Baseline water and previously reserved water, and whether improvements in water quality are necessary. The existing conditions model simulation does not include any previously reserved water, since there have been no water reservations yet completed within the geographic boundary of the SFWMD.

C.1.3.3 Identification of Water for Other Water-Related Needs

Section 385.35 of the Programmatic Regulations also requires that procedures be developed for identifying water generated by the Plan for use in the human environment and that the quantity, timing and distribution of water for other water-related needs be identified in PIRs.

C.1.3.4 Elimination or Transfer of Existing Legal Sources

Section 385.36 of the Programmatic Regulations requires that PIRs address whether existing legal sources of water are to be eliminated or transferred as a result of project implementation. If a project is expected to result in an elimination or transfer of an existing legal source of water, an implementation plan ensuring that a new source of comparable quantity and quality is available to replace the source that is being transferred as a result of the project be included in the PIR.

C.1.3.5 Flood Protection

Section 385.27 of the Programmatic Regulations requires that PIRs include an analysis of the project's impacts on flood protection levels of service that existed on the date of WRDA 2000 enactment in December 2000, and in accordance with applicable law. These conditions will be included in the Pre-CERP Baseline (see Section I.B.1). The final draft Pre-CERP Baseline document was issued by USACE and the SFWMD in April 2005. In accordance with the programmatic regulations, the final draft Pre-CERP Baseline document will be submitted to the Secretary of the Army for approval with concurrence by the Secretary of the Interior and Florida Governor. As of the date of this draft PIR, final approval of and concurrence on the Pre-CERP Baseline have not yet occurred; nevertheless, the baseline assumptions included in the April 2005 final draft Pre-CERP Baseline document were used to simulate conditions in existence as of the date of enactment of WRDA 2000 (December 2000) in accordance with the Savings Clause.

C.1.3.6 Operating Manual

Section 385.28(a)(6)(vi) of the Programmatic Regulations requires that the project operating manual be consistent with the reservation or allocation of water for the natural system as described in the PIR and reflect the operational criteria used in the identification of the appropriate quantity, timing and distribution of water dedicated and managed for the natural system. The Draft Project Operating Manual for this PIR was developed based on operations included in the hydrologic modeling used to formulate, evaluate and select the recommended plan. In the development of the Draft Project Operating Manual, the project delivery team worked with hydrologic modelers and water managers to develop operating criteria that reflected the intent of the operations simulated in the hydrologic model, which includes operations associated with the delivery of water for the natural system. The drought contingency plan included in the Draft Project Operating Manual for the Broward County Water Preserve Areas project will guide operations during drought conditions, and recognizes the water shortage plan administered by the SFWMD under state law. The Draft Project Operating Manual is included in Annex D of this PIR.

C.1.4 State of Florida Statutory Requirements

C.1.4.1 Review and Approval of Project Implementation Reports

Section 373.026, F.S., describes the powers and duties of the Florida Department of Environmental Protection (FDEP) with respect to CERP implementation in accordance with Chapter 373, Florida Statutes. Subsection (8)(b) of this statute addresses FDEP's role in reviewing and approving CERP projects:

> *373.026(8)(b) – "To ensure to the greatest extent possible that project components will go forward as planned, the department shall collaborate with the (South Florida Water Management) district in the restudy. Before any project component is submitted to Congress for authorization or receives an additional appropriation of state funds, the department must approve, or approve with amendments, each project component within 60 days following formal submittal of the project component to the department. Department approval shall be based upon a determination of the district's compliance with s. 373.1501(5). Once a project component is approved, all requests for an additional appropriation of state funds needed to implement the project component shall be submitted to the department and such requests shall be included in the department's annual request to the Governor."*

The project implementation report is to contain adequate documentation addressing the criteria contained in Section 373.1501 sufficient for FDEP approval. Section 373.470, Florida Statutes, requires that prior to executing a

Project Cooperation Agreement with USACE, a PIR that contains sufficient information to receive FDEP approval under Section 373.026(8)(b), Florida Statutes, must first be completed. The SFWMD must demonstrate, using information in the PIR, that criteria set forth in Section 373.1501(5), Florida Statutes, is complied with in order to receive approval of project component by FDEP.

C.1.4.1.1 Criteria for Approval (Section 373.1501[5], F.S.)

Section 373.1501(5), F.S., contains five criteria (a-e) to be addressed in CERP project documentation provided for FDEP review and approval*:*

> *373.1501 (5): In its role as local sponsor for the project, the district shall comply with its responsibilities under this chapter and implement project components through appropriate provisions of this chapter. In the development of project components, the district shall:*
>
> *(a) Analyze and evaluate all needs to be met in a comprehensive manner and consider all applicable water resource issues, including water supply, water quality, flood protection, threatened and endangered species, and other natural system and habitat needs;*
> *(b) Determine with reasonable certainty that all project components are feasible, based upon standard engineering practices and technologies, and are the most efficient and cost-effective of feasible alternatives or combinations of alternatives, consistent with restudy purposes, implementation of project components, and operation of the project.*
> *(c) Determine with reasonable certainty that all project components are consistent with applicable law and regulations, and can be permitted and operated as proposed. For purposes of such determination:*
>
> > *1. The district shall convene a pre-application conference with all state and federal agencies with applicable regulatory jurisdiction;*
> > *2. State agencies with applicable regulatory jurisdiction shall participate in the pre-application conference and provide information necessary for the district's determination; and*
> > *3. The district shall request that federal agencies with applicable regulatory jurisdiction participate in the pre-application conference and provide information necessary for the district's determination.*
>
> *(d) Consistent with this chapter, the purposes of the restudy provided in the Water Resources Development Act of 1996 and other applicable federal law provide reasonable assurances that the quantity of water available to existing legal users shall not be diminished by implementation of project components so as to adversely impact existing legal users, that existing levels of service of flood protection will not be diminished outside the geographic area of the project component, and that water management*

practices will continue to adapt to meet the needs of the restored natural environment.
(e) Ensure that implementation of project components is coordinated with existing utilities and public infrastructure, and that impacts to and relocation of existing utility or public infrastructure are minimized.

Annex C (Legislative and Statutory Requirements) of this draft PIR contains the report prepared by the SFWMD addressing the above-listed criteria associated with implementation of the recommended plan.

C.1.4.2 Water Reservations

Part II of Chapter 373, F. S., contains the laws of the state of Florida governing permitting of consumptive uses of water in Florida. Section 373.223(4), F.S., provides that:

> *"(4) The Governing Board or the department, by regulation, may reserve from use by permit applicants, water in such locations and quantities, and for such seasons of the year, as in its judgment may be required for the protection of fish and wildlife or the public health and safety. Such reservations shall be subject to periodic review and revision in the light of changed conditions. However, all presently existing legal uses of water shall be protected so long as such use is not contrary to the public interest."*

This statute provides the legal framework for water that may be reserved from use for the protection of fish and wildlife or for the protection of public health and safety. When water is reserved under this statute, it is not available to be allocated for use under a consumptive use permit and is protected for the natural system. The statute also requires existing legal uses of water be protected so long as such use is not contrary to the public interest. Additionally, the statute also directs that reservations shall be reviewed periodically to assess changed conditions and revised as necessary. Reservation of water is by administrative rule. The SFWMD anticipates that both CERP- and non-CERP-related reservations will be adopted for Everglades protection.

C.1.5 State and Federal Assurances

The state of Florida will protect the water for the natural system in South Florida by taking the following actions: 1) The state will use its water reservation authority to reserve the beneficial water made available for the natural system from each project as required by WRDA 2000; and 2) the state will protect the existing water that the PIR identifies is available and beneficial to the natural system, using resource protection authority under Florida law.

The following language sets forth these commitments:

> "*The overarching objective of the Plan is the restoration, preservation and protection of the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The federal government and the non-federal sponsor are committed to the protection of the appropriate quantity, quality, timing and distribution of water to ensure the restoration, preservation and protection of the natural system as defined in WRDA 2000, for so long as the project remains authorized. This quantity, quality, timing and distribution of water shall meet applicable water quality standards and be consistent with CERP's natural system restoration goals and purposes, as the Plan is defined in the programmatic regulations. The non-federal sponsor will protect the water for the natural system by taking the following actions to achieve the Plan's overarching natural system objectives:*
>
> *1. Ensure, through appropriate and legally enforceable means under federal law, that the quantity, quality, timing, and distribution of existing water that the federal government and the non-federal sponsor have determined in this Project Implementation Report is available and beneficial to the natural system, will be available at the time the Project Cooperation Agreement for the project is executed and will remain available for so long as the Project remains authorized.*
>
> *2a. Prior to the execution of the Project Cooperation Agreement, reserve for the natural system the beneficial water that the federal government and the non-federal sponsor have determined in this Project Implementation Report will be made available by the project.*
>
> *2b. After the Project Cooperation Agreement is signed and the project becomes operational, make such revisions under Florida law to this reservation of water that the non-federal sponsor determines, as a result of changed circumstances or new information, is beneficial for the natural system.*
>
> *3. For so long as the Project remains authorized, notify and consult with the Secretary of the Army should any revision in the reservation of water or other legally enforceable means of protecting water be proposed by the non-federal sponsor, so that the federal government can assure itself that the changed reservation or legally enforceable means of protecting water conform with the non-federal sponsor's commitments under paragraphs 1 and 2. Any change to a reservation of water made available by the project shall require an amendment to the Project Cooperation Agreement.*"

C.1.6 Identifying System-Wide and Project-Level Effects

In general terms, CERP projects may affect water availability for the natural system and other water-related needs in two ways:

1. System-wide effects – Hydrologic effects that occur outside the watershed or basin in which the project is located through storage, management, treatment and delivery of water via the C&SF Project.

2. Project-level effects – Hydrologic effects that occur within the watershed or basin in which the project is located (e.g., natural areas, wetlands, salinity control) or within the features of the project components (e.g., reservoirs, stormwater treatment areas, and well-field recharge distribution canals).

The spatial extent of system-wide and project-level effects must be identified to quantify water made available by the project and to perform Savings Clause evaluations. To restore some of the historic regional water storage function that has been lost through the implementation of drainage and flood control infrastructure and development in the region, one of CERP's underlying principles is to capture and store excess flows and discharges to tide. Since the projects that comprise CERP are designed to work together to achieve the system-wide (i.e., pertaining to the C&SF Project or the South Florida ecosystem as a whole) goals and purposes of CERP, in most cases, the quantification of water should be conducted on a system-wide basis, in addition to a project-level basis. It is important that the identification of project effects be investigated for the entire system and not just for the project itself, or the immediate area where it is located. Additionally, for some projects, such as seepage management projects, the amount of water made available by the project may not be readily determined unless a system-wide analysis is performed.

C.1.6.1 System-Wide Effects

For those projects expected to result in system-wide effects on the natural system and other water-related needs in South Florida, a regional-scale hydrologic simulation model is utilized to evaluate those effects. Due to its location, small storage volume, and negligible influence on the regional water budget, the Winsberg Farm Wetlands Restoration project is not expected to have any system-wide impact. The average daily flow to the Winsberg Farm project on an annual basis is estimated to be 3-5 MGD per day or 3,360-5,600 acre-feet per year. A significant portion (50-75 percent) of this amount of water would be lost due to evapotransporation (ET). The remainder will effectively contribute to maintaining Lake Worth Drainage District (LWDD) groundwater and canal elevations and thereby reduce consumptive use of an equal amount of water that is obtained from the natural system. The overall effect of such an

amount of water does not justify the time and cost to do regional modeling. There would be an insignificant effect on the hydroperiod depth and duration of WCA-1, and if any that would be within model sensitivity.

2x2 Model (SFWMM) Regional Modeling:

No modeling to study the effects of the Tentatively Selected Plan (TSP) on maintaining flood protection or to evaluate system-wide effects has been performed or is anticipated to be necessary. Under normal operating conditions, wetland cells will only receive as much effluent from the SRWRF as can be removed through the combined effects of ET and percolation (seepage). An auxiliary, 4 MGD pump station will be constructed to route excess water resulting from storm events that cause high pool elevation to the county's deep injection wells. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD per day or 4.6-7.7 cfs. About 50 to 75 percent of this water would be lost due to ET. The remainder will contribute to an off-site loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 Conveyances, which are roughly 100 cfs and 400-500 cfs, respectively. This small amount of off-site seepage by the TSP would have no adverse or significant impacts to the existing level of service for flood protection and does not justify flood protection modeling. The TSP project has already received permits, and construction has been completed for Phase 1.

C.1.6.2 Project-Level Effects

The selected plan for the Winsberg Farm Wetlands Restoration project involves creation of 114 acres of wetlands using treated reclaimed wastewater from Palm Beach County's Southern Regional Wastewater Reuse Facility. The reclaimed wastewater to be used to hydrate the wetland is now being disposed of by deep-well injection and currently is not part of the natural system. This will increase the spatial extent of natural areas providing fish and wildlife habitat in the study area. The quantity of water necessary to protect fish and wildlife in the wetland to be reserved or allocated by the state of Florida is identified in Section C.2.4

C.2 PRINCIPLES AND METHODS FOR IDENTIFYING WATER FOR THE NATURAL SYSTEM

C.2.1 Concept of Beneficial Water for the Natural System

Identification of water for the natural system is based on the concept of "beneficial water." Beneficial water for the natural system is the water required for the protection of fish and wildlife within natural systems, including water that contributes to meeting hydrologic, water quality, and ecologic targets for restoration of natural systems. Not all water in natural areas is beneficial for the protection of fish and wildlife; therefore, the hydrologic, water quality, and ecologic targets for the natural system will be utilized to identify water that is beneficial in contrast to water which may be harmful or otherwise not contribute to natural system targets.

C.2.1.1 Beneficial Water Made Available by the Project

The identification of water for the natural system involves identifying: a) the total amount of water in the natural system; b) existing beneficial water in the natural system at the time of PIR development that is available and beneficial; and c) additional beneficial water, if any, made available by the project being evaluated.

Existing water is composed of water in the C&SF Project system currently available and beneficial and water currently available for other water-related needs. For modeling and evaluation purposes, the "Existing Conditions PIR Baseline" (ExPIR) represents this condition. For this project, the ExPIR Baseline assumes 2000 land-use and 2000 permitted-water supply demands.

Water made available by the project includes beneficial water for the natural system and water for other water-related needs. For purposes of quantifying water made available for the natural system, this quantification includes any changes the project makes in the quantity, timing or distribution of water from the ExPIR Baseline that is beneficial. The state will reserve this beneficial water that is made available for the protection of fish and wildlife pursuant to Section 601(h)(4)(A)(iii)(V) of WRDA 2000 and will use its allocation authority to protect any remaining water made available by the project for the natural system. The identification of the quantity of water made available by a project that is beneficial for the natural system and the identification of the quantity of water made available by a project for other water-related needs follows similar procedures and is based on the same baseline conditions.

C.2.2 Quantity, Timing and Distribution of Water and Water Quality

Viewed from a programmatic perspective, identification of water for the CERP-associated natural system involves an analysis of four different aspects of ecological responses to hydrologic changes: 1) responses to changes in water quantity received by the natural system; 2) responses to the timing of those deliveries; 3) responses to the distribution of water delivered to the natural system; and 4) responses to the quality of the water received by the natural system. In a project-specific sense, however, the relative importance of each of these aspects (quantity, timing, distribution and quality) will vary from project to project depending upon the specific objectives established for the project.

For example, some CERP projects may focus formulation efforts on simply changing the timing (seasonality) or distribution (inflow and outflow points, and internal movement) of water delivered to the natural system. Other projects may focus primarily on increasing or decreasing the amount of water delivered to the natural system, while still other projects may focus on improving the quality of water delivered to the natural system to maintain desirable ecological community structure. All of these aspects (depending upon their applicability to specific projects) are addressed during plan formulation through performance measures and evaluation criteria used to evaluate alternative plans.

To identify the quantity, timing and distribution of water for the natural system, a probabilistic approach was selected. This approach utilizes volume probability curves to depict the distribution of volumes of water that provide natural system benefits as a result of project features through the entire range of climatic conditions contained within the 36-year period of hydrological record used in model simulations. These volumes of water may include beneficial water that currently exist without project features and the beneficial water made available from project features through the entire range of historic climatic conditions.

Water quality is also taken into account during plan formulation and evaluation as either a project constraint (i.e., projects cannot cause or contribute to violations of water quality standards) or as an objective. According to CERP Guidance Memorandum 23.01, "*Water Quality Considerations for the Project Implementation Report Phase*," the Winsberg Farm Wetlands Restoration Project is not specifically listed. Therefore, it will be assumed to be a Category C. This means components will not have performance measures for water-quality improvement and are not required to have evaluation criteria for comparing water-quality improvement of alternatives. However, adversely impacting water quality shall be treated as a constraint in the plan formulation and evaluation process for all project components.

C.2.3 Volume Probability Curves

For purposes of identifying the increase in beneficial water for the natural system made available by the project compared to the existing beneficial water, volume probability curves were produced depicting the range of quantities of water delivered to natural system areas and coastal estuaries under all climatic conditions through the period of record used to perform project evaluations. A 36-year period of hydrologic record (1965 through 2000) was used for simulation modeling for this project. This period includes sufficient climatological variability (including natural fluctuations of water) to be representative of long term hydrologic conditions in the region. However, because the Winsberg Farm Wetlands restoration Project uses very small volumes of treated reclaimed wastewater, and that wastewater is not part of the current Pre-CERP Baseline as it is disposed of through deep well injection, and there is no discharge to surface water from the wetlands, it was determined that no modeling was needed to determine that the project has no measurable impact on b) existing beneficial water in the natural system at the time in PIR development that is available and beneficial, and c) additional beneficial water, if any, made available by the project being evaluated.

C.2.4 Identification of Water to be Reserved or allocated

Water made available by the Winsberg Farm Wetlands Restoration project includes both beneficial water for the natural system and water for other water related needs. For purposes of quantifying water made available for the natural system, this quantification includes any changes that the project will make in the quantity, timing, or distribution of beneficial water compared to the quantity, timing, and distribution of beneficial water included in the Existing Conditions PIR Baseline. The Winsberg Farm Wetlands Restoration project is completely separate hydrologically from and therefore does not make any additional beneficial water available for the natural system in Loxahatchee National Wildlife Refuge (WCA-1), WCA-2A, WCA-2B, WCA-3A, WCA-3B, Everglades National Park, and the WCA 3A/3B Seepage Management Area.

The identification of existing water and water made available by the project for the natural system is based on the portion of water that is beneficial for the natural system. For the Winsberg Farm Wetlands Restoration Project, the water made available by the project that is beneficial for the natural system includes the quantity of additional water delivered to the natural system that meets the ecological restoration objectives of the project. Beneficial water made available as a result of the project features is determined by comparing the Existing Conditions with the Winsberg Farm Wetlands Restoration Project area. The amount of water diverted from the Palm Beach County Southern Regional Reuse Facility needed to maintain a minimum of 1 foot of water over the entire 114

acre wetland is the amount of water that will have to be reserved for this project. It is estimated the project will need to reserve 5 MGD.

The non-Federal Sponsor will have to comply with the Water reservation requirement and it will be done in accordance with Florida Statute, and will be done prior to signing a PCA.

C.3 PRINCIPLES AND METHODS FOR IDENTIFYING WATER FOR OTHER WATER RELATED NEEDS OF THE REGION

C.3.1 Principles

WRDA 2000 and Section 373.470, Florida Statutes, require that CERP is to "*restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection.*". Water for other water-related needs is identified as water that contributes to meeting targets for quantity, timing and distribution of water used for water supply or resource protection (i.e., control of saltwater intrusion into sources of water supply) and is evaluated using hydrologic performance measures established consistent with the goals and objectives of the project. The quantity, timing and distribution of water made available by a CERP project for other water-related needs is based on these water supply or resource protection performance measures identified on a system-wide basis and a project-level (i.e., basin-wide) basis, as appropriate for the project being evaluated.

C.3.2 Methods

The Winsberg Farm TSP is expected to have no adverse or significant impacts to any system outside its local aquifer system. The average daily flow to the TSP on an annual basis is estimated to be 3-5 MGD per day or 4.6-7.7 cfs. About 50-75 percent of this amount of water would be lost due to ET. The remainder will contribute to an offsite loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 canals, which are roughly 100 cfs and 400-500 cfs respectively.

<u>2x2 Model (SFWMM) Regional Modeling</u>

No modeling to study the effects of the Winsberg Farm TSP on a regional scale has been performed or is anticipated to be necessary. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD per day or 3360-5600 acre-feet per year. About 50-75 percent of this amount of water would be lost due to ET. The remainder will percolate into the groundwater table and LWDD's canal system. This could reduce consumptive use of water that is obtained from the natural system, but the overall effect of a potential 1100-1400 acre-feet per year of water does not justify any regional modeling because the

model is not sensitive enough to show an effect on the hydroperiod depths and durations of WCA-1 for this amount of water.

C.3.3 Quantification of Water for Other Water-Related Needs

The identification and quantification of water made available for other water-related needs should be based on water supply and resource protection metrics that are appropriate to meet the goals and objectives of the project. The quantity, timing and distribution of water for other water-related needs that help meet these metrics were evaluated.
Because the hydrological effects of the Winsberg Farm Wetlands Restoration Project is so small that it is difficult to measure, it was determined that the project will nave no effect on other water-related needs.

C.4 PRINCIPLES AND METHODS FOR IDENTIFYING PROJECT EFFECTS ON EXISTING LEGAL SOURCES OF WATER

C.4.1 Principles

Section 601(h)(5) of WRDA 2000, entitled "Savings Clause," requires an analysis of each project's effects on legal sources of water in existence on the date of WRDA 2000 enactment (i.e., December 2000).

Sources of water for the following water-user categories that are eliminated or transferred as a result of a CERP project must be replaced with a new source of comparable quantity and water quality:

- Agricultural and urban water supply
- The Seminole Indian Tribe of Florida
- The Miccosukee Tribe of Indians of Florida
- Water supply for Everglades National Park
- Water supply for fish and wildlife

One of CERP's fundamental principles is that the Plan, as a whole, is expected to make more water available for the natural system and for other water-related needs in South Florida. This is accomplished by providing new sources of water (e.g., reservoirs, aquifer storage and recovery facilities, treated wastewater, etc.) to meet the multiple demands for sources of water in South Florida, including sources for the natural system. To achieve CERP goals, it is intended that some CERP projects will eliminate or transfer some or all of a particular source of water, depending on that project's hydraulic connectivity to existing legal sources in the vicinity of the project site and the influence of the project on the regional water management system. However, not all CERP projects are expected to result in elimination or transfer of existing legal sources of water,

nor are the quantities of water sources that may be transferred proportionally distributed to each of the individual projects that comprise the CERP.

Another basic principal underlying the Savings Clause and Assurances evaluation is that if it is shown that a project will make more water available than that which is provided by the Pre-CERP Baseline condition, then those user categories affected by the project will receive a comparable quantity of water (compared to the Pre-CERP Baseline quantity) as a result of project implementation. However, although the initial evaluation may indicate that the total quantity of water available from all sources will be increased or not be reduced as a result of project implementation, it is still possible for the project to cause a transfer of an existing source of water to a new source, or a portion of an existing source to a new source. In fact, existing legal sources are anticipated to be transferred from one source to another as CERP projects are implemented. A source transfer necessitates a further consideration of the quality of the new water source and the timing of the transfer to the new source.

C.4.1.1 Pre-CERP Baseline

The Pre-CERP Baseline is a description of assumed hydrologic conditions on the date of WRDA 2000 enactment (December 11, 2000) developed to satisfy the requirements of CERP Programmatic Regulations as a tool in the implementation of the Savings Clause. The programmatic regulations define the Pre-CERP Baseline as "*the hydrologic conditions in the South Florida ecosystem on the date of enactment of WRDA 2000, as modeled by using a multi-year period of record based on assumptions such as land use, population, water demand, water quality, and assumed operations of the Central and Southern Florida Project.*"

The final draft Pre-CERP Baseline document was issued by USACE and the SFWMD in April 2005. In accordance with the programmatic regulations, the final draft Pre-CERP Baseline document will be submitted to the Secretary of the Army for approval with concurrence by the Secretary of the Interior and Florida Governor. As of the date of this draft PIR, final approval of and concurrence on the Pre-CERP Baseline have not yet occurred. However, because the Winsberg Farm Wetlands Restoration Project uses very small volumes of treated reclaimed wastewater, and that wastewater is not part of the current Pre-CERP Baseline as it is disposed of through deep-well injection, and there is no discharge to surface water from the wetlands, it was determined that no modeling was needed to determine that the project has no measurable impact on existing legal sources of water.

C.4.1.2 Water Quality Improvements

Water quality improvements, if any, necessary to maintain water quality comparable to that of the existing legal sources for those water supply categories affected by the transfer, should be included as project features of the selected plan. Typically, such effects are anticipated in plan formulation and features necessary to address water-quality improvements are included as appropriate in the array of plans evaluated by the project team. The Winsberg Farm Wetlands Restoration Project does not include features specifically formulated to improve water quality; however, a basic operational assumption for the project is that attenuation of source water in the reservoir cells will result in settling of water-borne pollutants and sequestration of pollutants in vegetation and sediments in the cells. Since the Winsberg Farm Wetlands Restoration Project has no discharge to surface waters, ground water monitoring wells have been installed to evaluate the impact of the wetland on the local aquifer.

C.4.1.3 Implementation Plan

If a CERP project will result in a transfer from an existing legal source to a new source in order to achieve project purposes, the project implementation plan should include specific actions to be taken (including appropriate sequencing of construction, operational testing and verification, and initiation of project operations and monitoring) to prevent diminishment of water quantity of made available to existing legal sources as a result of project implementation. The Winsberg Farm Wetlands Restoration Project has no impact to existing legal sources of water. Therefore, no implementation plan is required.

C.4.1.4 Winsberg Farm Wetlands Restoration Project Effects

The Winsberg Farm Wetlands Restoration Project will have no effect on existing legal sources of water.

C.5 PRINCIPLES AND METHODS FOR IDENTIFYING PROJECT EFFECTS ON EXISTING LEVELS OF SERVICE FOR FLOOD PROTECTION

C.5.1 Principles

In addition to an evaluation of a project's effects on legal sources of water, Section 601(h)(5) (Titled "*Savings Clause*") of WRDA 2000 also requires that implementation of the project not reduce levels of service for flood protection in existence on the date of enactment of WRDA 2000 (i.e., December 2000) and in accordance with applicable law. Similarly, Section 373.1501(5)(d), Florida Statutes, requires that CERP projects not diminish "*existing levels of service for flood protection*" outside the geographic area of a project component (i.e., the

footprint of the project's features). The distinction between these two legal requirements is the federal requirement that focuses on conditions in effect as of December 2000, whereas the state of Florida requirement focuses on existing conditions which are expected to change through time as a result of the construction and operation of CERP projects and implementation of other non-CERP activities in South Florida.

C.5.1.1 Project-Level and System-Wide Evaluations

Considering the hydrologic functions associated with the purposes of many CERP projects and the above-discussed legal constraints, project teams must first determine whether the project features and operations (e.g., storage and conveyance of water) are likely to affect ground and surface-water levels in the basin in which the project is located. While evaluations of project-related influences on the regional system are generally performed using the South Florida Water Management Model (SFWMM, a regional hydrologic model of southern Florida), project-level evaluations are typically performed using one or more sub-regional models capable of simulating seepage, groundwater movement, water routing, and potential changes in water levels at a finer scale of resolution than can be accomplished using a regional-scale hydrologic simulation model.

For those projects that are capable of influencing the regional water management system (C&SF Project and connected secondary and tertiary water management systems), a system-wide evaluation using a regional model may also be necessary, as the regional simulation may show potential project effects requiring additional investigation and may also be used to create the boundary condition for subsequent finer resolution modeling. Determinations regarding the potential effects of the project on the regional water management system should be based on the proposed elements and operations of the selected plan under consideration for the project (including inflow and discharge points) and a quantification of the likely extent and magnitude of net changes in hydrologic conditions (e.g., changes in elevation, stage or flow volume) in the vicinity of the project. Significant changes in local hydrologic conditions have the potential to affect regional water management practices and/or the regional water management system which, if observed, would necessitate a system-wide evaluation in the context of flood protection.

Through these project-level and regional evaluations, it must be determined whether a project:

- Is improving the level of service for flood protection (either incidentally or in accordance with the project's purposes and planning objectives) compared to the level of service provided by Year 2000 conditions and existing conditions (at the time the PIR was initiated; i.e., the "Existing Conditions PIR Baseline");
- Has no effect on the level of service for flood protection compared to that provided by Year 2000 conditions and existing conditions; or,
- Is expected to create an adverse effect on the level of service for flood protection compared to that provided by Year 2000 conditions and existing conditions.

If, through this evaluation, a project is predicted to create adverse effects on the level of service for flood protection which are determined to be significant (i.e., prolonged higher stages or elevations which are likely to cause damage to public or private property, or threaten public health and safety), the project must be modified to reduce those effects to acceptable levels before the project can be recommended for approval.

C.5.2 Water Made Available by the Project for the Natural System

C.5.2.1 System-Wide Effects

Because the Winsberg Farm Wetlands Restoration Project uses very small volumes of treated reclaimed wastewater, and that wastewater is not part of the current Pre-CERP Baseline as it is disposed of through deep-well injection, and there is no discharge to surface water from the wetlands, it was determined that no modeling was needed to determine that the project has no measurable system-wide effect.

C.5.3 Project Effects on Existing Legal Sources of Water

C.5.3.1 Sources for Urban and Agricultural Water Supply

Implementation of the Winsberg Farm Wetlands Restoration Project will have a small positive impact on the local urban and agricultural water supply. The water used to hydrate the wetlands is treated reclaimed wastewater that is currently disposed of by deep-well injection. There is no discharge to surface waters. When this water is diverted to the wetland, it will, through evaporation and seepage into the local aquifer, result in a small increase in the amount of water available for urban and agricultural users.

C.5.3.1.1 North Palm Beach and Lower East Coast Service Areas

In general, implementation of the Winsberg Farm Wetlands Restoration project is not expected to have any impact on water supply performance outside the local aquifer system.

C.5.3.2 Sources for the Seminole Tribe of Florida

No Seminole tribal lands are located near or will be affected by the project.

C.5.3.3 Sources for the Miccosukee Tribe of Indians of Florida

No Miccosukee tribal lands are located near or will be affected by the project.

C.5.3.4 Sources for Everglades National Park and Fish and Wildlife

The primary freshwater habitat for fish and wildlife in the South Florida ecosystem consists of the Water Conservation Areas and Everglades National Park. Collectively, these areas are defined under Florida law as the "Everglades Protection Area." The Winsberg Farm Wetlands Restoration Project has no connection to and therefore no impact on the quantity of water available from existing legal sources for fish and wildlife and Everglades National Park.

C.5.4 Project Effects on Level of Service for Flood Protection

The Winsberg Farm TSP is expected to have no adverse or significant impacts to the existing level of service for flood protection as of December 2000. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD per day or 4.6-7.7 cfs. About 50-75 percent of this amount of water would be lost due to ET. The remainder will contribute to an off-site loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 canals, which are roughly 100 cfs and 400-500 cfs respectively.

C.5.4.1 Modeling

<u>2x2 Model (SFWMM) Regional Modeling</u>

No modeling to study the effects of the Winsberg Farm TSP on a regional scale has been performed or is anticipated to be necessary. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD per day or 3360-5600 acre-feet per year. About 50-75 percent of this amount of water would be lost due to ET. The remainder will percolate into the groundwater table and LWDD's canal system. This could reduce consumptive use of water that is obtained from the natural system, but the overall effect of a potential 1100-1400

acre-feet per year of water does not justify any regional modeling because the model is not sensitive enough to show an effect on the hydroperiod depths and durations of WCA-1 for this amount of water.

C.5.4.2 Maintenance of Flood Protection Modeling

No modeling to study the effects of the Winsberg Farm TSP on maintaining flood protection has been performed or is anticipated to be necessary. Under normal operating conditions, the wetland cells will only receive as much effluent from the SRWRF as can be removed through the combined effects of ET and percolation seepage. An auxiliary 4 MGD pump station will be constructed to route excess water due to rainfall storm events that cause high pool elevation to the county's deep injection wells. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD per day or 4.6-7.7 cfs. About 50-75 percent of this amount of water would be lost due to ET. The remainder will contribute to an off-site loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 canals, which are roughly 100 cfs and 400-500 cfs, respectively. This small amount of off-site seepage by the TSP would have no adverse or significant impacts to the existing level of service for flood protection and does not justify flood protection modeling. The TSP project has already received permits and construction is completed for Phase 1.

ANNEX D
DRAFT PROJECT OPERATING MANUAL

This page intentionally left blank

TABLE OF CONTENTS

D DRAFT PROJECT OPERATING MANUAL D-1
D.1 INTRODUCTION D-1
D.2 GENERAL PROJECT PURPOSES, GOALS, OBJECTIVES AND BENEFITS ... D-1
D.3 PROJECT FEATURES D-2
D.3.1 Existing Features D-2
D.3.2 Proposed Features D-3
D.4 PROJECT RELATIONSHIP D-4
D.5 MAJOR CONSTRAINTS D-4
D.6 STANDING INSTRUCTIONS TO PROJECT OPERATORS D-5
D.7 OPERATIONAL STRATEGY TO MEET PROJECT OBJECTIVES D-5
D.7.1 Achieving Natural System Goals, Objectives, and Benefits D-6
D.7.2 Flood Damage Reduction D-6
D.7.3 Water Quality D-7
D.7.4 Water Supply Operations D-7
D.7.5 Recreation D-7
D.7.6 Fish and Wildlife D-7
D.7.7 Navigation D-7
D.7.8 Other D-7
D.8 PRE-STORM/STORM OPERATIONS D-8
D.9 CONSISTENCY WITH THE IDENTIFICATION OF WATER AND RESERVATIONS OR ALLOCATIONS OF WATER FOR THE NATURAL SYSTEM D-8
D.10 CONSISTENCY WITH SAVINGS CLAUSE AND STATE ASSURANCE PROVISIONS D-8
D.11 DROUGHT CONTINGENCY PLAN (DCP) D-9
D.12 FLOOD EMERGENCY ACTION PLAN D-9
D.13 DEVIATION FROM NORMAL REGULATION D-10
D.13.1 Emergencies D-10
D.13.2 Unplanned Minor Deviations D-10
D.14 RATE OF RELEASE CHANGE D-10
D.15 SEEPAGE CONTROL D-11
D.16 INITIAL STORAGE FILLING PLAN D-11
D.17 NON-TYPICAL OPERATIONS FOR TREATMENT AREA PERFORMANCE D-11
D.18 AQUIFER STORAGE AND RECOVER SYSTEM PLAN D-11
D.19 WATER CONTROL DATA ACQUISITION SYSTEM PLAN (WCDASP) D-11
D.20 CONSISTENCY WITH THE ADAPTIVE MANAGEMENT PROGRAM AND PERIODIC CERP UPDATES D-11
D.21 INTERIM OPERATIONS DURING CONSTRUCTION D-12
D.22 PRELIMINARY OPERATIONS DURING OPERATIONAL TESTING AND MONITORING PHASE D-12

D.23 CONCEPTUAL DESCRIPTION OF PROJECT OPERATIONS FOR TRANSITION FROM THE INITIAL OPERATING REGIME TO THE NEXT-ADDED INCREMENT D-12

LIST OF FIGURES

Figure D-1: Winsberg Farm Wetland Restoration Project Map D-2

D DRAFT PROJECT OPERATING MANUAL

D.1 INTRODUCTION

The main purpose of this draft project operating manual (POM) is for day-to-day use in water management for essentially all foreseeable conditions affecting the Winsberg Farm Wetland Restoration Project. The Winsberg Farm Wetland Restoration Project includes the existing Phase 1 of the Green Cay Wetlands and the Phase 2 extension of the wetlands. The project is currently in the Project Implementation Report/Environmental Impact Statement (PIR/EIS) Phase, and there is a possibility that modifications and/or revisions to the Draft POM may occur during the remaining project phases. Report preparation is pursuant to Engineering Regulation 1110-2-240, and is in accordance with guidance contained in Engineering Manual 1110-2-3600, Engineering Regulation 1110-2-8156, and the Programmatic Regulations Guidance Memorandum #5 Operating Manuals. All elevations referenced in this Draft POM are in feet (ft), the 1929 National Geodetic Vertical Datum (NGVD 29), unless otherwise stated.

D.2 GENERAL PROJECT PURPOSES, GOALS, OBJECTIVES AND BENEFITS

The Palm Beach County Water Utilities Department's (PBCWUD) Southern Region Water Reclamation Facility (SRWRF) currently eliminates its secondary treated effluent through both deep-well injection and discharge to the created Wakodahatchee Wetlands. In an effort to reduce the amount of water lost to deep-well injection and to create additional wetland habitat similar to the Wakodahatchee Wetlands the Winsberg Farm Wetland Restoration Project was included as an "Other Project Element" in the Comprehensive Everglades Restoration Plan (CERP). The Winsberg Farm Wetland Restoration Project consists of Phase 1 Wetland and Phase 2 Wetland; both phases will utilize effluent from the SRWRF to hydrate wetland habitat created on the former Winsberg Farm agricultural lands.

The Winsberg Farm Wetland Restoration Project was designed to use treated wastewater to restore wetlands in an urbanized environment and to reduce the amount of treated wastewater that is being wasted through deep well injection. In addition to creating wetlands and increasing the spatial extent of wildlife habit, the Winsberg Farm Wetland Restoration Project will provide the community with educational and recreational opportunities. There is currently a Nature Center and boardwalks in Phase 1 Wetland and plans to extend the boardwalk into Phase 2 Wetland.

Phase 1 Wetland has already been constructed and consists of two treatment cells covering a total of approximately 75 acres of created wetlands; Phase 2

Wetland consists of two cells covering approximately 50 acres of created wetlands on the eastern portion of the Winsberg Farm agricultural lands.

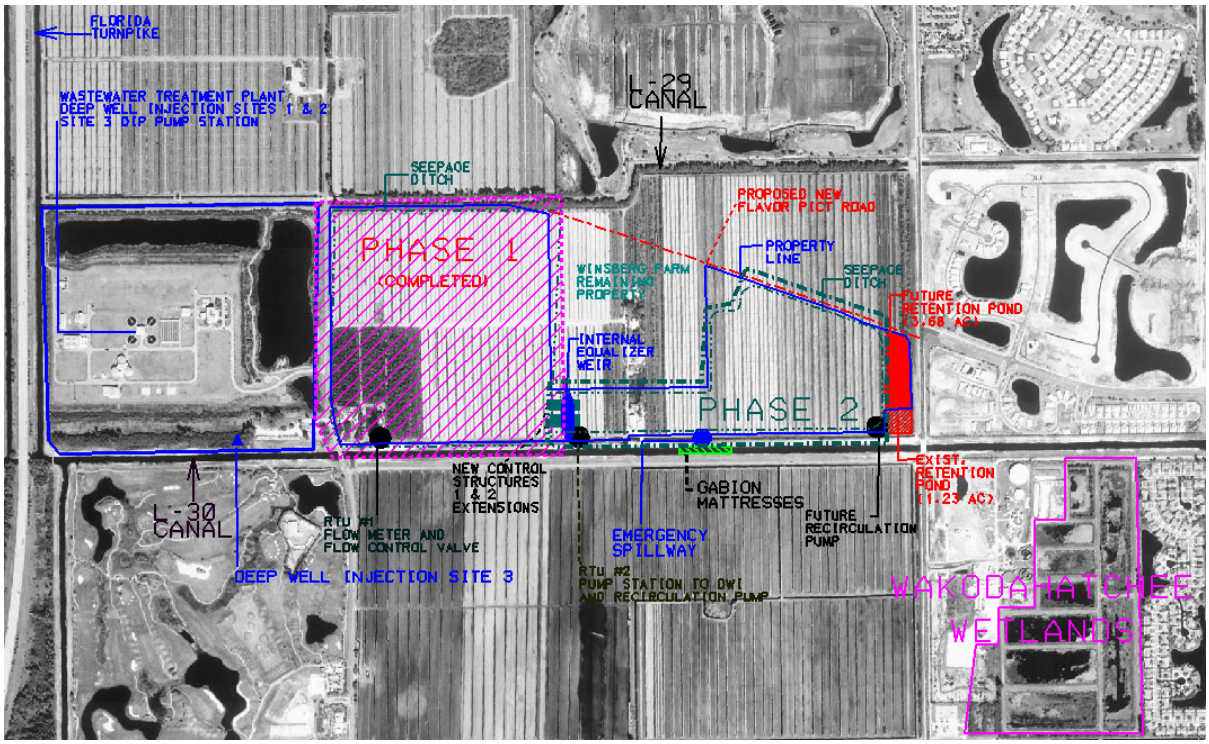


FIGURE D-1: WINSBERG FARM WETLAND RESTORATION PROJECT MAP

D.3 PROJECT FEATURES

D.3.1 Existing Features

1. Site 3 DIP Pump Station. This 250 hp pump, which is located at the SRWRF wastewater treatment plant, has a pipeline connection to Phase 1 of the wetland system. The treated effluent enters the system through a set of diffusers on the west side of Phase 1. The current capacity of the pump station is 3.0 million gallons per day (MGD), approximately 4.6 cubic feet per second (cfs). However, when Phase 2 comes online, an additional 2.0 MGD (3.1 cfs) pumping capacity will be added for a total system capacity of 5 MGD (7.7 cfs).

2. Cell No. 1 and Cell No. 2 Flow Control Structures. This structure consists of two culverts with electric weir gates located at the southeastern corner of Phase 1 Wetland in the levee between the two phases.
3. Remote Telemetry Unit #1 (RTU #1). The RTU #1 is located at the south west corner of Phase 1 Wetland and consists of an effluent flow meter and

flow control valve (FCV) assembly. The main purpose of RTU #1 is to monitor and transmit the signals to/from the lift station control panel and from the electromagnetic flow meter and the butterfly FCV valve.

4. Remote Telemetry Unit #2 (RTU #2). The RTU #2 is located at the south east corner of Phase 1 Wetland and consists of a 15hp recirculation pump, 250 hp discharge pump, and a water level transmitter. The 250hp discharge pump is used to send flows to deep well injection. The purpose of RTU #2 is to control the wetland level control structure, control the recirculation pump, transmit the water level in each cell of Phase 1 Wetland, and control the motorized butterfly valve.

5. Seepage Ditch. An existing seepage ditch surrounds Phase 1 for collection of seepage and rainfall. Overflow and seepage from the ditch enters the L-30 canal.

6. L-30 Canal. Lake Worth Drainage District L-30 canal is located adjacent to the Winsberg Farm Wetland Restoration Project site and will receive excess flows during extreme events when the emergency overflow spillway is overtopped.

D.3.2 Proposed Features

1. Recirculation Pump. An additional 15 hp pump will be located in the southeast corner of Phase 2 Wetland. The purpose of this pump is to re-circulate water in the wetlands and prevent stagnation. The structure will be used when no inflows are entering the system; under normal operating conditions sufficient flow will be available to prevent stagnation.

2. Deep-Zone Trenches. Deep zone trenches will be located throughout the wetland to allow even flow through the cells. In addition, during periods of low flow, the trenches will serve as deepwater refuge for aquatic organisms.

3. Emergency Overflow Spillway. This spillway is designed to pass the Probable Maximum Flood; it will be located in the south levee and will discharge to the L-30 Canal.

4. Internal Equalizer Weir. This passive weir will be located in the levee dividing the two project phases. The purpose is to allow flow between the two phases during extreme events; under average flow conditions, the Cell No. 1 and Cell No. 2 Flow Control Structures will pass flow between the two cells.

5. Cell No. 1 and Cell No. 2 Flow Control Structures. The existing control structures will be modified to allow flow to the eastern half of the project (Phase 2 Wetland).

6. Seepage Ditch. The current seepage ditch will be extended and capacity increased to encompass Phase 1 Wetland and Phase 2 Wetland for collection of seepage and rainfall. Overflow and seepage from the ditch enters the L-30 canal.

D.4 PROJECT RELATIONSHIP

The effluent pump station will discharge treated effluent from the SRWRF to Phase 1 Wetland. As part of the project the capacity of the effluent pump station will be increased to provide flow to the additional 50-acre wetland being added as part of Phase 2 Wetland. The Winsberg Farm Wetland Restoration Project is a standalone facility designed to use treated wastewater to restore wetlands. Since the project is standalone, there is no predicted interaction between the project and other CERP or Central and South Florida (C&SF) projects under normal operating conditions.

Outflow from the Winsberg Farm Wetland Restoration Project will enter the L-30 canal only when the emergency overflow spillway structure is overtopped. The runoff from the former agricultural area will be reduced by creating wetlands, thus reducing the runoff into L-30 from smaller storm events. No overflow will be released to the L-30 canal until the 100-year storm event elevation (22.5 ft) is reached.

D.5 MAJOR CONSTRAINTS

A. Wetland water depth. Water levels will be allowed to fluctuate seasonally within a one- to two-foot range throughout Phase 1 Wetland and Phase 2 Wetland in response to natural, seasonal variations in rainfall. These variations in the depth and duration of water elevations will influence the growth and distribution of plant species within the wetland. The wetland water levels will be maintained at an optimum water level between 19.5 ft and 19.75 ft for sufficient vegetation growth; with normal pool elevation not to exceed 20.0 ft. Significant fluctuations in pool elevation could result in a loss of vegetation which would require replanting.

B. Pretreatment System. Minimum treatment standards must be followed per Florida statutes. The wetland health and performance will depend heavily on avoiding excessive constituent loads. Maintaining normal and consistent operating conditions in the reclaimed treatment process will maintain a high level of treatment wetland performance.

C. Wetland-Cell Maintenance. Routine maintenance will consist of spraying for invasive plant species; non-typical operations are not required for this routine maintenance. Flow to the cell will be reduced to allow for other maintenance activities when necessary. The lift station, the Cell No. 1 and Cell No. 2 Flow Control Structures, and RTUs shall be physically inspected monthly. All manually operated valves shall be exercised at least once every 4 months.

D. Availability of Water. Water entering the Phase 2 Wetland must first pass through the Phase 1 Wetland. During a drought if sufficient water is not available to enter into the Phase 2 Wetland it is understood a loss of vegetation could occur. No alternate water source is identified.

D.6 STANDING INSTRUCTIONS TO PROJECT OPERATORS

The Winsberg Farm Wetland Restoration Project treatment system is designed to be a semi-automatic control system. Based on the wetland level signals recorded in the Supervisory Control Data Acquisition System (SCADA), the supply of secondary effluent from SRWRF can be interrupted by the operators at any time by shutting the butterfly motorized flow control valve co-located with the by-pass assembly at the RTU #1. In addition, re-circulation of wetland water can be achieved automatically from SCADA human machine interface (HMI) screens of the SRWRF. These are the main operations that can be performed remotely from SRWRF. The effluent lift station pumps are automatically started by the float level switch inside the wet well. All data monitored are also stored in the system's historical database. The system operation must be monitored and adjusted to ensure that treatment levels are consistently maintained and system upsets do not occur.

D.7 OPERATIONAL STRATEGY TO MEET PROJECT OBJECTIVES

The Winsberg Farm Wetland Restoration Project was designed to use treated wastewater to restore wetlands in an urbanized environment and to reduce the amount of treated wastewater that is being wasted through deep well injection by using it to restore these wetlands; thus returning the water to the natural environment. Treated wastewater will be pumped from the SRWRF into Phase 1 Wetland of the Winsberg Farm Wetland Restoration Project to hydrate the wetlands; as the flow passes through Phase 1 Wetland it will enter Phase 2 Wetland and percolate into the ground.

Water flows during the startup phase will be controlled to maintain optimal soil moisture. The effluent pump station will discharge approximately 2.5 MGD (3.9 cfs) to ensure that the cell soils are at least kept inundated. The water depths will be maintained shallow, less than 6 inches.

D.7.1 Achieving Natural System Goals, Objectives, and Benefits

The goal of the Winsberg Farm Wetland Restoration Project is to provide an additional point of discharge for the treated reclaimed water from SRWRF. This additional wetland will reduce the amount of reclaimed water discharged to deep well injection. The wetland water levels will be maintained at an optimum water level between 19.5 ft and 19.75 ft for sufficient vegetation growth; with normal pool elevation not to exceed 20.0 ft.

Under normal operations, highly treated wastewater from the SRWRF is pumped to Phase 1 Wetland through the Site 3 DIP Pump Station. The Cell No. 1 and No. 2 Flow Control Structures will be adjusted to allow flows from Phase 1 Wetland to enter Phase 2 Wetland. The normal operating pool elevation is not to exceed 20.0 ft; when necessary, the existing and future 15hp recirculation pumps will be used to prevent stagnation in Phase 1 Wetland and Phase 2 Wetland.

When the maximum pool elevation (21.0 ft) is reached Site 3 DIP Pump Station will cease to deliver flow to the wetlands and excess flows will be sent via RTU #2 to deep well injection.

D.7.2 Flood Damage Reduction

There is no flood damage reduction provided.

1. Normal and Emergency Operations. The PBCWUD will follow the Palm Beach County emergency operations procedures.

2. Hurricane or Tropical Storm Operations. The hurricane season is from 1 June through 30 November. When there are tropical depressions, tropical storms, and or hurricanes in the Atlantic/Caribbean Basin or Gulf Coast of Florida, the National Hurricane Center (NHC) issues tropical cyclone public advisories, forecast advisories, forecast discussions, and strike probability forecasts. Winsberg Farm Wetland Restoration Project operations during a hurricane or tropical storm will follow emergency procedures established by the Palm Beach County Water Utility Department.

3. Reservoir Emergency Overflow/Uncontrolled Discharge. An emergency overflow spillway will be constructed on the south side of Phase 2 Wetland; this spillway is designed to pass the Probable Maximum Flood for the area covered by both the existing Phase 1 Wetland and future Phase 2 Wetland. The crest elevation is set at 22.5 ft with a length of 200 ft and another portion is set with a crest elevation of 23.0 ft and length of

250 ft. The two crest elevations aid in limiting the amount of flow into the Lake Worth Drainage District L-30 canal during a large storm event. As required in the Florida Department of Environmental Protection permit emergency notification to the surrounding areas will occur when the elevation of the wetland exceeds 23.0 ft.

D.7.3 Water Quality

Prior to pumping the effluent into the wetland, the water must meet the water quality limits established in the State of Florida Domestic Wastewater Facility Permit No. FLA041424. The proposed wetlands would assimilate nutrients and improve water quality through natural biological, chemical, and physical processes under normal operations. In the event the wetlands exceed the maximum operating pool elevation of 21.0 ft due to direct rainfall, excess water will be delivered to deep well injection via RTU #2. Only under extreme conditions (greater than the 100-year storm event) will the emergency overflow spillway be overtopped; at that time the majority of the water will be from direct rainfall and water quality entering the L-30 canal should not be a concern.

D.7.4 Water Supply Operations

There are no operations for water supply.

D.7.5 Recreation

Although there is a nature center and boardwalk for public use, there are no operations specifically for recreation.

D.7.6 Fish and Wildlife

Although the wetland will attract wildlife, such as migratory birds, there are no operations specifically for fish and wildlife.

D.7.7 Navigation

No navigation will exist in the facility; there are no operations for navigation.

D.7.8 Other

Uniform water level control, as well as stocking the treatment wetlands with mosquito-eating fish will minimize mosquito problems. The uniform water level control will also assist in aquatic plant management. Regular maintenance will be performed on the system to reduce debris and exotic species.

D.8 PRE-STORM/STORM OPERATIONS

The inflow to the wetland will be from the SRWRF and rainfall. In the event the wetlands exceed the maximum operating pool elevation of 21.0 ft due to direct rainfall, excess water will be delivered to deep well injection via RTU #2. Only under extreme conditions (greater than the 100-year storm event) will the spillway be overtopped and water would enter the L-30 canal. As required in the Florida Department of Environmental Protection permit emergency notification to the surrounding areas will occur when the elevation of the wetland exceeds 23 ft. The PBCWUD will follow the Palm Beach County emergency operations procedures.

D.9 CONSISTENCY WITH THE IDENTIFICATION OF WATER AND RESERVATIONS OR ALLOCATIONS OF WATER FOR THE NATURAL SYSTEM

The Programmatic Regulations (Section 385.28(a)(6)(vi)) for the CERP require that the Draft POM be consistent with the reservation or allocation of water for the natural system as described in the PIR. The operating criteria within this Draft POM are consistent with the operating criteria used to identify the water available for the natural system to be made by the State of Florida in accordance with WRDA 2000. Refer to Annex C for details of the assumptions utilized in the technical procedures for identifying water to be reserved or allocated by the State. The project will be operated consistent with the assumptions set forth in Section C.2.2 Quantity, Timing and Distribution of Water and Water Quality.

D.10 CONSISTENCY WITH SAVINGS CLAUSE AND STATE ASSURANCE PROVISIONS

The Winsberg Farm Wetland Restoration Project has no adverse or significant impacts to existing sources of water. The Project consists of beneficial reuse of treated effluent that would otherwise be lost to deep well injection. The treated effluent will hydrate created wetlands that offer an opportunity for public education in addition to environmental benefits.

The Winsberg Farm Wetland Restoration Project has no adverse or significant impacts to the existing level of service for flood protection as of December 2000. The average daily flow to the wetland on an annual basis is estimated to be 3 – 5 MGD or 4.6-7.7 cfs. Approximately 50%-75% of this amount of water would be lost because of evapotranspiration. The remainder will contribute to an offsite loss due to percolation, which will be negligible when compared to design flow rates of the adjacent Lake Worth Drainage District L-29 and L-30 canals, which are approximately 100 cfs and 400-500 cfs, respectively.

While the Project is not adversely impacting the flood protection level of service, the Project is providing benefits to the area by reducing runoff during storm events by retaining water within the 125 acre wetland facility, reducing the amount of water discharging into the adjacent canals.

D.11 DROUGHT CONTINGENCY PLAN (DCP)

As previously indicated in Paragraph 10, the inflow to the wetland will be from the SRWRF and rainfall. A drought contingency plan is not necessary. During a drought sufficient water will be provided to maintain plant communities through the SRWRF. It is understood if insufficient flow is provided a loss of vegetation could occur that would require replanting the area and restart of plant communities.

D.12 FLOOD EMERGENCY ACTION PLAN

The Flood Emergency Action Plan will be completed for the Winsberg Farm Wetland Restoration Project prior to construction completion. The Flood Emergency Action Plan to be developed should be consulted for related emergency preparation and action. Local emergency management offices will be provided copies of the Flood Emergency Action Plan as necessary. This plan may be used to supplement Hurricane or Tropical Storm Regulations. As outlined in Engineering Regulation 1130-2-530, the Flood Emergency Action Plan shall include:

- A written Emergency Notification Procedure for serious abnormal conditions to provide for safety of people in the vicinity of the storage area and also trigger immediate response for remedial assistance to the levee/water control structure.
- A description or list of conditions leading to emergency situations and ways of dealing with them should they occur.
- Listing of location, types, and quantity of emergency repair materials and equipment.
- Details outlining responsibilities for inspection and execution of emergency repairs.
- List of contractors available within a reasonable distance of the project area.
- As required in the Florida Department of Environmental Protection permit (Permit Number FLA041424), emergency notification to the surrounding areas will occur when the elevation of the wetland exceeds 23 ft.

D.13 DEVIATION FROM NORMAL REGULATION

The USACE Jacksonville District Engineer is occasionally requested to deviate from the water management operations contained in the Draft Operating Manual. Prior approval for a deviation is to be obtained from the Jacksonville District Office (SAJ) except as noted below. The Jacksonville District Office will in turn obtain the necessary approvals from the South Atlantic Division (SAD) except as noted below. Deviation requests usually fall into the following categories:

D.13.1 Emergencies

Some emergencies that can be expected include drowning and other accidents, failure of project facilities, and flushing of pollutants. Necessary action under emergency conditions is taken immediately, unless such action would create an equal or worse condition. The Jacksonville District Office should be informed as soon as practicable. Written confirmation should be furnished after the incident. SAJ will report these deviations to SAD.

D.13.2 Unplanned Minor Deviations

There are unplanned instances where there is a temporary need for a minor deviation from normal regulation, although they are not considered emergencies. A change in releases is sometimes necessary for construction, maintenance, or inspection. These requested deviations are usually for duration of a few hours to a few days. Each request is analyzed on its own merits. Consideration is given to upstream watershed conditions, potential flood threat, conditions of lakes, and possible alternative measures. In the interest of maintaining good public relations, the request is generally granted, providing there are no adverse effects on the overall project regulation for authorized project purposes. Approval for minor deviations will normally be obtained from the Jacksonville District by telephone. A written confirmation will be furnished after the deviation is completed. SAJ will report these deviations to SAD.

D.14 RATE OF RELEASE CHANGE

The Winsberg Farm Wetland Restoration Project is a standalone facility that does not discharge water offsite; therefore there is no rate of release change constraints. The emergency overflow spillway is an uncontrolled structure used only during extreme rainfall events.

D.15 SEEPAGE CONTROL

Seepage from the Winsberg Farm Wetland Restoration Project will be captured by a seepage ditch that surrounds the wetland. This ditch will allow for percolation into the groundwater with continuous flow into the L-30 Canal.

D.16 INITIAL STORAGE FILLING PLAN

Water flows during the startup phase will be controlled to maintain optimal soil moisture conditions for rapid plant growth with an average flow of 2.5 MGD (3.87 cfs) to ensure that the cell soils are at least kept inundated.

D.17 NON-TYPICAL OPERATIONS FOR TREATMENT AREA PERFORMANCE

As previously indicated in Paragraph 10, the inflow to the wetland will be from the SRWRF and rainfall. Non-typical operations for avoiding dry-out during a drought are not applicable as inflow may not be available. Routine maintenance does not require implementation of non-typical operations since maintenance will primarily consist of plant management. Following a drought, the refilling of the wetlands will be the same as during the startup phase of the project, as described in Paragraph 16.

D.18 AQUIFER STORAGE AND RECOVER SYSTEM PLAN

There are no aquifer storage and recovery systems in the vicinity of the Winsberg Farm Wetland Restoration Project and no plans to include an ASR in the future. Currently only deep well injection is used.

D.19 WATER CONTROL DATA ACQUISITION SYSTEM PLAN (WCDASP)

The remote automation components installed at the pump station and other structures are remote telemetry units (RTU). The RTU is microprocessor based with a programmable logic controller (PLC) that serves as an interface to accumulate, process, transmit and receive discrete signals such as analog status and control messages between the SRWRF master radio station and the wetland RTU. As part of the Plan, data from the Project's RTU will be made available electronically.

D.20 CONSISTENCY WITH THE ADAPTIVE MANAGEMENT PROGRAM AND PERIODIC CERP UPDATES

After initiation of long-term operations and maintenance of this project, the operating manual may be further modified based on operating criteria approved

by the USACE and the SFWMD that results from CERP updates and/or recommendations from the adaptive assessment process as outlined in Guidance Memorandum # 6 Assessment Activities for Adaptive Management.

D.21 INTERIM OPERATIONS DURING CONSTRUCTION

No temporary water management operations are needed during construction of the project. The project is an addition to a standalone wetland; while the additional wetland area is under construction, operations in Phase 1 Wetland will not be changed.

D.22 PRELIMINARY OPERATIONS DURING OPERATIONAL TESTING AND MONITORING PHASE

No specific operations are needed during operational testing and monitoring phase of the project.

D.23 CONCEPTUAL DESCRIPTION OF PROJECT OPERATIONS FOR TRANSITION FROM THE INITIAL OPERATING REGIME TO THE NEXT-ADDED INCREMENT

The Winsberg Farm Project is a standalone wetland facility designed to use treated wastewater to restore wetlands. Since the project is stand-alone, there is no predicted interaction between the project and future added CERP projects.

ANNEX E
PROJECT MONITORING PLAN

This page intentionally left blank

TABLE OF CONTENTS

E PROJECT MONITORING PLAN E-1
E.1 WATER QUALITY MONITORING E-1
E.1.1 Permits E-1
E.1.2 Basis of Rationale E-1
E.1.3 Monitoring Scheme E-2
E.1.3.1 Groundwater Monitoring E-4
E.2 VEGETATION MONITORING E-4
E.2.1 Vegetation Overview E-4
E.2.2 Precautions E-5
E.2.3 Plant Cover and Biomass E-5
E.2.4 Invasive Species Control E-6
E.2.5 Embankment Maintenance E-6
E.2.6 Field Sampling E-8
E.3 WILDLIFE MONITORING E-10
E.4 HYDROLOGIC MONITORING E-10

LIST OF TABLES

Table E-1: Monitoring Wells to be Used For Sampling. E-3
Table E-2: Monitoring Well Parameters E-3
Table E-3: Reuse and Land Application Project Results Schedule E-4
Table E-4: Estimate of Number of Plants by Phase and Planting Zone E-5

LIST OF FIGURES

Figure E-1: Master Planting Table E-7

This page intentionally left blank

E PROJECT MONITORING PLAN

E.1 WATER QUALITY MONITORING

The proposed Winsberg Farm Wetlands Restoration Project consists of a 5.0 MGD, three-month-average daily flow (TMADF), a 125-acre, man-made wetland, divided into a 75-acre Phase I (3.0 MGD TMADF), and a 50-acre Phase II (2.0 MGD TMADF). Both wetlands have abilities to recirculate the effluent/overflow back through the wetlands. The Winsberg Farm Wetlands is located at latitude 26°29'30"N, longitude 80°10'00"N.

Effluent or reclaimed discharges from the Palm Beach County Southern Region Water Reclamation Facility shall be directed for disposal and reuse, respectively. Disposal shall occur at two underground injection locations -- U-001 and U-002. U-001 is located at the PBC-Southern Region Reclamation Facility (SRWRF) and consists of two 15-MGD peak hourly flow (PHF) Class I underground injection wells, IW-1 and IW-2, which discharge to Class G-IV ground water. The U-002 injection well system consists of one Class I underground injection well, IW-3, located at the Palm Beach County Site 3 Water Treatment Facility. Reuse discharge shall be used for both public access irrigation (R-001) at various locations, industrial reuse (R-003) at the SRWRF, and wetland reuse (R-002) at the Wakodahatchee and Winsberg Farm sites. However, only receiving and effluent (ground) waters entering and leaving the Winsberg wetland area, respectively, shall be monitored under this plan since it is expected that only it will be impacted by the proposed project. Since this project has been designed not to generate surface water discharges, no surface grab samples shall be collected.

E.1.1 Permits

As of the writing of this document, Phase I is the only permitted phase of the proposed wetland, and a permit application will be submitted for Phase II of the project. Overflow/effluent from the Winsberg Farm Wetlands will be combined with effluent from the Wakodahatchee Wetland and discharged to the Site 3 Deep Injection Well (IW-3) and SFWRF IW-1 and IW-2.

E.1.2 Basis of Rationale

RECOVER and the Winsberg Farm Project Delivery Team (PDTs) recognize that the effects from implementing CERP projects must be monitored at a system-wide and local scale. Responsibility for the design and implementation of system-wide monitoring is in the hands of RECOVER, while the design and implementation of monitoring to determine local effects and project performance is the responsibility of the Winsberg Farm PDT. To implement the system-wide program, RECOVER has developed the CERP Monitoring and Assessment Plan

(MAP). However, the MAP does not specifically cover the Winsberg project area. As a result, the RECOVER system-wide monitoring plan was not available to be referenced for development of the project-specific plan. Consequently, the local project monitoring plan will be based upon the monitoring scheme established as part of a State of Florida Domestic Wastewater Facility Permit (No. FLA041424). Project-specific monitoring will be coordinated with FDEP and RECOVER to ensure that measures and targets derived from the permit by the project team are consistent with system-wide measures and that duplication of effort is avoided. The Winsberg Farm Water Quality Monitoring Plan will utilize the results of pre-existent, routine Palm Beach County monitoring efforts within the project area of Winsberg Farm whenever possible. For example, Palm Beach County Environmental Resources Management (PBC-ERM) will provide the results of surface water nutrient, pH, and chlorophyll data or analyses (from Storet Stations 27A, 27B, 31C and 31E) to the Palm Beach County Water Utilities Department (PBCWUD). PBC-ERM has been collecting and analyzing total Nitrogen (as N), total Ammonia (as NH3), total Phosphorus (as P), Specific Conductance, pH, and chlorophyll quarterly as required by the NPDES Stormwater Permit issued by FDEP's Tallahassee Stormwater Section. PBCWUD will forward these data quarterly to FDEP, in addition to the testing results described in the following tables.

E.1.3 Monitoring Scheme

The following monitoring wells, as shown in **Table E-1**, shall be sampled in accordance with the monitoring frequencies specified in Permit Condition III.12 for the Winsberg Farm portion of Reuse System R-002. For the Winsberg Farm Wetlands (Phase I), monthly sampling must be reasonably spaced to be representative of potentially changing conditions.

The hurricane season is from June 1 through November 30. When there are tropical depressions, tropical storms, and or hurricanes in the Atlantic/Caribbean Basin or Gulf Coast of Florida, the National Hurricane Center (NHC) issues tropical cyclone public advisories, forecast advisories, forecast discussions, and strike probability forecasts.

Water Management operations within the Winsberg Farm Wetlands Restoration project area for hurricanes or tropical storms should follow the Water Management (SFWMD) Emergency Preparedness Manual – Suggested Hurricane Operating Procedures, April 2004. CESAJ SOP 500-1-1 should be consulted for emergency preparation and actions.

TABLE E-1: MONITORING WELLS TO BE USED FOR SAMPLING.

Monitoring Well ID	Alternate Well Name and/or Description of Monitoring Location	Depth (Feet)	Screening Elevation (Feet)	Aquifer Monitored	New or Existing
MWC-6	South of L-29 Canal & North of Winsberg Farm	19	11.5 to 16.5	Superficial	new
MWB-7	East of Winsberg Farm boundary	19	0.5 to 16.5	Superficial	new
MWC-8	North of L-30 Canal & South of Winsberg Farm	19	11.5 to 16.5	Superficial	new
MWB-9	East of Hagen Ranch Rd. & West of Winsberg Farm	19	0.5 to 16.5	Superficial	new
MWC-10	South of L-29 Canal & East of the MWC-6 at Winsberg Farm	19	7.0 to 12.0	Superficial	new
MWC-11	North of L-30 Canal & East of the MWC-8 at Winsberg Farm	19	7.0 to 12.0	Superficial	new

MWB = Background; MWI = Intermediate; MWC = Compliance

The following parameters shown in **Table E-2** shall be analyzed for each of the monitoring wells (except background wells) identified in Permit Condition III.11. For Winsberg Farm Wetlands (Phase I), the following parameters shall be monitored:

TABLE E-2: MONITORING WELL PARAMETERS

Parameter	Compliance Well Limit	Units	Sample Type	Monitoring Frequency
Water Level Relative to MSL	Report	FEET	In-situ	Note 1 below
Nitrogen, Nitrate, Total (as N)	10	MG/L	Grab	Note 1 below
Solids, Total Dissolved	500	MG/L	Grab	Note 1 below
Arsenic, Total Recoverable	50	UG/L	Grab	Note 1 below
Cadmium, Total Recoverable	5	UG/L	Grab	Note 1 below
Chloride (as Cl)	250	MG/L	Grab	Note 1 below
Chromium, Total Recoverable	100	UG/L	Grab	Note 1 below
Lead, Total Recoverable	15	UG/L	Grab	Note 1 below
pH	6.5-8.5	SU	In-situ	Note 1 below
Sulfate, Total	250	MG/L	Grab	Note 1 below
Coliform, total	4	#/100ML	Grab	Note 1 below
Trihalomethanes, Total	80	UG/L	Grab	Note 1 below
Nitrogen, Total (as N)	Report	MG/L	Grab	Note 1 below
Phosphorus, Total (as P)	Report	MG/L	Grab	Note 1 below

Note 1: The permittee shall monitor the above parameters monthly for the first year of this permit issuance, except during the first two months of the wetland operation during which the permittee shall monitor the above parameters biweekly. After the first year of monitoring the above parameters, the monitoring frequencies will be reduced to quarterly unless there is an objection from FDEP.

E.1.3.1 Groundwater Monitoring

Ground-water monitoring test results shall be submitted on Part D of Form 62-620.910(10). For reuse or land application projects, results shall be submitted with the discharge monitoring report (DMR) for each month listed in the following schedule (**Table E-3**). The submitted results shall be for each year during the period operation allowed by the permit in accordance with Permit Condition I.C.10. [62.522.600(10) and (11)(b), 62-601.300(3), 62.601.700, and Figure 3 of 62-601 and 62-620.610(18)]

TABLE E-3: REUSE AND LAND APPLICATION PROJECT RESULTS SCHEDULE

Sample Period	Report Due Date
January – March	April 28
April – June	July 28
July – September	October 28
October – December	January 28

Nutrient monitoring frequencies are weekly in accordance with 62-601, FAC. FDEP will increase these monitoring frequencies when Phase II of the Winsberg Farm Wetlands is permitted in the future.

E.2 VEGETATION MONITORING

Planting and vegetation maintenance will initially be the responsibility of the contractor (planting subcontractor) until a satisfactory level of plant survival is attained. Continuing plant growth maintenance will be the responsibility of the PBCWUD and aquatic vendor. Flooding of all wetland cells should be frequent enough to provide adequate soil moisture at the ground surface. Wetland operations staff will also need to maintain any other landscaping and plantings associated with upland areas. To maintain optimum treatment efficiencies, a uniform distribution of flow must be maintained in the wetland cells. Channeled flow (short circuiting) will reduce the detention time in the cells and reduce the level of reclaimed water treatment.

E.2.1 Vegetation Overview

The planter will excavate the creation and enhancement area in accordance with project drawings. Drawings can be found in the Winsberg Farm Wetlands

Restoration Project contract documents prepared by CH2MHILL, August 2001. A list of plants to be used can also be found in these documents. All trees will be planted randomly and not in rows. Plants should be evenly distributed throughout the wetland. As they grow, they may begin to obstruct reclaimed water flow in areas of the cell and cause short circuiting. If areas become overgrown, they should be thinned out to maintain a uniform flow pattern through the cells. The aquatic vendor can wade into the cells with wading boots to remove the plants in shallow zones by uprooting them by hand, or utilize an approved herbicide such as Round-Up.

Table E-4 is taken from the CH2MHILL, August 2001, contract document. It provides planting details for the first part (Phase 1 – 80 acres) of the project that has been constructed by the Palm Beach County Water Utilities Division. The same planting species, mix and spacing will be used in the 45 acres of Phase 2 of the project. The number of each species for Phase 2 will be estimated proportionally relative to the Phase 1 acreage (40 acres relative to 80 acres). See **Table E-4** for an estimate of the number of plants for each phase and planting zone.

TABLE E-4: ESTIMATE OF NUMBER OF PLANTS BY PHASE AND PLANTING ZONE

	Phase 1 (80 Acres)	Phase 2 (45 Acres)	Total
Deep Zones	30,605	17,215	47,820
Marsh Zones	392,232	219,649	611,881
Transition/Upland Zones	3,125	1,750	4,875
Total Plants	425,962	238,614	664,576

E.2.2 Precautions

Snakes (both poisonous and non-poisonous) and alligators will be attracted to the wetland cells because of the presence of fish and frogs. Workers in the wetland should be observant and avoid any interactions with snakes or alligators. Also, workers must be aware that reclaimed water in the wetland cells may contain disease-causing organisms. Proper sanitary precautions, such as the use of gloves, boots and other personal protective equipment, are very important for safe operation and maintenance.

E.2.3 Plant Cover and Biomass

Establishment of a vigorous and dense vegetative cover is the primary goal of wetland maintenance. Maintaining shallow water depths is crucial to the rapid

establishment of plant cover. Periodic monitoring through ground or aerial photographs will be utilized to measure plant growth, providing a record of this process, and may illustrate growth patterns related to season and/or operational phases.

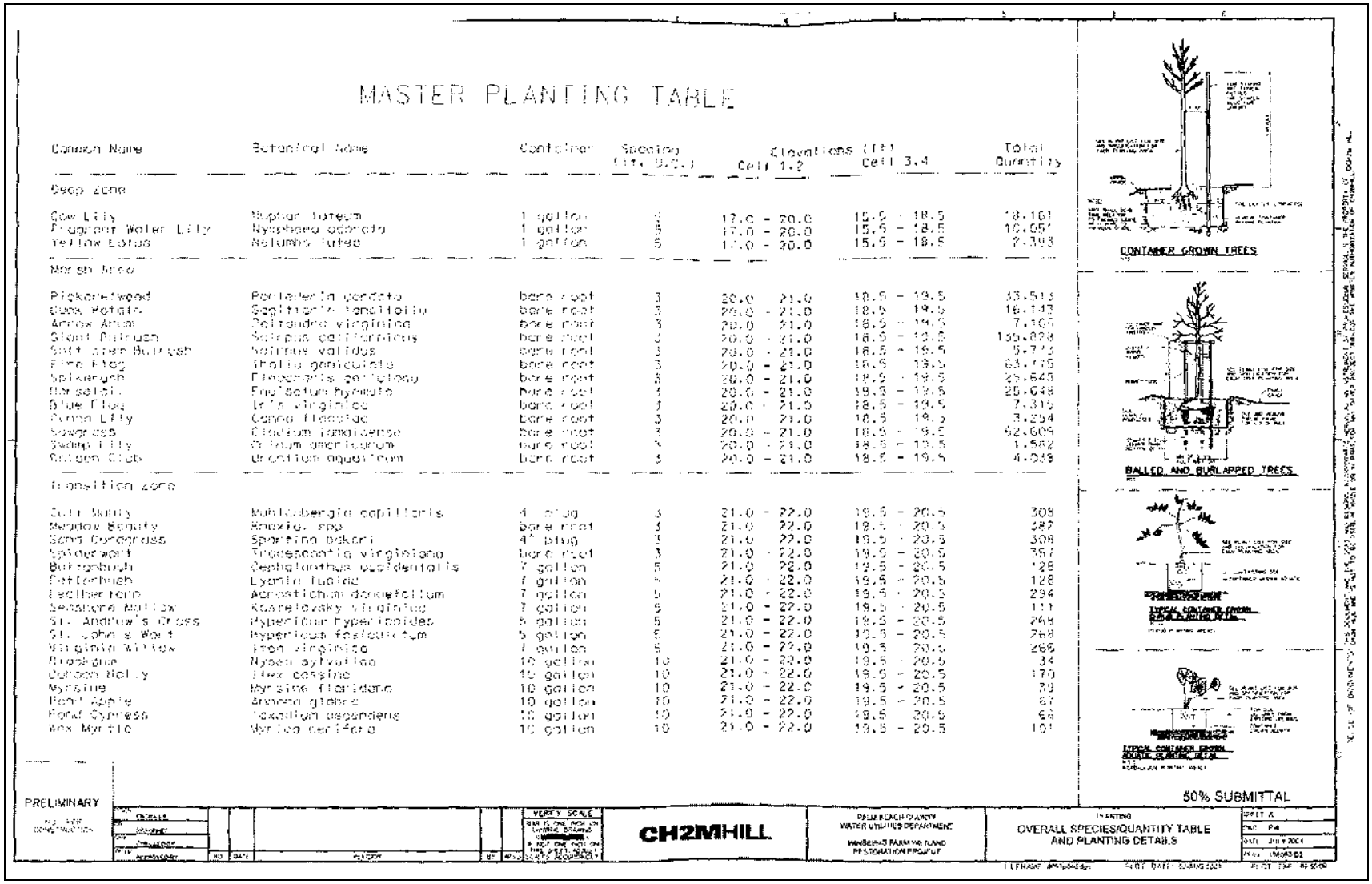
In any environment, plants are subject to attack by insect and fungal pathogens, or other environmental stressors. It is normal and reasonable to expect periodic occurrence of these stressors within the wetland. Water depths of one foot or greater sustained for months can also be expected to have a severe effect on wetland cover and condition. County staff should look for evidence of leaf tip browning, extensive yellowing, and chlorosis of leaves when water levels are being maintained at depths of six inches or greater within the marsh wetlands. Water levels should be lowered if these symptoms are extensive and continuing. If vegetative dieback occurs within the wetland, then open areas shall be replanted with the same species of plants.

E.2.4 Invasive Species Control

Nuisance plants, such as cattails, shall be controlled manually and removed through application of approved herbicides. In addition, invasive plants should be controlled manually and through application of approved herbicides during early stages of wetland plant cover establishment. The contractor and PBCWUD will utilize the most updated version of the following web site to determine which plant species are invasive and should be removed: www.fleppc.org.

E.2.5 Embankment Maintenance

Wetland embankments are being developed as landscape buffers and are representations of natural South Florida upland plant communities. The focus of embankment maintenance should be on maintenance of native diversity through selective planting and erosion control to maintain usable wetland acreages.



MASTER PLANTING TABLE

Common Name	Botanical Name	Container	Spacing (ft. O.C.)	Elevations (ft) Cell 1,2	Elevations (ft) Cell 3,4	Total Quantity
Deep zone						
Cow Lily	Nuphar lutea	1 gallon	5	17.0 - 20.0	15.5 - 18.5	18,161
Fragrant Water Lily	Nymphaea odorata	1 gallon	5	17.0 - 20.0	15.5 - 18.5	10,057
Yellow Lotus	Nelumbo lutea	1 gallon	5	17.0 - 20.0	15.5 - 18.5	2,393
Marsh Area						
Pickerelweed	Pontederia cordata	bare root	3	20.0 - 21.0	18.5 - 19.5	33,513
Duck Potato	Sagittaria latifolia	bare root	3	20.0 - 21.0	18.5 - 19.5	16,143
Arrow Arum	Peltandra virginica	bare root	3	20.0 - 21.0	18.5 - 19.5	7,105
Giant Bulrush	Scirpus californicus	bare root	3	20.0 - 21.0	18.5 - 19.5	105,828
Soft Stem Bulrush	Scirpus validus	bare root	3	20.0 - 21.0	18.5 - 19.5	5,773
Fine Flag	Thalia geniculata	bare root	3	20.0 - 21.0	18.5 - 19.5	63,175
Spikerush	Eleocharis cellulosa	bare root	3	20.0 - 21.0	18.5 - 19.5	25,643
Horsetail	Equisetum hyemale	bare root	3	20.0 - 21.0	18.5 - 19.5	20,648
Blue Flag	Iris virginica	bare root	3	20.0 - 21.0	18.5 - 19.5	7,315
Cutna Lily	Canna flaccida	bare root	3	20.0 - 21.0	18.5 - 19.5	3,254
Sawgrass	Cladium jamaicense	bare root	3	20.0 - 21.0	18.5 - 19.5	62,609
Swamp Lily	Crinum americanum	bare root	3	20.0 - 21.0	18.5 - 19.5	1,582
Golden Club	Orontium aquaticum	bare root	3	20.0 - 21.0	18.5 - 19.5	4,053
Transition zone						
Soft Rush	Juncus effusus	4" plug	3	21.0 - 22.0	19.5 - 20.5	308
Meadow Beauty	Rhexia spp	bare root	3	21.0 - 22.0	19.5 - 20.5	282
Sand Cordgrass	Spartina bakeri	4" plug	3	21.0 - 22.0	19.5 - 20.5	308
Spatterdock	Nuphar spp	bare root	3	21.0 - 22.0	19.5 - 20.5	357
Buttonbush	Cephalanthus occidentalis	7 gallon	5	21.0 - 22.0	19.5 - 20.5	128
Pickerelweed	Pontederia cordata	7 gallon	5	21.0 - 22.0	19.5 - 20.5	128
Leatherfern	Acrostichum danaeifolium	7 gallon	5	21.0 - 22.0	19.5 - 20.5	294
Swamp Milkweed	Asclepias incarnata	7 gallon	5	21.0 - 22.0	19.5 - 20.5	111
St. Andrew's Cross	Hypericum hypericoides	5 gallon	5	21.0 - 22.0	19.5 - 20.5	248
St. John's Wort	Hypericum fasciculatum	5 gallon	5	21.0 - 22.0	19.5 - 20.5	268
Virginia Willow	Itea virginica	7 gallon	5	21.0 - 22.0	19.5 - 20.5	266
Blackgum	Nyssa sylvatica	10 gallon	10	21.0 - 22.0	19.5 - 20.5	34
Dahoon Holly	Ilex cassine	10 gallon	10	21.0 - 22.0	19.5 - 20.5	170
Myrsine	Myrsine floridana	10 gallon	10	21.0 - 22.0	19.5 - 20.5	39
Pond Apple	Annona glabra	10 gallon	10	21.0 - 22.0	19.5 - 20.5	67
Pond Cypress	Taxodium ascendens	10 gallon	10	21.0 - 22.0	19.5 - 20.5	66
Wax Myrtle	Myrica cerifera	10 gallon	10	21.0 - 22.0	19.5 - 20.5	101

FIGURE E-1: MASTER PLANTING TABLE

E.2.6 Field Sampling

Field sampling will be conducted for six years following initial wetland planting to determine the success of the established wetlands. The sampling shall be conducted according to the following schedule:

- Start upon completion of plantings
- Follow-up one month after complete inundation of the wetland
- Quarterly thereafter for one year
- Biannually (every six months) for the next five years (include dry season and wet season)

The sampling shall be conducted as follows:

a) A number of belt transects will be established within the creation and enhancement area. Within each of the transects, monitoring stations will be established. The U.S. Army Corps of Engineers (USACE) will consult with the U.S. Fish and Wildlife Service (USFWS) and other interested parties regarding the appropriate number of transects and stations. The field sampling reports will include the following information:

   1. A count of live stems of survived planted vegetation by species within a 100-foot radius of each station,

   2. Assessment of growth (height) of planted tree species within a 100-foot radius of each station,

   3. Relative health of plantings observed within a 100-foot radius of each station, indicating any problems such as fungal infection, insect damage, etc.

   4. Percentage (aerial coverage) of invasive, exotic or nuisance species present within each transect,

   5. Wildlife utilization (qualitative) observed during a survey of each transect,

   6. Recruitment of hydrophytic vegetation observed in each belt transect,

   7. A notation of additional plant species observed in each of the belt transects that were not present in the previous sample, and

8. An observation of hydric soil indicators within the upper six inches of the substrate, including measurements of any organic detritus accumulation on the soil surface.

b) These reports shall be submitted to USACE within 60 days of completion of the monitoring event. The report shall include quantitative or qualitative data, narrative description, monitoring of water levels, and a one-page summary. The one-page summary shall highlight any potential problems. Some examples of potential problems are concerns with the hydrological conditions (deviations from hydrograph projections), a decline in wetland species (less than 85 percent obligate wetland and/or facultative wetland species in each area), an increase in nuisance or invasive species (more than 10 percent in any transect, poor average growth of woody tree plantings, and any other potential problems that may cause the established wetland area to fail. The county will utilize the 1988 List of Vascular Plants occurring in the Southeast Region to determine indicator status, such as facultative wetland or obligate.

c) The wetland will be considered successful if, at the end of the six-year monitoring period, the created and enhanced wetlands have achieved the following results:

1. Developed a hydrological regime in general accordance with the projected hydrograph. General accordance will be defined as "water levels that mirror the approximate projections indicated in the hydrograph." For instance, a permanently flooded wetland creation area during a normal rainfall year will be considered unsuccessful, as drawdown during winter months has been indicated on the hydrograph. Extreme rainfall events during months of normally decreased rainfall events will be taken into full consideration if water levels are higher than projected.

2. Sustained a minimum 85 percent obligate wetland and/or facultative wetland species as defined by the “1988 List of Vascular Plants occurring in the Southeast Region.”

3. Does not contain more than 10 percent nuisance or invasive species. Updated lists of invasive species in the state of Florida can be found at the following Web site: www.fleppc.org

4. For the purpose of this creation and enhancement site, *Tyhpa sp.* will be considered aggressive, nuisance species within the submerged planting area. The submerged planting area will not contain more than 10 percent of these species.

5. Plantings have achieved an 85 percent survivability rate.

E.3 WILDLIFE MONITORING

Wildlife surveys will be conducted from the perimeter of the wetland to document wildlife abundance, species diversity, and nesting activity and recommended in the Draft USFWS Coordination Act Report. Surveys will consist of half-day events scheduled to coincide with the vegetation monitoring described above. Reports will be submitted to USACE within 60 days of the monitoring event. USACE, in turn, will make annual reports to the USFWS.

E.4 HYDROLOGIC MONITORING

It is unknown at this time if flow monitoring will be required at the 15-HP recirculation pump. This document will be updated as needed.

ANNEX F
RECOVER REPORTS

This page intentionally left blank

TABLE OF CONTENTS

F RECOVER REPORTS F-1
F.1 FINAL REGIONAL EVALUATION REPORT BY RECOVER MAY 13, 2005 ... F-1
F.1.1 Introduction and Purpose of the Evaluation F-1
F.1.2 Project Background F-1
F.1.3 Evaluation F-2
F.1.3.1 Consistency with the Comprehensive Plan F-2
F.1.4 System-Wide Performance of the Plan F-5
F.1.5 Summary and Conclusions F-5

This page intentionally left blank

F RECOVER REPORTS

F.1 FINAL REGIONAL EVALUATION REPORT BY RECOVER MAY 13, 2005

F.1.1 Introduction and Purpose of the Evaluation

The Winsberg Farm Wetlands Restoration Project Team has completed the plan formulation phase of its project and requested that RECOVER prepare a Regional Evaluation.

The RECOVER Evaluation Team (RET) is an interagency and interdisciplinary scientific and technical team charged with developing and using performance measures for evaluating alternative plans developed for Project Implementation Reports (PIR). The purpose of RET evaluations is to ensure that each PIR has an alternative that is consistent with the goals and purposes of the CERP, specifically, an alternative that maximizes ecological benefits on a system-wide spatial scale. For evaluating alternative restoration projects, the RET has developed a suite of about 40 ecological performance measures and eight water-supply and flood-protection performance measures to evaluate project-level alternatives. Performance measures are calculated using output from the South Florida Water Management Model (SFWMM), which is the primary hydrologic simulation model for the CERP. The SFWMM is a regional scale model that provides simulations of hydrologic conditions at a 2-mile by 2-mile spatial resolution. Due to the large-scale resolution of the model and the relatively small hydrologic influence of some CERP projects, RET performance measures will not always illuminate differences in system-wide performance or alternatives even in cases where they occur.

F.1.2 Project Background

The Winsberg Farm study area is located in rapidly developing southeastern Palm Beach County west of the municipalities of Boynton and Delray Beach and east of the Arthur R. Marshall Loxahatchee National Wildlife Refuge.. The proposed action is the construction of a wetland system hydrated with treated wastewater from the Southern Region Water Reclamation Facility (SRWRF) in Palm Beach County. Being the local sponsor, Palm Beach County constructed a similar wetlands project with matching objectives in the mid-1990s called the Wakodahatchee Wetlands. Wakodahatchee is an approximately 50-acre site comprised of a mosaic of upland, emergent marsh, and deepwater habitats. The site has attracted and supported a wide variety of wildlife species and served as a model for the planning of the Winsberg Farm wetlands. The tentatively selected plan (TSP) is a 175-acre project footprint with conversion of 114 acres of former farmland at the Winsberg Farms site to a constructed wetland system and a 25-acre nature center with planted upland vegetation. The wetlands would

contain a mosaic of deepwater, upland and emergent marsh zones. The water source for wetland hydration would be the SRWRF, and water would exit the site through evapotranspiration and seepage.

The project is in the process of being built with Palm Beach County funds and this, therefore, is technically an after-the-fact evaluation.

F.1.3 Evaluation

The Winsberg Farms project is a relatively small-scale, wetland-creation project remote from the Indicator Regions utilized by the SFWMM. Because of these factors, use of RET performance measures would not likely discern differences between alternative plans or between the TSP and the no-action alternative. Accordingly, SFWMM simulations of alternatives for the Winsberg Farm project were not performed. Therefore, the RET cannot use any of its accepted or proposed performance measures to compare alternatives for the project. This evaluation, therefore, will concentrate on consistency of the selected alternative with the Comprehensive Plan (USACE and SFWMD, 1999), CERP goals and objectives, and a qualitative analysis of regional and system-wide effects.

F.1.3.1 Consistency with the Comprehensive Plan

Winsberg Farms is included in the Comprehensive Plan as an "Other Project Element" (OPE). During preparation of the Comprehensive Plan, the Restudy team saw many projects that were either outside the domain of SFWWM or that did not create regional effects. These came from a number of sources including Critical Projects, earlier formulation documents, and proposals. Within the context of this review, it is important to note that the OPE Evaluation Matrix in the Comprehensive Plan anticipated only local benefits of low significance, only some beneficial effect on ecology and water supply, and no effects on flood control or water quality for this project.

F.1.3.1.1 Alternatives

According to the draft Alternatives Formulation Briefing (AFB) Report, the primary objectives of the Winsberg Farm Project are to: "*(1) use treated wastewater to restore wetlands in a highly urbanized environment; and (2) reduce the amount of treated wastewater that is being wasted through deep well injection by using it to restore these wetlands, thereby returning the water to the natural environment.*" In actuality, the project was identified in the Comprehensive Plan as a wetlands creation, rather than a wetlands restoration project. Eight alternatives were considered for this wetland construction project with areas that ranged from 150 to 640 acres. All alternatives were generally consistent with the conceptual design outlined in the Comprehensive Plan that called for the construction of a 175-acre wetland east of the Loxahatchee National Wildlife

Refuge in Palm Beach County. Alternatives were developed and evaluated based on spatial extent of wetlands and an estimation of wetland quality using the Wetlands Rapid Assessment Procedure, or WRAP. The preferred or TSP alternative was chosen on the basis of cost effectiveness and overall project cost, and creates the smallest amount of wetland habitat of the studied alternatives. The TSP alternative creates 150 acres of wetlands, 25 acres less than specified in the Comprehensive Plan. The 25 acres lost from the original plan has been converted into a nature center managed by Palm Beach County.

F.1.3.1.2 Consistency with Comprehensive Plan Ecological Goals and Objectives

The Comprehensive Plan (Table 5-1) lists an inclusive set of goals and objectives for the Restudy which includes three bulleted goals under enhancement of ecologic values as follows below.

1. Increase the total spatial extent of natural areas.

The project will result in the creation of wetlands with an ecologically functional "lift" when compared to either the baseline agricultural land use condition or the likely "future without the project" residential or commercial development condition. The site is physically separated from the Loxahatchee National Wildlife Refuge (> three miles away). It is also separated from the nearby Wakodahatchee wetlands by a major highway (Jog Road) and the L-30 Canal.

Winsberg Farm project area soils are classified as non-hydric and moderately well-drained, generally characteristic of non-hydric (upland) flatwoods. Therefore, the project will create wetlands in an area that historically had very different habitats. All restoration projects, regardless of size, can provide benefits on a system-wide scale if they have the ability to reduce gaps in landscape corridors and restore habitat connectivity. This project does not increase the contiguity of Everglades wetlands or of historic upland flatwood habitat but does add to the local wetlands base.

It is recognized that non-surficially connected wetlands (i.e. "isolated wetlands") are an important component of the Everglades landscape. Restoration of such wetlands juxtaposed to other natural landscape features would result in increasing the total spatial extent of Everglades natural areas. While this project will technically increase the extent of wetlands, it is difficult to credit created, managed wetlands physically disjunctive from other Everglades habitats as increasing the total spatial extent of natural areas within the context of this CERP goal. The goal originated from a perceived major stressor on a key unique natural attribute of the Everglades system (large physical extent) and the concern for cumulative loss of physically and functionally connected

Everglades habitat through conversion to other land uses and/or fragmentation by roads, embankments and/or canals.

2. Improve habitat and functional quality.

The project will convert about 114 acres of agricultural land to a managed wetland system with increased habitat and functional quality when compared to the current baseline or the "future without project" condition. It is expected to improve habitat conditions for a variety of wildlife, including reptiles, amphibians, wading birds, waterfowl, migratory song birds, and small mammals.

Source water for the project will be reuse water from the SRWRF, which currently injects the water into deep wells. The water has a high total phosphate (TP) concentration (1400 ppb), but the water discharged to the reuse system must be filtered to comply with FDEP 62-610 requirements. This reduces TP concentration by reducing particulate phosphorus to about 239 ppb. The 114 acres of Winsberg Farm Wetlands provides some assimilative capacity of TP but this is outpaced if flows exceed 3-4 MGD. For this reason, the created wetland will be eutrophic at flows above the 3-4 MGD range. This system will not replicate the oligotrophic marsh of the Greater Everglades Ecosystem but will provide habitat for native species that can tolerate eutrophic habitat. This has been demonstrated at the nearby Wakodahatchee Wetlands.

3. Improve native plant and animal species abundance and diversity.

The created habitats should result in increased use by wildlife, including reptiles, amphibians, wading birds, waterfowl, migratory songbirds, and small mammals. The Wakodahatchee Wetlands system on which this project is modeled has documented use by about 120 species of birds, as well as many species of the above-listed wildlife groups. Depending upon design and management, native-plant abundance and diversity is also anticipated to improve. An intensive exotic control program will be important to ensure that native vegetation objectives are realized.

F.1.3.1.3 Consistency with Comprehensive Plan Economic and Social Well-Being Goals and Objectives

The Comprehensive Plan (Table 5-1) lists an inclusive set of goals and objectives for the Restudy which includes three bulleted goals under enhancement of economic values and social well-being as follows below.

1. Increase availability of fresh water (agricultural/municipal & industrial).

The project will utilize a portion (6-8 million gallons per day [MGD]) of the 34 MGD reuse water from the SRWRF to create the hydrological setting for wetland establishment. This water is currently being injected into deep wells. The ultimate fate of the water entering the site will be recharge of the local surficial aquifer with the exception of losses through evaporation, transpiration and seepage to adjacent surface-water canals. However, the limited volume of water added to the system is not expected to have any measurable benefit to the regional system (AFB, Page 18).

2. Reduce flood damage (agricultural/urban).

The project will not result in a decrease in the level of service for flood damage reduction.

3. Provide recreational and navigation opportunities.

The project is anticipated to result in local passive recreational benefits similar to those attributed to the nearby Wakodahatchee wetlands (e.g., bird watching, nature photography). In addition, the sacrifice of potential wetland creation space for a nature center (25 acres) will offer an opportunity for environmental education and greater public appreciation of wildlife and wetland systems.

4. Protect cultural and archeological resources and values.

The project should have no effect on any cultural resources listed, or eligible for listing, on the National Register of Historic Places.

F.1.4 System-Wide Performance of the Plan

While small projects may cumulatively enhance system-wide performance, it is difficult to individually evaluate and document these benefits. As Palm Beach County has demonstrated with the Wakodahatchee Wetlands, this project may provide wading bird forage habitat, habitat for other local wildlife, local water-treatment function, and wetland public awareness and outreach benefits. Conversely, the small size of the project, site selection, lack of landscape connectivity, high nutrient status, and the highly managed nature of the wetland complex would result in individually negligible and immeasurable benefits on a system-wide basis.

F.1.5 Summary and Conclusions

The scale of the project and sensitivity limitations of current, system-wide tools preclude a typical model-driven evaluation of this project. All alternatives

presented by the project team, including the selected alternative, are compatible with the project as outlined in the Comprehensive Plan. The Comprehensive Plan did not predict regional or system-wide benefits from the plan and limited expectations to some local ecological and water supply benefits. The selected alternative, although 25 acres less than envisioned in the Comprehensive Plan, should accomplish these objectives.

APPENDIX A
ENGINEERING

This page intentionally left blank

TABLE OF CONTENTS

A ENGINEERING A-1
A.1 STATUS OF ENGINEERING ACTIVITIES A-1
A.2 DESCRIPTION OF THE TSP A-1
A.3 OPERATION OF THE TSP A-2
A.4 WATER RESERVATIONS A-6
A.5 SAVINGS CLAUSE EVALUATION A-7
A.6 MODELING A-8
A.6.1 2x2 Model Regional Modeling A-8
A.6.2 Maintenance of Flood Protection Modeling A-8
A.6.3 Seepage A-8
A.7 STATUS OF MCASES A-9
A.8 COST-ESTIMATING PROCEDURE FOR ALTERNATIVES A-9
A.9 DESCRIPTIONS OF THE EIGHT POTENTIAL NEW LOCATIONS A-13
A.10 HYDRAULIC DESIGN ANALYSIS A-19
A.10.1 Hydraulic Design Criteria A-19
A.10.1.1 General Information A-19
A.10.1.2 Water-Surface Elevations A-19
A.10.1.3 Wetland Characteristics A-19
A.10.1.4 Embankments A-20
A.10.1.5 Water Control Structures A-20
A.10.1.6 Spoil Areas A-21
A.10.2 Hydraulic Design A-21
A.10.2.1 Overflow Spillway Structures A-21
A.10.2.2 Embankments A-22
A.10.2.3 Culverts A-23
A.11 EARTHWORK QUANTITIES AND BALANCE, PHASE 2 ..... A-23
A.11.1 Phase 2 Assumptions A-23
A.11.2 Phase 2 Construction Phases A-23
A.11.3 Phase 2 Materials Balance A-24
A.11.4 Phase 2 Wetland Features A-25
A.12 STRUCTURES A-25
A.12.1 Design Criteria A-25
A.12.1.1 Loading Conditions A-25
A.12.1.2 Stability A-25
A.12.1.3 Concrete A-25
A.12.1.4 Steel Sheet Pile A-25
A.12.1.5 Structural Steel A-26
A.12.2 Pump Intake Structure A-26
A.12.2.1 General A-26
A.13 MECHANICAL AND ELECTRICAL DESIGN A-26
A.13.1 Phase 1, Electrical Design A-26
A.13.1.1 General A-26
A.13.1.2 Effluent Pump Station A-27

A.13.1.3 Flow Control Structure A-28
A.13.1.4 Visitors Center A-28
A.13.1.5 Maintenance Building A-29
A.13.1.6 Parking Area A-29
A.13.2 Phase 2 Electrical Design A-30
A.13.2.1 Utility Relocation A-30
A.13.2.2 Recirculating Pump Station A-31
A.13.2.3 Actuator for Flow Control Structure A-32
A.13.3 Phase 1 Mechanical Features A-32
A.13.3.1 Green Cay Wetlands Operation Background A-32
A.13.3.2 Green Cay Wetlands Influent A-33
A.13.3.3 Winsberg Farm Pump Station A-33
A.13.3.4 Visitor Center A-33
A.13.3.5 Irrigation A-34
A.13.4 Phase 2 Mechanical Design A-34
A.13.4.1 Winsberg Farm Recirculating Pump Station: General Information A-34
A.13.4.2 Water and Sewer Utilities A-35
A.13.4.3 Winsberg Farm Recirculating Pump Station-Featured Equipment A-35
A.14 GEOLOGY AND SOILS A-37
A.14.1 Location A-37
A.14.2 Project Purpose A-37
A.14.3 Subsurface Investigation A-37
A.14.4 Geology A-37
A.14.5 Slope Stability A-38
A.15 HYDROLOGY A-38
A.16 ENGINEERING APPENDIX PLATES A-41

LIST OF TABLES

Table A-1: Winsberg Design Elevations A-2
Table A-2: Flow Volumes to Winsberg Farm Wetlands A-7
Table A-3: Wetland and Upland Construction Costs A-9
Table A-4: Conceptual Construction Cost Estimate, Winsberg Farm Wetlands A-12
Table A-5: Wetland and Upland Distribution of Alternative Designs A-13
Table A-6: Alternative Matrix For Potential New Locations A-17
Table A-7: Unit Cost Estimates for Alternatives A-18
Table A-8: Surplus and Availability of Soil Material A-24
Table A-9: Probable Maximum Precipitation For Storm Durations 6 to 72 Hours A-38
Table A-10: Precipitation For Each 6-Hour Increment of the 72 hr PMP A-38
Table A-11: Winsberg Farms Impoundment Inflow Design Flood Analysis A-40
Table A-12: Winsberg Farms Reservoir Emergency Overflow Spillway PMF Routing ... A-40

LIST OF FIGURES

Figure A-1: General Layout of Winsberg Farm Wetlands A-4
Figure A-2: Exhibit 7-1 – Conceptual Design of the TSP A-5
Figure A-3: Alternative Locations A-16
Figure A-4: Distribution of the Synthetic 72 hr Probable Maximum Precipitation A-39
Figure A-5: Plate G-1 - Location Map Plate A-42
Figure A-6: Plate G-2 - General Site Plan Plate A-43
Figure A-7: Plate G-3 - Site Plan Completed Phase 1 ..... A-44
Figure A-8: Plate G-4 - Proposed Site Plan Phase 2 Plate A-45
Figure A-9: Plate G-5 - Phase 2 to Phase 1 Connection Detail Plate A-46
Figure A-10: Plate G-6 - Recirculating Pump & Intake Structure Plate A-47
Figure A-11: Plate G-7 - Wetland Typical Sections Plate A-48
Figure A-12: Plate G-8 - Spillway Detailed Plan A-49
Figure A-13: Plate G-9 - Spillway Cross Section Detail A-50
Figure A-14: Plate A-1 - Phase 1 Recreational Features Plate A-51
Figure A-15: Plate A-2 - Phase 1 Nature/Visitor Center Exterior Elevations Plate A-52
Figure A-16: Plate A-3 - Phase 1 Nature/Visitor Center Floor Plan Plate A-53
Figure A-17: Plate A-4 - Boardwalk and Shelters Layout and Details A-54
Figure A-18: Plate S-1 - New 24-Inch Reinforced Concrete Pipe Plate A-55
Figure A-19: Plate S-2 - Pump Intake Structure Plate A-56
Figure A-20: Plate M-1 - Pump Station – Plan and Section Plate A-57
Figure A-21: Plate ME-1 - Phase 1 Mechanical Equipment Layout Plate A-58
Figure A-22: Plate ME-2 - Phase 1 Mechanical Equipment Details Plate A-59
Figure A-23: Plate E-1 - Existing Utilities Plate A-60
Figure A-24: Plate E-2 - Utility Relocations and Additions Plate A-61
Figure A-25: Plate E-3 - Recirculating Pump Station One-Line Diagram Plate A-62
Figure A-26: Plate E-4 - Gate Actuator One-Line Diagram Plate A-63

This page intentionally left blank

A ENGINEERING

A.1 STATUS OF ENGINEERING ACTIVITIES

The Tentatively Selected Plan (TSP) is the 175-acre Winsberg Farm Wetlands. See **Figure A-1** for a general layout of the project and **Figure A-2** for the conceptual design.

The project sponsor has contracted with CH2MHill to design the Winsberg Farm Wetlands. Phase 1 is about 89 acres of wetland and upland habitat. Included in Phase 1 is about 13 acres that includes an interpretive center, boardwalks, parking lot and maintenance building. Construction of Phase 1 wetland and upland habitat is near completion. Phase 2 will be an additional 63 acres of wetland and upland habitat located to the east of Phase 1.

During the study, alternative sites were looked at to support the economic analysis needed to identify the TSP. Cost estimates using a unit-cost method for alternative sites were done, and the procedure is described in Section A-8.

A.2 DESCRIPTION OF THE TSP

The tentatively selected wetland restoration project would be located on about 175 acres of farmland just east of the Southern Region Water Reclamation Facility (SRWRF). About 114 acres of the site would be hydrated using treated wastewater from the SRWRF. Thus, the concept proposed would result in creation of a wetland system about three times the size of the Wakodahatchee Wetlands, and its location adjacent to the Wakodahatchee site would leverage the recently created ecosystem restoration benefits by expanding the constructed wetland into an integrated system having even greater regional significance.

The configuration includes Phase 1 design and construction, which includes about 72 acres of wetlands to be created in the western half of the project. The remaining 42 acres of project area on the eastern half of Winsberg Farm, considered Phase 2 of the project, would contain the same habitat types and ratios as Phase 1. The TSP is configured assuming regulated inflow of water to maintain continuous inundation. Water levels will be allowed to fluctuate seasonally within a one- to two-foot range throughout the entire 114 acres in response to natural seasonal variation in rainfall. This variation in the depth and duration of flooding (i.e., hydroperiod) will influence the growth and distribution of plant species within the wetland.

Inflow from SRWRF enters the western half of the project (Phase 1). Phase 1of the project is divided by an internal embankment, which creates Cell 1 to the north and Cell 2 to the south. Each cell's water level can be independently managed by operation of inflow valves and outflow at adjustable weir control

structures. Each cell has a gated control structure with a 24-inch RCP culvert that connect the weir structures to each other to a 15 horsepower (hp) recirculation pump for moving water within phase 1, and a 250 hp pump for sending excess water back to the SRWRF for deep well injection. Phase 2 of the project is divided by an internal embankment creating cell 3 to the north and cell 4 to the south. There is a 15 horsepower pump located in the southeast corner of phase 2 that re-circulates flow in cells 3 and 4. This layout is displayed in **Figure A-2**.

The adjustable weir control structures in Phase 1 can be operated to allow flow:

- To the eastern half of the project (Phase 2), or
- Flow water between the control structures to maintain flow to cells 3 and 4 during periods of maintenance for cells 1 and 2, or if one of the control structures is down for maintenance, or
- Circulate flow in the western half of the project by a 15-HP recirculation pump, or

  Send flow to deep-well injection by a 250-HP discharge pump in the event pool elevations rise beyond a set point due to direct rainfall.

Table A-1 includes design elevations taken from Phase 1 construction plans.

TABLE A-1: WINSBERG DESIGN ELEVATIONS

	Elevation (FT-NGVD 29)
External Embankments	26.5 or greater
Walkway Deck	23.0-24.0
Internal Embankments	23.0
Normal Operating Water Level	20.0
Existing Ground	19.0-20.5
Shallow Marsh Area	19.5-20.0
Deep Marsh Area	16.0-19.5
LWDD Canals -- Normal	16.0
Deep Zones -- Bottom	15.0

A.3 OPERATION OF THE TSP

The TSP is configured assuming regulated inflow of water to maintain continuous inundation at a water level of 20.0 ft-National Geodetic Vertical Datum 1929 (NGVD 29). Water levels will be allowed to fluctuate seasonally within a one- to two-foot range throughout the entire 114 acres in response to natural seasonal variation in rainfall. This variation in the depth and duration

of flooding (i.e., hydroperiod) will influence the growth and distribution of plant species within the wetland.

The operations that manage water levels in the western and eastern half of the project can be done locally or by remote radio telemetry link to the SRWRF treatment plant control center.

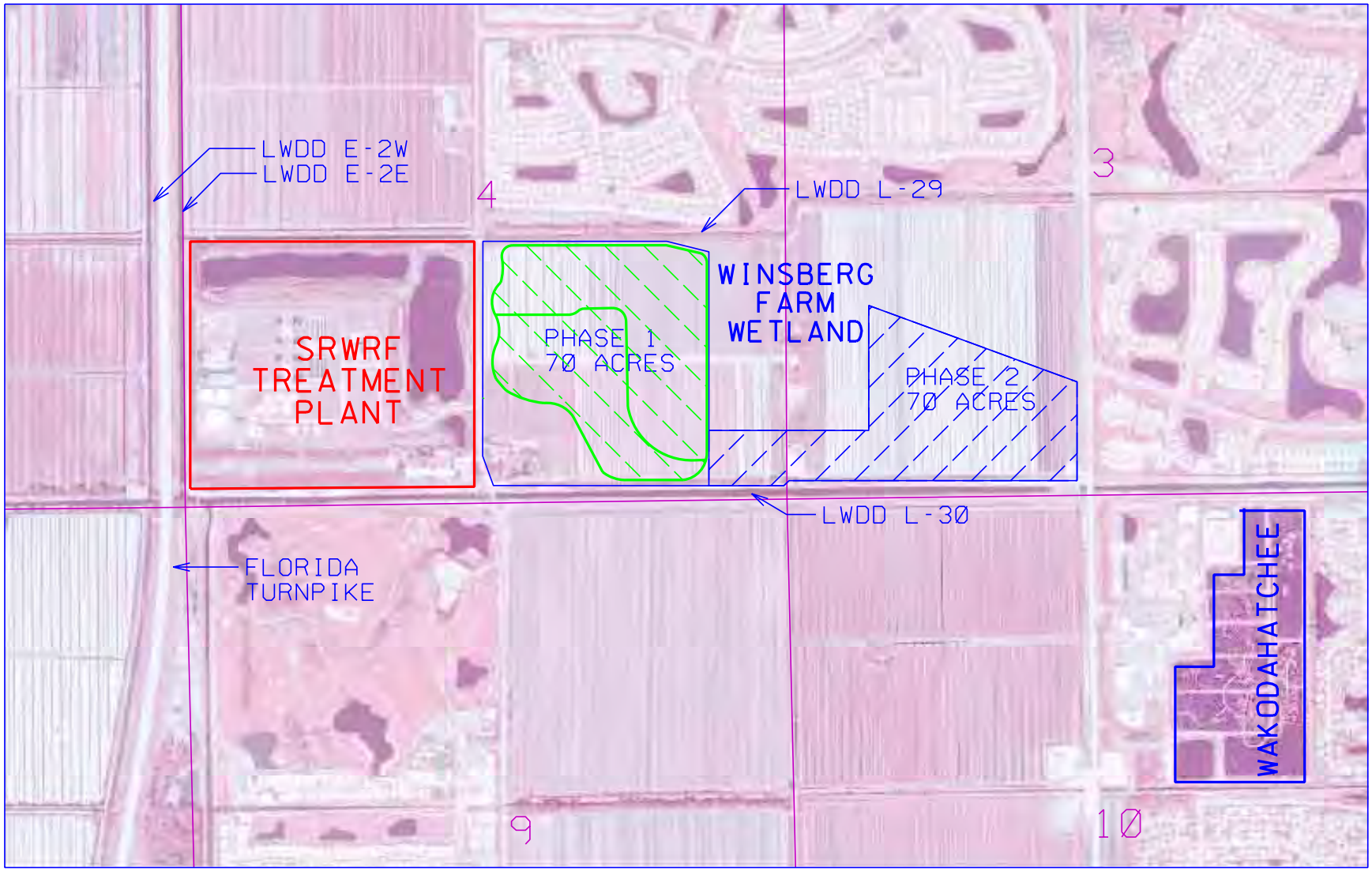


FIGURE A-1: GENERAL LAYOUT OF WINSBERG FARM WETLANDS

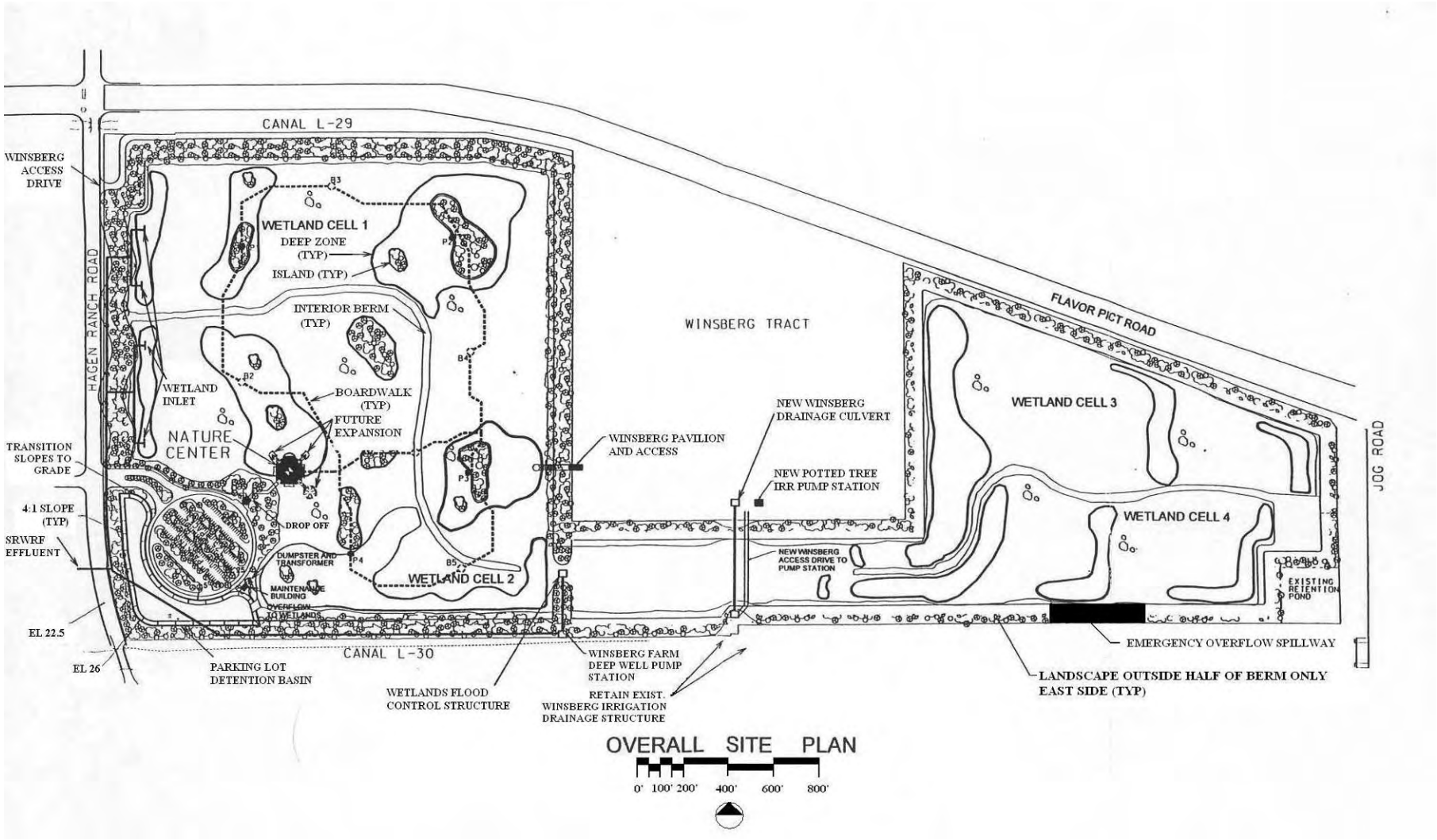


FIGURE A-2: EXHIBIT 7-1 – CONCEPTUAL DESIGN OF THE TSP

A.4 WATER RESERVATIONS

Section 601(h)(4)(A)(iii) of WRDA 2000 states in pertinent part:

(iii) REQUIREMENTS – A project implementation report shall –
(IV) Identify the appropriate quantity, timing and distribution of water dedicated and managed for the natural system; and

(V) Identify the amount of water to be reserved or allocated for the natural system necessary to implement, under state law, subclauses (IV) and (VI).

Section 601(h)(4)(B)(ii) of WRDA 2000 also states:

(ii) CONDITION – The Secretary shall not execute a project cooperation agreement until any reservation or allocation of water for the natural system identified in the project implementation report is executed under state law.

The TSP does not produce additional water for the natural system. Rather, it makes use of water that would be lost to deep-water injection. Under normal operating conditions, wetland cells will only receive as much effluent from the SRWRF as can be removed through the combined effects of evapotranspiration (ET) and percolation (seepage). ET for a wetland system and precipitation amounts in the area are roughly equal on an annual basis. The amount that is attributed to seepage can be approximated by using the operational records of the Wakodahatchee wetlands which are about one-third the size of the Winsberg Farm Wetlands. The average flow to the Wakodahatchee wetlands for the period June 1, 2001, to July 31, 2003, was 0.80 MGD, or 896 acre-feet per year. The average daily flow to the Winsberg project on an annual basis is estimated to be 3-5 MGD, or 3360-5600 acre-feet per year. About 50 percent of the 3-5 MGD of water would be lost due to ET. The remainder will contribute to maintaining Lake Worth Drainage District (LWDD) groundwater and canal elevations and thereby reduce consumptive use of an equal amount of water that is obtained from the natural system. Based on the Wakodahatchee wetlands peak flow rate, the TSP peak flow rate is estimated to be 12.5 cfs.

TABLE A-2: FLOW VOLUMES TO WINSBERG FARM WETLANDS

MGD	cfs	Acre-Feet/Day	Acre-Feet/Year
1	1.55	3.1	1120
2	3.09	6.1	2240
2.39*	3.69	7.3	2672
3	4.64	9.2	3360
4	6.19	12.3	4481
5	7.74	15.3	5601

*Yellow row denotes three times Wakodahatchee average for period of June 2001-July 2003

A.5 SAVINGS CLAUSE EVALUATION

Section 601(h)(5) of WRDA 2000 (the "Savings Clause") establishes the following project-specific requirements for CERP projects, including small CERP projects:

a) NO ELIMINATION OR TRANSFER – Until a new source of water supply of comparable quantity and quality as that available on the date of enactment of this Act is available to replace the water to be lost as a result of implementation of the Plan, the Secretary (of the Army) and the non-federal sponsor shall not eliminate or transfer existing legal sources of water for:

   i. An agricultural or urban water supply;
   ii. Allocation or entitlement to the Seminole Indian Tribe;
   iii. The Miccosukee Tribe of Indians of Florida;
   iv. Water supply for Everglades National Park; or
   v. Water supply for fish and wildlife.

b) MAINTENANCE OF FLOOD PROTECTION – Implementation of the Plan shall not reduce levels of service for flood protection that are:

   i. In existence on the date of enactment of this Act; and
   ii. In accordance with applicable law.

There is no elimination or transfer of an existing legal source of water due to TSP implementation.

The TSP has no adverse or significant impacts to the existing level of service for flood protection as of December 2000. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD, or 4.6-7.7 cfs or 3360 – 5600 acre-ft per year. About 50-75 percent of this amount of water would be lost due to ET. The

remainder will contribute to an off-site loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 canals, which are roughly 100 cfs and 400-500 cfs, respectively.

A.6 MODELING

A.6.1 2x2 Model Regional Modeling

No modeling to study the effects of the TSP on a regional scale has been performed or is anticipated to be necessary. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD or 3360-5600 acre-feet per year. About 50-75 percent of this amount of water would be lost due to ET. The remainder will percolate into the groundwater table and LWDD's canal system. This could reduce consumptive use of water that is obtained from the natural system, but the overall effect of a potential 1100-1400 acre-feet per year of water does not justify any regional modeling because the model is not sensitive enough to show an effect on the hydroperiod depths and durations of WCA-1 for this amount of water.

A.6.2 Maintenance of Flood Protection Modeling

No modeling to study the effects of the TSP on maintaining flood protection has been performed or is anticipated to be necessary. Under normal operating conditions, the wetland cells will only receive as much effluent from the SRWRF as can be removed through the combined effects of ET and percolation. An auxiliary 4-MGD pump station will be constructed to route excess water due to rainfall events that cause high pool elevation to the county's deep injection wells. The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD or 4.6-7.7 cfs. About 50-75 percent of this amount of water would be lost due to ET. The remainder will contribute to an off-site loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 canals, which are roughly 100 cfs and 400-500 cfs, respectively. This small amount of off-site seepage by the TSP would have no adverse or significant impacts to the existing level of service for flood protection and does not justify flood protection modeling. The TSP project has already received permits, and construction is nearly completed for Phase 1.

A.6.3 Seepage

The average existing ground elevation is about 19.5 feet. The interior of the restoration area will be graded down to elevation 19.0 feet. The normal water level in the wet land restoration area will be about 19.5 feet with a maximum water level of 21 feet. The embankment surrounding the wetland area will be at elevation 26.5 feet or about 7 feet high. The embankment side slopes will be 1V on 3H with 10 foot wide crest. A 3 foot high, 5 foot wide containment berm will

also surround the area. The embankment will consist of compacted silty sand. Based on this and with a maximum differential head of only 3 feet, seepage will not be a problem and a seepage analysis was not performed.

A.7 STATUS OF MCASES

A Micro Computer Assisted Cost Engineering System (MCASES) cost estimate has been preformed on TSP design features for the PIR to confirm previous cost estimates preformed by CH2MHill.

The summary total for the CH2MHill estimates for wetland construction activities and associated water delivery and control structures is shown in **Table A-3**.

TABLE A-3: WETLAND AND UPLAND CONSTRUCTION COSTS

Phase 1 Project Cost	$3,750,000
Phase 2 Project Cost	$2,682,000
Phase 1 and Phase 2 Total	$6,432,000

A.8 COST-ESTIMATING PROCEDURE FOR ALTERNATIVES

The following cost-estimating procedure was used for developing a matrix of 31 alternatives. This procedure can also be used for incremental and cost-effectiveness analysis pertaining to the Winsberg Farm Wetlands PIR.

The first task was to lay out the real estate information that was provided by Karl Nixon Real Estate in Microstation so that accurate measurements can be made of potential location areas.

The Corps of Engineers (COE) team decided that lands designated for the Agricultural Reserve Reservoir would not be designated as potential lands for this project because of the following two main factors:

- The Agricultural Reserve Reservoir was sited in the Water Preserve Area (WPA) Feasibility Study, and the footprint size was reduced from that in the Yellow Book (YB). The YB configuration was a 1,660-acre above-ground reservoir, 12 feet deep with 19,920 acre feet of storage. The 1,660 acres was irregular in shape, and therefore the perimeter of the reservoir vs. the storage provided required revision. Another major factor that reduced the size of the reservoir was the fact that the YB footprint included a major Florida Power & Light (FPL) transmission corridor inside the 12-foot-deep impoundment. The cost to relocate the FPL lines

was prohibitive, so the reservoir was sited to the west of the FPL right-of-way. These revisions reduced the Agricultural Reserve Reservoir to a 665-acre, 12-foot deep impoundment with 7,980 acre feet of storage. Because the size and storage of the reservoir has been greatly reduced, the remaining footprint needs to be preserved.

- The Agricultural Reserve Reservoir has a greater potential to reduce Lake Worth Drainage District consumptive use water withdrawals coming from the natural system, and therefore natural system benefits than the Winsberg project can be realized.

Eight potential new project locations were identified. They are lands in:

1. 305 acres in Section 1, Township 46 South, Range 41 East
2. 175 acres in Section 12 owned by Palm Beach County (McMurrain Property), Township 46 South, Range 41 East
3. 480 acres combining Section 1 (305 acres) and Section 12 (175 acres), Township 46 South, Range 41 East
4. 640 acres in Section 30, Township 45 South, Range 42 East
5. 640 acres in Section 31, Township 45 South, Range 42 East
6. 310 acres in Section 6 owned by Palm Beach County (York Property), Township 46 South, Range 42 East
7. 310 acres in Section 6 under private ownership, Township 46 South, Range 42 East
8. 640 acres in Section 7 owned by Palm Beach County (Bowman Property), Township 46 South, Range 42 East

Cost estimates in Exhibit 7-10 of the CH2MHill report, entitled Initial Plan Formulation for the Winsberg Farm Wetlands Restoration Project, dated September 2003, contract DACW17-001-D-0014, Delivery Order 002, developed for this project were then analyzed (see **Table A-4**). The exhibit estimated construction cost for the remaining 63-acre parcel, or Phase 2 of the Winsberg project property for three alternative designs. The three alternatives designs are:

- Alternative 2 – A fluctuating water-level wetland, which is the original design concept of the project recommended by the sponsor.
- Alternative 4 – A short hydroperiod wetland
- Alternative 11 – A long hydroperiod wetland

The COE team decided that project formulation and alternatives would best meet project objectives if the wetland were designed with habitat similar and operational characteristics of Alternative design 2. It will be applied to all the alternative sites. The acreage should be developed with the optimal distribution of 70 percent littoral wetland zones, 10 percent deep-water refuge, and 20

percent uplands, which was a USFWS-recommended distribution. The analysis of Exhibit 7-10 revealed that Alternatives 2 and 4 had relatively similar distribution targets of the USFWS-recommended distribution (see **Table A-5**).

TABLE A-4: CONCEPTUAL CONSTRUCTION COST ESTIMATE, WINSBERG FARM WETLANDS

Parameter	Units	Unit Cost	Alternative 2	Alternative 4	Alternative 11
			Fluctuating Water Level Wetland	Short Hydroperiod	Long Hydroperiod
Clear and Grubbing -- Light	AC	$500	$37,500	$37,500	$37,500
Clear and Grubbing -- Heavy	AC	$1,000	$20,000	$20,000	$20,000
Earthwork -- Excavation	CY	$12	$289,200	$270,000	$1,642,800
Earthwork -- Fill and Compact	CY	$8	$215,200	$233,600	$235,200
Wetlands Fine Grading	AC	$1,000	$49,800	$50,100	$29,400
6-foot Chain Link Fence	LF	$10	$85,000	$85,000	$85,000
Concrete Culvert and Control Stop Log Structure	EA	$75,000	$150,000	$150,000	$150,000
Access Road	LF	$100	$40,000	$40,000	$40,000
Wetlands Planting	AC	$8,000	$398,700	$400,900	$234,900
Native Uplands Landscaping -- Buffer Zone	AC	$40,000	$800,000	$800,000	$800,000
Native Uplands Landscaping -- Islands	AC	$75,000	$344,400	$165,600	$116,500
Embankment/Swale Hydroseeding	AC	$500	$2,200	$2,200	$2,200
Irrigation	EA	$250,000	$250,000	$250,000	$250,000
Phase 2 Total			$2,682,000	$2,504,900	$3,643,500
Phase 1 Total -- See Note 1			$3,750,000	$3,750,000	$3,750,000
Phase 1 and Phase 2 Total			$6,432,000	$6,254,900	$7,393,500
Land Cost Total (150 acres) -- Appraised Value	AC	150	$13,500,000	$13,500,000	$13,500,000
Total Project Cost			$19,932,000	$19,754,900	$20,893,500
Land Cost Total (150 acres) -- Acquisition Cost	AC	150	$3,857,143	$3,857,143	$3,857,143
Total Project Cost			$10,289,143	$10,112,043	$11,250,643

Note 1 -- The original Exhibit 7-10 used a Phase 1 cost of $9,750,000, which corresponded to the Design Report. Cost associated with recreation and interpretive facilities were removed to arrive at the Phase 1 cost for 75 acres of wetland construction.

TABLE A-5: WETLAND AND UPLAND DISTRIBUTION OF ALTERNATIVE DESIGNS

		Alternative 2	Alternative 4	Alternative 11	USFWS Recommendation
Total Area	AC	74	74	74	74
Total Wetland Area	AC	54	54	32	51.8
Total Open Water Area	AC	4	4	25	7.4
Total Upland Area	AC	16	16	17	14.8
Percent Wetland Area (littoral)	AC	73%	73%	43%	70%
Percent Open Water Area (deep water)	AC	5%	5%	34%	10%
Percent Upland Area	AC	22%	22%	23%	20%

Alternative design 2 unit cost factors were used to develop alternative construction cost estimates for the eight new potential project sites based on two factors. The first factor is that Alternative 2 was a close match to the USFWS-recommended optimal distribution of 70 percent littoral wetland zones, 10 percent deep-water refuge, and 20 percent uplands for constructed wetlands. The second factor is that Alternative 2, a fluctuating water-level design, is the design in use at the existing Wakodahatchee Wetlands. Alternative 4, a short hydroperiod design, was not used because operation of a constructed natural system for a short hydroperiod regime would not maximize the amount of water diverted from deep-well injection.

A matrix for each potential new location was developed that contained permutations for project acreage (maximum acreage, 310 acres, 150 acres and 75 acres) and perimeters of different size project areas. Alternative combinations for each potential new location were identified (see **Table A-6**). In addition, high- and low-land cost for the Winsberg site was applied to the three alternatives in the previously mentioned report exhibit. The permutations resulted in a set of 31 different combinations.

Using the unit costs for Alternative 2 and scaling to size of the new sites was done to arrive at construction cost for each new site. The project perimeter was the only variable that was not scaled and was determined by Computer Aided Drafting and Design (CADD) measurements of the anticipated site perimeter. The costs are shown in **Table A-7**.

A.9 DESCRIPTIONS OF THE EIGHT POTENTIAL NEW LOCATIONS

- Location 1 - Location 1 is 305 acres in Section 1, Township 46 South, Range 41 East. These lands are located west of SR 7 in the Ag Reserve

Area. The western half of the section is already owned by the U.S. government and is constructed as natural wildlife habitat by the Loxahatchee Wildlife Refuge. The project would enhance connectivity to the Loxahatchee Wildlife Refuge wildlife habitat. FPL power transmission lines pass through the middle of the lands from north to south. Access for maintenance of the transmission lines can be incorporated into the design and still allow for construction of the wetlands. LWDD Lateral 28 is north of the property and LWDD Lateral 30 is south. These two canals are maintained at a canal elevation of 16 feet NGVD 29.

- Location 2 consists of 175 acres in Section 12 owned by Palm Beach County (McMurrain Farms), Township 46 South, Range 41 East. These lands are located west of SR 7 in the Ag Reserve Area. Palm Beach County owns the entire section. The 175-acre project would boarder the eastern boundary of the Ag Reserve Reservoir. FPL power transmission lines pass through the middle of the lands from north to south. Access for maintenance of the transmission lines can be incorporated into the design and still allow for construction of the wetlands. LWDD Lateral 30 is north of the property and is maintained at a canal elevation of 16 feet NGVD 29.
- Location 3 consists of 480 acres combining Section 1 (305 acres) and Section 12 (175 acres), Township 46 South, Range 41 East. These lands are described above in paragraphs 1 and 2.
- Location 4 consists of 640 acres in Section 30, Township 45 South, Range 42 East. These lands are located east of SR 7 in the Ag Reserve Area. LWDD Lateral 24 is north of the property, Lateral 26 is south, Lateral 25 passes through the middle, and LWDD E-1 is to the west of the lands. These canals are maintained at a canal elevation of 16 feet NGVD 29.
- Location 5 consists of 640 acres in Section 31, Township 45 South, Range 42 East. These lands are located east of SR 7 in the Ag Reserve Area. Section 31 is owned and actively farmed by the Whitworth Family. LWDD Lateral 26 is north of the property, Lateral 28 is south, Lateral 27 passes through the middle, and LWDD E-1 is to the west of the lands. These canals are maintained at a canal elevation of 16 feet NGVD 29.
- Location 6 consists of 310 acres in Section 6 owned by Palm Beach County (York property), Township 46 South, Range 42 East. These lands are also located east of SR 7 in the Ag Reserve Area. LWDD Lateral 28 is north of the property, Lateral 29 is south, and LWDD E-1 is to the west of the lands. These canals are maintained at a canal elevation of 16 feet NGVD 29.
- Location 7 consists of 310 acres in Section 6 under private ownership, Township 46 South, Range 42 East. These lands are also located east of SR 7 in the Ag Reserve Area. LWDD Lateral 29 is north of the property, Lateral 30 is south, and LWDD E-1 is to the west of the lands. These canals are maintained at a canal elevation of 16 feet NGVD 29.

- Location 8 consists of 640 acres in Section 7 owned by Palm Beach County (Bowman property), Township 46 South, Range 42 East. These lands are located east of SR 7 in the Ag Reserve Area. The property is owned by Palm Beach County. LWDD Lateral 30 is north of the property, Lateral 32 is south, Lateral 31 passes through the middle, and LWDD E-1 is to the west of the lands. These canals are maintained at a canal elevation of 16 feet NGVD 29.

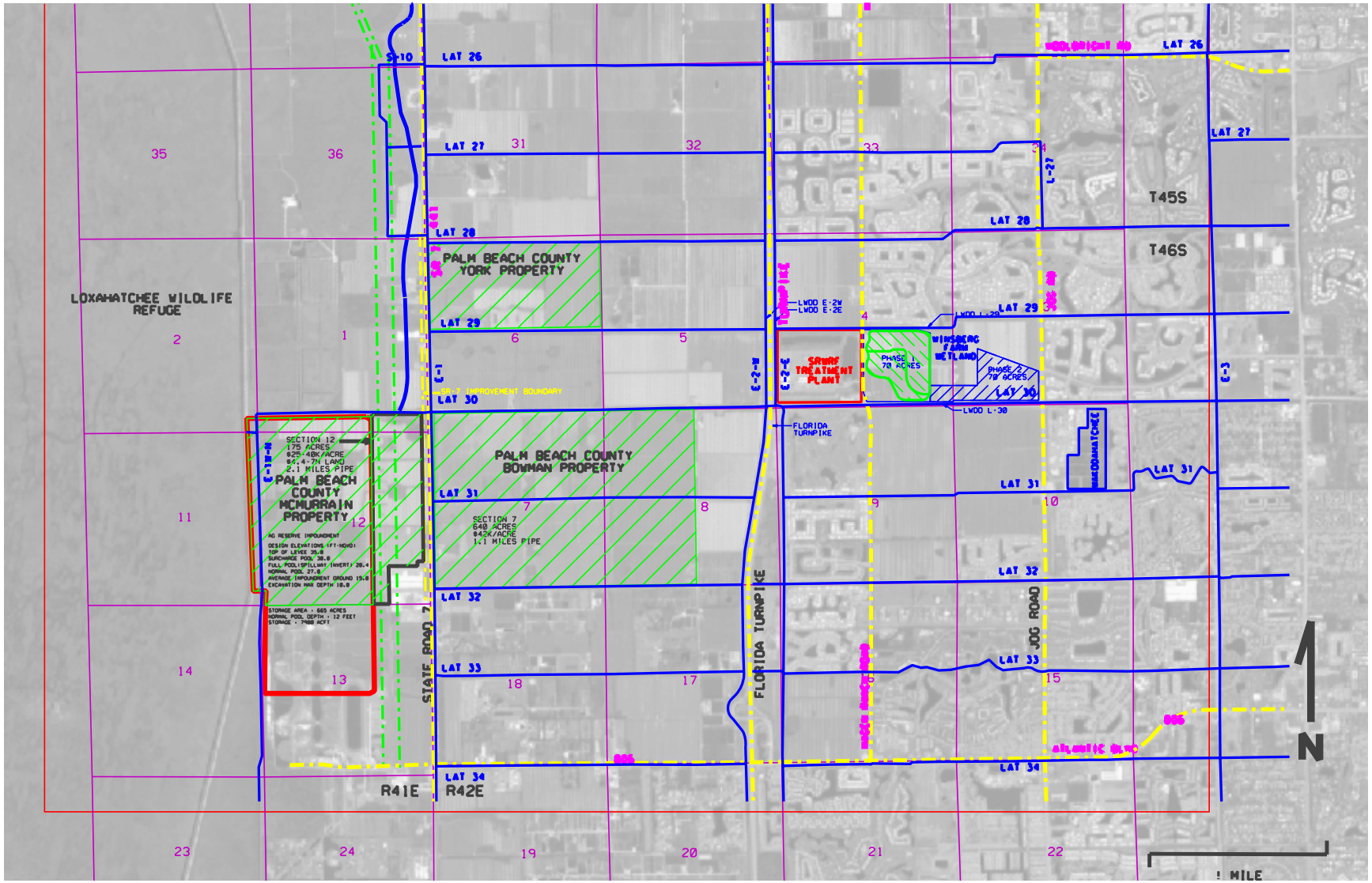


FIGURE A-3: ALTERNATIVE LOCATIONS

TABLE A-6: ALTERNATIVE MATRIX FOR POTENTIAL NEW LOCATIONS

	Section 1	Section 12 PBC McMurrain	Section 1 & 12	Section 30	Section 31	Section 6 PBC York	Section 6 Private	Section 7 PBC Bowman
Max Acres	200	175	375	540	550	310	310	640
Middle Acres	150	150		310	310	150	150	310
Middle Acres				150	150			150
Min Acres	75	75		75	75	75	75	75
Cost Per Acre	$40,000	$40,000	$40,000	$62,000	$62,000	$62,000	$62,000	$62,000
Piping Distance (miles)	2.1	2.1	2.1	3.1	2.1	1.6	1.1	1.1
Max Perimeter (LF)	15640	14735	30375	21000	21000	15700	15700	21000
Middle Perimeter (LF)	11000	11000		15700	15700	11000	11000	15700
Middle Perimeter (LF)				11000	11000			11000
Minimum Perimeter (LF)	7600	7600		7600	7600	7600	7600	7600
Pipe Cost Per Mile	$1,000,000							
Pipe Cost ($)	$2,100,000	$2,100,000	$2,100,000	$3,100,000	$2,100,000	$1,600,000	$1,100,000	$1,100,000
Max Acres Land Cost ($)	$8,000,000	$7,000,000	$15,000,000	$33,480,000	$34,100,000	$19,220,000	$19,220,000	$39,680,000
Middle Acres Land Cost ($)	$6,000,000	$6,000,000	$0	$19,220,000	$19,220,000	$9,300,000	$9,300,000	$19,220,000
Middle Acres Land Cost ($)	$0	$0	$0	$9,300,000	$9,300,000	$0	$0	$9,300,000
Min Acres Land Cost ($)	$3,000,000	$3,000,000	$0	$4,650,000	$4,650,000	$4,650,000	$4,650,000	$4,650,000

TABLE A-7: UNIT COST ESTIMATES FOR ALTERNATIVES

							Scaling Factor is based on a 75 acre site.				
Alt #	Location	Acres	Lands	Pipe Cost$	Construction	Total Cost	O&M (yrly)	VegMon (yrly)	ReVeg (yrly)	GW/S Mon (qrt)	Scaling Factor
1	Winsberg - Alt 2 (low)	150	$3,857,143	$0	$6,432,000	$10,289,143	$140,000	$140,000	$24,000	$18,000	2.0
2	Winsberg - Alt 2 (high)	150	$13,500,000	$0	$6,432,000	$19,932,000	$140,000	$140,000	$24,000	$18,000	2.0
3	Winsberg - Alt 4 (low)	150	$3,857,143	$0	$6,254,900	$10,112,043	$140,000	$140,000	$24,000	$18,000	2.0
4	Winsberg - Alt 4 (high)	150	$13,500,000	$0	$6,254,900	$19,754,900	$140,000	$140,000	$24,000	$18,000	2.0
5	Winsberg - Alt 11 (low)	150	$3,857,143	$0	$7,393,500	$11,250,643	$140,000	$140,000	$24,000	$18,000	2.0
6	Winsberg - Alt 11 (high)	150	$13,500,000	$0	$7,393,500	$20,893,500	$140,000	$140,000	$24,000	$18,000	2.0
7	Section 1 - Alt 1	200	$8,000,000	$2,100,000	$6,765,067	$16,865,067	$186,667	$186,667	$32,000	$24,000	2.7
8	Section 1 - Alt 2	150	$6,000,000	$2,100,000	$5,114,000	$13,214,000	$140,000	$140,000	$24,000	$18,000	2.0
9	Section 1 - Alt 3	75	$3,000,000	$2,100,000	$2,673,000	$7,773,000	$70,000	$70,000	$12,000	$9,000	1.0
10	PBC McMurrain - Alt 1	175	$7,000,000	$2,100,000	$5,953,683	$15,053,683	$163,333	$163,333	$28,000	$21,000	2.3
11	PBC McMurrain - Alt 2	150	$6,000,000	$2,100,000	$5,114,000	$13,214,000	$140,000	$140,000	$24,000	$18,000	2.0
12	PBC McMurrain - Alt 3	75	$3,000,000	$2,100,000	$2,673,000	$7,773,000	$70,000	$70,000	$12,000	$9,000	1.0
13	Section 1 & 12 - Alt 1	375	$15,000,000	$2,100,000	$12,718,750	$29,818,750	$448,000	$448,000	$76,800	$57,600	5.0
14	Section 30 - Alt 1	540	$33,480,000	$3,100,000	$17,730,400	$54,310,400	$504,000	$504,000	$86,400	$64,800	7.2
15	Section 30 - Alt 2	310	$19,220,000	$3,100,000	$10,295,933	$32,615,933	$289,333	$289,333	$49,600	$37,200	4.1
16	Section 30 - Alt 3	150	$9,300,000	$3,100,000	$5,114,000	$17,514,000	$140,000	$140,000	$24,000	$18,000	2.0
17	Section 30 - Alt 4	75	$4,650,000	$3,100,000	$2,673,000	$10,423,000	$70,000	$70,000	$12,000	$9,000	1.0
18	Section 31 - Alt 1	550	$34,100,000	$2,100,000	$18,051,333	$54,251,333	$513,333	$513,333	$88,000	$66,000	7.3
19	Section 31 - Alt 2	310	$19,220,000	$2,100,000	$10,295,933	$31,615,933	$289,333	$289,333	$49,600	$37,200	4.1
20	Section 31 - Alt 3	150	$9,300,000	$2,100,000	$5,114,000	$16,514,000	$140,000	$140,000	$24,000	$18,000	2.0
21	Section 31 - Alt 4	75	$4,650,000	$2,100,000	$2,673,000	$9,423,000	$70,000	$70,000	$12,000	$9,000	1.0
22	PBC York - Alt 1	310	$19,220,000	$1,600,000	$10,295,933	$31,115,933	$289,333	$289,333	$49,600	$37,200	4.1
23	PBC York - Alt 2	150	$9,300,000	$1,600,000	$5,114,000	$16,014,000	$140,000	$140,000	$24,000	$18,000	2.0
24	PBC York - Alt 3	75	$4,650,000	$1,600,000	$2,673,000	$8,923,000	$70,000	$70,000	$12,000	$9,000	1.0
25	Section 6 Priv - Alt 1	310	$19,220,000	$1,100,000	$10,295,933	$30,615,933	$289,333	$289,333	$49,600	$37,200	4.1
26	Section 6 Priv - Alt 2	150	$9,300,000	$1,100,000	$5,114,000	$15,514,000	$140,000	$140,000	$24,000	$18,000	2.0
27	Section 6 Priv - Alt 3	75	$4,650,000	$1,100,000	$2,673,000	$8,423,000	$70,000	$70,000	$12,000	$9,000	1.0
28	PBC Bowman - Alt 1	640	$39,680,000	$1,100,000	$20,939,733	$61,719,733	$597,333	$597,333	$102,400	$76,800	8.5
29	PBC Bowman - Alt 2	310	$19,220,000	$1,100,000	$10,295,933	$30,615,933	$289,333	$289,333	$49,600	$37,200	4.1
30	PBC Bowman - Alt 3	150	$9,300,000	$1,100,000	$5,114,000	$15,514,000	$140,000	$140,000	$24,000	$18,000	2.0
31	PBC Bowman - Alt 4	75	$4,650,000	$1,100,000	$2,673,000	$8,423,000	$70,000	$70,000	$12,000	$9,000	1.0

A.10 HYDRAULIC DESIGN ANALYSIS

A.10.1 Hydraulic Design Criteria

A.10.1.1 General Information

The Winsberg Farms project will consist of about 114 acres of wetlands enclosed by an embankment to create an environment where a wastewater reuse wetland can be constructed. Project features include two emergency overflow spillways, the first to allow emergency flows from Phase 1 to Phase 2, and the second to allow emergency discharges to the L-30 Canal for storm events greater then the 100-year event. Other structures to be included are two 24-inch RCP culverts with actuated gates, four wetland cells divided by internal embankments, two 15-HP pumps for wetland recirculation, and one 250-HP pump to reroute excess water back to deep-well injection. Cells will have varying pool depths and upland zone elevations to create a range of habitat environments. The southeast corner of Phase 2 will have a remotely operated 15-HP recirculation pump to ensure flow through the wetland system. The southeast corner of Phase 1 will have a 15-HP recirculation pump, and the 250-HP pump for deep-well injection. The system has been designed to allow for water removal from both phases of the project. Embankments, actuated gate culverts, and project feature elevations were previously designed in a previously constructed portion of the project, and these features have been checked for safety in accordance with USACE standards.

A.10.1.2 Water-Surface Elevations

The proposed operations of the constructed wetland will maintain a water surface elevation of 20 feet NGVD 29 with a seasonal fluctuation of one foot. This variation would occur in all cells of the wetland. The emergency overflow weir has been designed to allow for a necessary volume of water to pass from Phase 1 and Phase 2 to ensure that the maximum water surface elevation reached in the pool will remain at 23 feet or less for all events up to the Probable Maximum Flood (PMF) event. The system has been designed to ensure the 100-year rainfall event will be contained with no surface water discharge from the system. If a controlled discharge from the system is required, a 250-HP pump is capable of discharging excess water back to deep-well injection.

A.10.1.3 Wetland Characteristics

The wetlands shall be created by excavation of deeper wetland habitat, and an above-ground embankment will be constructed to meet the same habitat zone elevations that are shown in **Table A-1**. Maximum velocities and roughness coefficients were not required for this project. The entire system has a maximum regulated inflow of 5 MGD (7.73 cfs) spread out over 72 acres initially, and 114

acres overall. There is no conveyance requirement for the system. Since it is a self-contained manmade wetland, there is no discharge to a downstream source. When a maximum operations water-surface-level of 21 feet is achieved in the wetland, controlled inflows from the SRWRF will be discontinued. Any additional water that enters the system through rainfall can be discharged to the SRWRF for disposal.

A.10.1.4 Embankments

An embankment that is 7.5 feet high, with 3:1 side slopes and a 10-foot top width will surround all of Phase 2. The embankment alignment was selected to maximize the wetland area, while taking into account the needs of the local sponsors. It was necessary to alter the embankment alignment from the original plan to account for a stormwater retention pond that will be constructed on the eastern edge of Phase 2. It was also necessary to move the alignment of the embankment on the northwest corner of the project along the proposed Flavor Pict Road. This realignment allows for a proposed fire and rescue station. The initial embankment design was obtained from the local sponsor who contracted the design to Hazen and Sawyer. This design was evaluated for stability by USACE, and this analysis is attached in the Geotechnical section of this appendix.

A.10.1.5 Water Control Structures

Initial inflows into the wetlands for both phases are delivered from the wastewater treatment facility through diffusers into cells 1 and 2 in Phase 1. This flow is measured through by an electromagnetic flow meter located on the secondary monitoring and control structure that is part of Phase 1. Currently, the flow control structure regulates inflows to 3 MGD, which is the permitted volume for Phase 1. Upon completion of Phase 2, the flow control structure will regulate inflows to 5 MGD, the design flow for the complete system. No modifications of the structure are required for this flow increase, as the increase was already accounted for during the initial design.

Phase 2 of the project uses two, 24-inch RCP culvert flow control structures with actuated mechanical weirs on the western project boundary to route water into Phase 2. These structures were completed with stub-outs for future connections to Phase 2 when Phase 1 was constructed. Two, 24-inch pipes will be connected to the structures during construction of Phase 2 to complete the structures and allow controlled flows into cells 3 and 4. Operation of the structures will be controlled remotely from the SRWRF, with the option of on-site operations.

A 15-HP pump will be located in the southeast corner of the project with a pipeline running to the head of Phase 2, allowing the recirculation of water in the wetlands to prevent stagnation. Discharge from the pump will be through

two diffusers at the head of the system. Since there is no flow requirement for this pump to meet, it is only used to provide a minimal flow in the system to ensure there is no standing water in the wetlands when no inflows from the wastewater treatment facility are present. This pump will be similar to the pump used in Phase 1 of the project, and the specifications are provided in the Mechanical portion of the appendix.

A.10.1.6 Spoil Areas

There are no spoil sites required for the project. All soil excavation and disposal will occur on-site during the process of excavating and constructing the wetlands, the upland zones, and the embankments. The project will be designed using a cut-and-fill balance to ensure there is no extra material that needs to be excavated or discarded.

A.10.2 Hydraulic Design

A.10.2.1 Overflow Spillway Structures

a) Internal Overflow Spillway – This spillway separates Phase 1 from Phase 2. This passive structure will be constructed by lowering the existing embankment to 22 feet NGVD 29 and then reinforcing the flow section with articulated concrete mattresses or another form of permeable armoring. This structure provides a large volume passive hydraulic connection between phase 1 and phase 2 allowing water to pass from phase 1 to phase 2 during large storm events allowing peak flows to discharge over the emergency overflow spillway if required.

b) Emergency overflow spillway – The emergency overflow spillway is 450 feet wide and will be located on the southern boundary of Phase 2 with a discharge outlet to the C-30 canal under control of the Lake Worth Drainage District (LWDD). The first level of the spillway is 200 feet long and has an elevation of 22.5 feet NGVD 29 and the second level is 250 feet long at an elevation of 23.0 feet. This wetland design contains all storm events less then the 100-year event within the wetlands system, and a peak discharge from the spillway during the Probable Maximum Precipitation (PMP) is 1240 cfs. The design of the spillway is a articulated concrete reinforced mat, that is installed into the embankment from the operational pool level on the wetland side, up and over the spillway crest and down to the toe of the embankment. At the toe of the embankment, there will be a 12 foot wide concrete pad with a .5 foot endsill to control the hydraulic jump. Water will then pass down an articulated concrete mat reinforced section towards the C-30 canal. (New Paragraph same sub heading) The emergency overflow spillway is a design compromise that is required to meet all regulatory and design requirements of the

Palm Beach County Water Utility District, the LWDD, the Florida Department of Environmental Protection (FDEP), and Federal dam safety requirements. This system is designed to contain the entire 100-year storm event with no discharges over the emergency overflow spillway. The local sponsor has a design requirement of not increasing any existing embankment heights while maximizing storage and FDEP has a design requirement of not allowing a storm pool to encroach on 2 feet buffer between the storm and the emergency overflow spillway crest. This requirement is different then the USACE requirement for a low hazard system where the storm pool will not encroach on a three foot buffer between the routed storm pool and the embankment crest. Using the two crest design, FDEP will allow the water to encroach on the two foot clearance requirement because the system is designed to contain the 100-year event, which is larger then the normal FDEP design storm. The LWDD does not want any stormwater discharge into the C-30 canal due to the rainwater mixing with secondary treated effluent. Upon further discussion the LWDD will allow discharges to the C-30 canal if the flow is dispersed, only storm events larger then the 100 year event have discharges, and the C-30 canal does not receive all of the flow in a single slug. They agreed to a two level weir as being an acceptable solution meeting all of their requirements. The local sponsor will not need to raise embankment heights due to the composite spillway routing the probable maximum precipitation (PMP) storm event and maintaining the 3 foot buffer between the maximum storm pool and the crest of the embankments which is required by Federal regulations.

A.10.2.2 Embankments

The embankments surrounding Phase 2 of the project were designed to match the profiles and cross-sections established in the previously constructed phase of the project. These embankments are set to 26.5 feet NGVD 29 (7.5 feet high) or greater, with a 10-foot crest width and 1:3 side slopes. Geotech Branch evaluated the design and determined it to be sufficient for a water surface up to 25.5 NGVD 29 (6.5-foot pool depth). This is a larger volume of water than the system is expected to retain even under a PMF event. The emergency overflow spillway has a crest elevation set at the 100-year storm event elevation (22.5 ft), and the spillway is designed to allow a maximum pool stage behind the embankment of 23.5 foot (4-foot pool depth) for the PMF event, allowing for three feet of embankment freeboard. There is no wind or wave run-up expected for the system due to the short reach lengths, shallow water depths, presence of vegetation, and disruptions in the water surface by constructed upland areas and internal embankment.

A.10.2.3 Culverts

There are two, 24-inch RCP-actuated culverts that connect Phase 1 with Phase 2. These culverts were designed and already constructed in the completed section of the project. Based on design inflows to the system, and that the second phase will receive 2 MGD, this works out to 1.5 cfs per culvert under normal operating conditions. No additional analysis was required as these structures are more than adequate to handle the design flow rate.

A.11 EARTHWORK QUANTITIES AND BALANCE, PHASE 2

A.11.1 Phase 2 Assumptions

The following design assumptions were made during calculations and design:

a) All elevations are referenced to NGVD 1929. The average existing grade at the site is 19.5 feet.
b) An average of six inches of the existing topsoil within the entire wetland footprint will be scraped off to level the site to an elevation of 19 feet.
c) Total perimeter embankment length is estimated to be 8,000 linear Feet (LF). The interior embankment length is estimated to be 3,570 LF.
d) The footprint area of the wetland is estimated to be 63 acres at the exterior edge of the perimeter, and 42 acres at the interior edge.
e) The excavated topsoil will be used to construct tree islands and the exterior ditch/embankment combination. However, these design features will be capped with a minimum of six inches of uncontaminated soil to prevent migration of residual contaminants in the topsoil.
f) The material for construction of the perimeter and interior embankments will be obtained from within the site from the excavation of the deep zones below the topsoil layer.
g) The deep zones will be excavated to an elevation of 15 feet, the islands to 22 feet, and the shallow areas to 19 feet.

A.11.2 Phase 2 Construction Phases

Due to the limited space in the project site and for the most effective and practical use of the space, the following construction phasing or sequencing is assumed:

a) The top six inches (estimated) of the existing topsoil layer will be scraped off the entirety of the footprint and stockpiled within the project site to be subsequently used in the construction of the tree islands. At the same time that the topsoil is being excavated, the exterior ditch/embankment combination feature will be constructed and capped. Following the construction of the ditch/embankment feature, about 36,000 cubic yards

(CY) of topsoil will be stockpiled in two to three piles within the project site in areas that will not be needed by any other of the project features. These piles will vary in height from five to eight feet. Therefore, the material will be moved only twice. The material will first be moved to a stockpile as previously stated and the second time to construct the tree islands.

b) The suitable embankment building material will be excavated from within the site at the same time the deep zones are being constructed. The material will be excavated from the demarcated areas for the deep zone areas and carried directly to the areas of embankment construction. All design features have been designed so that materials balance to zero.
c) The second-to-last earthwork phase will be the construction of the tree islands using the stockpiled topsoil material and capped accordingly.
d) The last operation will be fine-grading of the site.

A.11.3 Phase 2 Materials Balance

Two types of materials will be used. The topsoil layer, scraped off to about six inches, will be used for non-structural features such as tree islands and the exterior ditch/embankment combination. The second type is the soil to be excavated during the construction of the deep zones. This suitable material will be used in the construction of the project's structural feature, the perimeter embankment, and as capping material as indicated before. The construction of the interior separating embankment, a non-structural feature of the project, will be built by mixing a small remnant volume of top-soil with suitable material at a ratio of 92% suitable to 8% topsoil.

TABLE A-8: SURPLUS AND AVAILABILITY OF SOIL MATERIAL

FEATURE	REQUIRED SUITABLE FILL (CY)	AVAILABLE SUITABLE FILL (CY)	AVAILABLE TOPSOIL EXCAVATED (CY)	REQUIRED TOPSOIL (CY)	BALANCE (CY)
Perimeter Embankment	94,000				-94,000
Interior Embankment	9,920				-103,920
Excavated Deep Zones		103,115			-805
Scraped-Off Topsoil			58,000		+57,195
Islands				-35,324	+21,871
Exterior Ditch & Embankment				-21,871	0

The above table (Table A-8) shows that there will be no surplus or deficiency of materials.

A.11.4 Phase 2 Wetland Features

The following wetland features will be created:

a) Total Wetland Footprint -- 63 acres (at maximum perimeter within right-of-way)
b) Net Wetland Restoration -- 42 acres (at water elevation of 21 feet)
c) Deep Zones -- 11.52 acres
d) Tree Islands -- 2.75 acres -- Shallow Marshes -- 28.23 acres

A.12 STRUCTURES

A.12.1 Design Criteria

A.12.1.1 Loading Conditions

Each standard design is developed to withstand usual, unusual and extreme loading conditions. Usual loading conditions include loads most frequently experienced by the structural system when performing its primary function throughout its normal service life. Unusual loading conditions, such as construction or maintenance operations, produce short-duration loads, and their occurrence is not frequent. Extreme conditions, such as the PMF, and hurricane-force winds in the worst-case scenario, represent extreme loads at the widest deviation from usual and unusual loading conditions.

A.12.1.2 Stability

EC 1110-2-291 criteria are followed for the Stability Analysis of Concrete Structures, which includes overturning, flotation and sliding checks. A structure-importance factor and site information factor of 1.0 has been assumed for design.

A.12.1.3 Concrete

EM 1110-2-2104, Strength Design for Reinforced Concrete Hydraulic Structures, and ACI-318-05, Building Code Requirements for Structural Concrete, are used for structural concrete design. A compressive strength of 4 kilo-pound per square inch (KSI) and yield strength of 60 KSI for tension reinforcement have been assumed for design.

A.12.1.4 Steel Sheet Pile

EM 1110-2-2504, Design of Sheet Pile Walls, is used to design cofferdams. Yield strength of 50 KSI has been assumed for sheet pile design.

A.12.1.5 Structural Steel

The Manual of Steel Construction, Allowable Stress Design, 9th edition, is used to design wales and struts for cofferdams. A yield strength of 50 KSI is assumed for structural steel.

A.12.2 Pump Intake Structure

A.12.2.1 General

This project includes a manhole structure to be used as an intake structure for the new recirculation pump station. The intake structure will be constructed with reinforced concrete. The intake pipe will be a 24-inch, reinforced concrete pipe. The manhole installation will be performed using a cofferdam system with sheet piles.

A.13 MECHANICAL AND ELECTRICAL DESIGN

A.13.1 Phase 1, Electrical Design

A.13.1.1 General

A.13.1.1.1 Electrical Service

Electrical service to Winsberg Farm is provided by Florida Power & Light (FPL). An aerial 23 kV feeder line runs east-west along the L-30 Canal and provides power to the Phase 1 project site (See Plate E-1).

A.13.1.1.2 Communication Lines

Telephone service to the Phase 1 site is provided by BellSouth. Telephone lines are located on the same poles carrying the aerial 23 kV feeder running east-west along the L-30 Canal. Cable and fiber optic lines owned by Adelphia Cable run north-south along the western side of Hagen Ranch Road (See Plate E-1). Cable service to the Phase 1 site is fed from these lines.

A.13.1.1.3 Grounding

Primary building grounding consists of an embedded grid of 4/0 AWG wire installed in the foundation and around the building perimeter to form a complete loop. Secondary ground connections at all metal equipment, hand rails, structural steel, concrete pads, and rebar have a minimum of 4 stranded copper conductor bonded using approved lugs or exothermic weld connections.

A.13.1.1.4 Wiring

All conductors shall be copper with 600 volt insulation type XHHW with a minimum size of 12 AWG unless otherwise indicated.

A.13.1.1.5 Instrumentation and Control

The Palm Beach County Water Utilities Department (PBCWUD) has an extensive Supervisory Control and Data Acquisition (SCADA) system. Connectivity between the water and wastewater systems is achieved via a Wide Area Network (WAN). The wastewater system consists of in-plant, as well as several external SCADA systems that provide communication with remote lift stations. One existing master radio tower is located at the Southern Region Water Reclamation Facility (SRWRF) and includes a master radio that can communicate with remote terminal units (RTUs). Phase 1 of the project has several RTUs that have been incorporated into the utility's existing SCADA system, which will sequentially pole each of the wetlands RTUs to acquire data.

A.13.1.2 Effluent Pump Station

A.13.1.2.1 Electrical Service

A 23 kV line that runs north-south is connected to the 23 kV feeder line running east-west along the L-30 Canal and provides power to the effluent pump station. This 23 kV line is connected to a 400kVA pad-mounted transformer, which steps down the voltage to 480VAC. A distribution panel is connected to this service and controls power to the pump station's recirculation pump, disposal pump, two effluent gates, and a mini power zone panel with a rated voltage of 120/208V.

A.13.1.2.2 Instrumentation and Control

Field instrumentation at the effluent pump station includes a Low-Low level float switch, a pressure gauge on the pump discharge, a discharge side-flow control valve, a flow meter located on the pumps discharge, and an isolation valve on the SRWRF effluent line to prevent water from flowing to the SRWRF deep wells. An ON/OFF/REMOTE (OOR) hand switch is located adjacent to the pump, and the control valves have an integral operator station to provide local control. Under remote control, the control valve is modulated by the SCADA system to maintain system pressure and prevent the pump from running out if its curve.

An RTU provides automatic control of the pump station control valve and the pumps. Once the pump is running, the pump discharge control valve will be operated to maintain a set system pressure. The abnormal condition of Low-Low level will shut off the pump. The pumps can only resume operation upon manual reset or a high level. Control of the isolation valve at the SRWRF deep wells is

interlocked with operation of the pump station through the Central Site SCADA system at SRWRF.

A.13.1.3 Flow Control Structure

A.13.1.3.1 Electrical Service

A 480VAC, three-phase service from a distribution panel at the effluent pump station provides power to the flow control structure.

A.13.1.3.2 Instrumentation and Control

Three weir gates that can be adjusted manually, locally, or remotely are located in the flow control structure at the junction of the western cells at the Phase 1 site and the eastern cells at the Phase 2 site. These weir gates control the water level within the cells, which is a measured by an ultrasonic level transmitter. The weir gates also control the source flow to the effluent pump station. A position-indicating transmitter is located on each of the weir gates, and each weir has an integral operator station to provide local control.

A remote I/O station is linked to an RTU and used to monitor and control the flow control structure. At the central SCADA site, the operator can manually adjust the western exit weir to any intermediate position. Flow over the exit weir is calculated by the RTU. The operator is also able to manually adjust the electric weirs that open or isolate the western and eastern cells from the effluent pump station. These weirs are adjustable to any intermediate position selected by the operator in order to draw from the western cells, the eastern cells, or both when operating the effluent pump station.

A.13.1.4 Visitors Center

A.13.1.4.1 Electrical Service

Electrical service to the Visitors Center is 120/208 volt, 3-phase and is run in underground conduit from a distribution panel in the maintenance building located at the southeast corner of the parking lot.

A.13.1.4.2 Communication Lines

Telephone and cable service lines to the Visitors Center are located in underground conduits that border the eastern perimeter of the parking lot. These communication lines are run from aerial lines at the southern boundary of the Phase 1 project site and north of the L-30 Canal.

A.13.1.4.3 Systems

Systems in the Visitors Center include heating, air conditioning, phone, cable, sound, security, closed circuit television, lightning protection, grounding, and fire detection and alarm.

A.13.1.4.4 Lighting

The types of lighting fixtures used in the Visitors Center include parabolic, troffer, fluorescent, emergency battery pack, walkway, down lights, wall sconces, indirect metal halide, decorative pendant, track lighting, exit, and vanity lights.

A.13.1.5 Maintenance Building

A.13.1.5.1 Electrical Service

A 23 kV line that runs north-south is connected to the 23 kV feeder line running east-west along the L-30 Canal. This north-south line is connected to a 300kVA pad-mounted transformer, which steps down the voltage to 480VAC. A distribution panel is connected to this service and controls power to the Maintenance Building, Interpretative Center, chiller, chiller pumps, lift station, and a mini power zone panel with a rated voltage of 120/208V.

A.13.1.5.2 Systems

Systems in the Maintenance Building include security, lightning protection, grounding, and fire detection and alarm.

A.13.1.5.3 Lighting

The types of lighting fixtures used in the Maintenance Building include, fluorescent, emergency battery pack, and wet location exit lights.

A.13.1.6 Parking Area

A.13.1.6.1 Security

Pole-mounted cameras have been installed in the parking lot area at a height sufficient to adequately view the parking lot at the walkway entrance from parking lot to the Visitors Center, and also the Visitors Center entrance to the walkway. Continuous camera signals are sent to the PBCWUD communications center via a high-speed telephone cable through the existing telephone system.

A.13.1.6.2 Lighting

Pole-mounted metal halide fixtures have been installed both inside and surrounding the perimeter of the parking area.

A.13.2 Phase 2 Electrical Design

A.13.2.1 Utility Relocation

A.13.2.1.1 General

All known necessary utility relocations are listed, since accounting for the impact of any construction interference is an essential part of project planning.

A.13.2.1.2 Electrical Lines

Electrical service to Winsberg Farm is provided by FPL. An aerial 23 kilovolt (kV) feeder line runs east-west along the L-30 Canal. Running east from Hagen Ranch Road, the feeder line is located on the northern side of the canal for 2,600 feet. The feeder line then crosses the canal and runs along the southern side of the canal for the remainder of the project area (see Plate E-1).

An aerial line running north-south is connected to this feeder line and supplies power to the Winsberg Farm residence at 12750 Hagen Ranch Road. Electrical relocation will be required for this north-south line where the line crosses the Phase 2 construction site. The shortest route of relocation will be to bury the segment of the line that crosses into the Phase 2 construction site (see Plate E-2). The approximate burial distance is 500 feet. The electrical line will be enclosed in conduit inside a waterproof duck bank.

A.13.2.1.3 Communication Lines

Telephone service to Winsberg Farm is provided by BellSouth. Telephone lines are located on the same poles carrying the aerial 23 kV feeder line and the line supplying power to the Winsberg Farm residence as stated above (see Plate E-1). The relocation of telephone lines necessitated by this construction is about the same as described above for electrical lines for a total of about 500 feet. The telephone line can be buried in the same duct bank as the electrical line in a separate run of conduit (see Plate E-2).

Cable and fiber optic lines owned by Adelphia Cable only run north-south along the west side of Hagen Ranch Road and do not cross into the Phase 2 construction site. Therefore, cable relocation will not be necessary (see Plate E-1).

A.13.2.2 Recirculating Pump Station

A.13.2.2.1 General

The recirculating pump station will require a typical electrical system setup as shown on Plate E-3. New electrical controls and telemetry equipment will be located inside an exterior cabinet near the 1.55 cfs recirculating pump. As a minimum, the electrical system at the pump station will contain the following:

A.13.2.2.2 Electrical Service

The recirculating pump that will be installed on the southeastern corner of the project site can be powered by the addition of a 120/208-volt, three-phase electrical service. This service can be provided by a new line connected to the existing 23kV feeder line. The distance of this new line will be about 300 feet (see Plate E-2).

A.13.2.2.3 Grounding

The main grounding will include a grounding grid consisting of ground rods and 4/0 ground wire. Enclosures of electrical equipment will be bonded to the grounding system. Ground conductors will be bare, soft annealed copper cables, and ground rods will be of copper clad type, 3/4-inch diameter by 10 feet long.

A.13.2.2.4 Lighting

Exterior lighting for the recirculating pump station will consist of a high-pressure sodium fixture. For security purposes, the fixture will be automatically controlled by a photoelectric cell.

A.13.2.2.5 Wiring

Insulated copper conductors will generally be installed in either PVC-coated, rigid galvanized steel conduit or schedule 80 rigid plastic conduits. Conductors will be rated for 600-volt insulated type XHHW. All wiring will conform to Guide Specifications UFGS-16120A. Conductors will all be copper. Aluminum conductors will not be used.

A.13.2.2.6 Controls

The new circulating pump station controls will consist of a control panel housed inside a weatherproof and corrosion proof NEMA 4X stainless steel enclosure.

A.13.2.2.7 Water-Level Sensors

Water-level sensors are sole-source items. One water-level sensor with readout shall provide continuous level readings. Two water-level sensors shall provide normal cutoff and ultimate cutoff for the pump.

A.13.2.2.8 Telemetry

The remote automation components installed at the recirculating pump station in Phase 2 are the remote terminal unit (RTU) and communication channel to the Southern Region Water Reclamation Facility (SRWRF).

A.13.2.3 Actuator for Flow Control Structure

A.13.2.3.1 General

The existing flow control structure on the western side of the Phase 2 site will require the addition of an electric motor actuator (see Plate E-4). The actuator unit shall be self-contained, vandal proof, and waterproof and shall have sufficient capacity to raise and lower the weir gate. Included in the actuator unit will be the motor, limit switches, and torque switches.

A.13.2.3.2 Electrical Service

Electrical service to the actuator can be provided by an existing 480VAC, three-phase service at a distribution panel near the flow control structure that was installed in Phase 1 (see Plates E-1 and E-4).

A.13.3 Phase 1 Mechanical Features

A.13.3.1 Green Cay Wetlands Operation Background

The Green Cay Wetland is designed to operate in a semi-automatic mode. Most operating parameters can be monitored and controlled by the operators from the Human Machine Interface (HMI) screens of the Southern Region Water Reclamation Facility (SRWRF).

Based on the wetland-level signals recorded in the Supervisory Control Data Acquisition System (SCADA), the supply of secondary effluent from the SRWRF can be interrupted by the operators at any time by shutting the butterfly motorized flow control valve at the bypass assembly (see Plates ME-1 and ME-2). In addition, recirculation of wetland water and discharge of excess wetland water can be achieved automatically from the SCADA HMI screens of the SRWRF. These are the main operation that can be performed remotely from

SRWRF. The wetland's pumps are automatically started by a float-level switch inside the wet well.

A.13.3.2 Green Cay Wetlands Influent

Highly treated effluent water comes to the wetlands from a 24-inch ductile iron pipe (DIP), which is split from an existing pipe from the SRWRF, which sends the effluent to Palm Beach County's Site 3 Deep-Well Injection Pump Station. A remotely operated isolation valve is installed at the SRWRF 36-inch effluent DIP to prevent backflow to SRWRF. The wetland's influent flow (3 MGD) is separately controllable in a bypass assembly by a motorized, butterfly, flow-control valve to cells 1 and 2 and is metered by an electromagnetic flow meter. Influent flow is sent to cells 1 and 2 in separate piping, equipped with flow control valves, through east and west diffuser sites. A propeller type flow meter monitors flow into the east diffuser, as shown. See Plates ME-1 and ME-2.

A.13.3.3 Winsberg Farm Pump Station

The Winsberg Farm pump station (WFPS) incorporates two submersible, single and constant-speed, vertical, centrifugal pumps: a 9 cfs, 250-HP pump (Flygt Pump Model C-3231) and a 1.55 cfs, 15-HP submersible pump (Flygt Pump Model C-3152). The pumps are installed in a station that is built in the ground with the walls extending just above the wetland's embankment elevation of 26.5 NGVD 29. The 250-HP pump provides excess water pumping capability in the Green Cay wetlands to Palm Beach County's deep-well injection system. The 15-HP pump recirculates the water in Cells 1 and 2. The intake pipeline to the pumping station consists of 2 (one for each cell) flow-control structures with electrically controlled weirs and a mechanical trash screen. The 15-HP pump's discharge pipe incorporates check and gate valves and the 250-HP pump's discharge pipe incorporates check and butterfly valves. Both pumps' discharge pipes converge and use a common flow meter. See Plates ME-1 and ME-2.

A.13.3.4 Visitor Center

The Visitor Center, shown on Plate ME-1, incorporates the following mechanical features:

A.13.3.4.1 Air Conditioning System

The Visitor Center utilizes a three-zone, chilled water system air conditioning system with VAV that incorporates the following major components:

- 33.8 ton chiller unit (Trane Model No. CGAF-C40)
- 3100 cfm AHU (Trane Model No. MCC-06)
- 3500 cfm AHU (Trane Model No. MCC-06)

- 2730 cfm AHU (Trane Model No. MCC-06)
- 13 VAV terminal boxes, 11 with reheat (Trane VCEF Models)
- 540 cfm supply fan (Greenheck Model No. 850-90-4)
- 880 cfm supply fan (Greenheck Model No. 850-100-4)
- 96 cfm lavatory exhaust fan (Greenheck Model No. SP-7)
- 1280 cfm lavatory exhaust fan (Greenheck Model No. BSQ-130-4)

A.13.3.4.2 Plumbing and Sanitary

a) The site has a 40-GPM potable water system for its various water needs, including a fire-hydrant, a 30-gallon, 4.5 KW water heater (A.O. Smith Model No. ELJF-30), and the following plumbing fixtures from various suppliers:

- 9 water closets
- 2 urinals
- 4 bathroom sinks
- 2 lavatories
- 2 counter sinks
- 1 mop sink
- 2 water fountains
- Hose bibs

b) The site incorporates a four-inch-diameter sanitary sewer system with a lift station that features two, 2-HP, 30 gpm pumps (Barnes Grinder Pumps, Series SGV).

A.13.3.5 Irrigation

The irrigation system utilizes a 5-HP pump in a shallow groundwater well for irrigating the grass and vegetation at the project site. The irrigation water supply is from an eight-inch reclaimed water main. See Plates ME-1 and ME-2.

A.13.4 Phase 2 Mechanical Design

A.13.4.1 Winsberg Farm Recirculating Pump Station: General Information

The Winsberg Farm Phase 2 project location, as shown on Plate G-1, will incorporate a pumping station that will utilize a small, vertical, submerged, electric pump to circulate water around the Phase 2, manmade wetland. The re-circulating pump for Phase 2 will be similar to the recirculating pump in Phase 1.

The pump station to be installed in Phase 2 will be similar to the one shown on Plate M-1, which shows a section and plan view of a vertical, submerged, electric pump and station, similar to the setup in Phase 1, but without the 250-HP pump.

A.13.4.2 Water and Sewer Utilities

Palm Beach County Water Utilities has researched and found that there are no water or sewer utilities that will impact the Phase 2 project. There are some proposed utilities and a road (to be called Flavor Pict Road) that will be installed adjacent to and north of the project site, as shown on Plate G-2. Contact personnel for any information on existing or proposed utilities in the area are as follows:

- Larry Johnson, Palm Beach County Water Utilities Department, 8100 Forest Hill BL, West Palm Beach FL 33416, Phone: 561-493-6090.
- Duane Palumbo, Palm Beach County Water Utilities Department, 8100 Forest Hill BL, West Palm Beach FL 33413, Phone: 561-493-6087.

A.13.4.3 Winsberg Farm Recirculating Pump Station-Featured Equipment

The Winsberg Farm recirculating pumping station will feature the following:

- Lift-type pump station with one wet well.
- (1), 1.55 cfs, vertical, submerged, electric pump.
- Pump well water-level detection.
- Automatic backwashing strainer system.

A.13.4.3.1 Pump and Station

The pumping equipment and station shall be similar to that shown on Plate M-1. All NGVD 29 elevations shall be exactly the same as shown.

The pump station is constructed below ground, as shown, with walls extending above 25 feet NGVD 29 so that the water surface elevation in the pump station is nominally the same as the water surface elevation in the Phase 2 wetland. The pump station includes a wet well with an automatic backwashing strainer system and an influent baffle structure to prevent most floatable or settling materials (that may pass from the strainer) from reaching the pump. The distance from the intake to the pump station will be about 250 feet. The electric weir-gate structure location is shown on Plate G-5 with details shown on Plates S-1 and S-2.

The pump shall be a vertical, submerged, electric pump rated to deliver 1.55 cfs at 15 feet of total dynamic head, at no less than 50 percent efficiency.

The maximum pumping water level on the discharge side will be about 25.5 feet NGVD 29. The minimum water level in the intake well sump shall be 15.5 NGVD 29.

The pump shall pump water down to a low of 15.5 feet NGVD 29 in the pump well sump at a discharge-side high-water level of 25.5 feet NGVD 29. At 15.5 feet NGVD 29 in the intake well sump, the pump shall cut off. The pump shall also cut off at a water level of 25.5 feet NGVD 29 in the pump well. The pump shall be capable of constant speed operation through the range of static heads, a maximum of 10.5 feet, and head losses due to minor friction losses from the associated valves, fittings and discharge pipe, as well as the intake pipe and structures.

A.13.4.3.2 (b) Valves and Flow Meters

The discharge pipe shall be outfitted with a check valve and a gate valve as shown on Plate M-1.

A.13.4.3.3 (c) Discharge Pipe

The pump shall discharge water through about 3200 feet DIP as shown on Plate M-1 and Plates G-3, G-4 and G-5. The final velocity at the discharge end shall be no greater than 1 fps. The pump discharge pipe will terminate into a diffuser as shown on Plates G-3 and G-4.

A.13.4.3.4 (d) Automatic Backwashing Strainer System

The trash strainer system will be an automatic backwashing strainer system, similar to the one used in Phase 1 and shown on Plate M-1. The strainer system selected must show a satisfactory history of operation at previously completed pump stations.

A.13.4.3.5 (e) Pump Bay Water-Level Detection

A float/switch type, water-level detection device in each pump bay will be necessary for detecting pump shut-off low and high water levels.

A.14 GEOLOGY AND SOILS

A.14.1 Location

The Winsberg Farm Wetlands Restoration Project is located in Palm Beach County and is bordered by Hagen Ranch Road to the west, Jog Road to the east, and L-29 and L-30 canals to the north and south, respectively. Future wetlands are comprised of three tracts totaling about 175 acres.

A.14.2 Project Purpose

The purpose of the Winsberg Farm Wetlands Restoration Project is to reduce the amount of water wasted in deep injection wells, recharge the local aquifer, create a new ecologically significant wildlife habitat, and extend the functionality of the nearby Wakodahatchee Wetland. This phase of the project consists of wetland cells 3 and 4 and covers an area of about 103 acres.

This project will consist of the construction of a low-perimeter embankment around the wetlands. The embankment will be about eight feet high, elevation 26.5 feet or greater, with a 10-foot-wide crest and one vertical on three horizontal side slopes.

A.14.3 Subsurface Investigation

In 2003, Hazen & Sawyer, P.C., hired Dunkelberger Engineering & Testing to conduct a preliminary subsurface study of the proposed wetland area. Dunkelberger drilled three borings along an access road off Hagen Ranch Road on the north side of the project area.

A.14.4 Geology

The soil survey of Palm Beach County shows the surficial soils as primarily Mayakka sands, with some Immokalee fine sand and Oldsmar sand. The Myakka, Immokalee and Oldsmar soil groups are sandy soils with a weakly cemented layer with organic staining at an approximate depth of 2.5 feet, and an approximate thickness ranging from two to three feet. During the wet season, the water table in these soils is in the upper foot of the surface. During the dry season, the water level is about 3.5 feet below the ground surface.

Three core borings were drilled to a depth of about 25 feet. The material encountered in the core borings indicated that the site is covered with a surficial layer of topsoil that is generally one foot thick. Below this layer is predominantly poorly graded sand with layers of silty/clayey sands. Based on Standard Penetration Testing (SPT) data, the upper 10 feet of the subsurface profile ranges from very loose to medium-dense sand.

A.14.5 Slope Stability

The proposed design embankment is about eight feet high, elevation 26.5 feet or greater, with a 10-foot wide crest and one vertical on three horizontal side slopes. Hazen & Sawyer, P.C., performed a slope stability analysis which indicated a water level of 23 feet at the embankment. The Factor of Safety, which is actual breaking strength per a given load amount, computed by Hazen & Sawyer for the perimeter embankment exceeded the general criteria for this type of structure and is stable under all loading conditions. USACE also performed slope stability analyses on the proposed embankment design assuming a water level of 25 feet. The proposed embankment has a FS of 1.5 for the steady-state loading condition.

A.15 HYDROLOGY

The Probable Maximum Precipitation (PMP) was developed according to guidelines from the Hydrometeorological Report (HMR) No. 51 (Probable Maximum Precipitation Estimates, Eastern U.S.) and HMR No. 52 (Probable Maximum Storm Computation). A value of 55.7 inches was selected from the all season 72 hr, 10 mi2 PMP chart.

A synthetic 72-hour PMP rainfall event was developed according to HMR-52 to contain discrete PMP storm durations from 6 to 72 hours (**Table A-9**). The peak hour rainfall rate was calculated and smoothing was applied to yield the 1-hour distribution of the probable maximum storm **(Table A-10)**.

TABLE A-9: PROBABLE MAXIMUM PRECIPITATION FOR STORM DURATIONS 6 TO 72 HOURS

Storm Duration (hr)	6	12	24	48	72
PMP (in)	32.0	38.7	47.1	51.8	55.7

TABLE A-10: PRECIPITATION FOR EACH 6-HOUR INCREMENT OF THE 72 HR PMP

6-Hour Increment	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation (in)	1.0	1.0	1.0	1.0	1.0	1.1	1.8	5.9	3.2	6.7	2.5	0.7

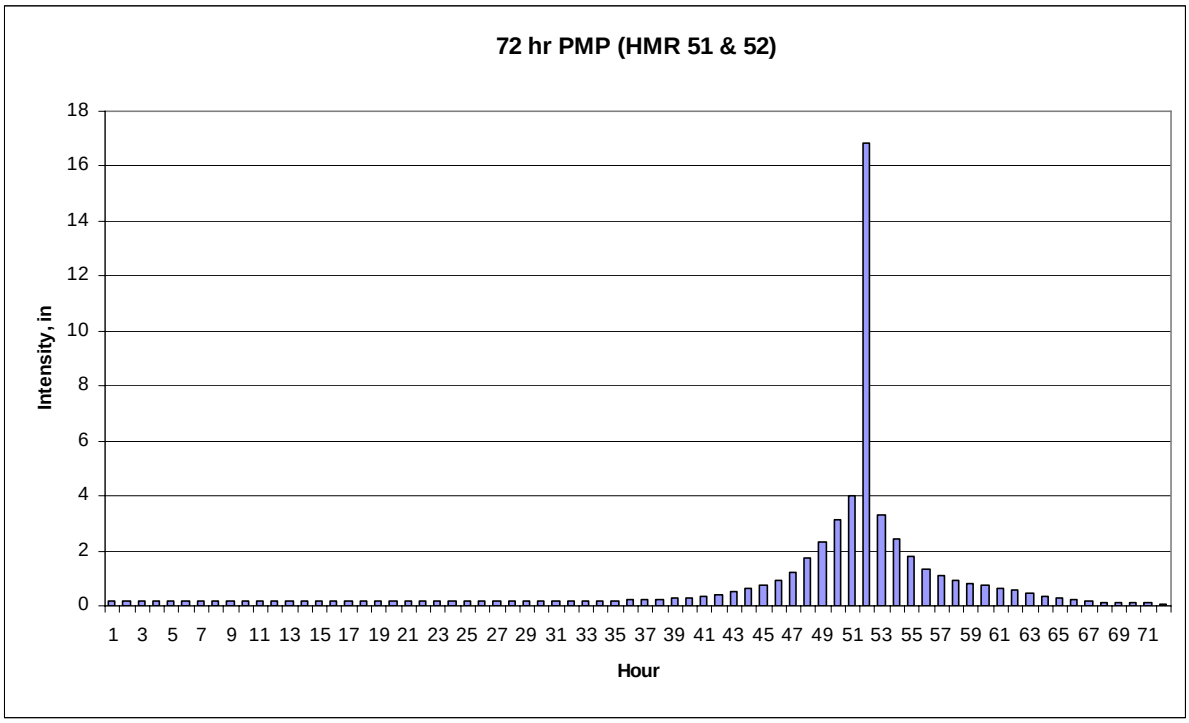


FIGURE A-4: DISTRIBUTION OF THE SYNTHETIC 72 HR PROBABLE MAXIMUM PRECIPITATION

The Corps' HEC-RAS (River Analysis System) model was employed to determine the maximum pool (or surcharge pool) elevation and peak discharge. The model configuration consisted of a storage area equal to 0.20 square miles with a weir outlet. Since the impoundment itself is the tributary basin and its surface is considered impermeable when full, all storm precipitation was readily available for routing without any loss. The initial pool stage used in the routing model of Winsberg Farms impoundment was the maximum normal pool stage of 21.0 feet NGVD.

The spillway crest elevation for the Winsberg Farms impoundment was determined in accordance with these procedures. The Florida Department of Environmental Protection (DEP) requires 2 feet between the operating pool elevation and the spillway crest elevation; therefore, the emergency overflow spillway crest was set to 23.0 feet NGVD with a length of 450 feet. A section of the spillway was lowered to 22.5 feet NGVD, which contained the 72-hour, 100-year rainfall with no discharge, and was sized to 200 feet in order to limit the peak stage to 23.5 feet NGVD. This allows for 3 feet of freeboard as the embankments will be constructed to 26.5 feet NGVD.

TABLE A-11: WINSBERG FARMS IMPOUNDMENT INFLOW DESIGN FLOOD ANALYSIS

Probable Maximum Precipitation (PMP) 72-Hour Rainfall	55.7	inches
2.0-foot deep Basin Area	125	acres
Basin Area	0.20	sq miles
Normal Pool Elevation	21.0	ft-NGVD
Emergency Overflow Spillway Crest Elevation	22.5	ft-NGVD
Emergency Overflow Spillway Length	200.0	ft
Emergency Overflow Spillway Crest Elevation	23.0	ft-NGVD
Emergency Overflow Spillway Length	250.0	ft
Peak IDF Instantaneous Inflow	1,143	cfs

Average ground elevation based on LIDAR data.

The PMP analysis should consider an antecedent-setting event to address concerns over the sequencing of rainfall storms as described in the Design Criteria Memorandum (DCM-2, Acceler8 Ref# P 599). Two routings must be performed to determine governing circumstances (**Table A-12**):

A. Three-Cycle 160% PMF Routing (per DCM-2)
   1. From normal pool, route a **30**% PMF-72hr storm: spillway flow, gates are inoperable.
   2. Provide for a **3-day** dry spell with spillway flow, gates are operable.
   3. Route a **100**% PMF-72hr storm: spillway flow, gates are inoperable.
   4. Provide for a **10-day** dry spell with spillway flow, gates are operable.
   5. Route a **30**% PMF-72hr storm: spillway flow, gates are inoperable.

B. Three-Cycle 180% PMF Routing (per DCM-2)
   1. From normal pool, route a **40**%PMF-72hr storm: spillway flow, gates are inoperable.
   2. Provide for a **5-day** dry spell with spillway flow, gates are operable.
   3. Route a **100**%PMF-72hr storm: spillway flow, gates are inoperable.
   4. Provide for a **10-day** dry spell with spillway flow, gates are operable.
   5. Route a **40**%PMF-72hr storm: spillway flow, gates are inoperable.

However, all simulations were done utilizing only spillway flow as this system has no gates available for regulation of emergency outflows.

TABLE A-12: WINSBERG FARMS RESERVOIR EMERGENCY OVERFLOW SPILLWAY PMF ROUTING

Routing	Peak Height Above Spillway Crest (feet)	Peak IDF Pool Elevation (ft-NGVD)	Peak IDF Spillway Discharge (cfs)
PMF	0.5	23.5	1,006
160% PMF	0.6	23.6	1,240
180% PMF	0.6	23.6	1,240

A.16 ENGINEERING APPENDIX PLATES

Please see following pages (**Figures A-5** through **A-26**) for engineering plates:

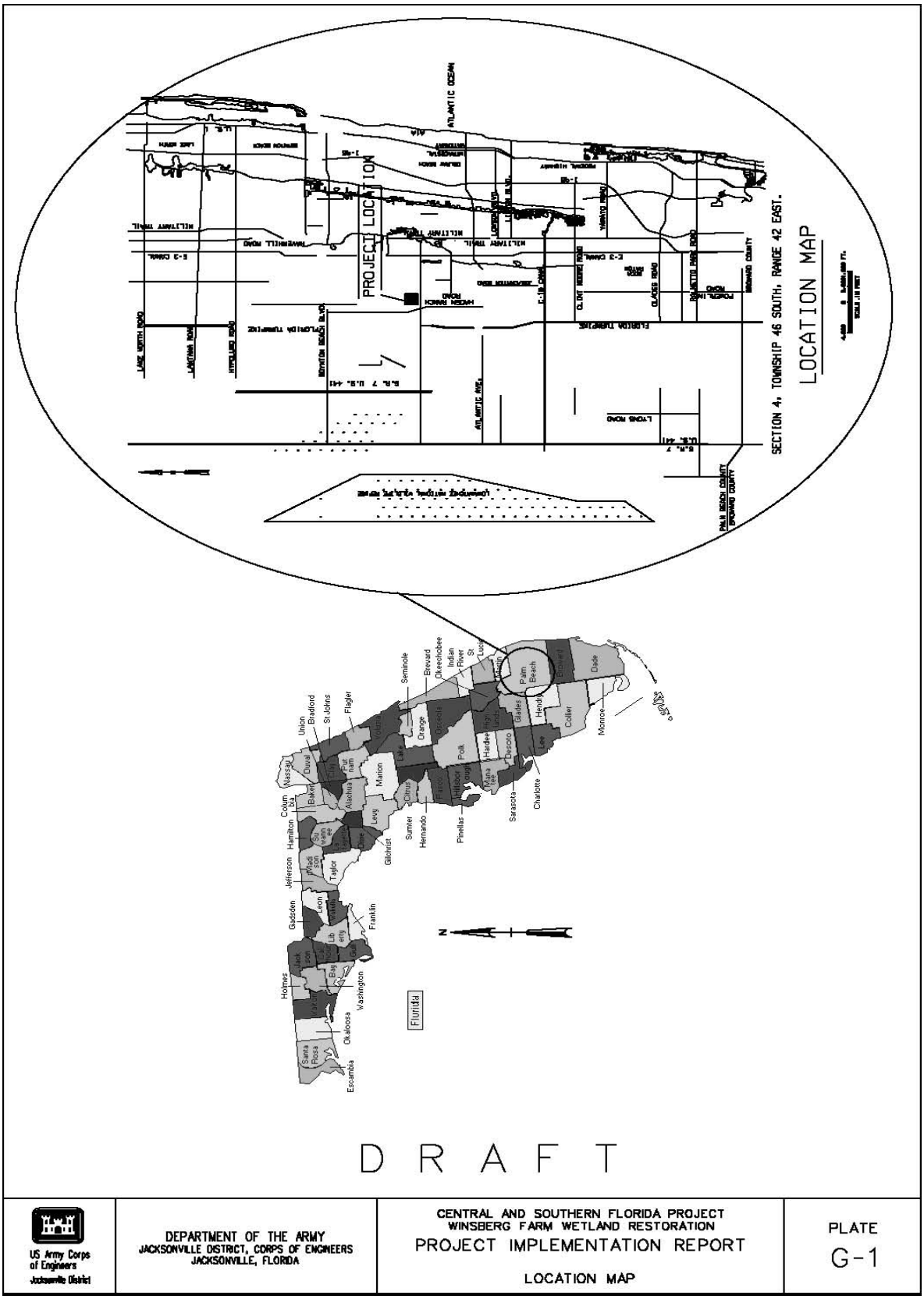


FIGURE A-5: PLATE G-1 - LOCATION MAP PLATE

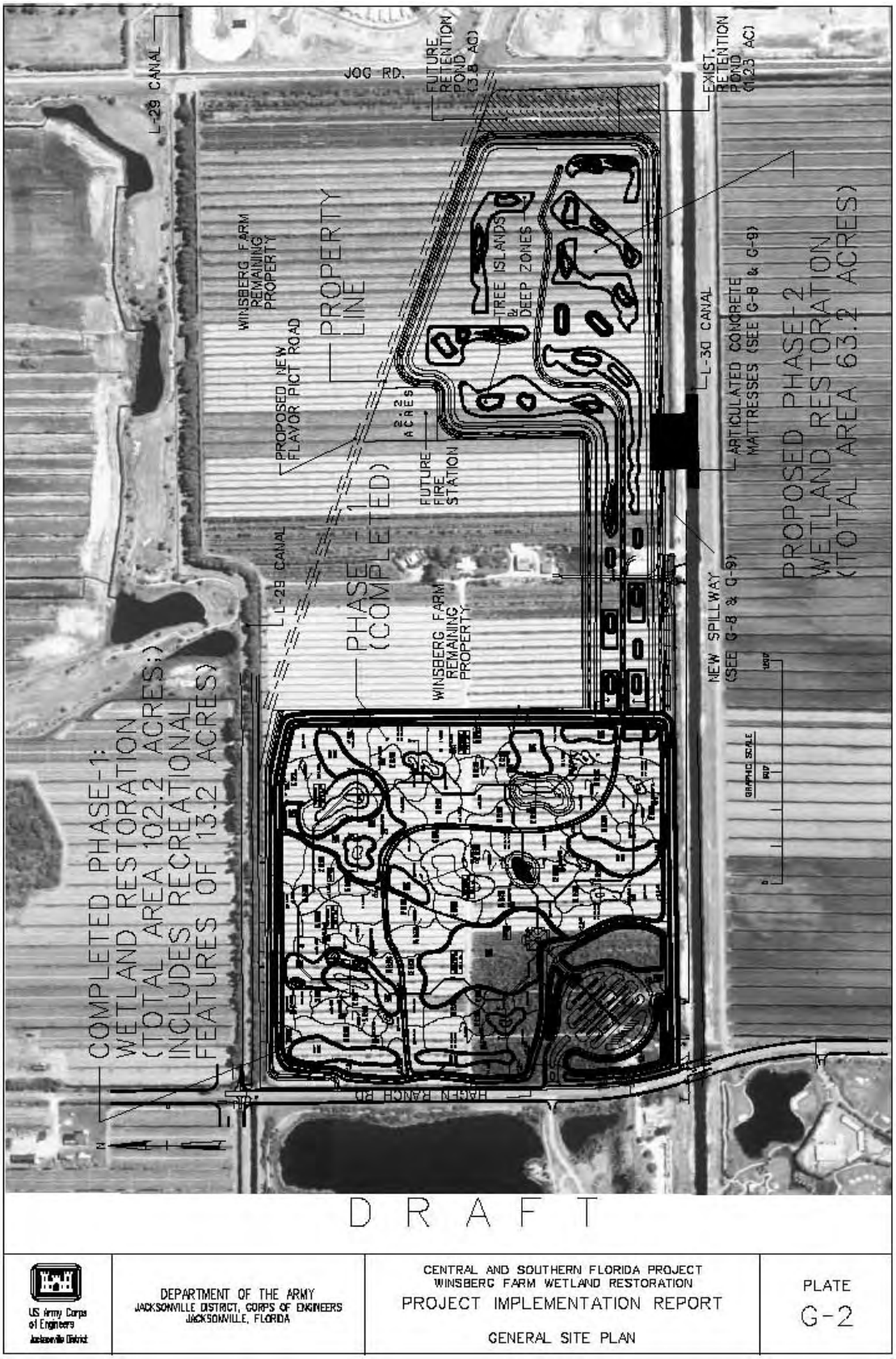


FIGURE A-6: PLATE G-2 - GENERAL SITE PLAN PLATE

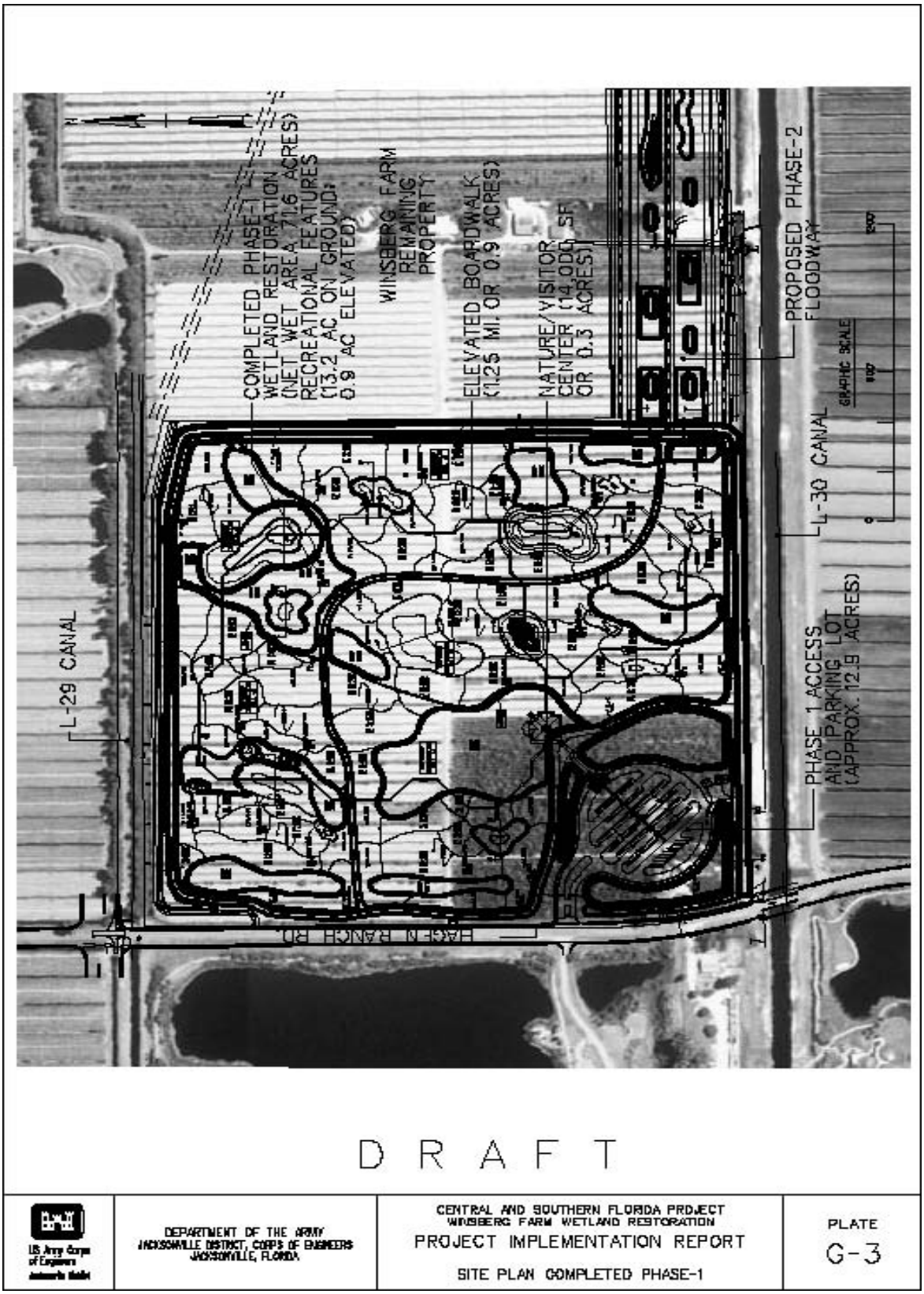


FIGURE A-7: PLATE G-3 - SITE PLAN COMPLETED PHASE 1

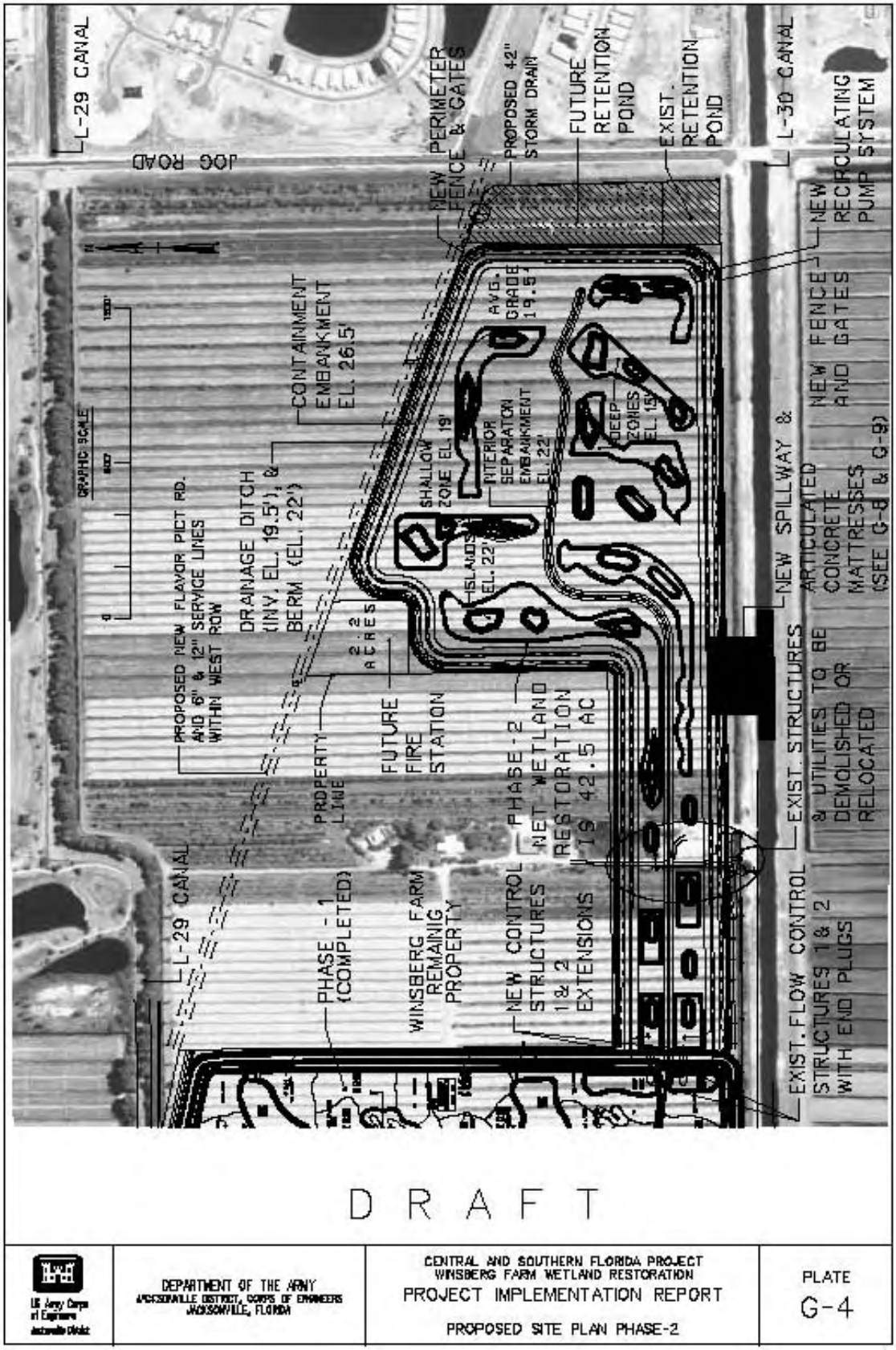


FIGURE A-8: PLATE G-4 - PROPOSED SITE PLAN PHASE 2 PLATE

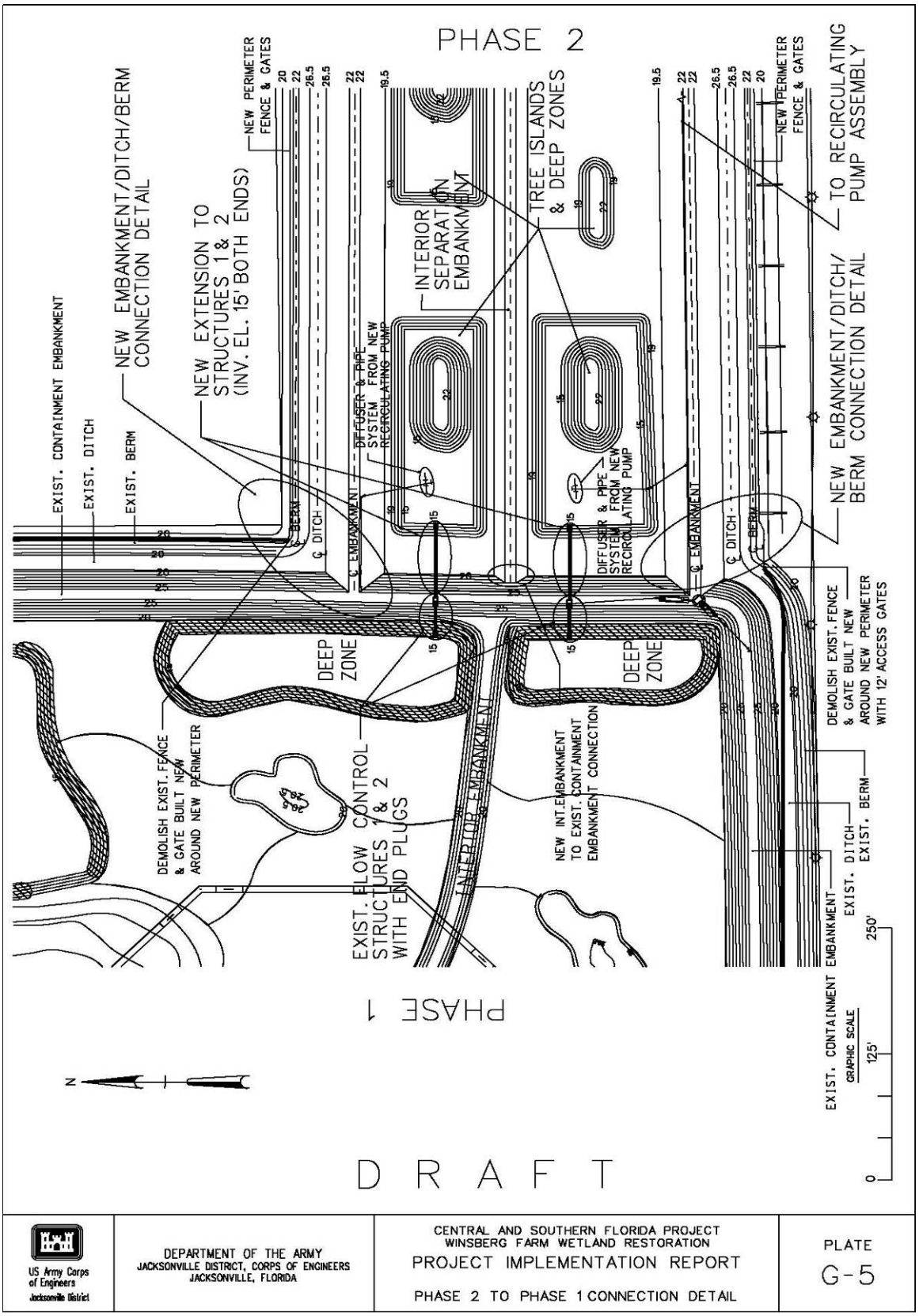


FIGURE A-9: PLATE G-5 - PHASE 2 TO PHASE 1 CONNECTION DETAIL PLATE

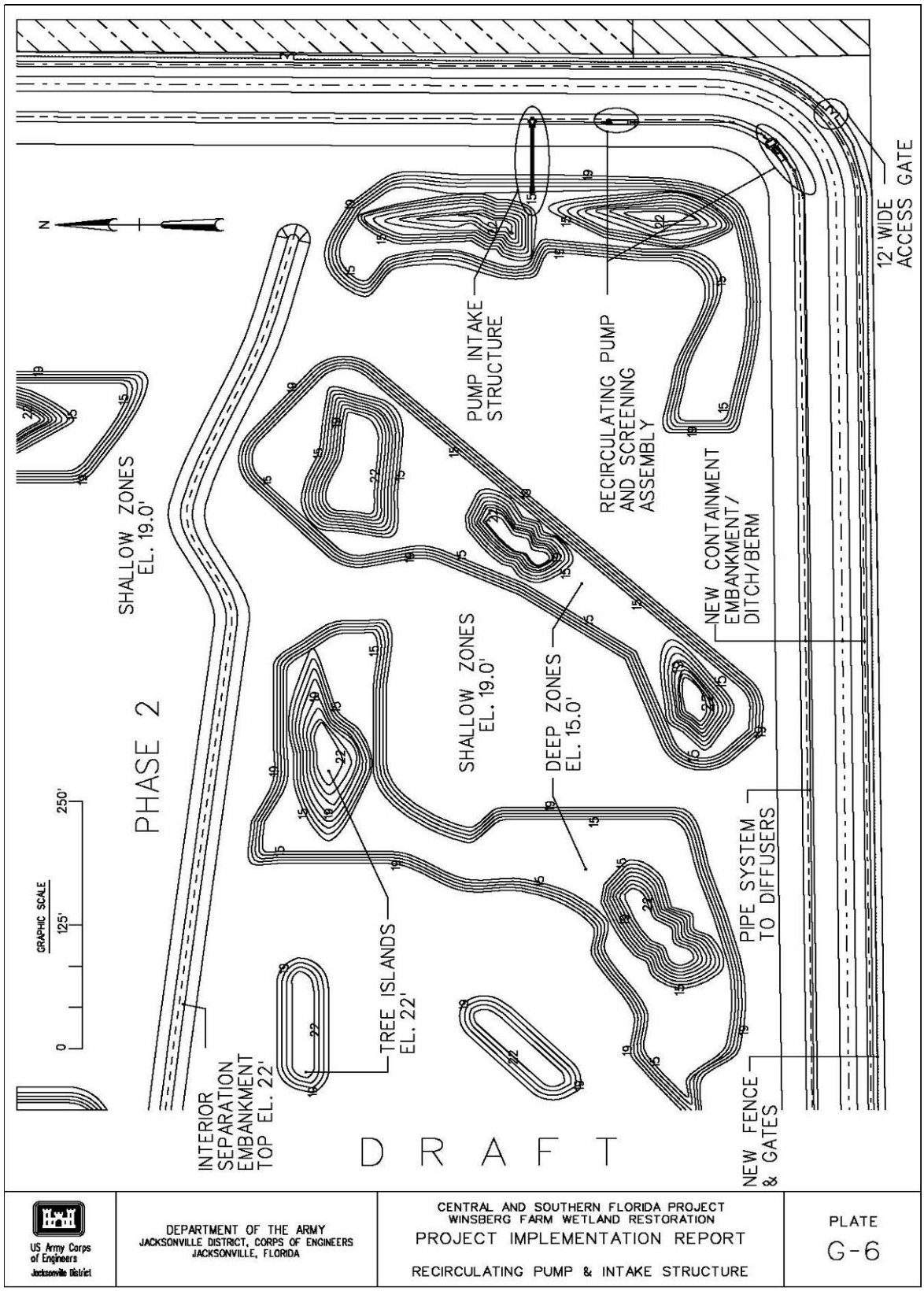


FIGURE A-10: PLATE G-6 - RECIRCULATING PUMP & INTAKE STRUCTURE PLATE

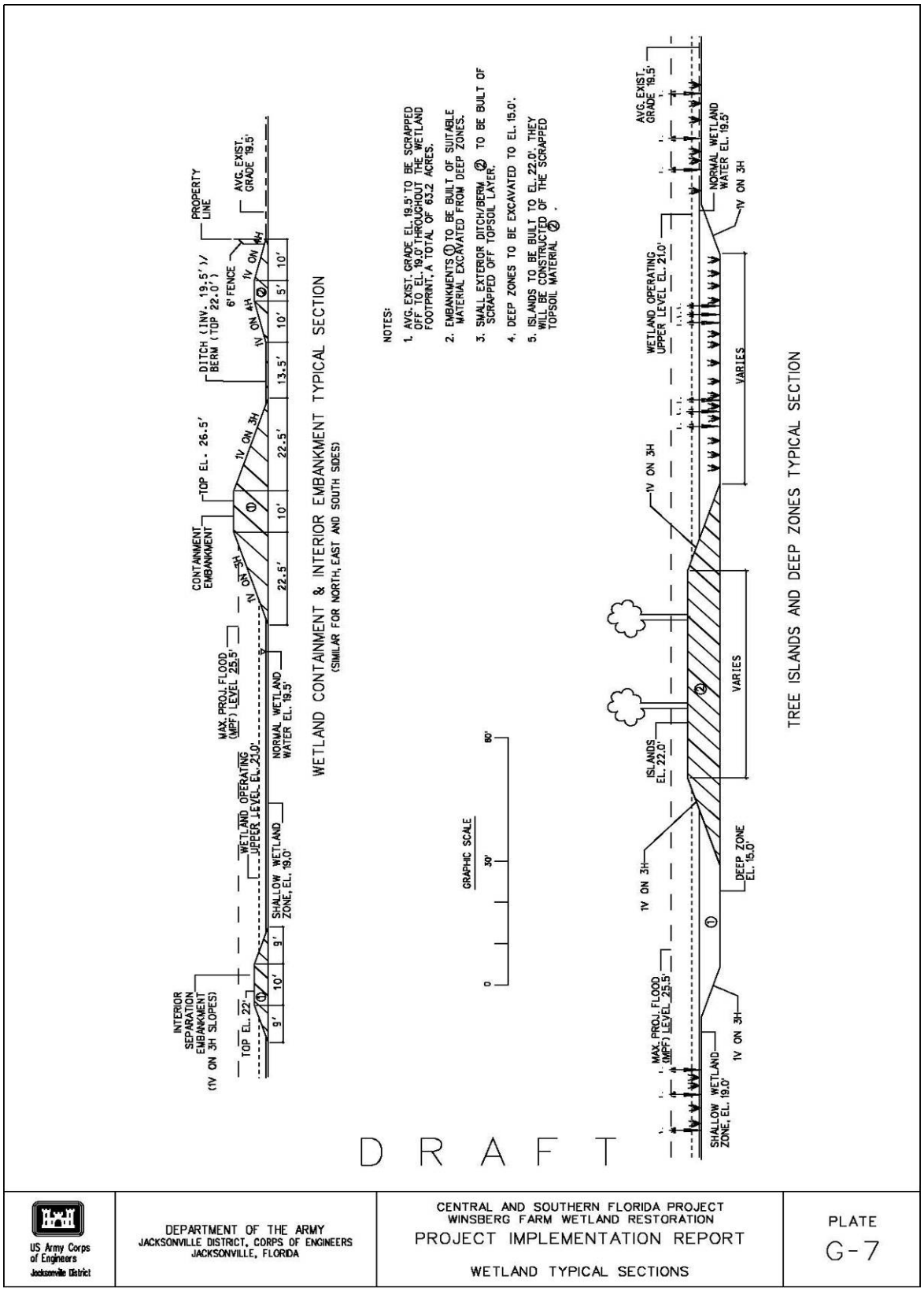


FIGURE A-11: PLATE G-7 - WETLAND TYPICAL SECTIONS PLATE

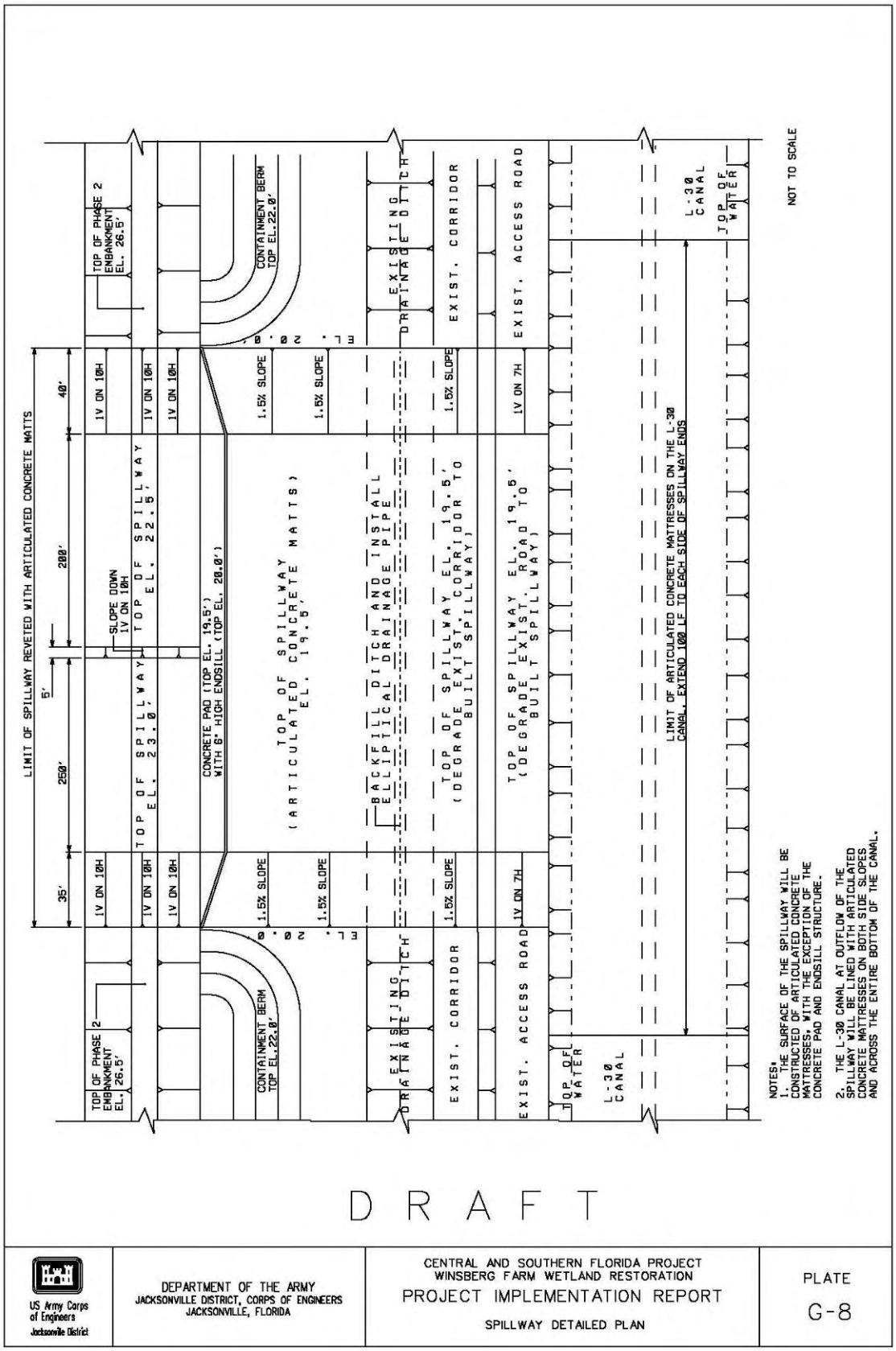


FIGURE A-12: PLATE G-8 - SPILLWAY DETAILED PLAN

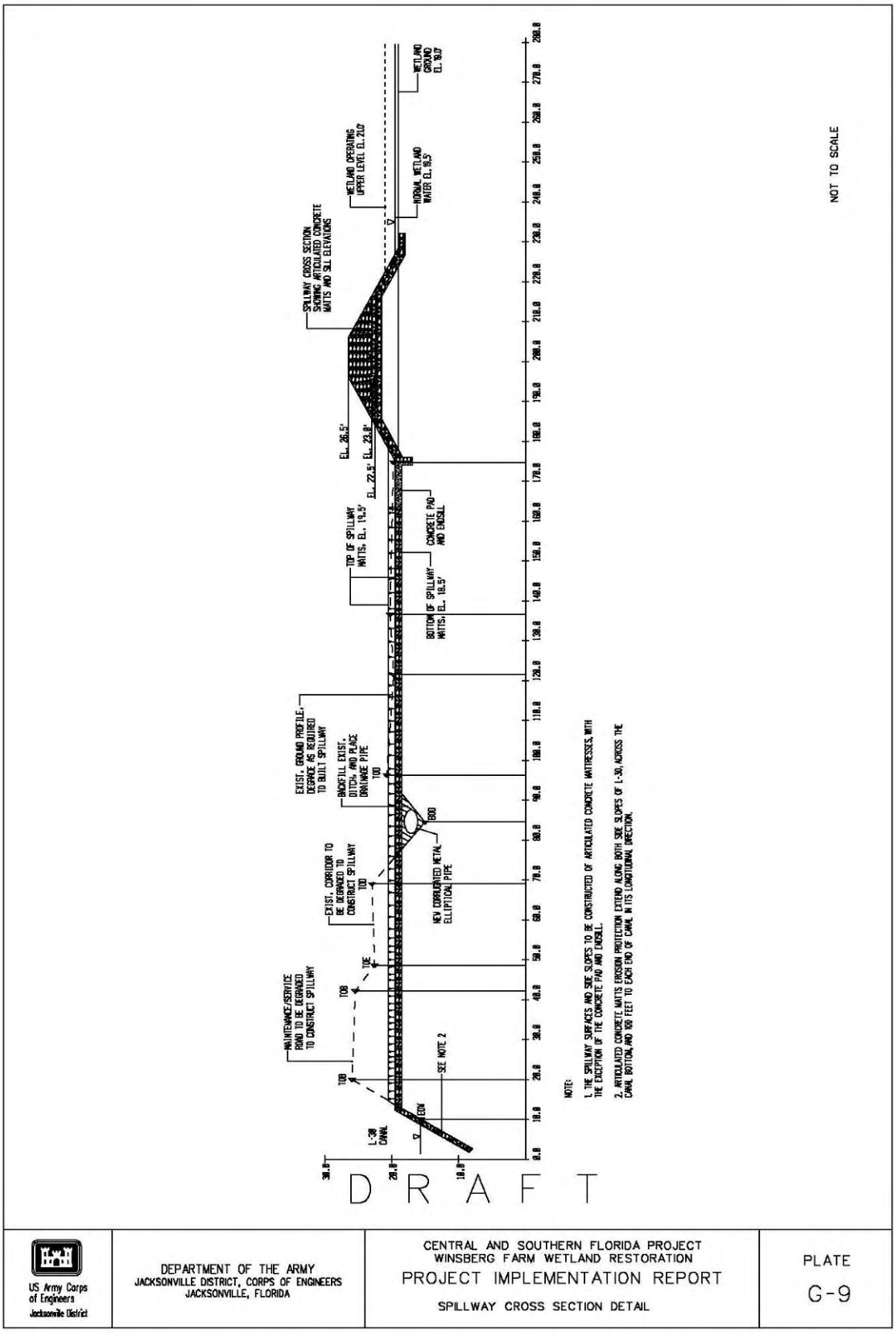


FIGURE A-13: PLATE G-9 - SPILLWAY CROSS SECTION DETAIL

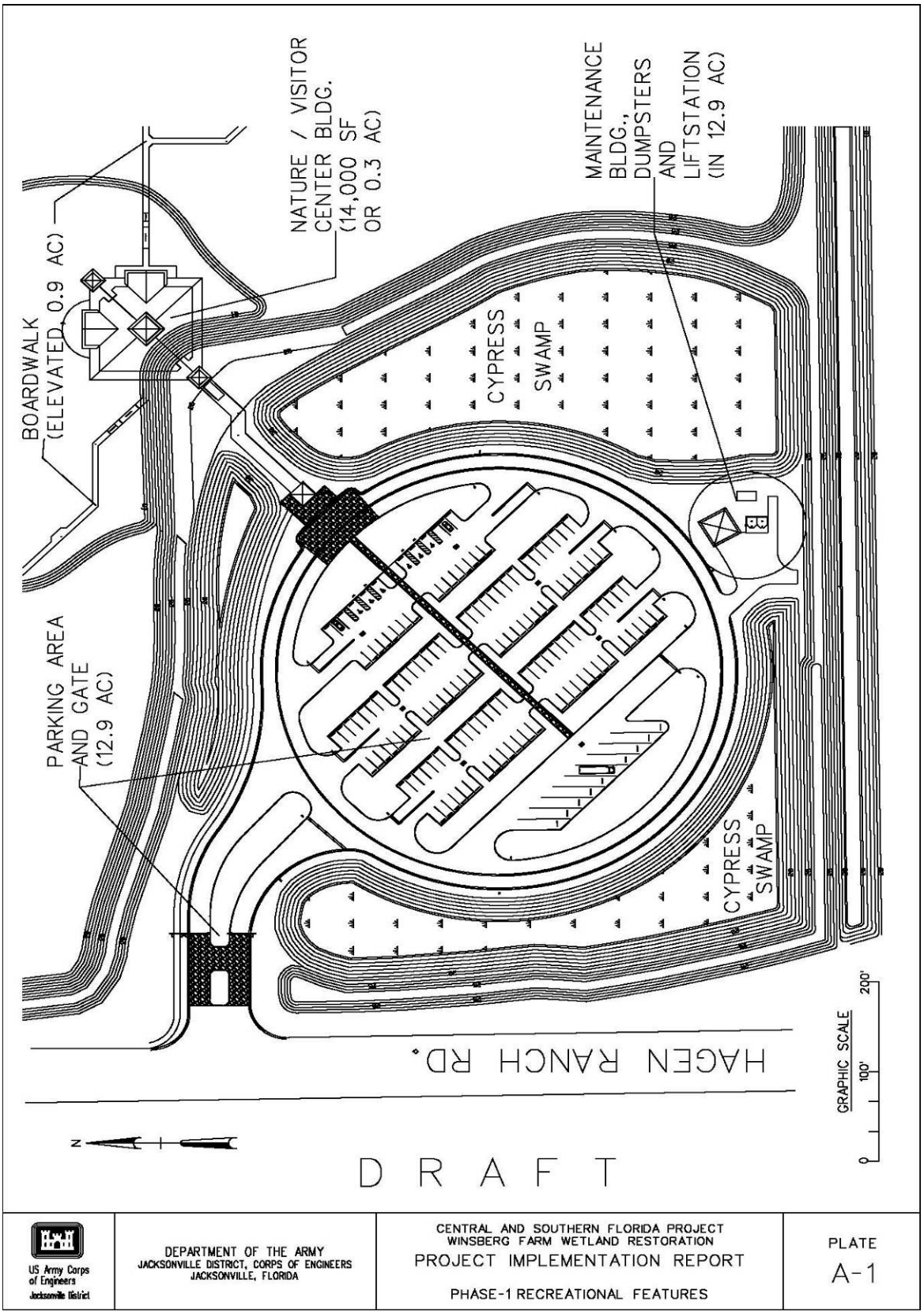


FIGURE A-14: PLATE A-1 - PHASE 1 RECREATIONAL FEATURES PLATE

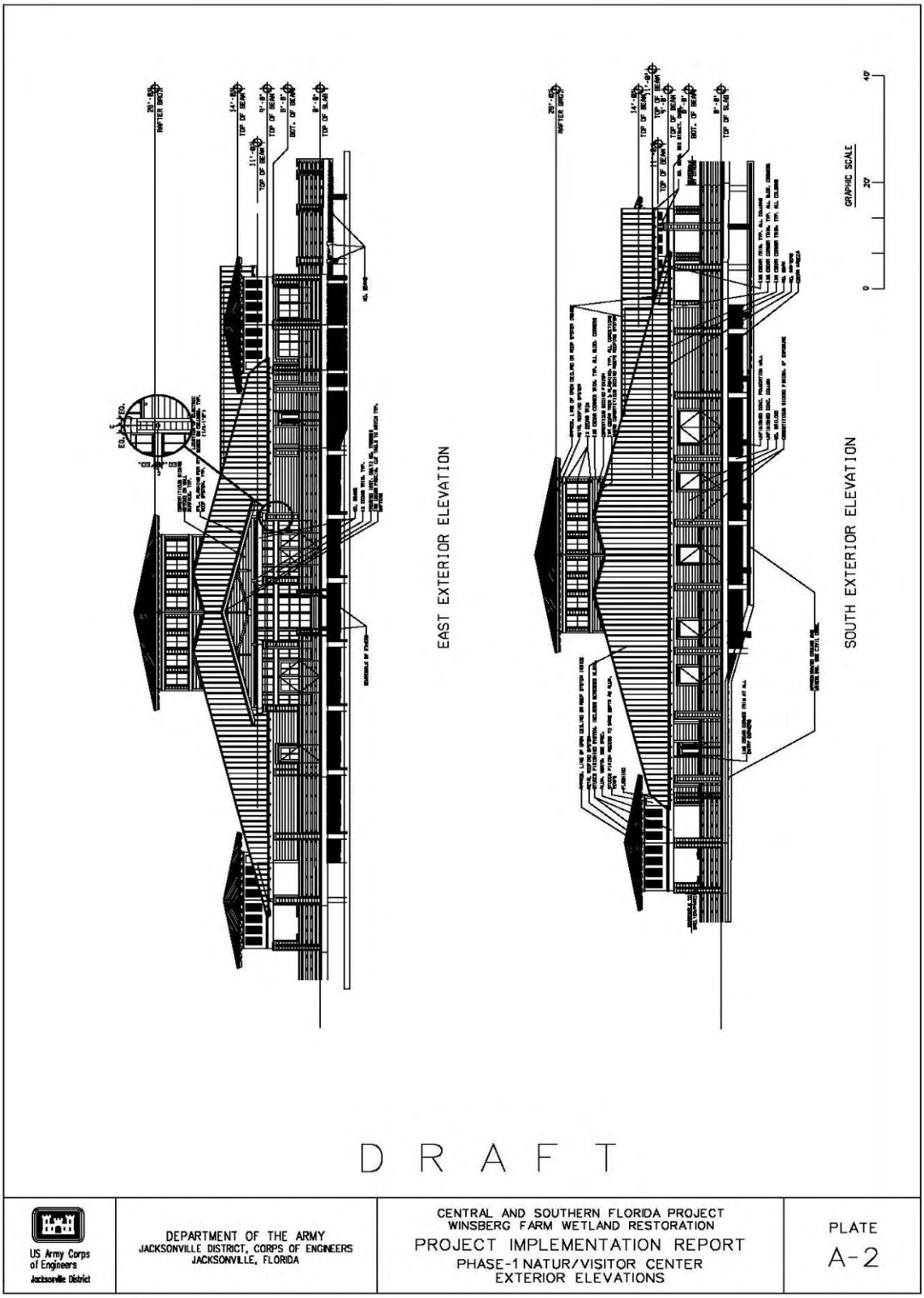


FIGURE A-15: PLATE A-2 - PHASE 1 NATURE/VISITOR CENTER EXTERIOR ELEVATIONS PLATE

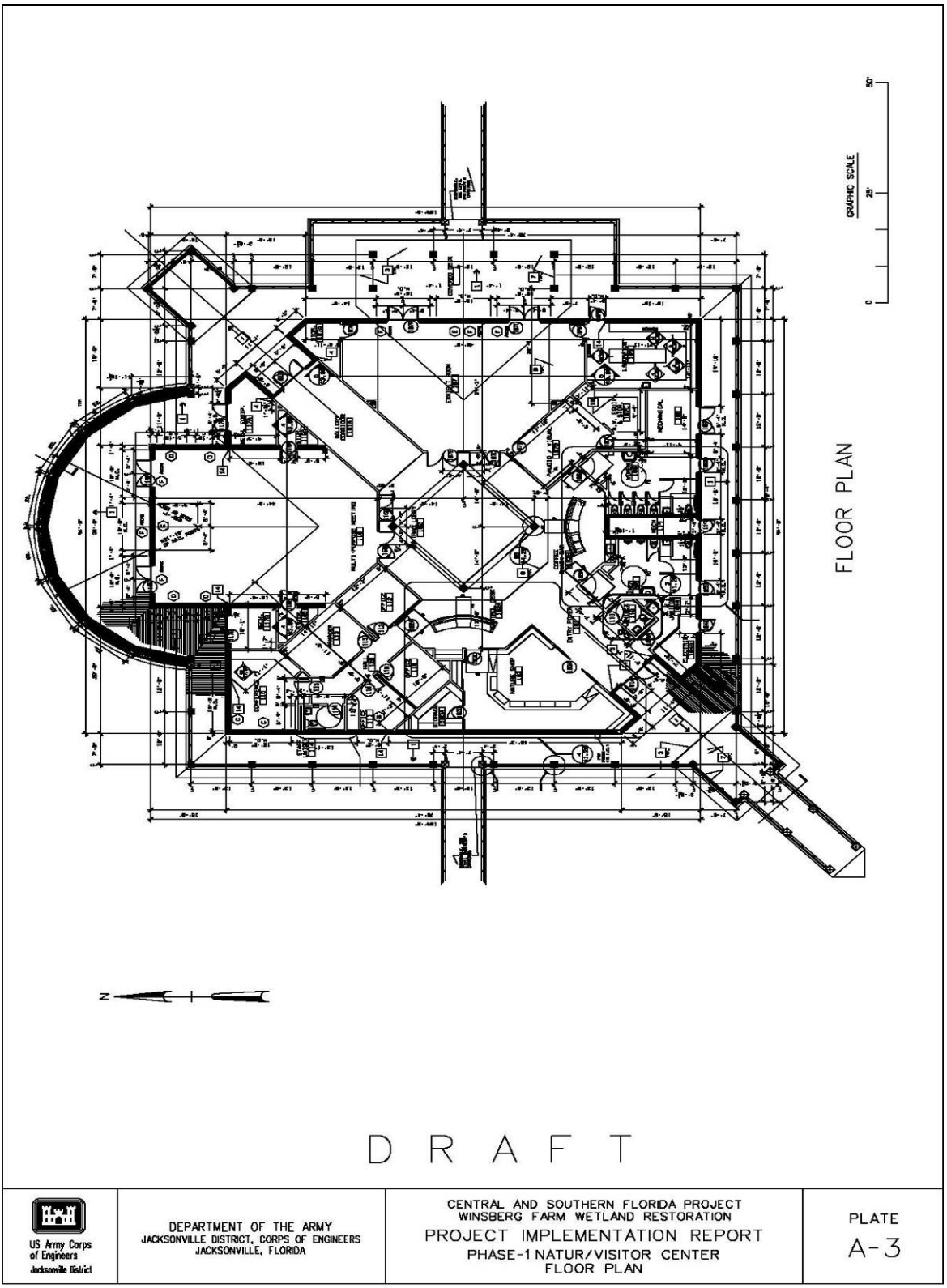


FIGURE A-16: PLATE A-3 - PHASE 1 NATURE/VISITOR CENTER FLOOR PLAN PLATE

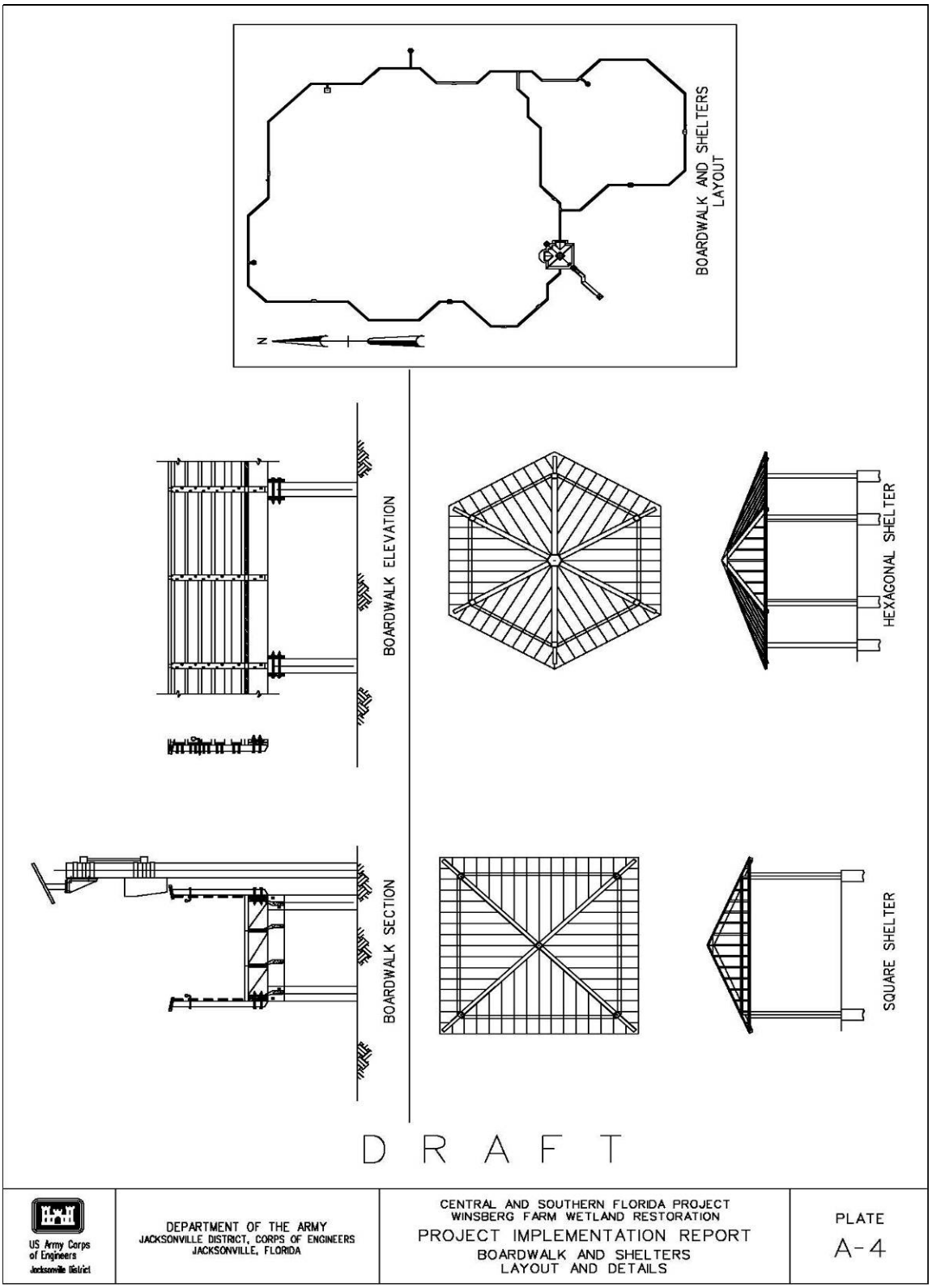


FIGURE A-17: PLATE A-4 - BOARDWALK AND SHELTERS LAYOUT AND DETAILS

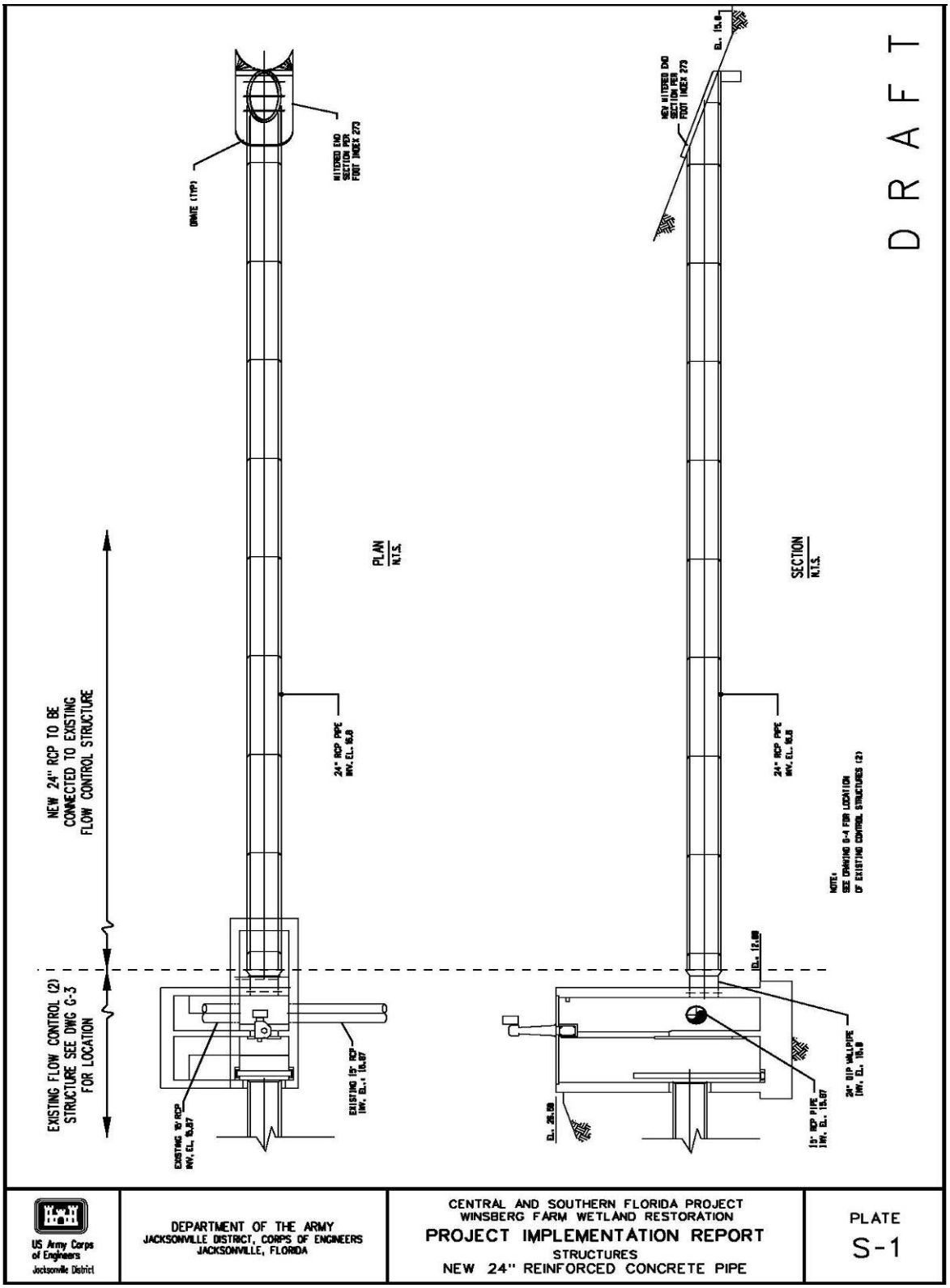


FIGURE A-18: PLATE S-1 - NEW 24-INCH REINFORCED CONCRETE PIPE PLATE

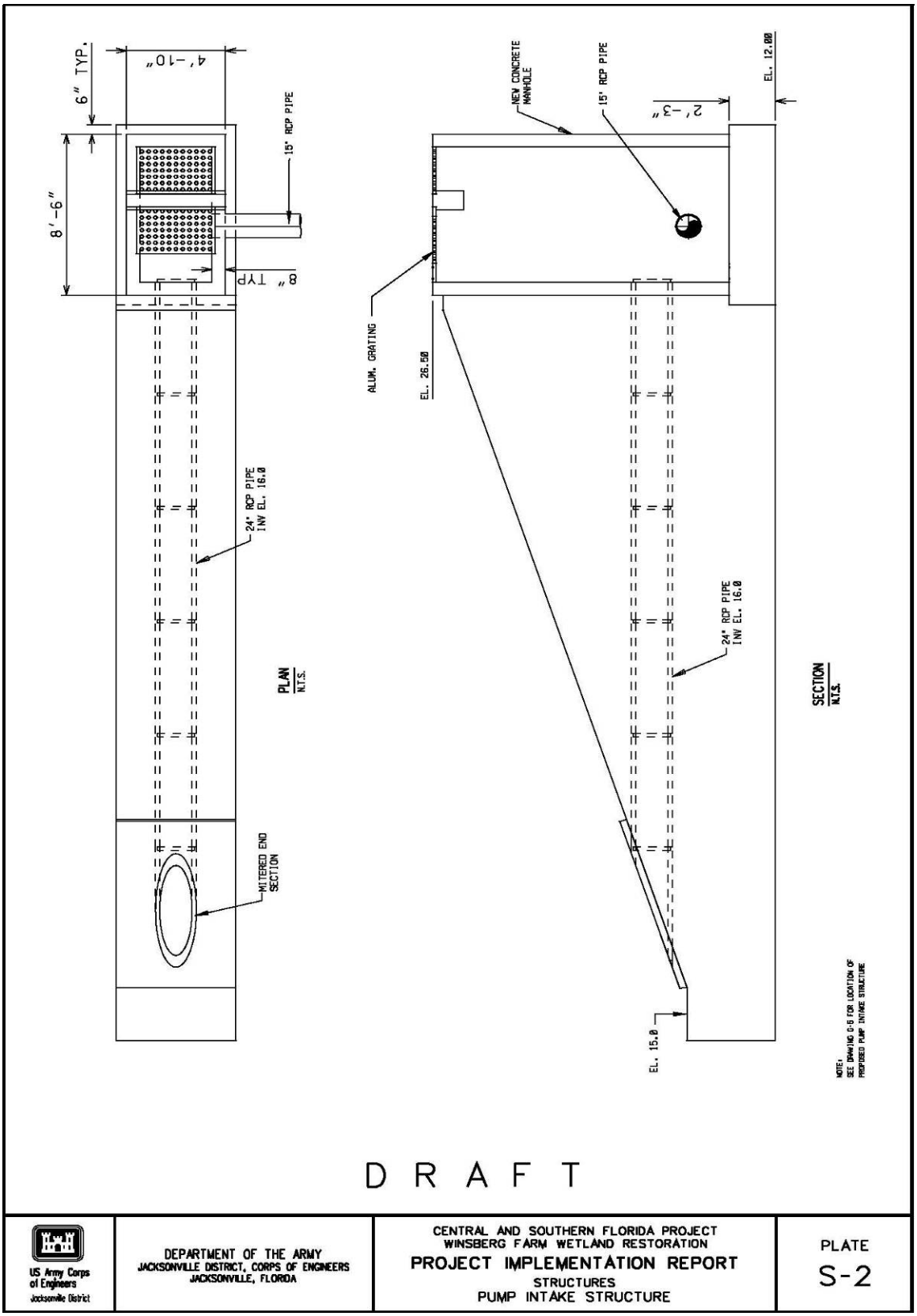


FIGURE A-19: PLATE S-2 - PUMP INTAKE STRUCTURE PLATE

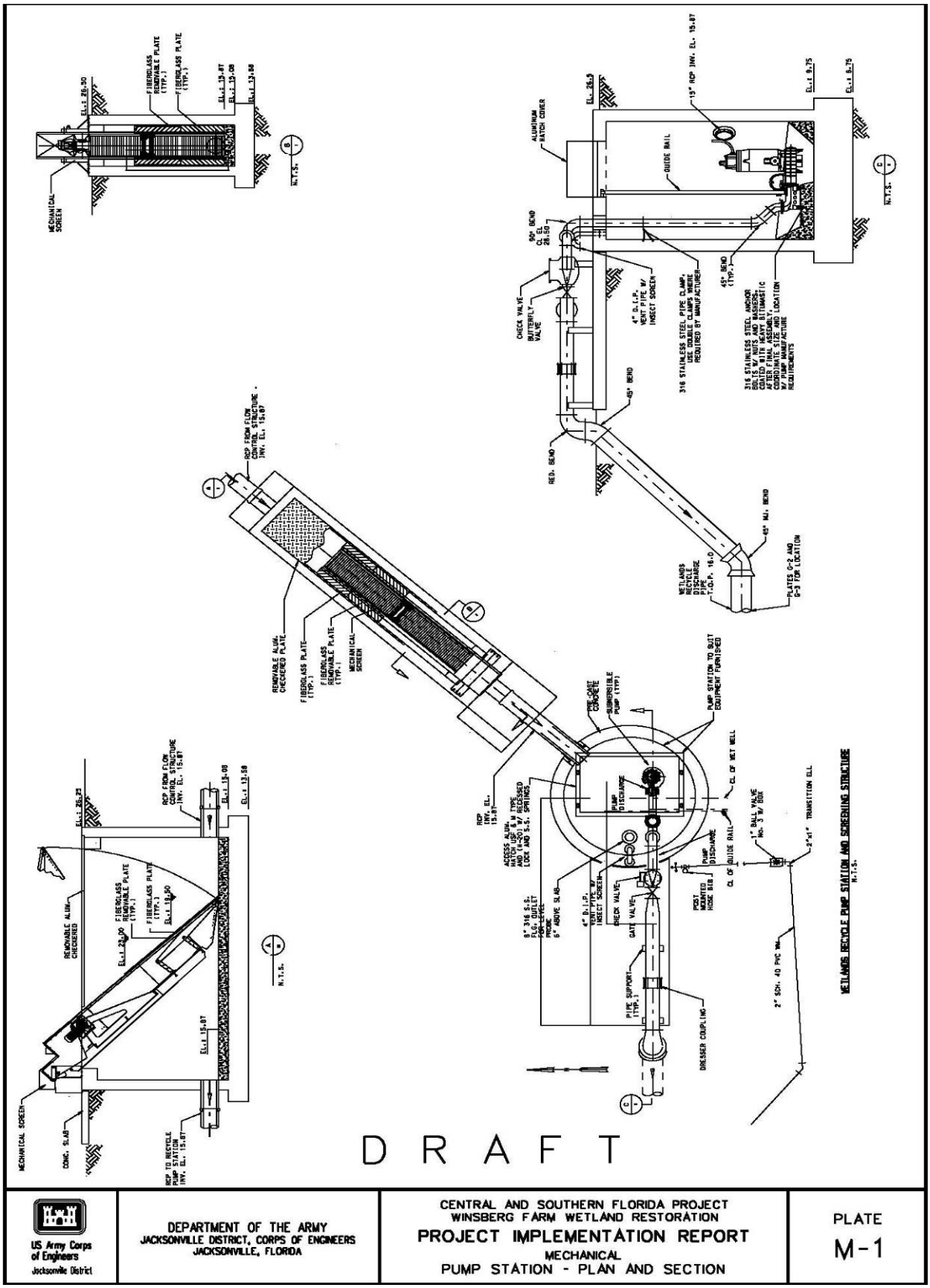


FIGURE A-20: PLATE M-1 - PUMP STATION – PLAN AND SECTION PLATE

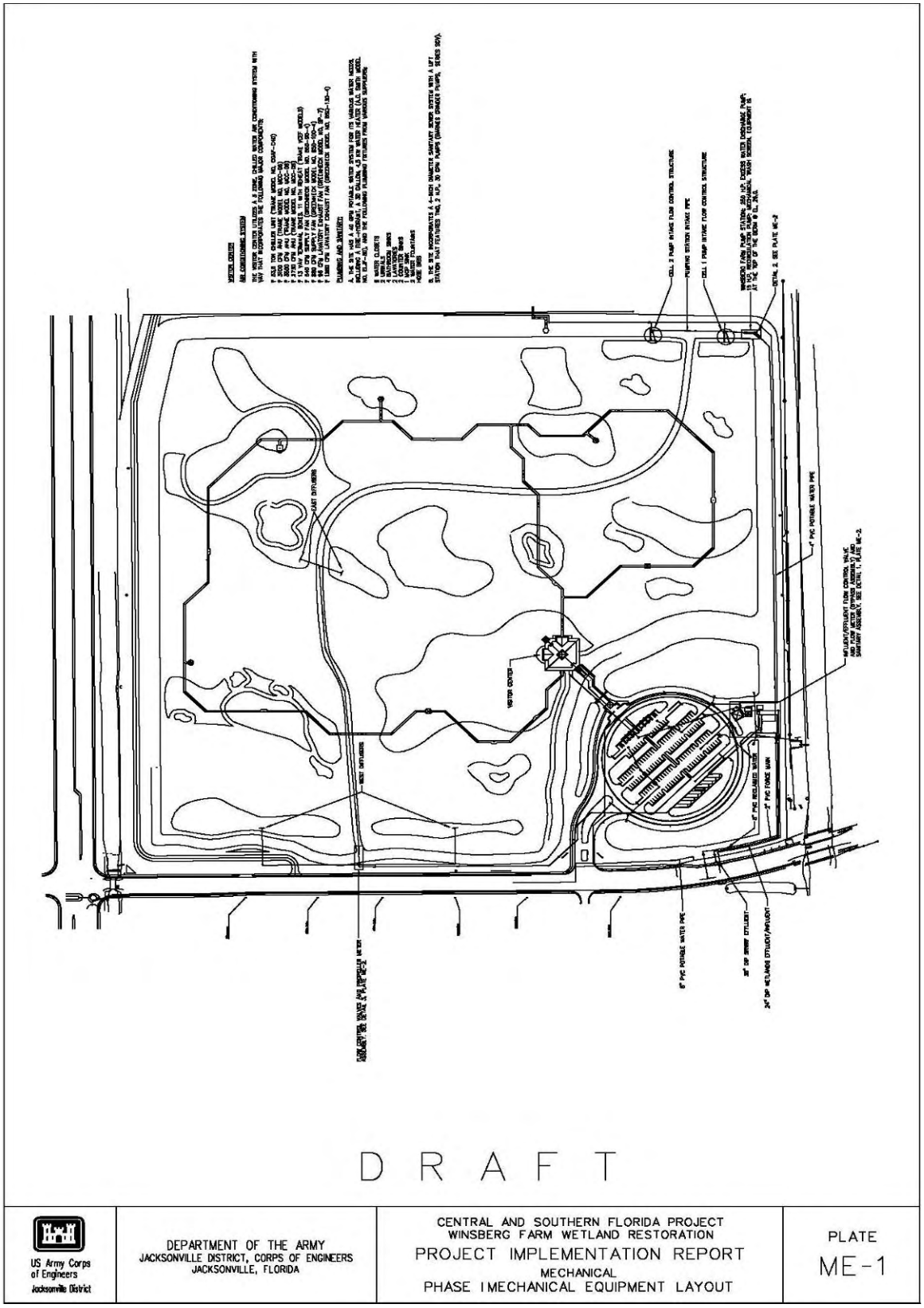


FIGURE A-21: PLATE ME-1 - PHASE 1 MECHANICAL EQUIPMENT LAYOUT PLATE

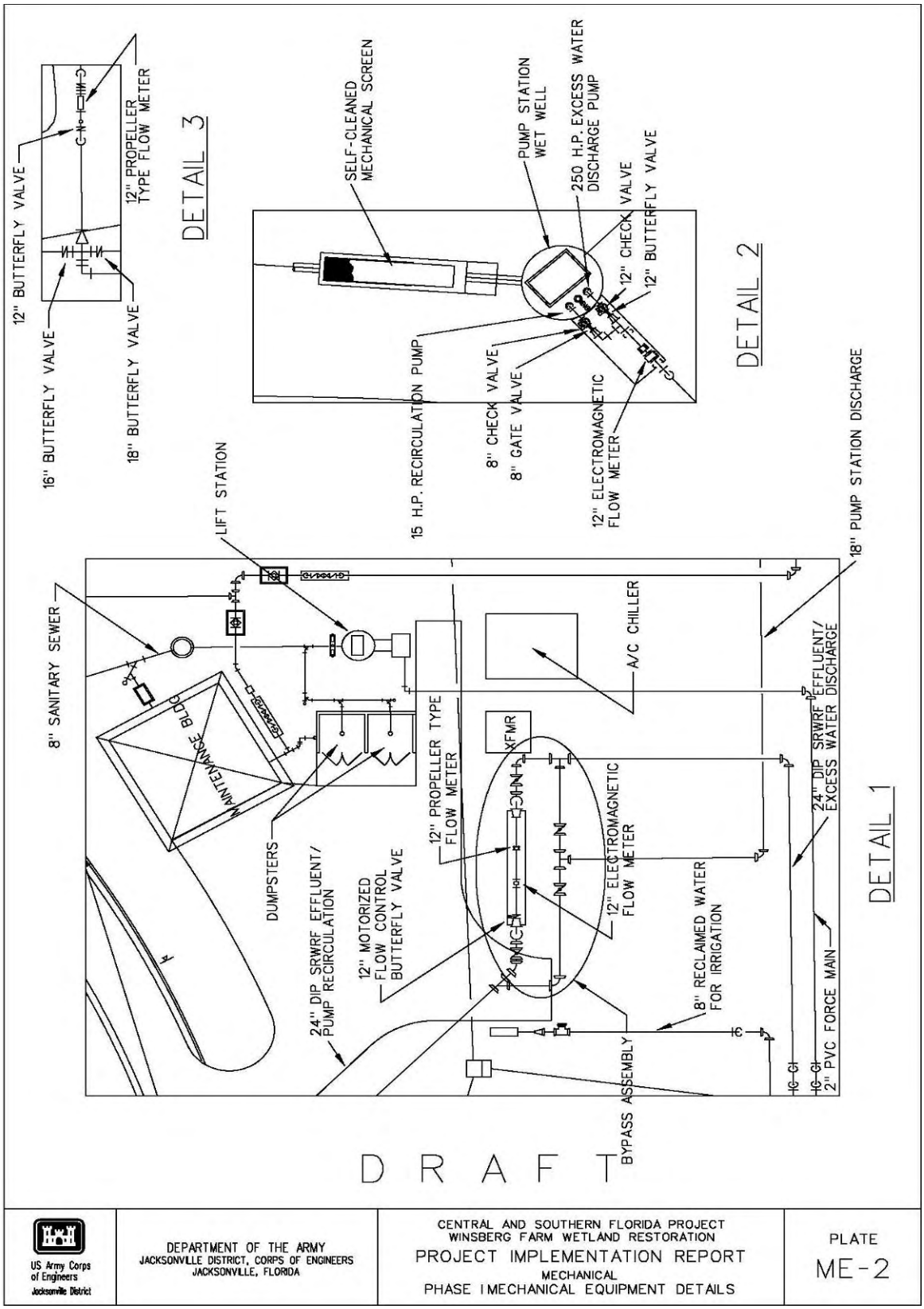


FIGURE A-22: PLATE ME-2 - PHASE 1 MECHANICAL EQUIPMENT DETAILS PLATE

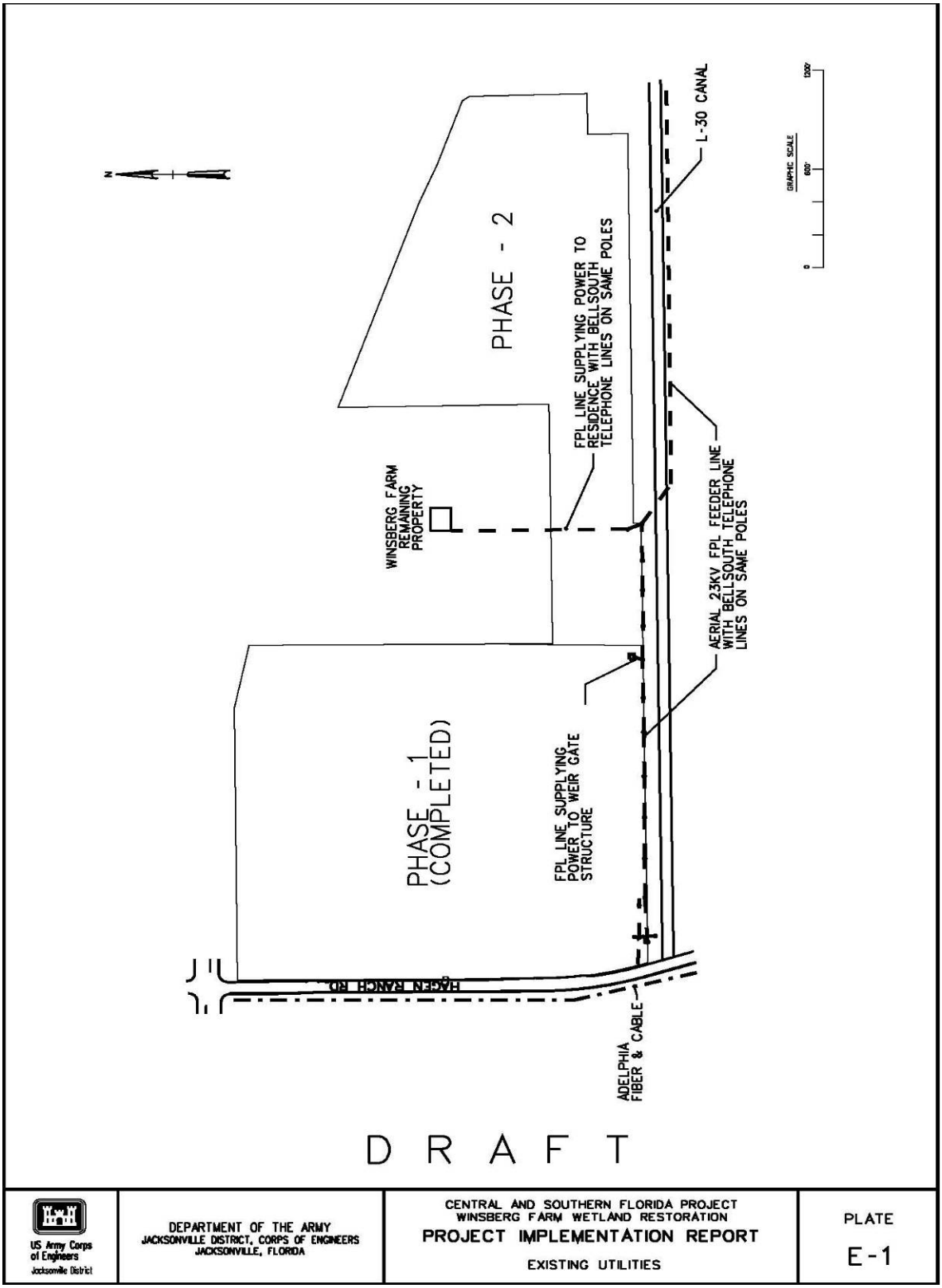


FIGURE A-23: PLATE E-1 - EXISTING UTILITIES PLATE

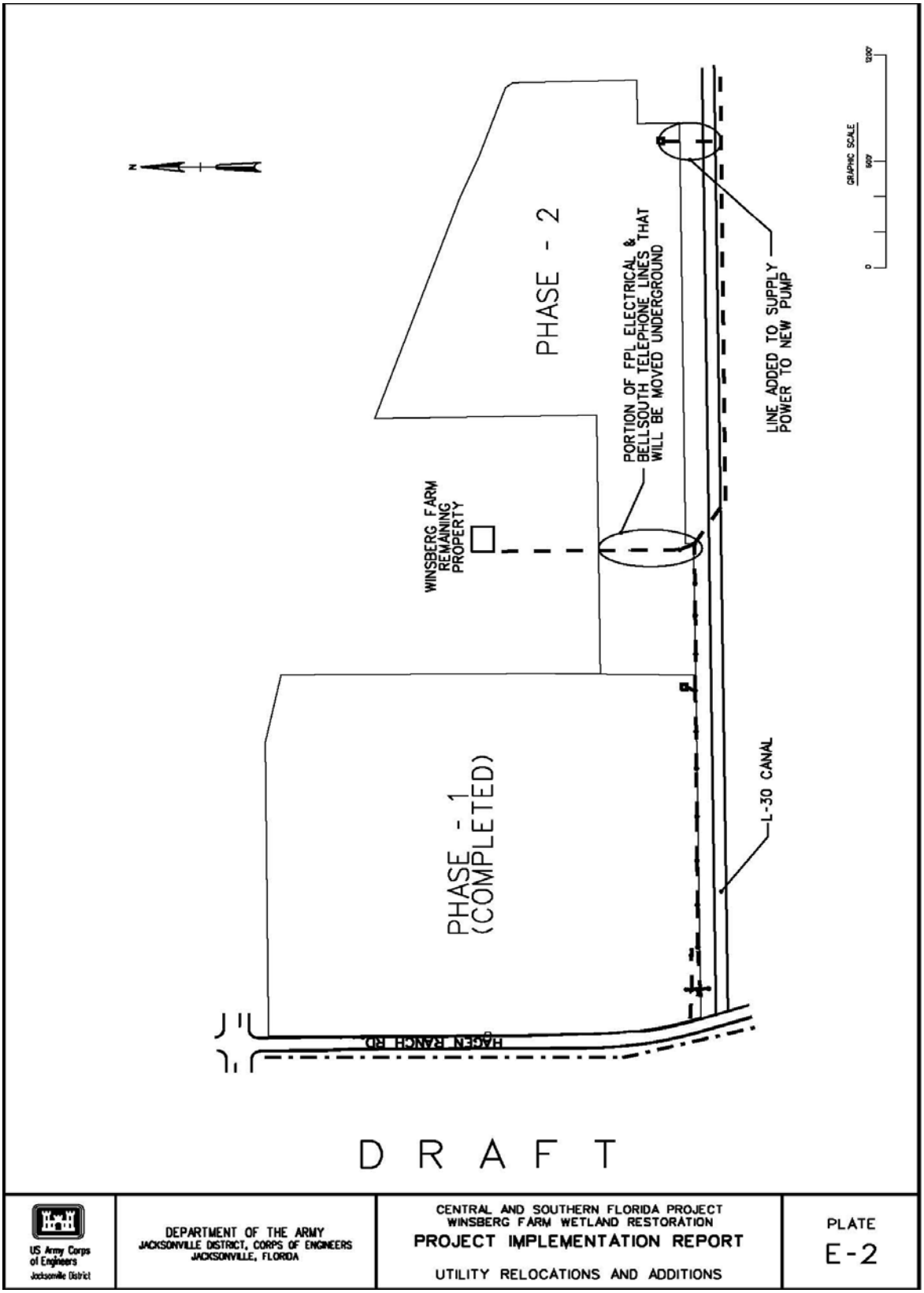


FIGURE A-24: PLATE E-2 - UTILITY RELOCATIONS AND ADDITIONS PLATE

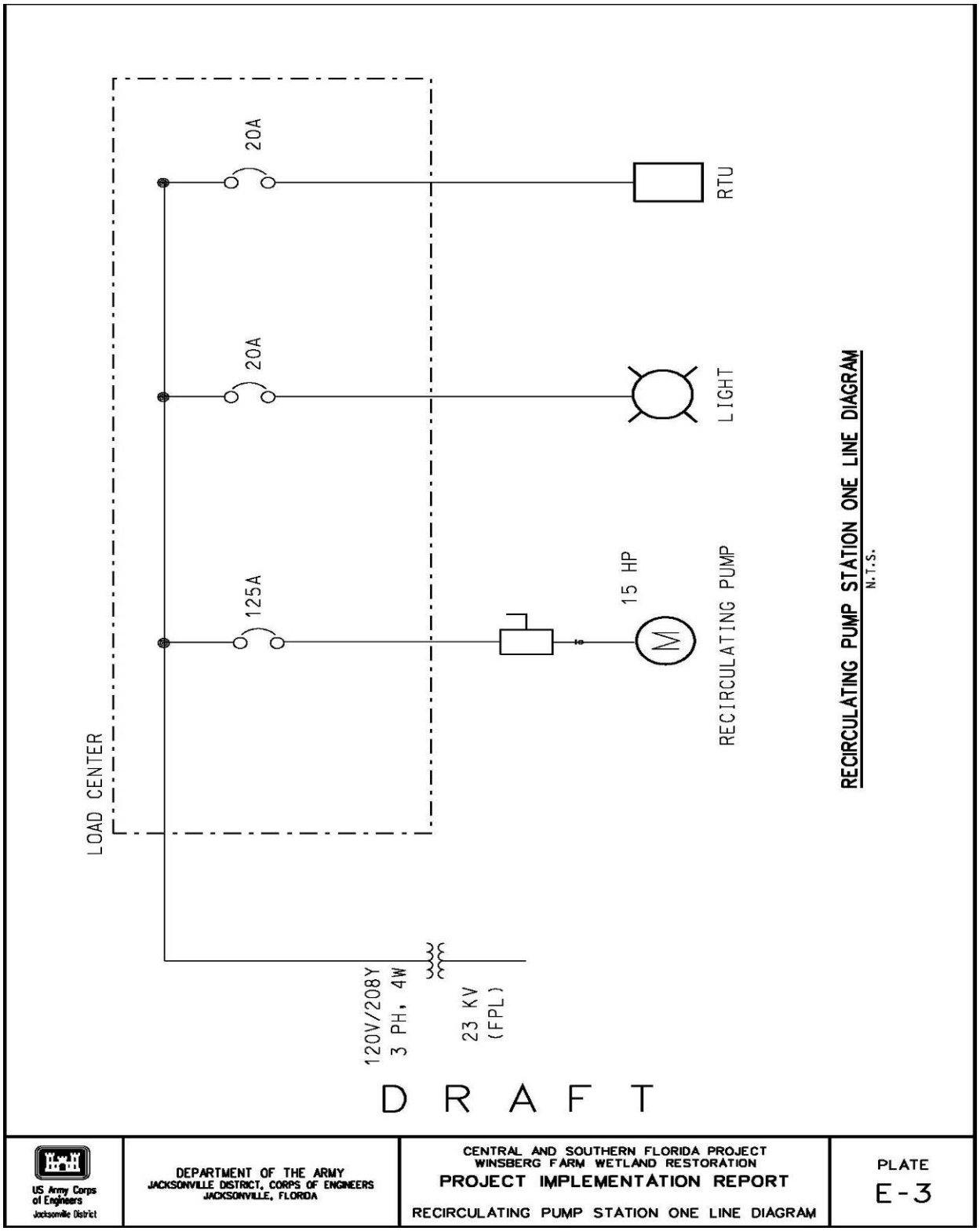


FIGURE A-25: PLATE E-3 - RECIRCULATING PUMP STATION ONE-LINE DIAGRAM PLATE

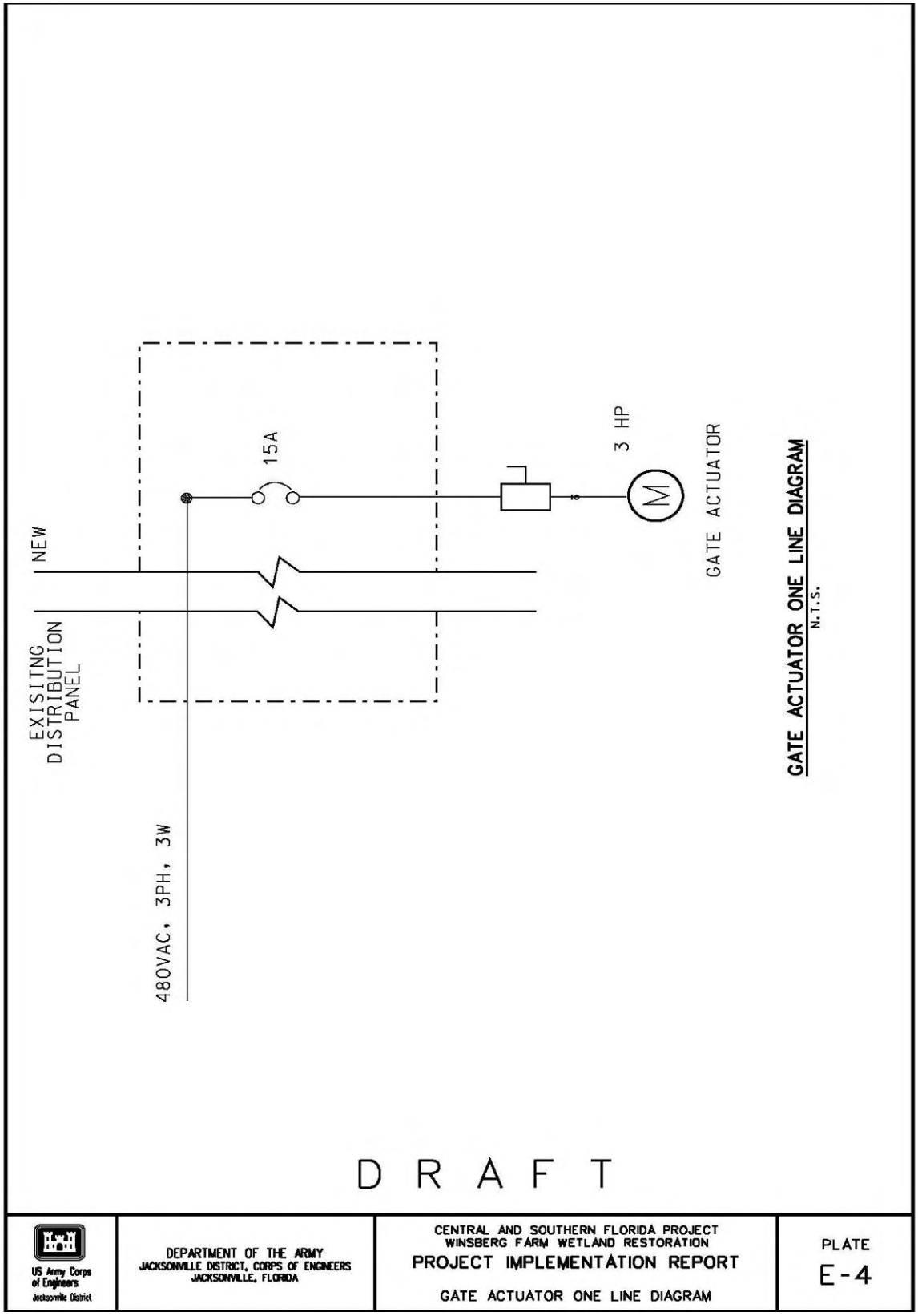


FIGURE A-26: PLATE E-4 - GATE ACTUATOR ONE-LINE DIAGRAM PLATE

This page intentionally left blank

APPENDIX B
COST ESTIMATES

This page intentionally left blank

TABLE OF CONTENTS

B COST ESTIMATES B-1
B.1 MCACES COST ESTIMATES B-1

This page intentionally left blank

B COST ESTIMATES

B.1 MCACES COST ESTIMATES

This section contains the MCACES cost estimate for the project and related text. The first MCACES was prepared in November of 2005. It contains a cost estimate for both Phase 1 and Phase 2. The costs for Phase 1 are as-built costs as the non-Federal sponsor Palm Beach County Water Utilities District has constructed all of Phase 1 including the recreation features. In this MCACES, the cost for Phase 2 are 2005 costs.

The second MCACES was prepared in August 2007 and only contains an update of the Phase 2 costs as they are the only cost that changed as Phase 2 has not been constructed.

The total construction cost of the project is $16,777,239. It is adding the Phase 1 cost from the 2005 MCACES and Phase 2 of the 2007 MCACES.

Please see the following pages for the MCACES analysis:

Print Date Thu 8 December 2005
Eff. Date 11/29/2005

U.S. Army Corps of Engineers
Project PIR_ROM: WBF_PIRv3
COE Standard Report Selections
This Estimate covers the 2 Phases of the Winsberg Farms project.

Time 16:44:07
Title Page

Estimated by Medlock II, Robert E., MSCE
Designed by CESAJ
Prepared by Medlock II, Robert E., MSCE
Preparation Date 11/29/2005
Effective Date of Pricing 11/29/2005
Estimated Construction Time 180 Days
This report is not copyrighted, but the information contained herein is For Official Use Only.

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Thu 8 December 2005
Eff. Date 11/29/2005

U.S. Army Corps of Engineers
Project PIR_ROM: WBF_PIRv3
COE Standard Report Selections

Time 16:44:07
Project Cost Summary Report Page 1

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Project Cost Summary Report			9,131,958	88,580	2,305,135	11,525,673
Phase I of Winsberg	1.00	LS	6,732,101	65,301	1,699,351	8,496,753
Alternative 2	1.00	LS	6,732,101	65,301	1,699,351	8,496,753
			3,854.12			*4,864.38*
Clearing and Grubbing	100.00	ACR	385,412	3,738	97,288	486,438
Earthwork	1.00	LS	865,264	8,393	218,414	1,092,071
			1.43			*1.81*
Wetlands Fine Grading	240,000.00	SY	343,781	3,335	86,779	433,895
Fencing	1.00	LS	277,034	2,687	69,930	349,652
RW Control Structures	1.00	LS	28,395	275	7,168	35,838
Access Road	1.00	LS	25,127	244	6,343	31,713
			2,325.98			*2,935.68*
Wetlands Planting	35.00	ACR	81,409	790	20,550	102,749
			2,325.98			*2,935.68*
Native Uplands Landscaping	21.30	ACR	49,543	481	12,506	62,530
			1,487.08			*1,876.88*
Hydroseeding	5.00	ACR	7,435	72	1,877	9,384
			235,287.78			*296,962.59*
Irrigation	1.00	EA	235,288	2,282	59,393	296,963
			129.47			*163.40*
Interpretative center	13,000.00	SF	1,683,070	16,326	424,849	2,124,244
			552,520.95			*697,350.50*
Parking Lot	1.00	EA	552,521	5,359	139,470	697,351
Boardwalk	1.00	LS	1,336,281	12,962	337,311	1,686,554
			861,540.41			*1,087,371.69*
Recycle Pump Station	1.00	EA	861,540	8,357	217,474	1,087,372
Phase II of Winsberg	1.00	LS	2,399,857	23,279	605,784	3,028,920
Alternative 2	1.00	LS	2,399,857	23,279	605,784	3,028,920
			3,854.12			*4,864.38*
Clearing and Grubbing	100.00	ACR	385,412	3,738	97,288	486,438
			3.66			*4.62*
Earthwork	51,100.00	CY	187,135	1,815	47,238	236,188
			1.43			*1.81*
Wetlands Fine Grading	241,000.00	SY	345,214	3,349	87,141	435,703
Fencing	1.00	LS	400,316	3,883	101,050	505,249
			769.69			*971.45*
RW Control Structures	40.00	LF	30,788	299	7,772	38,858
Access Road	1.00	LS	25,127	244	6,343	31,713
			2,325.98			*2,935.68*

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Thu 8 December 2005
Eff. Date 11/29/2005

U.S. Army Corps of Engineers
Project PIR_ROM: WBF_PIRv3
COE Standard Report Selections

Time 16:44:07
Project Cost Summary Report Page 2

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Wetlands Planting	35.00	ACR	81,409	790	20,550	102,749
			2,325.98			*2,935.68*
Native Uplands Landscaping	21.30	ACR	49,543	481	12,506	62,530
			1,487.08			*1,876.88*
Hydroseeding	5.00	ACR	7,435	72	1,877	9,384
Irrigation	1.00	LS	235,288	2,282	59,393	296,963
Relocation of Utilities	1.00	LS	71,767	696	18,116	90,579
Weir	1.00	LS	409,716	3,974	103,422	517,112
			170,706.69			*215,453.18*
Recycle Pump Station	1.00	EA	170,707	1,656	43,091	215,453

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms

Time 14:12:03

Winsberg Farms

Title Page

Summary estimate for planning report.

Estimated by	R. Medlock; G. Hightower; R. Clifton
Designed by	CESAJ
Prepared by	T. Leeser
Preparation Date	8/9/2007
Effective Date of Pricing	8/9/2007
Estimated Construction Time	180 Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms
Winsberg Farms

Time 14:12:03

Table of Contents

Library Properties i
Project Notes ii
Markup Properties iii
Direct Costs 1
Phase II 1
A Construction Costs 1
06 Fish and Wildlife Facilities 1
Earthwork 1
Access Road 1
Irrigation 1
Hydroseeding 1
Native Uplands Landscaping 1
Wetlands Planting 1
Fencing 1
Wetlands Fine Grading 1
Clearing and Grubbing 1
15 Flood Control and Diversion Structures 1
RW Control Structures 1
Spillway 1
B Non-Construction Costs 1
01 Lands and Damages 1
Lands and Damages 1
30 Planning, Engineering and Design 1
PED 1
31 Construction Management 1
S&A 1
Indirect Costs 2
Phase II 2
A Construction Costs 2
06 Fish and Wildlife Facilities 2
Earthwork 2
Access Road 2
Irrigation 2
Hydroseeding 2
Native Uplands Landscaping 2
Wetlands Planting 2
Fencing 2
Wetlands Fine Grading 2
Clearing and Grubbing 2
15 Flood Control and Diversion Structures 2
RW Control Structures 2
Spillway 2

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms
Winsberg Farms

Time 14:12:03

Table of Contents

B Non-Construction Costs 2
01 Lands and Damages 2
Lands and Damages 2
30 Planning, Engineering and Design 2
PED 2
31 Construction Management 2
S&A 2
Owner Costs 3
Phase II 3
A Construction Costs 3
06 Fish and Wildlife Facilities 3
Earthwork 3
Access Road 3
Irrigation 3
Hydroseeding 3
Native Uplands Landscaping 3
Wetlands Planting 3
Fencing 3
Wetlands Fine Grading 3
Clearing and Grubbing 3
15 Flood Control and Diversion Structures 3
RW Control Structures 3
Spillway 3
B Non-Construction Costs 3
01 Lands and Damages 3
Lands and Damages 3
30 Planning, Engineering and Design 3
PED 3
31 Construction Management 3
S&A 3

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms
Winsberg Farms

Time 14:12:03
Library Properties Page i

Designed by
CESAJ

Estimated by
R. Medlock; G. Hightower; R. Clifton

Prepared by
T. Leeser

Design Document

Document Date	8/9/2007
District	CESAJ-EN-C
Contact	S. Burch
Budget Year	2007
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
UserCost1

Timeline/Currency

Preparation Date	8/9/2007
Escalation Date	8/9/2007
Eff. Pricing Date	8/9/2007
Estimated Duration	180 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB04EB: MII English Cost Book 2004 Final

Labor LB04NatFD: Labor National 2004 Final Draft 2

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP03R03: MII Equipment Region 3 2003

SOUTHEAST

Sales Tax	7.50
Working Hours per Year	1,530
Labor Adjustment Factor	0.83
Cost of Money	5.75
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.065
Gas	2.800
Diesel Off-Road	2.740
Diesel On-Road	2.990

Shipping Rates

Over 0 CWT	7.00
Over 240 CWT	6.32
Over 300 CWT	5.65
Over 400 CWT	5.10
Over 500 CWT	4.55
Over 700 CWT	5.39
Over 800 CWT	5.32

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms
Winsberg Farms

Time 14:12:03
Project Notes Page ii

Date	Author	Note
9/30/2005	R. Medlock	1. This estimate is for the PIR on the 2 phase Winsberg project. The cost associated are very preliminary and are based on information received from Palm Beach County Water Utilities Department, CH2MHill, and our in house staff.
		2. Estimate is based on what is fair and reasonable for a project of this type. Careful coordination has been made to PDT members and team leaders to assure costs are accurate for given data.
8/9/2007	T. Leeser	3. This version incorporates the spillway and uses articulated concrete mats in the spillway design, as recommended in the Value Engineering Study report dated May 2007. Prices have been brought from FY 2005 to FY 2007 price levels via indexing factors taken from CWCCIS (yearly average), except for the spillway which was created in FY 2007 price levels and therefore has no adjustment (including the articulated concrete mats). The escalation applied is shown in the estimate as 'Escalation'. A contractor structure was assumed and applied to the project that is expected to be reflective of this type and order of magnitude of project. Sales tax was added to materials at a rate of 7.5%. Bond is incorporated at 2% of the running cost total. Ten percent profit was generally applied throughout. Twenty-five percent contingency was added in accordance with ER 1110-2-1302, page D-9., based on the report type and construction cost. No contingency is applied to the lands and damages costs.
8/13/2007	T. Leeser	Removed markup structure on articulated concrete mats after consultation with the PTL and ETL. The price used as the bare price is a historic bid price that is assumed to already capture all applicable markups. Also, reduced contingency on this item to 12.5% after consultation with the PTL and ETL, since they felt there were less unknowns by using the historic bid price.

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms
Winsberg Farms

Time 14:12:03
Markup Properties Page iii

Direct Cost Markups		**Category**		**Method**		
Productivity		Productivity		Productivity		
Overtime		Overtime		Overtime		
	Days/Week	*Hours/Shift*	*Shifts/Day*	*1st Shift*	*2nd Shift*	*3rd Shift*
Standard	*5.00*	*8.00*	*1.00*	*8.00*	*0.00*	*0.00*
Actual	*5.00*	*8.00*	*1.00*	*8.00*	*0.00*	*0.00*

Day	*OT Factor*	*Working*	*OT Percent*	*FCCM Percent*
Monday	*1.50*	*Yes*	*0.00*	*0.00*
Tuesday	*1.50*	*Yes*		
Wednesday	*1.50*	*Yes*		
Thursday	*1.50*	*Yes*		
Friday	*1.50*	*Yes*		
Saturday	*1.50*	*No*		
Sunday	*2.00*	*No*		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		

Contractor Markups	**Category**	**Method**
JOOH	JOOH	Running %
HOOH	HOOH	Running %
Profit	Profit	Running %
Bond	Bond	Running %

Owner Markups		**Category**		**Method**		
Escalation		Escalation		Escalation		
	StartDate	*StartIndex*	*EndDate*		*EndIndex*	*Escalation*
	10/1/2004	*608.36*	*10/1/2006*		*659.42*	*8.39*

Contingency	Contingency	Running %

Labor ID: LB04NatFD EQ ID: EP03R03 Currency in US dollars TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms

Time 14:12:03

Winsberg Farms

Direct Costs Page 1

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost
Direct Costs			686,677	269,641	328,504	0	4,696,717	0	5,981,540
Phase II	1	LS	686,677	269,641	328,504	0	4,696,717	0	5,981,540
A Construction Costs	1	EA	686,677	269,641	328,504	0	1,368,943	0	2,653,766
06 Fish and Wildlife Facilities	1	EA	641,490	257,308	217,392	0	0	0	1,116,190
Earthwork	51,100	CY	72,219	71,201	0	0	0	0	143,421
Access Road	1	LS	955	827	13,150	0	0	0	14,932
Irrigation	1	LS	112,496	2,473	24,480	0	0	0	139,448
Hydroseeding	5	ACR	810	379	3,236	0	0	0	4,425
Native Uplands Landscaping	21	ACR	6,042	428	22,898	0	0	0	29,368
Wetlands Planting	35	ACR	9,929	704	37,625	0	0	0	48,258
Fencing	1	LS	99,213	22,804	116,003	0	0	0	238,020
Wetlands Fine Grading	241,000	SY	138,074	72,381	0	0	0	0	210,455
Clearing and Grubbing	100	ACR	201,751	86,112	0	0	0	0	287,863
15 Flood Control and Diversion Structures	1	EA	45,188	12,332	111,112	0	1,368,943	0	1,537,575
RW Control Structures	40	LF	6,188	332	3,112	0	0	0	9,632
Spillway	1	EA	39,000	12,000	108,000	0	1,368,943	0	1,527,943
B Non-Construction Costs	1	EA	0	0	0	0	3,327,774	0	3,327,774
01 Lands and Damages	1	EA	0	0	0	0	2,647,774	0	2,647,774
Lands and Damages	1	EA	0	0	0	0	2,647,774	0	2,647,774
30 Planning, Engineering and Design	1	EA	0	0	0	0	380,000	0	380,000
PED	1	EA	0	0	0	0	380,000	0	380,000
31 Construction Management	1	EA	0	0	0	0	300,000	0	300,000
S&A	1	EA	0	0	0	0	300,000	0	300,000

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms

Time 14:12:03

Winsberg Farms

Indirect Costs Page 2

Description	Quantity	UOM	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
Indirect Costs			5,981,540	386,997	6,368,537	742,179	7,110,715
Phase II	1	LS	5,981,540	386,997	6,368,537	742,179	7,110,715
A Construction Costs	1	EA	2,653,766	386,997	3,040,763	742,179	3,782,941
06 Fish and Wildlife Facilities	1	EA	1,116,190	333,115	1,449,305	655,776	2,105,081
Earthwork	51,100	CY	143,421	0	143,421	97,956	241,377
Access Road	1	LS	14,932	10,199	25,130	8,917	34,047
Irrigation	1	LS	139,448	75,685	215,133	76,332	291,466
Hydroseeding	5	ACR	4,425	2,402	6,827	2,422	9,250
Native Uplands Landscaping	21	ACR	29,368	15,940	45,308	16,076	61,384
Wetlands Planting	35	ACR	48,258	26,192	74,450	26,416	100,866
Fencing	1	LS	238,020	70,433	308,453	109,444	417,896
Wetlands Fine Grading	241,000	SY	210,455	132,265	342,721	121,602	464,323
Clearing and Grubbing	100	ACR	287,863	0	287,863	196,610	484,473
15 Flood Control and Diversion Structures	1	EA	1,537,575	53,882	1,591,458	86,403	1,677,860
RW Control Structures	40	LF	9,632	2,737	12,369	4,389	16,758
Spillway	1	EA	1,527,943	51,145	1,579,088	82,014	1,661,102
B Non-Construction Costs	1	EA	3,327,774	0	3,327,774	0	3,327,774
01 Lands and Damages	1	EA	2,647,774	0	2,647,774	0	2,647,774
Lands and Damages	1	EA	2,647,774	0	2,647,774	0	2,647,774
30 Planning, Engineering and Design	1	EA	380,000	0	380,000	0	380,000
PED	1	EA	380,000	0	380,000	0	380,000
31 Construction Management	1	EA	300,000	0	300,000	0	300,000
S&A	1	EA	300,000	0	300,000	0	300,000

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

Print Date Mon 13 August 2007
Eff. Date 8/9/2007

U.S. Army Corps of Engineers
Project Planning: Winsberg Farms

Time 14:12:03

Winsberg Farms

Owner Costs Page 3

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Owner Costs			7,110,715	178,022	991,748	8,280,486
Phase II	1	LS	7,110,715	178,022	991,748	8,280,486
A Construction Costs	1	EA	3,782,941	178,022	821,748	4,782,712
06 Fish and Wildlife Facilities	1	EA	2,105,081	176,616	570,424	2,852,122
Earthwork	51,100	CY	241,377	20,252	65,407	327,035
Access Road	1	LS	34,047	2,857	9,226	46,130
Irrigation	1	LS	291,466	24,454	78,980	394,900
Hydroseeding	5	ACR	9,250	776	2,506	12,532
Native Uplands Landscaping	21	ACR	61,384	5,150	16,634	83,168
Wetlands Planting	35	ACR	100,866	8,463	27,332	136,660
Fencing	1	LS	417,896	35,061	113,239	566,197
Wetlands Fine Grading	241,000	SY	464,323	38,957	125,820	629,100
Clearing and Grubbing	100	ACR	484,473	40,647	131,280	656,400
15 Flood Control and Diversion Structures	1	EA	1,677,860	1,406	251,324	1,930,590
RW Control Structures	40	LF	16,758	1,406	4,541	22,705
Spillway	1	EA	1,661,102	0	246,783	1,907,885
B Non-Construction Costs	1	EA	3,327,774	0	170,000	3,497,774
01 Lands and Damages	1	EA	2,647,774	0	0	2,647,774
Lands and Damages	1	EA	2,647,774	0	0	2,647,774
30 Planning, Engineering and Design	1	EA	380,000	0	95,000	475,000
PED	1	EA	380,000	0	95,000	475,000
31 Construction Management	1	EA	300,000	0	75,000	375,000
S&A	1	EA	300,000	0	75,000	375,000

Labor ID: LB04NatFD EQ ID: EP03R03

Currency in US dollars

TRACES MII Version 2.2

This page intentionally left blank

APPENDIX C
ENVIRONMENTAL AND CULTURAL RESOURCES INFORMATION

This page intentionally left blank

TABLE OF CONTENTS

C ENVIRONMENTAL AND CULTURAL RESOURCES INFORMATION.....C-1
C.1 BENEFITS EVALUATION PART 1.....C-1
C.1.1 Ecological Evaluation of Alternative Sites.....C-1
C.1.1.1 Introduction.....C-1
C.1.1.2 Project Background.....C-1
C.1.1.3 Alternatives Analyzed.....C-1
C.1.1.4 Evaluation Methodology.....C-4
C.1.1.5 Scoring Alternative Sites.....C-6
C.2 WETLAND RAPID ASSESSMENT EXECUTIVE SUMMARY.....C-11
C.3 BENEFITS EVALUATION PART II - WETLAND QUALITY INDEX.....C-14
C.4 APPLICABLE FLORIDA WATER QUALITY REQUIREMENTS.....C-33
C.5 CULTURAL RESOURCES INFORMATION.....C-41
C.6 COASTAL ZONE CONSISTENCY EVALUATION.....C-41
C.7 HAZARDOUS, TOXIC AND RADIOACTIVE WASTES.....C-45

LIST OF TABLES

Table C-1: Key Differences Between The Sites.....C-4
Table C-2: WRAP Scores For Each Site.....C-8
Table C-3: Groundwater Samples Collected From Monitor Well MW-1.....C-34
Table C-4: Groundwater Samples Collected From Monitor Well MW-2.....C-35
Table C-5: Groundwater Samples Collected From Monitor Well MW-3.....C-36
Table C-6: Groundwater Samples Collected From Monitor Well MW-4.....C-37
Table C-7: Coliform Data Collected From the L-30 Conveyance Canal at El Clair Ranch Road From 1998-2002.....C-40
Table C-8: Coliform Data Collected From the L-30 Conveyance at U.S. Highway 441 From 1998 to 2002.....C-40

LIST OF FIGURES

Figure C-1: Aerial View of Site Location.....C-3

This page intentionally left blank.

C ENVIRONMENTAL AND CULTURAL RESOURCES INFORMATION

C.1 BENEFITS EVALUATION PART 1

The modified wetland rapid assessment procedure is used for the benefits evaluation.

C.1.1 Ecological Evaluation of Alternative Sites

C.1.1.1 Introduction

As part of the plan formulation process, the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACE) evaluated the environmental benefits of alternative plans for the Winsberg Farm Wetlands Restoration Project. This report documents the process used in that evaluation. It includes general project information, a description of the alternatives evaluated, an explanation of the evaluation method used and the results of the analysis. These results will be combined with cost estimates for the alternatives and used in a separate cost-effectiveness/incremental cost analysis.

C.1.1.2 Project Background

The proposed action is the construction of a wetland system hydrated with treated wastewater from the Southern Region Water Reclamation Facility (SRWRF) in Palm Beach County, Florida. Objectives of the project include:

1. Increase in the spatial extent of wetlands;
2. Creation of wildlife habitat; and
3. Beneficial use of secondary treated wastewater (with basic disinfection).

Palm Beach County, the local sponsor, constructed a project with matching objectives in the mid-1990s called the Wakodahatchee Wetlands (**Figure C-1**). Wakodahatchee is an approximately 50-acre site comprised of a mosaic of upland, emergent marsh, and deepwater habitat. The site has attracted and supported a wide variety of wildlife species in an otherwise suburban area. Given the success of the Wakodahatchee site, it served as a model wetland creation plan for this alternatives analysis.

C.1.1.3 Alternatives Analyzed

To evaluate the benefits of a range of plans, eight sites in the vicinity of the Southern Region Water Reclamation Facility (SRWRF) were considered in this analysis (**Figure C-1**). For purposes of comparison, each project area was evaluated based on project sizes of 75 acres, 150 acres, and the maximum number of acres available at a particular site. Based on earlier plan formulation

decisions, it was assumed that an identical mosaic of emergent marsh, upland buffer and deepwater refugia would be constructed on each of the alternative sites/scales, similar to the habitats created at the nearby Wakodahatchee Wetlands. Specifically, it was assumed that the site would exhibit 70 percent emergent marsh, 20 percent upland, and 10 percent deepwater habitat. The evaluation of alternatives, therefore, focused only on differences in location and size of the wetland site. Alternative sites varied in a number of important ways that would be expected to influence the ecological value of the proposed constructed wetland:

1. Proximity to the Arthur R. Marshall Loxahatchee National Wildlife Refuge (A.R.M. LNWR) varied, with the refuge adjacent to some sites and greater than three miles away from others (**Table C-1**). Proximity to the refuge was assumed to influence wildlife usage of alternative sites. Wildlife movement between the refuge and adjacent sites was assumed to be unencumbered. Movement between the refuge and sites that were farther away was considered to be limited, except for bird species.
2. Maximum project size varied between 150 acres and 640 acres at the alternative sites. Generally, larger projects were assumed to have greater wildlife value. Such sites would provide suitable area for larger wildlife species, and would, in a sense, buffer themselves from adjacent land uses.
3. Future without-project conditions vary for the alternative sites due to different Palm Beach County zoning restrictions. Generally, higher-density development is possible on the easternmost alternative site. All other sites are in the Palm Beach County Agricultural Reserve, and are subject to more restrictive zoning.
4. Extent of historic hydric soils and existing wetlands varied. Generally, hydric soils and extant wetlands were more common on the western alternative sites.

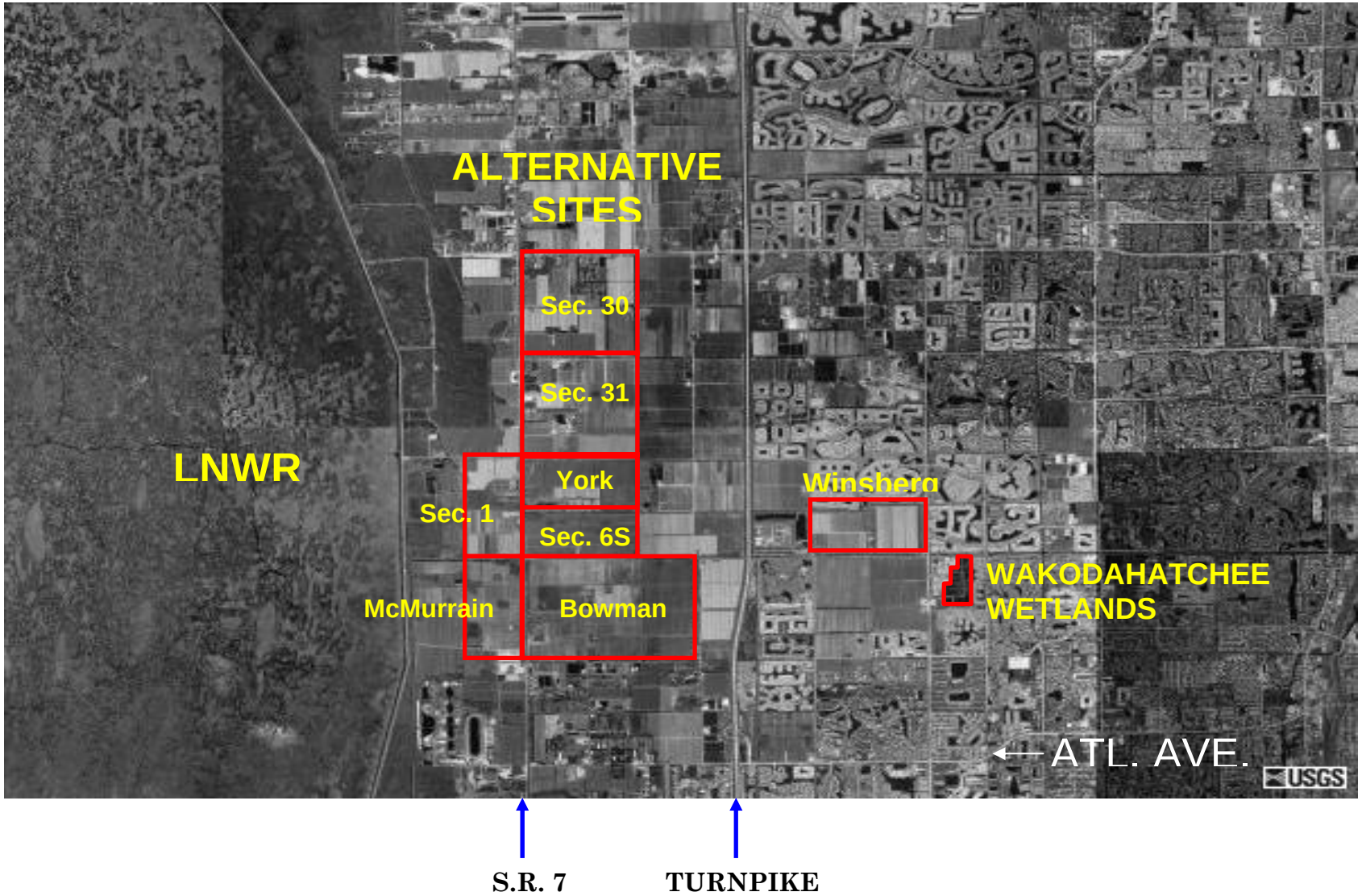


FIGURE C-1: AERIAL VIEW OF SITE LOCATION

TABLE C-1: KEY DIFFERENCES BETWEEN THE SITES

Site	Distance to Refuge	Maximum Project Size	Existing Land Use	Projected Land Use	Existing Wetlands
Winsberg	> 3 miles	150 acres	Primarily agricultural; also residential	High-density Residential	No
Bowman	≥ 1 mile	640 acres	Agricultural	Medium density Residential	Minor if at all
Sec. 6 South	≥ 1 mile	360 acres	Primarily agricultural; also residential and commercial	Medium density Residential	Minor
York	≥ 1 mile	310 acres	Primarily agricultural; also commercial	Medium density Residential	Minor
Section 31	≥ 1 mile	550 acres	Primarily agricultural; also commercial	Medium density Residential	Minor
Section 30	≥ 1 mile	540 acres	Primarily agricultural; also residential and commercial	Medium density Residential	Substantial
McMurrain	≤ 0.5 miles	175 acres	Agricultural	Low Density Residential	Substantial
Sec. 1	≤ 0.5 miles	200 acres	Primarily agricultural; also commercial	Low Density Residential	Minor

C.1.1.4 Evaluation Methodology

The potential ecological benefits of each alternative plan were quantified through the development of habitat units (HUs) designed to reflect the quality and quantity of the habitat resulting from plan implementation at a particular site.

Habitat quality was assessed for each site and condition (existing, future without-project, and future with-project) using a modified Wetland Rapid Assessment Procedure (WRAP) (Miller and Gunsalus, 1997). WRAP is a tool that was originally developed by the South Florida Water Management District (SFWMD) for the regulatory evaluation of wetland mitigation sites. The procedure considers six variables to evaluate how well a wetland is functioning:

1. Wildlife utilization;
2. Overstory/shrub canopy of desirable species;
3. Vegetative groundcover of desirable species;
4. Adjacent upland/wetland buffer;
5. Field indicators of wetland hydrology; and
6. Water quality input and treatment.

WRAP is presently utilized by USACE staff in the regulatory program in Jacksonville, and is being used to assess benefits and impacts in other CERP projects (e.g., Acme Basin B).

Two modifications of WRAP were deemed necessary for this application. First, since the wetlands envisioned here are not in existence, direct field observations could not be used. Instead, the proposed wetlands were evaluated based on assumptions about how they would function after construction, largely guided by observations of the nearby Wakodahatchee Wetland site. Second, since WRAP is designed specifically to evaluate wetland sites, changes were necessary in order to evaluate the range of upland conditions (agricultural fields and residential development) existing on the alternative sites and predicted for those sites in the future.

The modified WRAP used for this analysis included the following variables:

1. Wildlife Utilization – Sites were evaluated based on their potential to provide breeding, feeding and sheltering areas for native wildlife. As most of the sites under consideration currently provide little native habitat, direct observations of wildlife were not incorporated into the ranking methodology. Rather, the evaluators relied on observations of existing potential habitat within the alternative sites and dispersal corridors from A.R.M. LNWR. Scores were based on a rationale that closely follows the WRAP manual guidelines.
2. Vegetation – Two components of vegetative composition were used to evaluate each site: canopy and groundcover. The scoring scheme is based largely on WRAP, with minor modifications that allow for consideration of upland vegetation. Scores were calculated separately for each vegetative component and then combined as a weighted mean based on the ratio of canopy to groundcover area.
3. Adjacent Buffer – The impacts of neighboring land uses on an alternative condition were scored essentially as in WRAP.
4. Impacts to Water Resources (land use and impervious surfaces). Two attributes contribute to the score for this variable. The Land Use Category follows the WRAP methodology. The Impervious Surface scores were based on the relationship between percent cover of impervious surface and the impacts to water quality (Mesner, 2001). A third attribute, Consumptive Water Use, was considered as a potential evaluation criterion based on the water demand of different land-use types. Preliminary calculations, however, indicated a high degree of variability in water demands for agriculture depending on season and rainfall conditions. This variability reduced the utility of the Consumptive Water-Use attribute in differentiating alternative sites.

Each variable was assigned a score ranging from 0 to 3. A score of 3 for any variable indicates that a system is representative of pristine conditions, while a score of 0 indicates that a system has negligible ecological benefits.

C.1.1.5 Scoring Alternative Sites

The eight alternative sites and various scales were evaluated using the scoring scheme outlined above. Sites were evaluated using aerial photographs and direct observations made from the perimeter of each property.

As a starting point, the project team evaluated the existing and forecasted future conditions for the Wakodahatchee Wetlands, a 50-acre wetland southeast of Winsberg Farm completed by Palm Beach County in 1996. This site was evaluated because it is located in the vicinity of the alternative sites and serves as a model constructed wetland for this project. For the Wakodahatchee site, future conditions were assumed to be generally the same as existing conditions, except for wildlife utilization and canopy variables which are expected to increase in value as wetland vegetation matures.

After establishing scores for Wakodahatchee, the project team evaluated the existing, future without, and future with-project conditions for the Winsberg Farm property. The existing condition for this site was a row-crop vegetable farm, and the future with-project condition was assumed to be the same as Wakodahatchee's future condition. Based on prevailing land use in the area and the Palm Beach County Comprehensive Plan, the future without-project land use was assumed to be high-density residential development (multiple units per acre).

Finally, the additional alternative sites were evaluated in a similar manner. Each property was scored for existing, future with-project, and future without-project (residential and agricultural) conditions. As with Winsberg, existing land use for these sites is essentially agricultural, and the future with-project conditions were assumed to be the same as Wakodahatchee's future condition. Future without-project conditions varied for the sites because, unlike the Winsberg parcel, each of these properties was located in an area designated to preserve agricultural land use (Palm Beach County Agricultural Reserve). Residential development is possible in the Agriculture Reserve; however, allowable housing densities vary based on location. Simply put, properties east of State Road (SR) 7 are eligible for considerably higher housing densities than those west of SR 7. Two different future without conditions (agricultural and residential) were evaluated due to the uncertainty in future land use in this part of the Palm Beach County Agricultural Reserve.

Evaluation scores were similar among the seven properties for each of the conditions, with the following exceptions: Scores for wildlife, buffer and impervious surface were better for areas west of SR 7 due to their proximity to ARM LNWR and the assumption that potential future residential development will be at a lower density in that part of the agricultural reserve; larger

properties had higher wildlife scores for future with-project conditions based on the potential for larger natural areas to support a greater diversity of species with larger home ranges.

Scores for each variable were added together and then divided by the maximum possible score to yield a functional unit score ranging from 0 to 1 (**Table C-2**). This functional score was then multiplied by the number of acres to yield HUs. These scores were later used in a separate cost-effectiveness/incremental cost analysis.

TABLE C-2: WRAP SCORES FOR EACH SITE

Site	Condition	Size (acres)	Assessments											WRAP Score	HU (WRAP*ac)
			Wildlife Utilization	Vegetation					Buffer	Impacts to Water Resources					
				Canopy	Wt	Ground Cover	Wt	Wt Ave		Land Use	Imper Surface	Con-sum Use	Ave		
Wakodahatchee	Existing	56	2.00	1.50	1	2.00	3	1.88	0.50	3.00	3.00	N/A	3.00	0.61	34.42
	Future	56	2.25	2.00	1	2.00	3	2.00	0.50	3.00	3.00	N/A	3.00	0.65	36.17
Winsberg	Existing	150	0.75	0.00		0.00		0.00	0.75	1.00	2.50	N/A	1.75	0.27	40.63
	Future w/o project	150	0.25	0.00		0.00		0.00	0.50	1.00	0.00	N/A	0.50	0.10	15.63
	Future with-project	150	2.25	2.00	1	2.00	3	2.00	0.50	3.00	3.00	N/A	3.00	0.65	96.88
Bowman	Existing	75	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	28.75
	Future w/o-project	75	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	9.38
	Future with-project	75	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	54.69
	Existing	150	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	57.50
	Future w/o-project	150	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	18.75
	Future with-project	150	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	109.38
	Existing	310	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	118.83
	Future w/o-project	310	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	38.75
	Future with-project	310	2.50	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.75	232.50
	Existing	640	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	245.33
	Future w/o-project	640	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	80.00
	Future with-project	640	2.75	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.77	493.33
Section 6S	Existing	75	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	28.75
	Future w/o-project	75	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	9.38
	Future with-project	75	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	54.69
	Existing	150	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	57.50
	Future w/o-project	150	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	18.75
	Future with-project	150	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	109.38
	Existing	360	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	138.00
	Future w/o-project	360	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	45.00
	Future with-project	360	2.50	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.75	270.00

Site	Condition	Size (acres)	Assessments											WRAP Score	HU (WRAP*ac)
			Wildlife Utilization	Vegetation					Buffer	Impacts to Water Resources					
				Canopy	Wt	Ground cover	Wt	Wt Ave		Land Use	Imper Surface	Con-sum Use	Ave		
York	Existing	75	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	28.75
	Future w/o-project	75	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	9.38
	Future with-project	75	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	54.69
	Existing	150	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	57.50
	Future w/o-project	150	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	18.75
	Future with-project	150	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	109.38
	Existing	310	1.25	1.00	1	0.00	9	0.10	1.50	1.00	2.50	N/A	1.75	0.38	118.83
	Future w/o-project	310	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	38.75
	Future with-project	310	2.50	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.75	232.50
Section 31	Existing	75	1.25	1.00	1	0.00	20	0.05	1.50	1.00	2.50	N/A	1.75	0.38	28.42
	Future w/o-project	75	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	9.38
	Future with-project	75	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	54.69
	Existing	150	1.25	1.00	1	0.00	20	0.05	1.50	1.00	2.50	N/A	1.75	0.38	56.85
	Future w/o-project	150	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	18.75
	Future with-project	150	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	109.38
	Existing	310	1.25	1.00	1	0.00	20	0.05	1.50	1.00	2.50	N/A	1.75	0.38	117.48
	Future w/o-project	310	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	38.75
	Future with-project	310	2.50	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.75	232.50
	Existing	550	1.25	1.00	1	0.00	20	0.05	1.50	1.00	2.50	N/A	1.75	0.38	208.43
	Future w/o-project	550	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	68.75
	Future with-project	550	2.75	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.77	423.96
Section 30	Existing	75	1.25	1.00	1	0.00	15	0.06	1.50	1.00	2.50	N/A	1.75	0.38	28.52
	Future w/o-project	75	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	9.38
	Future with-project	75	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	54.69
	Existing	150	1.25	1.00	1	0.00	15	0.06	1.50	1.00	2.50	N/A	1.75	0.38	57.03
	Future w/o-project	150	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	18.75
	Future with-project	150	2.25	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.73	109.38

Site	Condition	Size (acres)	Assessments											WRAP Score	HU (WRAP*ac)
			Wildlife Utilization	Vegetation					Buffer	Impacts to H2O resources					
				Canopy	Wt	Ground cover	Wt	Wt Ave		Land Use	Imper Surface	Con-sum Use	Ave		
Section 30, Cont'd	Existing	310	1.25	1.00	1	0.00	15	0.06	1.50	1.00	2.50	N/A	1.75	0.38	117.86
	Future w/o-project	310	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	38.75
	Future with-project	310	2.50	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.75	232.50
	Existing	540	1.25	1.00	1	0.00	15	0.06	1.50	1.00	2.50	N/A	1.75	0.38	205.31
	Future w/o-project	540	0.25	0.25		0.25		0.25	0.50	1.00	0.00	N/A	0.50	0.13	67.50
	Future with-project	540	2.75	2.00	1	2.00	3	2.00	1.50	3.00	3.00	N/A	3.00	0.77	416.25
Section 12	Existing	75	1.75	2.00	1	0.00	5	0.33	2.25	1.00	2.50	N/A	1.75	0.51	38.02
	Future w/o-project	75	1.50	0.75		0.75		0.75	2.25	2.00	1.25	N/A	1.63	0.51	38.28
	Future with-project	75	2.50	2.25	1	2.00	3	2.06	2.25	3.00	3.00	N/A	3.00	0.82	61.33
	Existing	150	1.75	2.00	1	0.00	5	0.33	2.25	1.00	2.50	N/A	1.75	0.51	76.04
	Future w/o-project	150	1.50	0.75		0.75		0.75	2.25	2.00	1.25	N/A	1.63	0.51	76.56
	Future with-project	150	2.50	2.25	1	2.00	3	2.06	2.25	3.00	3.00	N/A	3.00	0.82	122.66
	Existing	175	1.75	2.00	1	0.00	5	0.33	2.25	1.00	2.50	N/A	1.75	0.51	88.72
	Future w/o-project	175	1.50	0.75		0.75		0.75	2.25	2.00	1.25	N/A	1.63	0.51	89.32
	Future with-project	175	2.50	2.25	1	2.00	3	2.06	2.25	3.00	3.00	N/A	3.00	0.82	143.10
Section 1	Existing	75	1.75	2.00	1	0.00	3	0.50	2.75	1.50	2.50	N/A	2.00	0.58	43.75
	Future w/o-project	75	1.50	0.75		0.75		0.75	2.25	2.00	1.25	N/A	1.63	0.51	38.28
	Future with-project	75	2.75	2.25	1	2.00	3	2.06	2.50	3.00	3.00	N/A	3.00	0.86	64.45
	Existing	150	1.75	2.00	1	0.00	3	0.50	2.75	1.50	2.50	N/A	2.00	0.58	87.50
	Future w/o-project	150	1.50	0.75		0.75		0.75	2.25	2.00	1.25	N/A	1.63	0.51	76.56
	Future with-project	150	2.75	2.25	1	2.00	3	2.06	2.50	3.00	3.00	N/A	3.00	0.86	128.91
	Existing	200	1.75	2.00	1	0.00	3	0.50	2.75	1.50	2.50	N/A	2.00	0.58	116.67
	Future w/o-project	200	1.50	0.75		0.75		0.75	2.25	2.00	1.25	N/A	1.63	0.51	102.08
	Future with-project	200	2.75	2.25	1	2.00	3	2.06	2.50	3.00	3.00	N/A	3.00	0.86	171.88

C.2 WETLAND RAPID ASSESSMENT EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Wetland Rapid Assessment Procedure (WRAP) is a rating index developed to assist in the regulatory evaluation of wetland sites that have been created, enhanced, preserved, or restored through the District's Management and Storage of Surface Waters or Environmental Resource Permit processes. This standardized rating index can be used in combination with professional judgment to provide an accurate and consistent evaluation of wetland sites.

The WRAP rating index establishes a numerical ranking for individual ecological and anthropogenic factors (variables) that can strongly influence the success of mitigation projects. The numerical output for the variables is then used to evaluate the current wetland condition. The rating index can be used to evaluate a wide range of wetland/upland systems (e.g., emergent marsh, wet prairie, hardwood swamp, wet pine flatwoods, etc.) but it is not intended to compare different wetland community types (i.e., marsh to wet prairie) to each other.

Use of the WRAP rating index is intended to accomplish a number of objectives: to establish a simple, accurate, consistent and timely regulatory tool; to track trends over time (land use vs. wetland impacts); and to offer guidance for environmental site plan development.

WRAP is not a substitution for applied research science. It is a tool that is to be used by the regulatory community to ensure consistency and accuracy when evaluating a site during the regulatory process of resource permitting and post permit compliance. WRAP can be used as a tool to document baseline information for a site prior to development activities. WRAP input data consist primarily of field observations and professional experience.

WRAP variables include the following:

- Wildlife Utilization
- Wetland Overstory/Shrub Canopy
- Wetland Vegetative Ground Cover
- Adjacent Upland Support/Wetland Buffer
- Field Indicators of Wetland Hydrology
- Water Quality Input and Treatment Systems

Evaluation of a wetland site requires office preparation as well as the field investigation. Office preparation includes obtaining aerial maps, identifying the project boundaries and adjacent lands uses, and identifying on-site wetland areas. In addition, the evaluator should attempt to locate any references to on-site hydrology, soils, site management, seasonal variability, wildlife studies, rainfall data and any other pertinent information.

Methodology for the Habitat Assessment Variable is a series of discussions - one for each WRAP assessment variable. Following each variable description is a rating index containing a set of calibration descriptions and corresponding score points. A score of 3 is considered the best a system can function and 0 is for a system that is severely impacted and is exhibiting negligible attributes.

-iii-

Each system must be evaluated on its own attributes and is not to be compared to a different type of system (i.e. wet prairie vs. marsh vs. cypress dome). An evaluator also has the option to score each variable in half (0.5) increments. This provides the flexibility to score a variable that is not accurately described or fitted by the calibration description. Half increments are utilized on the point scale from 0.5 through 2.5. Each applicable variable is scored: the scores are totaled ($\sum V$) and then $\sum V$ is divided by the total of the maximum score for that variable ($\sum Vmax$). The final rating score for "Habitat Assessment Variables" will be expressed as a number between 0 and 1.

WRAP has been tested statistically and found to be a repeatable procedure. A total of 303 data points was used in the preliminary testing of WRAP. This included 81 different wetland sites with between 3-5 independent evaluators per site, 8 different wetland communities and 19 land use designations. Analysis for multicollinearity among the variables yielded no significant correlation.

Ten land use designations were originally selected in the attempt to determine the degree of impact associated with the wetland variables identified in WRAP. The ten land use designations were as follows:

- Agriculture
- High Intensity Commercial
- Highways
- Industrial
- Institutional
- Low Density Residential
- Low Intensity Commercial
- Multi-Family Residential
- Recreational/open space
- Single-Family Residential

Once the testing of WRAP was complete it became apparent that for most land uses the dataset was inadequate to make any inferences with regard to land use associated with wetland impacts. In addition, the testing of WRAP identified as many as eight additional land uses that were not originally included. The current list of WRAP land use designations now includes:

- Citrus Grove
- Dairy and Feedlot
- Golf Course
- High Intensity Commercial
- Highways (low volume and high volume)
- Improved Pasture
- Industrial
- Institutional
- Low Density Residential
- Low Intensity Commercial
- Mining
- Moderately Intensive Commercial
- Multi-Family Residential
-

- Open space / Natural Undeveloped Areas
- Recreational
- Row Crop
- Single-Family Residential
- Unimproved pasture / Rangeland
- Sugarcane

As additional data are collected, further analysis will be conducted in an attempt to establish a relationship between land use and wetland function.

The overall objective in the development of WRAP is to utilize as much information as possible, both from literature reviews and professional experience, and organize it in the form of a simple but accurate rating index. In order for a functional assessment procedure to be accepted by the regulatory community, the procedure has to be simple enough to use without collecting time-consuming field data and must be able to be completed within a relatively short time period.

C.3 BENEFITS EVALUATION PART II - WETLAND QUALITY INDEX

DRAFT

SECTION 7

Evaluation of Alternatives

7.1 Alternatives Remaining Under Consideration

A quantitative analysis was performed on the short-listed design alternatives, screened from the initial list of 13 preliminary alternatives:

- Alternative 2: 140-acre fluctuating water level wetland (similar to Wakodahatchee Wetlands)
- Alternative 4: 70 acres fluctuating water level wetland on west, 70 acres short-hydroperiod wetland on east
- Alternative 11: 70 acres fluctuating water level wetland on west, 70 acres long hydroperiod wetland on east

Because fairly detailed design concepts for the west 70 acre parcel have been developed by CH2M HILL and modified by Hazen and Sawyer during prior work efforts on behalf of PBCWUD, the following analysis was focused principally on the attributes and differences among three proposed designs for the east parcel. More detailed descriptions of these east parcel concepts are provided in the subsequent section.

7.1.1 Alternative 2

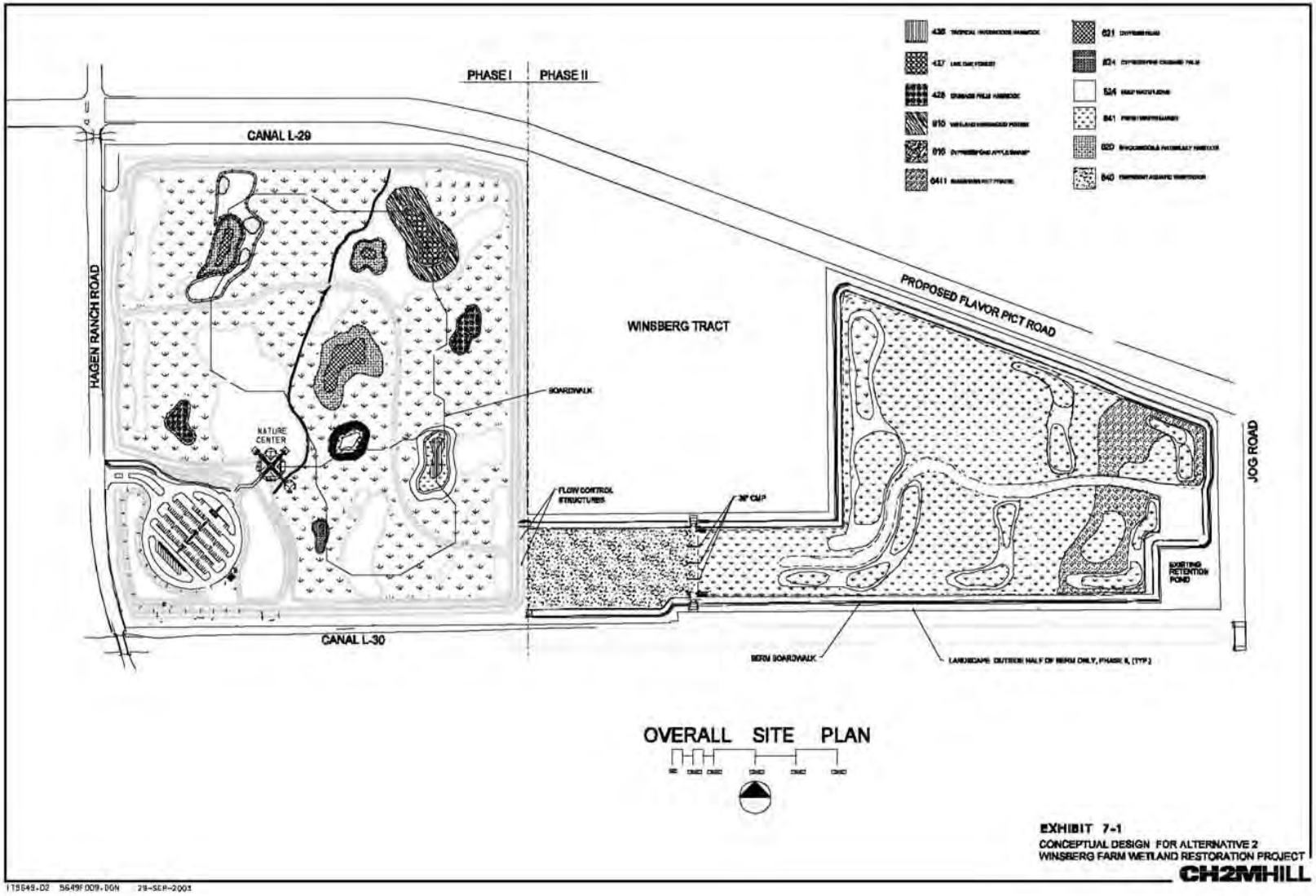
The fluctuating water level design proposed for the east parcel as Alternative 2 would largely resemble the vegetation and habitat types found in the Wakodahatchee Wetlands. This plan includes concepts proposed in previous conceptual renditions for this part of the Winsberg site (CH2M HILL, 2001a). The plan includes a mosaic of emergent marsh habitats, including relatively large areas of fireflag, pickerelweed, arrowhead, and mixtures of these species (Exhibit 7-1). A sinuous earthen berm, planted as hardwood hammock habitat, would divide the east parcel into north and south halves. Visitors would view the wetland using a trail constructed on the perimeter berm, rather than with a boardwalk loop.

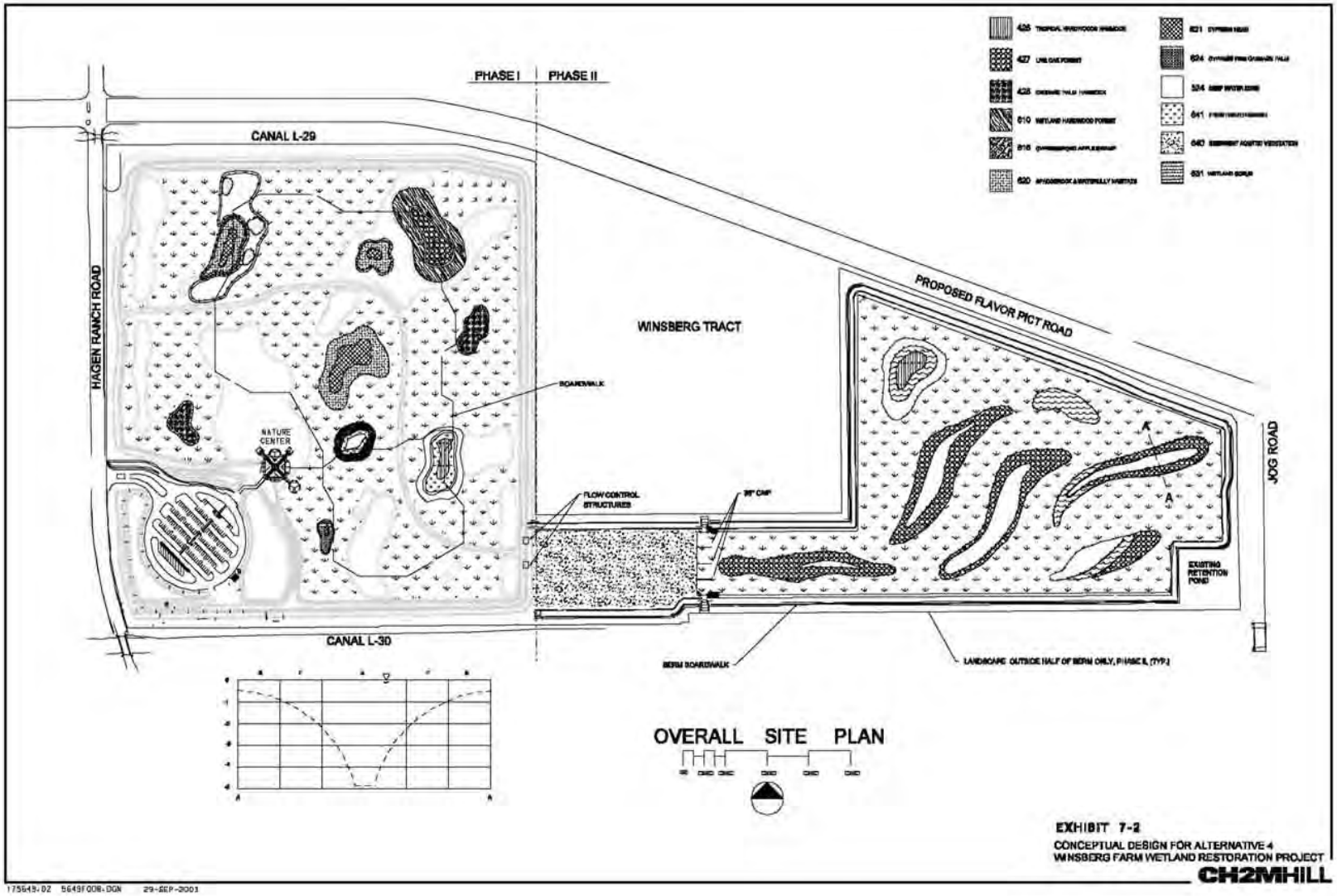
7.1.2 Alternative 4

Under Alternative 4, the eastern portion of the site would consist of largely wet prairie habitat populated by native species typically associated with shorter hydroperiods and dry periods that recur on at least an annual cycle during the winter-spring dry season. These plants would include sawgrass, muhly grass, and sand cordgrass (*Spartina bakeri*), (Exhibit 7-2). Within this background of sawgrass are habitat inclusions of upland or facultative forest, deeper water ponds, thickets of wax myrtle (*Myrica cerifera*) and cocoplum (*Chrysobalanus icaco*), and a small hardwood hammock. As with Alternative 2, visitors would view the wetland using a trail along the perimeter berm.

DFB31003696 1232.DOC/092720054
W092003006DFB

7-1


PHASE I
PHASE II
CANAL L-29
HAGEN RANCH ROAD
WINSBERG TRACT
PROPOSED FLAVOR PICT ROAD
BOARDWALK
NATURE CENTER
FLOW CONTROL STRUCTURES
JOG ROAD
EXISTING RETENTION POND
CANAL L-30
BERM BOARDWALK
OVERALL SITE PLAN
EXHIBIT 7-1
CONCEPTUAL DESIGN FOR ALTERNATIVE 2
WINSBERG FARM WETLAND RESTORATION PROJECT
CH2MHILL


PHASE I
PHASE II
CANAL L-29
HAGEN RANCH ROAD
WINSBERG TRACT
PROPOSED FLAVOR PICT ROAD
JOG ROAD
BOARDWALK
NATURE CENTER
FLOW CONTROL STRUCTURES
EXISTING RETENTION POND
CANAL L-30
BERM BOARDWALK
LANDSCAPE OUTSIDE HALF OF BERM ONLY, PHASE II, (TYP.)
OVERALL SITE PLAN
EXHIBIT 7-2
CONCEPTUAL DESIGN FOR ALTERNATIVE 4
WINSBERG FARM WETLAND RESTORATION PROJECT
CH2MHILL

DRAFT

7.1.3 Alternative 11

Under Alternative 11, the eastern portion of the site would be developed as largely a deepwater habitat, with multiple marsh or forested islands consisting of transitions from spatterdock (*Nuphar luteum*), fire flag, arrowhead, and spikerush (*Eleocharis cellulosa*) to bald cypress (*Taxodium distichum*) and pond apple (*Annona glabra*) (Exhibit 7-3). The perimeter of the deepwater habitat consists of a transition from the deeper to shallower habitat in the following sequence: fireflag, giant bulrush (*Scirpus californicus*) -- fire flag, arrowhead, spikerush — cordgrass (*Spartina bakeri*), sawgrass, muhly grass (*Muhlenbergia capillipes*), and Fakahatchee grass (*Tripsacum dactyloides*). As for the other two alternatives, public education and passive recreational opportunities would be provided by visitors use of nature trails established on the perimeter berm.

7.2 Analysis Procedures and Results

Criteria for detailed analysis of the three design alternatives and no action alternative are similar to those employed in the prescreening process but are based where possible upon a quantitative comparison using prioritized performance measures. These measures included wetland habitat type and area, local aquifer recharge, nutrient removal capacity, wetland functional assessment, and potential for public education and recreational use benefits. This section details the criteria and comparative results for each performance measure.

7.2.1 Habitat Area Analysis

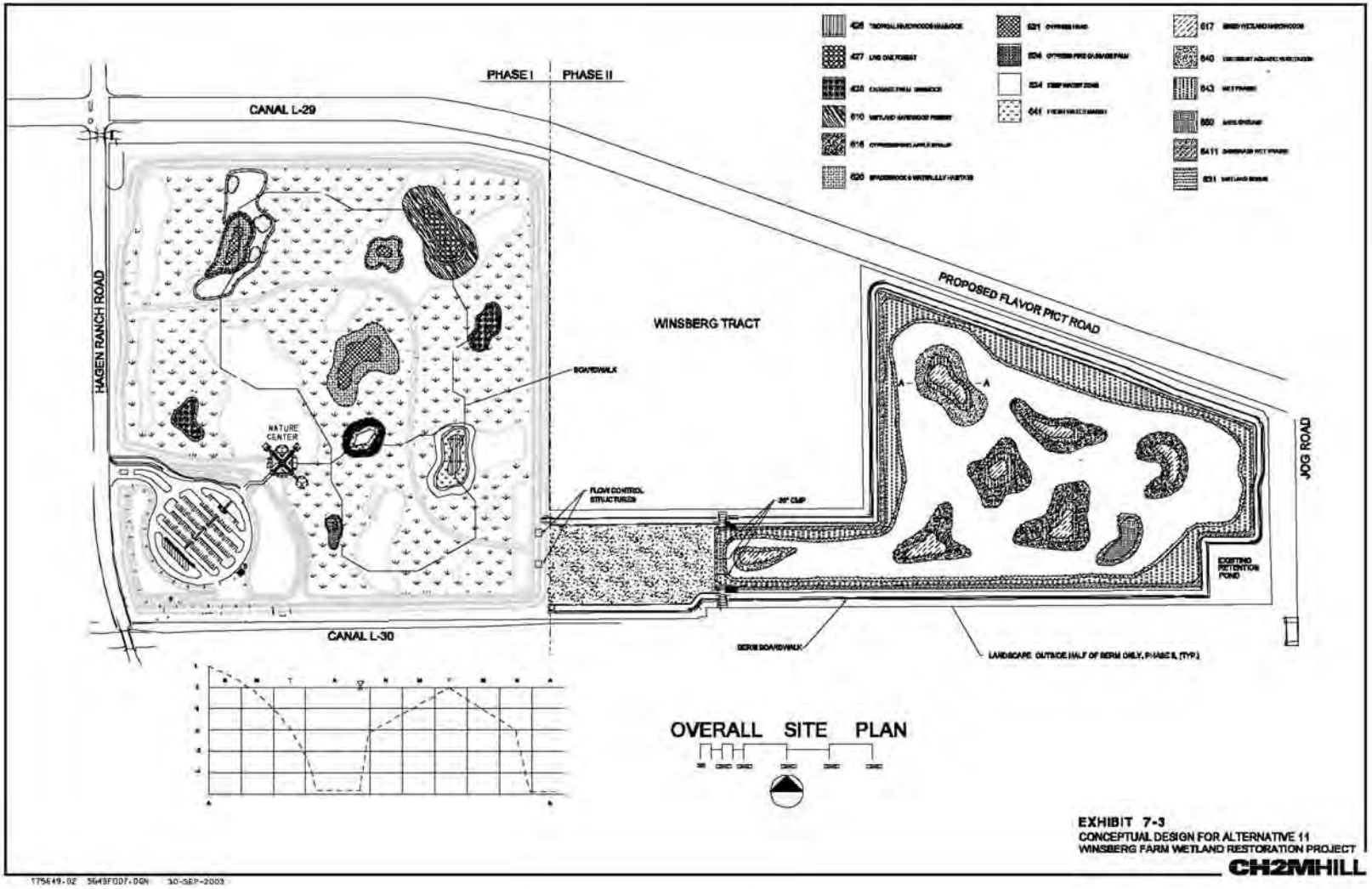
Habitat areas designated on each alternative represent not only species mixtures, but the hydrologic condition of the wetland. Exhibit 7-4 summarizes acreage of each habitat type digitized from plan views of the wetlands and categorized by Florida Land Use and Cover Classification (FLUCCS).

Habitat area analyses were utilized as the basis for both hydrologic and habitat evaluations, as they described the relative depth profiles and hydrology of the wetland alternatives, as well as the wetland species and function.

As indicated in the descriptions of each alternative and in these results, Alternative 2 is dominated largely by emergent marshes of fireflag and a relatively even distribution of other macrophytes such as sawgrass and bulrush. Alternative 4 is principally sawgrass and muhly prairie, with small areas of other macrophytes, while Alternative 11 includes large proportions of open water, but no particularly dominating vegetation type. All alternatives included a significant portion of aquatic slough habitat dominated by spatterdock, which would occupy the portion of the eastern area between the berm bounding the western wetland segment and the irrigation pump access road. This habitat is modeled after the deep zones dominated by spatterdock at the Wakodahatchee Wetlands, which would pose no significant resistance to flow between the western and eastern portions of the wetland.

7.2.2 Water Balance Analysis

A principal goal of the Winsberg Farm Wetland Restoration project is the reduction in the total quantity of wastewater that is lost to deep injection from the SRWRF. Water losses


PHASE I
PHASE II
CANAL L-29
HAGEN RANCH ROAD
WINSBERG TRACT
PROPOSED FLAVOR PICT ROAD
BOARDWALK
NATURE CENTER
FLOW CONTROL STRUCTURES
JOG ROAD
EXISTING RETENTION POND
CANAL L-30
BERM BOARDWALK
LANDSCAPE OUTSIDE HALF OF BERM ONLY, PHASE II, (TYP.)
OVERALL SITE PLAN
EXHIBIT 7-3
CONCEPTUAL DESIGN FOR ALTERNATIVE 11
WINSBERG FARM WETLAND RESTORATION PROJECT
CH2MHILL

DRAFT

Exhibit 7-4
Habitat Type and Coverage (ac) by Land Cover Classification for the East Portion of the Site

FLUCS Classification	Habitat Type	Alternative 2: Fluctuating Water Level Wetland	Alternative 4: Short Hydroperiod, East Parcel	Alternative 11: Long Hydroperiod, East Parcel
426	Tropical Hardwood Hammock	5	0.3	
540	Lakes < 10 acres	4	4	25
617	Mixed Hardwood Forest		6	
621	Cypress			2
631	Wetland Shrub Island		2	
641	Freshwater Marsh	32		11
643	Wet Prairie	6	34	3
644	Slough	8	8	14
650	Non-vegetated Wetland			0.4
Total		**54**	**54**	**54**
420	Hardwood Hammock/Pine Flatwoods Buffer	20	20	20
Total		74	74	74

DFB31003696368.xls/032720051
W092003006DFB

DRAFT

from a constructed wetland into groundwater functions to recharge the surficial aquifer system locally, thereby helping to offset the consumptive loss of water that would otherwise result from a residential or urbanized system.

Exhibit 7-5 summarizes the basis and results of a hydrologic comparison of the three conceptual alternatives, focused solely on the eastern portion of the site. The total area subject to periodic inundation (i.e., open water, wetlands, islands), the hydroperiod, and annual and daily estimates of infiltration from the wetland are provided. The latter value was estimated based upon observed infiltration rates from the Wakodahatchee Wetlands of 12,500 gallons per day per acre (CH2MHILL, 1999).

Assigned hydroperiods were either 365 days per year, indicative of continuous flooding, or 240 days per year, a value typically observed for native south Florida wetland ecosystems comprised of muhly grass and sawgrass (Schomer and Drew, 1982) and emergent marsh vegetation (Duever et al, 1979). Infiltration under Alternatives 2 and 11 was estimated to be 247 million gallons per year, while a slightly lower total of 163 million gallons per year was estimated for Alternative 4 because of the shorter hydroperiod scenario. Differences between alternatives are caused by differences in the duration of standing water in the wetland. Cumulative infiltration losses from Alternative 4, which has a shorter hydroperiod, would be expected to be less than those from with a continuous duration of inundation, such as Alternatives 2 and 11.

7.2.3 Nutrient Removal

Improvement of the secondary effluent water quality is a stated objective of the Winsberg Farm Wetland Restoration Project. Natural treatment processes of nitrogen assimilation and denitrification, as well as phosphorus assimilation and sedimentation, are estimated to improve the water quality significantly so that nutrient concentrations in water reaching the eastern section of the wetland or water infiltrating into the groundwater will be significantly decreased.

Exhibit 7-6 summarizes predicted nitrogen and phosphorus removal rates by the Winsberg Farm Wetlands Restoration Project. Removal rates were modeled using the first-order, area-based, treatment wetland design model (Kadlec and Knight, 1996). Model assumptions included a wetland area of 140 acres, 2 mgd of inflow, assumed nitrogen and phosphorus inflow concentrations based upon known performance of the SRWRF, and global average estimates of pollutant removal rates described in Kadlec and Knight (1996).

For the assumed flow and input concentration for both Alternatives 2 and 11, concentration reductions for total phosphorus were estimated to be 86 percent, with a 90 percent reduction in total nitrogen predicted. For Alternative 4, the phosphorus concentration reduction was estimated at 95 percent. A 94 percent reduction in total nitrogen was predicted. Percent removal rates are slightly higher for Alternative 4 which has a decreased hydraulic loading compared to the other alternatives. Lower hydraulic loading rates are associated with greater concentration reduction.

Total mass removal of nitrogen and phosphorus was 30 lbs/day and 413 lbs/day, respectively for both Alternatives 2 and 11, and 14 lbs/day and 186 lbs/day for Alternative 4. Mass removal rates are greater for Alternatives 2 and 11 because of the continuous hydraulic loading to the Winsberg Farm wetlands in comparison to Alternative 4.

DRAFT

Exhibit 7-5
Hydrologic Performance of Alternatives Considered for the East Portion of the Winsberg Farm Wetland Restoration Project

Parameter	Alternative 2: Fluctuating Water Level Wetland	Alternative 4: Short Hydroperiod, East Parcel	Alternative 11: Long Hydroperiod, East Parcel
Wetland Area (ac)	54	54	54
Hydroperiod (days)	365	240	365
Annual Infiltration Loss (million gallons)	247	163	247
Daily Infiltration Loss (million gallons)	0.68	0.45	0.68

Notes:
[a] Assumed hydrologic infiltration, based on actual measurements at Wakodahatchee. 12,500 gpd/ac

DFB31003696368.xls/032720051
W092003006DFB

DRAFT

Exhibit 7-6
Nutrient Removal Performance by Alternatives for the East Portion of the Winsberg Farm Wetland Restoration Project

Parameter	Alternative 2: Fluctuating Water Level Wetland	Alternative 4: Short Hydroperiod	Alternative 11: Long Hydroperiod
Nutrient Loading (lbs/day)			
Total Phosphorus Load [a]	35.0	15.1	35.0
Total Nitrogen Load [b]	458	198	458
Nutrient Removal (lbs/day)			
Total Phosphorus Retention [c]	30.1	14.4	30.1
Total Nitrogen Retention [d]	413	186	413
Notes:			
[a] Assumed total P concentration to Phase 1 (mg/L)	2.1	2.1	2.1
[a] Assumed total N concentration to Phase 1 (mg/L)	27.5	27.5	27.5
[c] Assumed total P retention by plant uptake and sedimentation; k = 10 m/yr, background (C*) = 0.02 mg/L	86%	95%	86%
[d] Assumed total N removal by denitrification, ammonia volatilization, and plant or microbial assimilation; k = 22 m/yr, C* = 1.5 mg/L.	90%	94%	90%
[e] Assumed total inflow to combined Phases 1 and 2 (mgd)	2.0	1.3	2.0

DFB31003896368.xls/032720051
W092003006DFB

DRAFT

7.2.4 Wetland Quality Index (Wetland Functional Value)

The expected ecological quality of the three short-listed alternatives was compared using the Wetland Quality Index (WQI), a wetland functional assessment methodology, originally designed for Everglades type habitats (Lodge, 1997). This method was selected for application to this analysis from a variety of wetland functional assessment methods because of it's flexibility in allowing attributes of proposed conceptual plans to be compared. Other assessment methods require the analyst to perform an evaluation of the status of an existing wetland, rather than a proposed configuration. For example, procedures such as the Wetland Rapid Assessment Procedure (WRAP) and Hydrogeomorphic (HGM) procedure are more appropriate for evaluating the success and condition of existing wetlands, including the degree to which water quality improvements are observed, presence of preferred animal species, establishment of representative hydrology, and habitat productivity. The WQI methodology is appropriate for evaluation of proposed designs because criteria used include water levels, presence and diversity of wetland plant species, hydroperiod, surrounding environment, and other attributes measurable at the design level.

In some instances, the WQI did include criteria for assessing current condition. In these cases, alternatives were typically scored equally. Brief descriptions of WQI criteria are as follows:

- Aquatic Prey Base Abundance – Prey species abundance measured in the field using throw-traps, where the number of fishes, crustaceans, mollusks, insects and others are counted in a semi-annual assessment.
- Aquatic Prey Base Diversity – Total number of qualifying species counted in at least half of the throw trap samples collected during Aquatic Prey Base Abundance procedure.
- Exotic Pest Plants – Percent cover of exotic species as defined by the Florida Department of Environmental Protection, Chapter 62C-52, Florida Administrative Code.
- Diversity of Macrophytes – Percent cover of vascular plants large enough to be observed without magnification representing over 5 percent of the total area. For this alternatives analysis, all proposed plant types were included.
- Habitat Diversity within 1,000 feet – Habitats that offer significantly different conditions than the community being evaluated, such as other uplands, shallow open water such as sloughs, Sawgrass marsh, cypress heads, etc. For the purposes of this evaluation, this criterion was assumed to reflect the total number of habitat types in the east parcel.
- Hydropattern – Water level status, where conditions include:
  - Inundation greater than 1 foot for 2.5 months or more (but not exceeding 2 feet), followed by a seasonal reduction to less than 0.5 foot for a month; this reflects an Everglades-type seasonal habitat, and for the purposes of representing a natural wetland in the region, is a relevant criterion for this evaluation
  - Depth does not exceed 0.5 foot or is greater than 2.5 feet for any period of the year
  - Conditions are between the above two

DRAFT

- Hydroperiod – Annual period of continuous inundation of at least 0.5 inch, where categories include inundation for five months or longer, but drying at least once in five years, inundation for 3 to 5 months, or greater than 5 years, or inundation for less than 3 months.
- Intactness of Wetland Resource – Criteria that include undisturbed, prior disturbance, or prior hydrologic and soil disruption (e.g., farming)
- Peat/Muck Soil Layer – Criteria include average depth > 1 foot and covers > 95 percent of the surface area, average depth 6 to 12 inches covering > 95 percent of the surface area, and average depth < 6 inches covering < 95 percent of the surface area.
- Protected Animal Species – Number of protected animal species recorded during monitoring events; assumed equal among these three alternatives in the absence of data.
- Protected Plant Species – Species listed as endangered or threatened in state or federal listings;
- Proximity to Aquatic Refugia – Degree to which wetland habitat is connected to other sources of open water, whereby replenishment of aquatic life to repopulate wetland after dry period or predation is desirable; assumed negligible for all alternatives, as the alternatives are all isolated habitats in a constructed site.
- Sheet Flow – Measure of the uniformity of water flow over wetland surface
- Surrounding Landscape Condition – Criteria include undisturbed (near natural), agricultural, rural, or lightly urbanized, and highly urbanized.
- Water Quality – Visual inspection of potential indicators of poor water quality, such as excessive algal growth, odors, aquatic faunal indicators, etc. Because of the status of the Winsberg Farm Wetland Restoration project as a wetland demonstration project receiving secondary effluent, the wetlands are assumed to exhibit similar water quality.
- Wetland Vegetation Cover – Occurrence of obligate wetland species, as defined in the National List of Plant Species that Occur in Wetlands (Chapter 62-340.450(1), FAC).
- Wildlife Use – Observations of the counts of various bird species (e.g., wading birds, ospreys, anhingas, and others), mammals (e.g., round-tailed muskrat), and reptiles (e.g., alligator, Florida softshelled turtle); based on diversity observed at Wakodahatchee, and which was assumed to be equal among the three design alternatives under consideration.

Results for the WQI analysis are provided in Exhibit 7-7. Combined scores for the WQI were 22, 18.0, and 18.5 for Alternatives 2, 4, and 11, respectively. The relatively close scoring by the three alternatives indicates that all would provide significant and comparable wetland habitat, and associated ecological functions. The following listing provides explanations and rationale for scores assigned to each alternative.

- Aquatic Prey Base Abundance – Aquatic prey abundance was considered highest for Alternative 11, where inundation is more consistent and occurs at a greater magnitude than Alternatives 2 or 4. These other alternatives were scored equally. Despite the shorter hydroperiod of Alternative 4, it would still be expected to maintain at least low to moderate numbers of aquatic prey in deep water areas.

DRAFT

Exhibit 7-7
Wetland Functional Assessment of Alternatives, Winsberg Farm Wetlands Restoration Project

Parameter / Function	Abbreviated Rating Criteria (see text)	Rating Points	Weighting Factor	Alt 2 Score	Alt 4 Score	Alt 11 Score
1 Aquatic Prey Base Abundance	High numbers of potential aquatic prey	1.00				
	Low to moderate numbers of potential aquatic prey	0.50	1	0.5	0.5	1
	Few to no aquatic prey	0.00				
2 Aquatic Prey Base Diversity	7 or more species commonly observed	1.00				
	3 - 6 species commonly observed	0.50	2	1	1	1
	2 or fewer species commonly observed	0.00				
3 Category I Exotic Pest Plant Species	<5% cover	1.00				
	Between 5% and 35% cover	0.50	2	1	1	1
	>35% cover	0.00				
4 Diversity of Macrophytes	No one species has >50% cover	1.00				
	One species has 51% to 90% cover	0.50	2	1	0.5	1
	One species has >90% cover	0.00				
5 Habitat Diversity within 1000 Feet	2 or more alternative habitats	1.00				
	One alternative habitat	0.50	1	1	1	1
	No alternative habitats	0.00				
6 Hydroperiod	5 months or longer, but drying at least once in 5 years	1.00				
	3 to 5 months, or >5 years continuous inundation	0.50	2	0.5	1	0.5
	Less than 3 months	0.00				
7 Hydropattern	> 1 ft. for > 2.5 months; < 2 ft. max.; and < 0.5 ft. for > 1 month	1.00				
	Between above and below	0.50	4	0.5	0.5	0.5
	Does not exceed 0.5 ft.; or does exceed 2.5 ft.	0.00				
8 Intactness of Wetland Resource	Undisturbed	1.00				
	Prior hydrologic disruption	0.50	1	0	0	0
	Prior hydrologic and soil horizon disruption (e.g., farming)	0.00				
9 Peat/Muck Soil Layer	Average depth > 12" and covers > 95% of surface area	1.00				
	Average depth 6" to 12" and covers at least 95% of surface area	0.50	2	1	0.5	1
	Average depth < 6" and covers < 95% of surface area	0.00				
10 Protected Animal Species Use	Verified or expected frequent use	1.00				
	Occasional use but habitat not conducive to sustained presence	0.50	1	1	1	1
	No use expected	0.00				
11 Protected Plant Species	Significant population(s) reported or known present	1.00				
	Significant population(s) possible due to habitat	0.50	1	0.5	0.5	0.5
	Habitat not conducive to significant population(s)	0.00				
12 Proximity to Aquatic Refugia	Open connection to aquatic refugia less than 600'	1.00				
	Restricted connection to aquatic refugia, or >600' but <2,500'	0.50	3	1	1	1
	Isolated from aquatic refugia, or more than 2,500'	0.00				
13 Sheet Flow (during inundation)	Uniform flow over most of the area observed or expected	1.00				
	Uneven flow due to uneven terrain, berms, ditches, etc.	0.50	1	1	1	1
	Hydrologically isolated, no net lateral movement	0.00				
14 Surrounding Landscape Condition	Undisturbed, near natural condition	1.00				
	Agricultural, rural, or lightly urbanized	0.50	1	0	0	0
	Highly urbanized	0.00				
15 Water Quality	No visual indicators of poor water quality observed	1.00				
	Visual indicators of poor water quality questionable	0.50	1	1	1	1
	Visual indicators of poor water quality observed	0.00				
16 Wetland Vegetation Cover	>50% obligate wetland species	1.00				
	Between 10% and 50% obligate wetland species	0.50	1	1	1	1
	<10% obligate wetland species	0.00				
17 Wildlife Use (may be seasonal only)	High utilization by native wetland mammals, birds, and reptiles	1.00				
	Moderate utilization by native wetland birds, mammals, or reptiles	0.50	2	1	1	1
	Low utilization by native wetland birds, mammals, or reptiles	0.00				
	Cumulative Score			22	19	20.5
	Maximum Possible Score			28	28	28

Notes
* Source: Lodge, Thomas, pers. comm.

DFB31003896368 v1/03/27/2007
W0920030060FB

DRAFT

- Aquatic Prey Base Diversity – The presence of at least 7 different species would likely be observed in each alternative, particularly in a vigorous, managed wetland habitat. Thus, each alternative was assigned a score of 1.
- Exotic Pest Plants – As with Wakodahatchee, it is expected that exotic or invasive species would be physically removed by maintenance personnel. Thus, each alternative received a score of 1.
- Diversity of Macrophytes – Macrophytic vegetation coverage was evaluated by calculating the coverage of each habitat type for each alternative (Exhibit 7-4). As previously stated, habitat areas with multiple vegetation types were assumed to exhibit equal coverage among species. Scores of 1 were assigned to Alternatives 2 and 11, where no single species covered greater than 50 percent of the area, while a score of 0.5 was assigned to sawgrass-dominated Alternative 4.
- Habitat Diversity within 1,000 feet – By design, Alternatives 2, 4, and 11 all possessed at least 2 habitat types within 1,000 feet in any direction. Each alternative was therefore assigned a score of 1.
- Hydroperiod – Alternative 4 was assigned a score of 1, as its short hydroperiod allowed drying at least once in five years, while Alternatives 2 and 11 were assigned 0.5 scores because of the assumption of continuous inundation despite meeting minimum requirements for duration of inundation. This assumption is somewhat conservative, because as shown at the Wakodahatchee site, wetland cells have been periodically drawn down for plant maintenance since the wetland was open to the public in 1996.
- Hydropattern –A score of 1 was assigned to each alternative because they all include habitats with water depths that are > 1 foot for more than >2.5 months (e.g., open aquatic habitats), < 2 feet maximum, and <0.5 foot for more than 1 month (e.g. cypress and hardwood hammock habitats).
- Intactness of Wetland Resource – All alternatives were assigned scores of 0 due to previous agricultural use of the site.
- Peat/Muck Soil Layer – Given that greater accumulation of peat will likely occur in the continuously inundated and more heavily vegetated alternatives, Alternatives 2 and 11 were assigned scores of 1. Alternative 4, which is largely a deepwater habitat, was assigned a score of 0.5.
- Protected Animal Species – Number of protected animal species recorded during monitoring events; assumed equal among the three alternatives in the absence of data.
- Protected Plant Species – The potential for serving as habitat for protected plant species such as bromeliads and orchids, or other endemic south Florida flora is considered equal among the three design alternatives because of the assumption of exotic and nuisance plant maintenance and the wide diversities of habitats in each. All alternatives were assigned a score of 0.5 for this category.
- Proximity to Aquatic Refugia – All three alternatives include deep open water or aquatic slough habitats, which will serve as dry season refugia for mosquitofish and aquatic wildlife, and were assigned a score of 1.

DRAFT

- Sheet Flow – Due to the presence of deepwater areas and islands, Alternatives 2 and 11 were assigned scores of 0.5. Alternative 4, which is largely sawgrass-dominated, was assigned a score of 1.0, as it most accurately represents a sheet-flow, even depth distribution of an Everglades type system.
- Surrounding Landscape Condition – All three design alternatives received scores of 0.5, as the surrounding landscape will ultimately be residential or part of the Winsberg family agricultural reserve, depending upon the use of the Winsberg property not included in the parcels designated for wetland restoration habitat.
- Water Quality – Due to the absence of data, each design alternative received a score of 1. Based on experience at the Wakodahatchee site, it is assumed that nutrient concentrations in the wetland will be reduced by plant and microbial processes that are comparable regardless of the conceptual design variations under consideration.
- Wetland Vegetation Cover – The design of each alternative as wetland habitat and nature of the species selected for these designs indicates that they will be largely dominated by obligate wetland species. Thus, each alternative was assigned a score of 1.
- Wildlife Use – Experience at the Wakodahatchee site and similar habitats in the region suggest that a diverse set of animal species can be expected at the wetland. Alternatives 2 and 11, both fairly diverse habitats, should be expected to contain the full suite of resident wading birds and also be used by migratory species, based upon observations at the Wakodahatchee Wetlands. In spite of the more monotypic habitat in Alternative 4, the presence of deeper and shallower habitats still suggests that animal species will be diverse and abundant. Thus, all three alternatives are assigned a score of 1.

7.2.5 Public Education and Recreation

In the absence of any differences in the nature and length of pedestrian trails or observation points among the three design alternatives (and quantitative comparisons thereof), the measurement of public interest at the Winsberg Farm site requires a substitute metric. The success of the Wakodahatchee site as a public attraction provides evidence that a diversity of environments provides a more stimulating experience than monotypic wetlands.

For the purposes of this evaluation, environmental diversity was considered analogous to the number of different habitats encountered by the visitor standing at various points along the berms on the long axis (east-west) of the wetland. Each wetland plan view was therefore evaluated using north-south transects drawn at approximately 400-foot intervals across the east-west axis of the east parcel. The number of transitions from one habitat to another were counted along each transect and averaged for each design alternative. The scores for each alternative were assumed to present the number of different wetland environments observed that would be perceived during a walk along the berm trail.

Scores were 6.1, 5.9, 10.0 for Alternatives 2, 4, and 11, respectively, where the highest score was attributable to a number of rapid transitions from the perimeter, as well as across the island units (Exhibit 7-8). Both Alternatives 2 and 11 would possess unique habitats, such as a hardwood hammock and bare-ground island, respectively. Hardwood hammock forests have become rare in heavily developed South Florida, and are present only in preserved areas. Bare ground areas are conducive to shorebird nesting, while islands in general

DRAFT

EXHIBIT 7-8
Habitat Transitions Index for the East Portion of the Winsberg Site

Transect	Alternative 2: Fluctuating Water Level Wetland	Alternative 4: Short Hydroperiod, East Parcel	Alternative 11: Long Hydroperiod, East Parcel
1	2	2	9
2	6	4	6
3	8	6	10
4	6	8	11
5	6	4	17
6	7	11	9
7	8	6	8
AVERAGE	**6.1**	**5.9**	**10.0**

Notes:
[a]Transects established in north-south direction every 400 ft along east-west axis

provide good rookery opportunities. These features would likely resemble the habitat islands in the deep water habitats of the Wakodahatchee Wetlands, which are of continued high interest to visiting bird watchers, particularly during the nesting season.

Thus, given the results of transect scoring, coupled with habitats conducive to bird nesting and foraging, Alternative 11 provides the highest score. In combination with the fluctuating water level wetland on the west parcel, it provides a different habitat type than might be realized with the other two alternatives under consideration, increasing the diversity and interest in the overall restoration project.

7.3 Summary of Technical Benefits

Exhibit 7-9 summarizes results of the performance measure comparisons by alternative. The relative placement among the four alternatives is provided for each of the categories evaluated in the previous sections. For performance in increasing local water availability (Objective 1), Alternatives 2 and 11 were equally ranked based on the estimated total infiltration recharge, as well as the expectation of mass removal of pollutants. For performance in creating wetland habitat (Objective 2), Alternative 4 was ranked first, because of the relative evenness of distribution of vegetated habitats compared with the other alternatives, and Alternatives 11 and 2 were ranked a narrow second and third, respectively. Alternative 2, with the highest WQI, was ranked highest in terms of wildlife habitat value function (Objective 3). For Objective 4: Increase Public Recreational and Educational Opportunities, Alternative 11 was ranked highest, with Alternatives 2 and 4 ranked second and third.

The average rank (with low being the best) was 1.4 for Alternative 11, 1.6 for Alternative 2 and 2.4 for Alternative 4. Based upon an unweighted average (i.e., no performance measure considered more important than another), Alternative 11 exhibited the best combination

DRAFT

Exhibit 7-9
Relative Rank of Alternatives 2, 4, and 11 by Performance Measure, Winsberg Farm Wetland Restoration

Performance Measure	Alternative 1: No Action	Alternative 2: Fluctuating Water Level Wetland	Alternative 4: Short Hydroperiod, East Parcel	Alternative 11: Long Hydroperiod, East Parcel
Objective 1: Increase Local Water Availability				
-Mass removal of pollutants		1	2	1
-Measurement of water returned to regional hydrology through runoff, perc., evap otherwise lost to deep injection wells	4	1	3	1
Objective 2: Restore wetlands on Winsberg Farm				
-Creation of mosaic of native habitats	4	3	1	2
Objective 3: Increase wildlife habitat and wetland function				
-Wetland Quality Index score	4	1	3	2
Objective 4: Enhance Public Education and Recreational Opportunities				
-Number of transitions from various wetland habitats	4	2	3	1
Average Rank	4.0	1.6	2.4	1.4

Notes:
[a] Performance measures weighted equally
[b] Values indicate rank among the four alternatives in each category

DFB31003696368.xls/032720051
W092003006DFB

DRAFT

of hydraulic capacity, species and habitat function, and recreational/educational interest. This finding warrants caution in interpretation, given the narrow difference in average score between Alternatives 2 and 11.

7.4 Relative Costs

7.4.1 Planning Level Construction Cost Estimate

Planning level construction cost estimates developed for each of the short-listed alternatives are shown in Exhibit 7-10. Costs for the western parcel were assumed to be $9.75 million, based upon available design cost estimates prepared by CH2M HILL on behalf of Palm Beach County Water Utilities Department (CH2M HILL, 2001b). The cost estimates for the eastern parcel were prepared using identical cost categories and updated unit costs reflective of 2003 pricing assumptions.

Estimated construction costs for the eastern portion of the Winsberg Farm Wetland Restoration project, corresponding to Alternatives 2, 4, and 11 totaled $2.68 million, $2.50 million, and $3.64 million, respectively. Total construction costs for Alternatives 2, 4, and 11 when combined Phase 1 estimates are $12.43 million, $12.25 million, and $13.39 million, respectively. Alternative 11 includes the greatest amount of earthwork to establish the predominant pond habitats, and Alternative 4 requires the least, assuming that the construction approach would be to minimize grading and maximize to the extent possible the existing soil surface for establishment of a shallow wet prairie.

As highlighted in the table, the differences between alternatives are attributed to differences in excavation quantities, areas of wetland fine grading and planting, and planting costs for islands. All other costs are estimated to be identical between alternatives. For the purpose of this planning-level estimate, cut and fill quantities are assumed to balance from within the site, and residual cut and fill estimates would be either taken from or applied to the perimeter berm surrounding the site.

The cost estimates shown have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions, final project costs, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding.

7.4.2 Operation, Maintenance and Monitoring Cost Estimate

Routine maintenance is anticipated to be necessary to sustain each of the Winsberg Farm Wetland Restoration project alternatives to be free of exotic and invasive nuisance vegetation. This effort is an important reason why the Wakodahatchee site continues to be free of dominance by nuisance and exotic vegetation seven years after project opening.

Other likely maintenance costs include grounds maintenance and upkeep of structures and buildings. However, because the primary difference between construction cost estimates for the three alternatives is related to the extent of wetland excavation, filling, grading and

DRAFT

Exhibit 7-10
Conceptual Construction Cost Estimate, Winsberg Farm Wetland Restoration Project

Parameter	Units	Unit Cost	Alternative 2: Fluctuating Water Level Wetland	Alternative 4: Short Hydroperiod	Alternative 11: Long Hydroperiod
Clearing and Grubbing - Light	AC	$ 500	$ 37,500	$ 37,500	$ 37,500
Clearing and Grubbing - Heavy	AC	$ 1,000	$ 20,000	$ 20,000	$ 20,000
Earthwork - Excavation	CY	$ 12	$ 289,200	$ 270,000	$ 1,642,800
Earthwork - Fill and Compact	CY	$ 8	$ 215,200	$ 233,600	$ 235,200
Wetlands Fine Grading	AC	$ 1,000	$ 49,800	$ 50,100	$ 29,400
6-ft Chain Link Fence	LF	$ 10	$ 85,000	$ 85,000	$ 85,000
Concrete Culvert and Control Stop Log Structure	EA	$ 75,000	$ 150,000	$ 150,000	$ 150,000
Access Road	LF	$ 100	$ 40,000	$ 40,000	$ 40,000
Wetlands Planting	AC	$ 8,000	$ 398,700	$ 400,900	$ 234,900
Native Uplands Landscaping - Buffer Zone	AC	$ 40,000	$ 800,000	$ 800,000	$ 800,000
Native Uplands Landscaping -Islands	AC	$ 75,000	$ 344,400	$ 165,600	$ 116,500
Berm/Swale Hydroseeding	AC	$ 500	$ 2,200	$ 2,200	$ 2,200
Irrigation	EA	$ 250,000	$ 250,000	$ 250,000	$ 250,000
Total			$ 2,682,000	$ 2,504,900	$ 3,643,500
Phase 1 Total			$ 9,750,000	$ 9,750,000	$ 9,750,000
Phase 1 and Phase 2 Total			$ 12,432,000	$ 12,254,900	$ 13,393,500
Operation and Maintenance (Annual	AC	$ 1,000	$ 70,000	$ 70,000	$ 49,000
Vegetation Monitoring (Annual	AC	$ 1,000	$ 70,000	$ 70,000	$ 49,000
Revegetation (annual)	AC	$ 8,000	$ 12,000	$ 12,000	$ 12,000
Groundwater and Surface Quality Monitoring (Quarterly	EA	$ 2,300	$ 9,000	$ 9,000	$ 9,000
Total			$ 161,000	$ 161,000	$ 119,000
Notes:					
Total Area		AC	74	74	74
Total Wetland Area		AC	54	54	54
Total Open Water Area		AC	4	4	25

DFE31003696368 xls/03272005 1
W092003006DFB

DRAFT

planting, these operation and monitoring (O&M) cost estimates were developed solely based upon the available wetland and native buffer area requiring vegetation maintenance.

Wintering waterfowl, changes in operating water elevations, non-target effects during routine nuisance vegetation control, and vegetation adaptation to and tolerance of the available source waters have all contributed to changes in vegetation coverage at the Wakodahatchee site since 1996. For planning purposes, about 15 percent of the Winsberg Farm wetlands are assumed to require replanting every five years, or about 1.5 acre per year at a unit cost of $8,000.

Monitoring costs are presumed to be based primarily upon the need to track and remedy possible changes in the planted vegetation. However, provisions were included for monthly monitoring of five deep and five shallow aquifer groundwater monitoring wells, presuming that compliance with state groundwater quality and reuse quality guidelines will have to be demonstrated on a quarterly basis. Quarterly surface water quality monitoring is also assumed for the inflow plus four monitoring stations to be located throughout the Winsberg Farm project site. For conceptual budgeting purposes, water samples are assumed to be analyzed for total kjeldahl nitrogen and nitrate+nitrite nitrogen to demonstrate compliance with total nitrogen limits, total phosphorus for informational purposes, and chloride and total hardness as indicators of dilution or movement of wetland source water into the local groundwater. To create an allowance for quality assurance and quality control sampling, an additional 15 percent was added to the unit cost. The list of analytes selected for water quality assessment may differ from these assumptions.

Annual vegetation monitoring, maintenance, revegetation, and water quality monitoring costs totaled $161,000 for Alternatives 2 and 4 and $119,000 for Alternative 11.

7.5 Cost Effectiveness

A comparison of the three alternatives indicates that Alternative 11 showed an incrementally greater cumulative set of benefits than Alternative 2, and both of these alternatives performed better than Alternative 4. However, the construction costs for Alternative 11 were nearly $1 million greater than Alternative 2. Operation, maintenance, and monitoring costs are slightly greater for Alternatives 2 and 4 over Alternative 11, but these differences appear relatively inconsequential relative to the incremental cost in construction.

C.4 APPLICABLE FLORIDA WATER QUALITY REQUIREMENTS

There is a number of State of Florida statutes with which the project must comply.

1. Chapter 62-302, FAC Standards for Surface Water Quality;
2. Chapter 62-600, FAC Standards for Groundwater Quality, Domestic Wastewater;
3. Chapter 62-610, FAC Standards for Reclaimed Water and Land Application Systems;
4. Chapter 62 520, FAC Standards for Groundwater Quality;
5. Regulations for Discharges Under the Underground Injection Control Program (UIC) Chapter 62-528; and
6. Regulations for Discharges to Manmade Wetlands Under the FAC Chapter 62-611.

Ch. 62-600, Florida Administrative Code (FAC) -- Minimum Treatment Standards (Rule 62-600.420) – Technology-Based Effluent Limitations (TBELS). Under Secondary Treatment rules, all domestic wastewater facilities shall be designed to achieve an effluent after disinfection containing not more than 20 mg/L CBOD5 and 20 mg/L Total Suspended Solids (TSS), or 90 percent removal of each of these pollutants from the wastewater influent, whichever is more stringent.

When plant effluent is to ultimately be discharged to Class I waters, facilities are required to achieve pollutant reduction to levels beyond that specified by secondary treatment. Specifically, reclaimed water or effluent discharge shall:

- Meet "Additional Treatment" water-quality standards. These consist of the minimum treatment standards (Technology Based Effluent Limitations (TBELs)) plus any Water Quality-Based Effluent Limitations (WQBELs) determined to be applicable by Florida Department of Environmental Protection (FDEP);
- Receive high-level disinfection (defined as a total chlorine residual of at least 1.0 milligram per liter maintained at all times);
- Not to exceed 10 milligrams per liter TN; and
- Achieve WQBELs specific to surface receiving waters when applicable [e.g., Impaired Waters (303d-listed), Non-Degradation Standards].

Ch. 62-610, FAC — Aspects of Slow-Rate Land Application Systems (Rule 62-610.410) and Rapid-Rate Land Application Systems (Rapid Infiltration Basins and Absorption Fields; Rule 62-610.510) apply to the Winsberg Farm Wetlands Restoration Project. Under the former rule, pre-application treatment must result in reclaimed water meeting, at a minimum, secondary treatment and

basic disinfection levels (total chlorine residual of at least 0.5 milligram per liter maintained after at least 15 minutes contact time at the peak hourly flow) before land application. Under the latter rule, the same secondary treatment and basic disinfection levels are required; also, nitrate concentration in the applied reclaimed water shall not exceed 12 mg/L (as nitrogen) unless reasonable assurance is provided that 10 mg/L will not be exceeded in a down-gradient perimeter monitoring well or other established background levels.

Applicable Water Quality Standards — Discharge from the SRWRF has been authorized by the following permits: (1) ERP SI 50-0050844-014 for the PBC Southern Region Wastewater Facility Expansion/Winsberg Farm Interpretive Center, and (2) SFWMD Surface Water Management Permit (as modified) 50-01793-S for the SRWRF. The former defers to the latter for a description of applicable water quality standards that may govern the compliance of plant discharge(s). Primarily, Classes I or III of Rule 62-302 may be referenced for numerical limits of up to 48 selected parameters identified in the SFWMD permit. However, in August 2002, FDEP offered the Palm Beach County Water Utility District (PBCWUD) an opportunity to prove project permittability via a demonstration project. The PBCWUD was required to test samples from existing Wakodahatchee monitoring wells for pertinent FAC 62-600 parameters (discussed above) and Total Coliforms. In October 2002, The PBCWUD submitted monitoring results in compliance with the FDEP demonstration plan. PBCWUD provided data pertaining to Primary/Secondary Drinking Water Standards, Total Coliform, Fecal Coliform, Total Nitrogen, Turbidity and Chlorine Residual. These results proved to be satisfactory and, as a result, an Environmental Resource Permit was issued for the PBC Southern Region Wastewater Facility Expansion/Winsberg Farm Interpretive Center on June 26, 2003. The following tables (**Tables C-3** through **C-6**) display the results of monitoring wells.

TABLE C-3: GROUNDWATER SAMPLES COLLECTED FROM MONITOR WELL MW-1

Parameter (No, of Samples)	Min.	Max.	Avg.	Std. Dev.
Arsenic (7)	0.0004	0.00152	0.001024	0.000441
Barium (6)	0.000749	0.0114	0.00763	0.00426
Cadmium (7)	0.000025	0.0003	0.00010	0.00010
Chloride (9)	34.3	100.3	80.9	20.8
Chromium (7)	0.000983	0.0112	0.00386	0.00368
Conductivity, micromhos per sq. cm. (9)	625	890	732	87
Fecal Coliform, cols. per 100 mL (9)	<1	<1	<1	0
Lead (7)	0.000182	0.0017	0.00081	0.00064
Mercury (6)	<0.0001	0.14	0.02348	0.05709

Ammonia (9)	2.06	8.65	5.10	2.05
Nitrite (9)	<0.0100	0.08	0.0228	0.0249
Nitrate (9)	0.0344	2.52	0.6255	0.7599
pH (9)	6.43	7.12	6.80	0.22
Sodium (3)	46.3	62.4	53.6	8.2
Sulfate (7)	19.6	63.3	33.9	15.5
Total Dissolved Solids (TDS, 9)	328	492	408	52.75
Temp (9)	24	27.3	25.6	0.9
Total Kjeldahl Nitrogen (9)	0.896	11	6.62	3.18
Total Nitrogen (9)	0.945	11.3	7.26	3.44
Notes: Samples collected quarterly from 1999 through 2001. All values in mg/L unless otherwise noted.				

TABLE C-4: GROUNDWATER SAMPLES COLLECTED FROM MONITOR WELL MW-2

Parameter (No. of Samples)	Min.	Max.	Avg.	Std. Dev.
Arsenic (7)	0.00011	0.00116	0.00066	0.00036
Barium (6)	0.0123	0.0285	0.01672	0.00593
Cadmium (7)	0.000015	0.00005	0.00003	0.00001
Chloride (9)	41.8	102.4	78.5	21.4
Chromium (7)	0.00053	0.0023	0.00138	0.00076
Conductivity, micromhos per sq. cm. (9)	461	699	607	82
Fecal Coliform, cols. per 100 mL (9)	<1	<1	<1	0
Lead (7)	<0.0001	0.0026	0.00073	0.00096
Mercury (6)	<0.0001	0.14	0.02348	0.05709
Ammonia (9)	0.246	6.32	1.74	1.81
Nitrite (9)	<0.0100	0.04	0.011	0.012
Nitrate (9)	<0.0100	0.32	0.100	0.106
pH (9)	6.81	7.37	7.05	0.19
Sodium (3)	43.1	62.6	53.0	9.8
Sulfate (7)	2.2	38.8	22.8	13.5
TDS (9)	268	392	350	38
Temp (9)	24.1	27.3	25.47	1.13
Total Kjeldahl Nitrogen (9)	1.01	6.78	2.61	1.80
Total Nitrogen (9)	1.18	6.79	2.71	1.77
Notes: Samples collected quarterly from 1999 through 2001. All values in mg/L unless otherwise noted. *Groundwater Samples Collected From Wakodahatchee Wetlands Monitor Well MW-2				

Four mercury values were greater than the applicable drinking water standard. The mercury exceedance are most likely sampling or laboratory contamination incidents, given the low concentration of mercury in the remainder of the samples and that all four mercury values that exceeded the MCL occurred on the same test date. Only two tests for total dissolved solids (TDS) were found to approach the drinking water MCL (90 percent of the MCL).

TABLE C-5: GROUNDWATER SAMPLES COLLECTED FROM MONITOR WELL MW-3

Parameter (No. of Samples)	Min.	Max.	Avg.	Std. Dev.
Arsenic (7)	0.00029	0.00300	0.00099	0.00091
Barium (6)	0.0201	0.0305	0.02470	0.00378
Cadmium (7)	<0.00003	<0.0001	NA	NA
Chloride (9)	54.6	111.2	80.8	17.3
Chromium (7)	0.00018	0.0029	0.00127	0.00096
Conductivity, micromhos per sq. cm. (9)	489	717	627	69
Fecal Coliform, cols. per 100 mL (9)	<1	<1	<1	0
Lead (7)	<0.0003	0.0021	0.00068	0.00070
Mercury (6)	<0.0001	0.13	0.02611	0.05808
Ammonia (9)	3.21	13.4	6.77	3.61
Nitrite (9)	<0.0100	0.0481	0.011	0.014
Nitrate (9)	<0.0100	0.492	0.109	0.173
pH (9)	6.52	7.09	6.74	0.18
Sodium (3)	51.2	72.6	59.6	11.4
Sulfate (7)	21.7	32.3	29.2	3.6
TDS (9)	234	420	348	52
Temp (9)	24.3	27.8	25.7	1.2
Total Kjeldahl Nitrogen (9)	3.49	18.9	9.01	4.86
Total Nitrogen (9)	3.6	18.9	9.1	4.8

Notes: Samples collected quarterly from 1999 through 2001.
All values in mg/L unless otherwise noted.
*Groundwater Samples Collected From Wakodahatchee Wetlands Monitor Well MW-3

The highest recorded nitrate value for all four monitoring wells was 20 times below the MCL of 10mg/l. Eight TN concentrations at or near 10 mg/L in MW-1 and MW-3 are most likely attributable to the Wakodahatchee Wetlands, which were created from percolation ponds in limited operation since the early 1970s. The eight values included mostly ammonia and organic nitrogen, which are the

main components of nitrogen found in treated wastewater effluent used to hydrate the Wakodahatchee Wetlands. Given the high concentrations of ammonia-nitrogen in the wetland influent, the production of nitrate through nitrification is inevitable. The low values of nitrate and nitrite within the groundwater samples documents the effective de-nitrification of nitrate to nitrogen gas within the wetland.

TABLE C-6: GROUNDWATER SAMPLES COLLECTED FROM MONITOR WELL MW-4

Parameter (No. of Samples)	Min.	Max.	Avg.	Std. Dev.
Arsenic (7)	0.00043	0.00206	0.00102	0.00057
Barium (6)	0.000582	0.012	0.0076553	0.00407
Cadmium (7)	<0.00003	0.00015	0.000047	0.00005
Chloride (9)	6.3	23.7	12.56	5.19
Chromium (7)	<0.0002	0.0043	0.0018	0.0014
Conductivity, micromhos per sq. cm. (9)	412	665	504.22	88.37
Fecal Coliform, cols. per 100 mL (9)	<1	<1	<1	0
Lead (7)	0.000484	0.00516	0.00149	0.00168
Mercury (6)	<0.0001	0.14	0.02348	0.05709
Ammonia (9)	0.195	0.78	0.51	0.18
Nitrite (9)	<0.0100	0.01	0.006	0.002
Nitrate (9)	<0.0100	0.501	0.135	0.176
pH (9)	6.46	7.05	6.74	0.22
Sodium (3)	2.69	5.92	3.93	1.74
Sulfate (7)	1.84	28.1	11.89	8.44
TDS (9)	244	422	314.6	59.6
Temp (9)	23.4	26.4	25.3	0.99
Total Kjeldahl Nitrogen (9)	0.583	1.34	0.93	0.23
Total Nitrogen (9)	0.82	1.63	1.07	0.28

Notes: Samples collected quarterly from 1999 through 2001.
All values in mg/L unless otherwise noted.
*Groundwater Samples Collected From Wakodahatchee Wetlands Monitor Well MW-4

Though the proposed project does not currently consist of an alternative that includes surface water discharge, the L-30 conveyance, located on the southern boundary of the Winsberg property, has been listed (as Segment E-3) as an impaired water body (reference Impaired Waters Rule, 62-303 FAC). The parameters of concern for which the L-30 has been listed are Coliforms, Nutrients and Dissolved Oxygen (DO).

Since Total Maximum Daily Loads (TMDLs) have not been calculated for the E-3 segment, the Comprehensive Everglades Restoration Plan (CERP) general policy of not degrading receiving water bodies would be adhered to for design and operations development purposes (in other words, the wetlands are recommended to be designed for zero discharge to the no-compliant canal waters).

Discharges of wastewater are regulated under the National Pollutant Discharge Elimination Survey (NPDES) Program. By State law, wastewater discharges to surface water and aquifers must meet surface water standards. Due to the high WQ standards and low assimilative capacity of waterways, most wastewater plants do not discharge to surface waters. Similarly, treated wastewater is not discharged to surficial aquifers. These standards prevent wastewater plants from discharging to natural wetlands.

In most reuse applications, discharges are restricted to constructed wetlands. The Wakodahatchee is a constructed wetland. The Winsberg Farm is proposed constructed wetland. These discharges are regulated under FAC 62-610. Prior to discharge, these reuse facilities must meet removal requirements for nutrients, pathogens and toxics. Reuse facilities require advanced disinfection and filtration prior to discharge. The constructed wetlands are designed so that the assimilative capacity for nutrients is not exceeded.

As a permitted and regulated facility, the SRWRF meets these (referenced) standards. It is an advanced secondary plant that provides removal of Biochemical Oxygen Demand (BOD), suspended solids, pathogens and some nitrogen compounds. It has two wastewater effluent filters and post-disinfection that it employs for water discharged to the Wakodahatchee Wetland. Winsberg Farm will receive effluent from these filters and post-disinfection.

The following provides a detailed discussion of water quality provided by the SRWRF and a case history of two constructed wetlands. The SRWRF consists of typical process features designed to produce a high-level, secondarily treated effluent [bar, grit chamber, aeration-nitrification basin (for step aeration-activated sludge treatment), clarifier. The reclamation feature consists of filter system where high-level disinfection occurs]. Treated secondary effluent from SRWRF meets all primary/secondary drinking water standards except for odor and color.

- **Total Coliform:** Low values (0-380 cfu/ml) of Total Coliform were present in the SRWRF secondary effluent as expected, and these values are considerably less than the adjacent surface water bodies, such as Canals L-30 and L-31 which varied from 30–7,000 cfu/1000 ml. Higher values of Total Coliform were found in Wakodahatchee Wetlands' pond cells AG

and I, presumably due to the presence of many different wildlife species that have chosen these wetlands as their habitat.

- **Fecal Coliform:** There are no signs of Fecal Coliform present in any of the four ground-water monitor wells at the perimeter of the Wakodahatchee Wetlands, nor in the SRWRF effluent or reclaimed water. Fecal Coliform counts in Canals L-30 & L-31 varied between 4-800 cfu/100 ml. Higher values of Fecal Coliform were found in Wakodahatchee Wetlands' Ponds AG&I due to the presence of many different wildlife species that have chosen these wetlands as their habitat.

- **Chlorination:** Reported Free Chlorine Residuals ranged from 0.24 to 3.2 mg/l (approximate average of 1.8 mg/l) in SRWRF effluent for the monitoring period that ranged from August–September 2002. This value range compares favorably with the recommended minimum range of about 0.2 to 0.5 mg/l free chlorine residual. At this range, satisfactory disinfection (i.e., deactivation of giardia cysts) can be achieved if the residual (free chlorine, hypochlorous acid, and hypochlorite ions) is distributed and maintained throughout the system in question. Reported Free Chlorine residuals ranged from 1.8 to 6.8 mg/l (approximate average of 4.4 mg/l) in reclaimed water during the same time period. This higher range is desirable due to the fact that the fate of reclaimed waters will be in a system where organic/inorganic materials will be present, pH may be low, and mixing opportunities limited. These and other factors increase the chlorine demand, and, thus, the requirement for a higher chlorine presence in reclaimed waters. For example, wetland N species will likely consist of ammonia nitrogen. The ammonia will combine with chlorine to form chloramines (available combined residual). The chloramines will provide disinfection, but with lesser intensity than free chlorine residuals. The reported higher range will ensure that chlorine (primarily combined) residual will meet the recommended 1.0 to 2.0 mg/L at distant points in the receiving waters.

- **Nutrients:** Total Nitrogen values in SRWRF secondary effluent varied from 25.2 and 32.3 mg/l, and from 23.8 to 30 mg/l in the reclaimed water. Total Nitrogen values in pond cells AG and I varied from 3.1 to 12.1 mg/l, indicating the treatment capability of wetland vegetation in removing nutrients. Total Nitrogen values in perimeter monitor wells varied from 1.4 to 9.6 mg/l. However, when measured as Nitrate, in accordance with the regulatory requirement, the values were considerably less than the limit of 10 mg/l N measured as NO3. Total Phosphorus results were not included in the 2002 Palm Beach County Water Utilities Department Water Quality Analytical Results Report to FDEP; however, SRWRF effluent values were reported in the 1999 PBCWUD Underground

Injection Control (UIC) WQ Comparison report. Total Phosphorus in the effluent was reported as 1.4 mg/l.

Two sampling stations along the L-30 Conveyance were sampled between 1998 and 2002 by LWDD. The total and fecal coliform data results can be found in **Tables C-7 and C-8** below, respectively.

TABLE C-7: COLIFORM DATA COLLECTED FROM THE L-30 CONVEYANCE CANAL AT EL CLAIR RANCH ROAD FROM 1998-2002

Year (No. of Samples)	Total Coliform		Geometric Mean	Fecal Coliform		Geometric Mean
	Min.	Max.		Min.	Max.	
1998 (12)	130	2,400	857.7	13	930	112.1
1999 (12)	BDL1	2,400	581.7	22	930	89.0
2000 (11)	80	2,400	714.5	11	1,600	78.8
2001 (12)	300	1,600	858.0	17	1,600	244.5
2002 (9)	30	1,600	366.4	30	900	168.3
Period of Record (56)	BDL1	2,400	665.8	11	1,600	125.6
Notes: 1=Below Detection Limit Source=Lake Worth Drainage District						

TABLE C-8: COLIFORM DATA COLLECTED FROM THE L-30 CONVEYANCE AT U.S. HIGHWAY 441 FROM 1998 TO 2002

Year (No. of Samples)	Total Coliform		Geometric Mean	Fecal Coliform		Geometric Mean
	Min.	Max.		Min.	Max.	
1998 (12)	240	2,400	1,086.3	23	2,400	102.9
1999 (12)	170	2,400	1,087.9	2	2,400	66.2
2000 (11)	130	1,600	511.4	4	1,600	50.1
2001 (12)	80	1,600	646.2	7	900	64.2
2002 (9)	35	1,600	470.6	4	240	46.3
Period of Record (56)	35	2,400	733.0	2	2,400	64.6
Notes: Source=Lake Worth Drainage District						

C.5 CULTURAL RESOURCES INFORMATION

A Phase I Cultural Resource Survey of the Winsberg Farm property was conducted on February 14, 2003, by a USACE contractor. The survey concluded that the project area had no significant cultural resources listed, nor was it eligible for listing on the National Register of Historic Places. No further evaluation, documentation or fieldwork was recommended.

In addition, a review of the Florida Master Site files indicated no reported cultural resources in the project area.

C.6 COASTAL ZONE CONSISTENCY EVALUATION

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM FEDERAL CONSISTENCY EVALUATION PROCEDURES

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed project is not seaward of the mean high water line and would not affect shorelines or shoreline processes.

2. Chapters 163 (Part II), 186 and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the state's future. Its purpose is to define, in a broad sense, goals and policies that provide decision-makers directions for the future, and provide long-range guidance for orderly social, economic and physical growth.

Response: The proposed project has been coordinated with various federal, state and local agencies during the planning process. Environmental assessment will be coordinated with the state to determine final compliance.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed action would have no adverse affect on existing or projected future flood control, or public safety. Adequate flood control for residents of the region will be maintained. This action would be consistent with the efforts of the Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed action will make a positive contribution to preserving water, fish and wildlife, and wetland resources, and will not influence other resources mentioned above. The proposed project would comply with the intent of this chapter.

5. Chapters 253, 259, 260 and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: The property proposed for this project is already in public ownership. The proposed project would comply with the intent of this chapter.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project would have no direct or indirect adverse impact on state parks or aquatic preserves and is thus consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes procedures and responsibilities for implementing the Florida Historic Resources Act.

Response: The proposed project has been coordinated with the State Historic Preservation Officer (SHPO).where an archival and literature search was conducted. The SHPO concurred with USACE's determination that the proposed project will not adversely affect any significant cultural or historic resource. The project will thus be consistent with the goals of this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: Contributions from the study area to the state's tourism economy would not be compromised by implementation of the proposed project. The project would

be compatible with tourism in this area and would be consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe, balanced and efficient transportation system.

Response: No public transportation system would be impacted by the proposed project.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic and other studies and research.

Response: The proposed action is located more than five miles from the coast and would have no effect on saltwater resources either directly or indirectly through downstream discharge.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission (now called the Florida Fish and Wildlife Conservation Commission) and directs it to manage freshwater aquatic life and wild animal life and their habitat. This will perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic and economic benefits.

Response: The project will have a long-term positive effect on freshwater aquatic life or wild animal life.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage and consumption of water.

Response: The proposed project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage and transportation of pollutants and the cleanup of pollutant discharges.

Response: The proposed project does not involve the transportation or discharge of pollutants.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling and production of oil, gas and other petroleum products.

Response: The proposed project does not involve the exploration, drilling or production of gas, oil or petroleum products and, therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed project would further the goals of this chapter by contributing to a long-range master plan for South Florida's water resources, which would support the continued orderly social, economic and physical growth of the region.

16. Chapters 381 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: Wetlands naturally attract mosquitoes and other pest arthropods. Part of wetland maintenance will include periodic spraying for any pests.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: A draft environmental assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies, including the FDEP. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. Water-quality certification will be sought from the state prior to construction. Accordingly, this project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state's soil and water through the Department of

Agriculture. Land-use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop and utilize soil and water resources on site or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: Project construction and implementation will include appropriate erosion control plans and measure to ensure compliance with the intent of this chapter.

C.7 HAZARDOUS, TOXIC AND RADIOACTIVE WASTES

Environmental Site Assessments (ESAs) were conducted on the Winsberg, Bowman, York and McMurrain properties. The analytical results are presented below.

Summary of Analytical Results from Winsberg (Green Cay) Farms PCAR (Phase II Environmental Assessment).

A. Groundwater

1. Of all volatile and semi-volatile organic compounds in the six groundwater samples, only one exceeded reportable limits. Benzene (VOC) occurred in sample MW-3 at 1.2 uq/l (compared to 1.0 uq/l). However, re-analysis showed benzene concentrations below reportable limits.
2. All chlorinated pesticides and polychlorinated biphenyl (PCB) concentrations fell below reportable limits.
3. Nitrate concentrations in three samples -- MW-2, MW-2S and MW-2E -- exceeded the Florida primary drinking water standard (Chapter 62-550.310, F.A.C.) maximum contaminant level of 10 mg/l.
4. Regarding metals, though samples contained low concentrations of barium, copper, lead and zinc, none of these metals exceeded the Florida primary or secondary drinking water standards of 2.0 mg/l, 1.0 mg/l, 0.015 mg/l, and 5.0 mg/l, respectively.
5. The arsenic concentration (0.056 mg/l) in one sample -- MW-2E -- exceeded the Florida primary drinking water standard (0.050 mg/l).
6. No samples contained reportable quantities of cyanide.

B. Surface Water

Concentrations of analytical constituents, including chlorinated pesticides, PCBs and herbicides, fell below reportable limits for all three surface-water samples -- SW-1 and SW-4 (in the L-30 Conveyance) and SW-3 (in the north-south drainage canal).

Total Nitrogen and Total Phosphorus concentrations ranged from 1.2 to 1.3 mg/l and 0.12 and 0.13 mg/l, respectively.

C. Soil

1. All volatile and semi-volatile organic analyses fell below reportable limits in each of the two surface soil samples -- SS-MW-3A and SS-MW-3B (duplicate) -- in the vicinity of MW-3.
2. Testing was conducted for eight chlorinated pesticides (delta-BHC; chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT, dieldrin, endrin and methoxychlor); all were detected. Concentrations were below Florida soil clean-up targets for either residential or groundwater leachability.
3. All but one sample contained reportable quantities of 4,4'-DDT and/or its breakdown byproducts (4,4'-DDD and 4,4'-DDE). None of these samples exceeded the Florida soil clean-up targets for either residential or groundwater leachability.
4. One sample contained a dieldrin concentration of 4.2 ug/kg; which is in exceedance of the leachability criteria of 4.0 uq/l.
5. With the exception of arsenic, all soil samples contained low, albeit compliant, concentrations of metals. All eight samples of arsenic equaled or exceeded the residential exposure comparison criteria of 0.8 mg/kg. (Samples SS-1A, SS-1B, SS-2, SS-6, SS-7, SS-11, SS-12, SS-17 equaled 0.84, 1.5, 0.80, 0.80, 0.80, 0.84, 1.0 and 0.82, respectively.)

Contractor (Taylor Engineering) Recommendations:

The project contains relatively low levels of some persistent pesticides throughout the site. Recommend further interpretation of soil analytical results to help determine potential ecological impacts that may occur during operations of the proposed project.
Assessment revealed no unbiased soil or groundwater analytical evidence of petroleum product contamination. No further action required.
Elevated nitrate levels in the area of MW-2 were assumed to be, most likely, due to storage and handling of fertilizer localized around the fertilizer storage/mixing area. Since such storage practices have been discontinued, no further action is required.

USACE Recommendations:

Actual exceedances of Florida soil clean-up target levels are rare, marginal, and/or disputed (biased, as proved by duplicate tests). Consequently, the only remaining concern is the widespread occurrence of chlorinated pesticides, particularly 4,4'-DDT and DDT byproducts (4,4'-DDD and 4,4'-DDE). Though analytical data revealed no apparent contamination hot spots for pesticides to

minimize any potential leaching into the water, the top six inches (estimated) of the existing topsoil layer will be scraped off the entirety of the footprint and stockpiled within the project site to be subsequently used in the construction of the tree islands. At the same time that the topsoil is being excavated, the exterior ditch/berm combination feature will be constructed and capped.

II. Summary of Analytical Results from Bowman Property Phase I/II Environmental Assessments

A. Phase I Environmental Assessment (Phase I ESA) was conducted by URS Corporation of the 960-acre Bowman property located east of State Road 441, west of Starkey Road, north of the Lake Worth Drainage District L-32 Canal, and south of the LWDD L-30 Canal (Conveyance) west of the city of Delray Beach. The Phase I ESA was prepared in accordance with the American Society for Testing and Materials' (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527–00). The purpose of this Phase I ESA was to identify Recognized Environmental Conditions (RECs) relating to hazardous substances and petroleum products on the subject property and/or adjoining properties, as defined by the ASTM.

The Phase I ESA of the Bowman property has revealed evidence of potential RECs. The areas of concern and associated assessment recommendations are as follows:

- Western/Central/Eastern Agricultural Areas (B-1) – Sample soil and groundwater for agro-/petrochemicals and Metals;
- Former Cattle Pen Area (B-2) – Sample for soil and groundwater for pesticides, petrochemicals and arsenic;
- Eastern Equipment Staging Area (B3) – Sample soil and groundwater for agrochemical and soil amendment constituents;
- Western Equipment Staging Area (B-4) – Sample soil and groundwater for agrochemical and soil amendment constituents;
- Pole Barn (B-5) – Sample soil and groundwater sampling in the area of the pole barn structure for agrochemical and petroleum constituents;
- Pump Stations (B-6) – Sample soil at all pump locations for typical petroleum constituents;
- Canal Sediments (B-7) – Sample sediment for metals, herbicides and pesticides;
- Solid Waste Dumping Areas (B-8) – Sample soil and groundwater in the area of solid-waste dumping observed in the Farm Support/Equipment Staging Area for typical landfill indicators; and

- Farm Support Area (B-9) – Sample for typical agrochemical and petrochemical constituents in the area of the former farm support structure.

Phase II ESA activities were based on the preliminary results of the above URS Phase I ESA. The objective of the Phase II ESA was to further evaluate areas of potential environmental concern for the presence of contaminants. The Phase II assessment was conducted to evaluate potential impacts to the soil and groundwater resulting from a release of pesticide/herbicides, metals and/or petroleum product handling during day-to-day operations. Soil and groundwater analytical results from the Phase II ESA investigations were reviewed to evaluate the necessity for, and estimated costs of, corrective actions, as deemed necessary.

Fourteen soil samples, 11 groundwater samples and two sediment samples were collected from various areas and analyzed for pesticides, herbicides, metals and petroleum hydrocarbons. Twenty-six soil borings were advanced and soils were screened for organic petroleum vapors. Numerous test pits were excavated in three areas of the Bowman property where solid waste and debris were observed. The following conclusions/recommendations were given for each of the above-listed areas of concern:

- Western/Central/Eastern Agricultural Areas (B-1) – No corrective actions recommended.
- Former Cattle Pen Area (B-2) – No additional investigations warranted.
- Eastern Equipment Staging Area (B3) – Recommend repair of secondary containment structure; excavation and disposal of about 5 cubic yards of stained soil.
- Western Equipment Staging Area (B-4) – No additional assessment or corrective actions warranted.
- Pole Barn (B-5) – Excavate and properly dispose of soil contaminated with 4,4-DDE and low levels of arsenic, barium, chromium, copper and lead.
- Pump Stations (B-6) – Retrofit fuel and return lines to pump station; provide secondary containment to any existing ASTs.
- Canal Sediments (B-7) – No assessment or corrective actions are warranted.
- Solid Waste Dumping Areas (B-8) – Collect and remove solid wastes and debris to permitted facilities and close septic systems.
- Farm Support Area (B-9) – Toxaphene concentrations exhibited in groundwater samples decreased with each sampling event, indicating that these levels may have been a result of groundwater coming into contact with toxaphene-impacted soils during monitor-well installation. Recommend at least one additional groundwater sample. (Note: Palm Beach County [Interoffice Memorandum, 3 May 2001] determined that no

additional toxaphene testing was needed, primarily since soil was below target clean-up levels and groundwater was only slightly above target clean-up levels. Another reason given for the discontinuation of testing is the fact that farming was expected to continue on the property.)

III. Summary of Analytical Results from McMurrain Farms Phase I/II Environmental Assessments

A. Phase I and II environmental site assessment was performed on the McMurrain Farms property. Phase II indicated the presence of DDE and copper in background locations and toxaphene at two point-source locations.

A subsequent, expanded sampling program was conducted on the property to evaluate the extent of these impacts. A 95 percent upper-confidence statistical analysis was then applied to these constituents to calculate average concentration values. The UCL results indicated that the site-average concentration for toxaphene was 229.48 ug/kg, for copper the UCL was 39.59 mg/kg, and for DDE the UCL was 1.40 ug/mg. These average concentrations exceeded published sediment quality assessment guidelines for the protection of sediment-dwelling organisms in Florida Sediment Quality Assessment Guidelines (SQAG) for toxaphene (TEC=0.10 ug/kg; PEC=32 ug/kg) and copper (TEC=32 mg/kg; PEC=150 mg/kg). The average concentration for DDE was below the designated SQAG (TEC=3.2 ug/kg; PEC= 31 ug/kg) for that compound.

Environmental Consulting & Technology, Inc. (ECT), recommended calculating site-specific sediment guidelines based upon site-specific soil type, organic carbon content, and site flooding with freshwater (non-saline). Once site-specific SQAGs were to be derived for this property, ECT believed it could make a defensible argument as to the viability of this property being developed into a reservoir with acceptable risk to target species. This approach is similar to the one tentatively agreed to by the U.S. Fish and Wildlife Service (USFWS) and USACE technical staff. In such cases, the USFWS, local sponsor, and USACE will coordinate the appropriate monitoring and/or remediation effort. The local sponsor will be the lead agency in scoping and funding any corrective action.

IV. Summary of Analytical Results from the York Property

During the field reconnaissance portion of the Phase I assessment, URS/Dames & Moore identified 10 areas of potential environmental concern. During the Phase II environmental site assessment (ESA), soil and groundwater investigations further evaluated the property for the presence or absence of contamination associated with the aforementioned areas. The assessment included the advancement of 46 soil borings, collection of 22 soil samples for

laboratory analysis, installation of 11 temporary groundwater monitoring wells, and the collection of groundwater samples for laboratory analysis. Collected samples were submitted for analyses for the presence of pesticides and herbicides, petroleum constituents and/or selected metals.

On the basis of information obtained from the Phase I and II ESAs, URS/Dames & Moore recommended additional assessment of arsenic impacted groundwater in the former equipment staging area. However, no additional assessment of the former mix and load area (0.009 mg/l mercury) or the fertilizer mix and load (0.064 mg/l lead, 108 mg/l nitrate) areas were recommended at the time of report release. Finally, comprehensive assessment and subsequent corrective actions, with respect to the petroleum impacted soils identified at the maintenance shed, and corrective actions in the form of source removal at each of the pump stations were recommended.

APPENDIX D
REAL ESTATE

This page intentionally left blank

TABLE OF CONTENTS

D REAL ESTATE D-1
D.1 STATEMENT OF PURPOSE D-1
D.2 PROJECT AUTHORIZATION D-1
D.3 PROJECT LOCATION D-4
D.4 PROJECT DESCRIPTION AND FEATURES D-6
D.5 TEMPORARY WORK AREAS D-13
D.6 BORROW AND DISPOSAL SITES D-13
D.7 ACCESS TO PROJECT AREA D-13
D.8 FEDERAL GOVERNMENT-OWNED LAND D-13
D.9 EXISTING FEDERAL PROJECTS D-14
D.10 NON-FEDERALLY OWNED LAND D-14
D.11 ESTATE ANALYSIS D-14
D.11.1 Minimum Real Estate Interest Factors D-14
D.11.2 Paragraph 1.9.3.a. D-15
D.11.3 Paragraph 1.9.3.b. D-18
D.11.4 Paragraph 1.9.3.c. D-18
D.11.5 Paragraph 1.9.3.d. D-19
D.11.6 Paragraph 1.9.3.e. D-19
D.11.7 Paragraph 1.9.3.f. D-19
D.11.8 Paragraph 1.9.3.g. D-20
D.11.9 Paragraph 1.9.3.h. D-20
D.11.10 Paragraph 1.9.3.i. D-20
D.11.11 Paragraph 1.9.3 Conclusion D-21
D.12 LERRD CREDITING D-21
D.13 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE D-22
D.13.1 Contractor Recommendations D-22
D.13.2 USACE Recommendation D-23
D.14 UNIFORM RELOCATION ASSISTANCE ACT, PL 91-646 ..... D-23
D.15 RELOCATIONS, ALTERATIONS, VACATIONS AND ABANDONMENT D-23
D.16 INDUCED FLOODING D-24
D.17 MINERAL AND TIMBER ACTIVITIES D-25
D.18 ZONING ORDINANCES D-25
D.19 NAVIGATIONAL SERVITUDE D-25
D.20 NON-FEDERAL AUTHORITY TO PARTICIPATE IN THE PROJECT D-25
D.21 PROJECT SUPPORT D-25
D.22 REAL ESTATE ACQUISITION SCHEDULE D-25
D.23 BASELINE COST ESTIMATES AND MCASES COST ESTIMATES D-26
D.24 PROJECT MAP D-28

LIST OF TABLES

Table D-1: Project Features and Components D-9
Table D-2: Summary of the Baseline Cost Estimate D-26
Table D-3: MCASES for Real Estate D-27

LIST OF FIGURES

Figure D-1: Study Area D-5
Figure D-2: Project Location Map D-6
Figure D-3: General Site Plan D-7
Figure D-4: Site Plan Phase 1 ..... D-10
Figure D-5: Site Plan Phase 2 ..... D-12
Figure D-6: Planimetric Map of the Project Area D-28

D REAL ESTATE

D.1 STATEMENT OF PURPOSE

The purpose of this Real Estate Plan (REP) is to present the overall real estate requirements, costs, acquisition schedules, and other real estate requirements necessary for the Central and Southern Florida, Comprehensive Everglades Restoration Plan (CERP), Winsberg Farm Wetlands Restoration Project. This REP is tentative in nature, and the final real property acquisition lines and estimates of value are subject to change after approval of the Project Implementation Report (PIR), decision document, to which this Plan is appended.

D.2 PROJECT AUTHORIZATION

Along with the Central & Southern Florida (C&SF) Comprehensive Review Study, the Winsberg Farm Wetlands Restoration Project PIR was authorized by Section 309(l) of the Water Resources Development Act (WRDA) of 1992 (Public Law 102-580) which states:

"(1) CENTRAL AND SOUTHERN FLORIDA -- The Chief of Engineers shall review the report of the Chief of Engineers on Central and Southern Florida, published as House Document 643; 80th Congress, 2nd Session, and other pertinent reports, with a view to determining whether modifications to the existing project are advisable at the present time due to significantly changed physical, biological, demographic, or economic conditions, with particular reference to modifying the project or its operation for improving the quality of the environment, improving protection of the aquifer, and improving the integrity, capability, and conservation of urban water supplies affected by the project or its operation."

This study is also authorized by two resolutions of the Committee on Transportation and Infrastructure, United States House of Representatives, dated September 24, 1992. The first resolution states:

"Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, that the Board of Engineers for Rivers and Harbors, is requested to review the report of the Chief of Engineers on Central and Southern Florida, published as House Document 643, Eightieth Congress, Second Session, and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable at the present time, in the interest of environmental quality, water supply and other purposes."

The second resolution states:

"Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, that the Board of Engineers for Rivers and Harbors, is requested to review the report of the Chief of Engineers on Central and Southern Florida, published as House Document 643, Eightieth Congress, Second Session, and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable at the present time, in the interest of environmental quality, water supply and other purposes for Florida Bay, including a comprehensive, coordinated ecosystem study with hydrodynamic modeling of Florida Bay and its connections to the Everglades, the Gulf of Mexico, and the Florida Keys Coral Reef ecosystem."

The Water Resources Development Act of 1996 was enacted on October 12, 1996. Section 528 of the Act (Public Law 104-303), entitled "*Everglades and South Florida Ecosystem Restoration*," authorizes a number of ecosystem restoration activities and also provides specific direction and guidance for the CERP.

(b) RESTORATION ACTIVITIES

1. *COMPREHENSIVE PLAN*

(A) DEVELOPMENT

(i) PURPOSE -- The Secretary shall develop, as expeditiously as practicable, a proposed Comprehensive Plan for the purpose of restoring, preserving and protecting the South Florida ecosystem. The Comprehensive Plan shall provide for the protection of water quality in, and the reduction of the loss of fresh water from, the Everglades. The Comprehensive Plan shall include such features as are necessary to provide for the water-related needs of the region, including flood control, the enhancement of water supplies, and other objectives served by the Central and Southern Florida Project.

(ii) CONSIDERATIONS -- The Comprehensive Plan shall

(I) Be developed by the Secretary in cooperation with the non-federal project sponsor and in consultation with the Task Force; and

(II) Consider the conceptual framework specified in the report entitled "Conceptual Plan for the Central and Southern Florida Project Restudy," published by the Commission and approved by the Governor.

(B) SUBMISSION -- Not later than July 1, 1999, the Secretary shall

(i) Complete the feasibility phase of the Central and Southern Florida Project comprehensive review study as authorized by section 309(l) of the Water Resources Development Act of 1992 (106 Statue. 4844), and by two resolutions of the Committee on Public Works and

Transportation of the House of Representatives, dated September 24, 1992; and

(ii) Submit to Congress the plan developed under subparagraph (A)(i) consisting of a feasibility report and a programmatic environmental impact statement covering the proposed federal action set forth in the plan.

(C) ADDITIONAL STUDIES AND ANALYSES -- Notwithstanding the completion of the feasibility report under subparagraph (B), the Secretary shall continue to conduct such studies and analyses as are necessary, consistent with subparagraph (A)(i).

In Section 601 of the Water Resources Development Act of 2000 (PL 106-541), Congress approved the C&SF Project Comprehensive Review Study Integrated Feasibility Report and Programmatic Environmental Impact Statement (known as the "*Yellow Book*"), which describes and outlines the CERP:

(b) Comprehensive Everglades Restoration Plan

2. *APPROVAL*

(A) IN GENERAL -- Except as modified by this section, the Plan is approved as a framework for modifications and operational changes to the Central and Southern Florida Project that are needed to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Plan shall be implemented to ensure the protection of water quality in, the reduction of the loss of fresh water from, and the improvement of the environment of the South Florida ecosystem and to achieve and maintain the benefits to the natural system and human environment described in the Plan, and required pursuant to this section, for as long as the project is authorized.

A Project Implementation Report must be completed for Acme Basin B Discharge as set forth in Section 601(b) (2) (D) of WRDA 2000.

(i) PROJECT IMPLEMENTATION REPORTS -- Before implementation of a project described in any of clauses (i) through (x) of subparagraph (C), the Secretary shall review and approve for the project a project implementation report prepared in accordance with subsections (f) and (h).

(ii) SUBMISSION OF REPORT -- The Secretary shall submit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environment and Public Works of the Senate the project implementation report required by sub-sections (f) and (h) for each project under this paragraph (including all relevant data and information on all costs).

(iii) FUNDING CONTINGENT ON APPROVAL -- No appropriation shall be made to construct any project under this paragraph if the project implementation report for the project has not been approved by resolutions adopted by the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environment and Public Works of the Senate.

Finally, Section 601(h)(4) of WRDA 2000 further requires that PIRs document:

4. PROJECT-SPECIFIC ASSURANCES

(A) PROJECT IMPLEMENTATION REPORTS

(i) IN GENERAL -- The Secretary and the non-federal sponsor shall develop project implementation reports in accordance with Section 10.3.1 of the Plan.

(ii) COORDINATION -- In developing a project implementation report, the Secretary and the non-federal sponsor shall coordinate with appropriate federal, state, tribal, and local governments.

(iii) REQUIREMENTS -- A project implementation report shall

(I) Be consistent with the Plan and the programmatic regulations promulgated under paragraph (3);

(II) Describes how each of the requirements stated in paragraph (3)(B) is satisfied;

(III) Comply with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.);

(IV) Identify the appropriate quantity, timing, and distribution of water dedicated and managed for the natural system;

(V) Identify the amount of water to be reserved or allocated for the natural system necessary to implement, under state law, sub-clauses (IV) and (VI);

(VI) Comply with applicable water quality standards and applicable water quality permitting requirements under subsection (b)(2)(A)(ii);

(VII) Be based on the best available science; and

(VIII) Include an analysis concerning the cost-effectiveness and engineering feasibility of the project.

D.3 PROJECT LOCATION

The project is located within an unincorporated area of Palm Beach County commonly referred to as West Boynton. It is part of greater Boynton Beach, which includes the City of Boynton Beach and the incorporated area to the west. The boundaries of West Boynton are generally considered to be Hypoluxo Road to the north, Military Trail to the east, Florida's Turnpike to the west, and Lake

Worth Drainage District Lateral Canal L-30 to the south. The project area is within Township 46 South, Range 42 East, in Sections 3 and 4, Palm Beach County, Florida. The project site is mostly bounded by Hagen Ranch Road to the west, L-29 to the north, Jog Road to the east, and L-30 to the south. Most of the area consists of low- to medium-density residential development. The neighborhood is approaching 60 percent build-out with a few significant, large tracts of vacant land in agricultural use available between Jog Road and Hagen Ranch Road. The land west of Hagen Ranch Road remains largely agricultural. Access to the project area is from major federal and state roads and highways onto Hagen Ranch Road or onto Jog Road. See map and figures below entitled "Winsberg Farm Wetlands Restoration Project – CERP, **Figure D-1** Study Area, and **Figure D-2** Project Location Map.

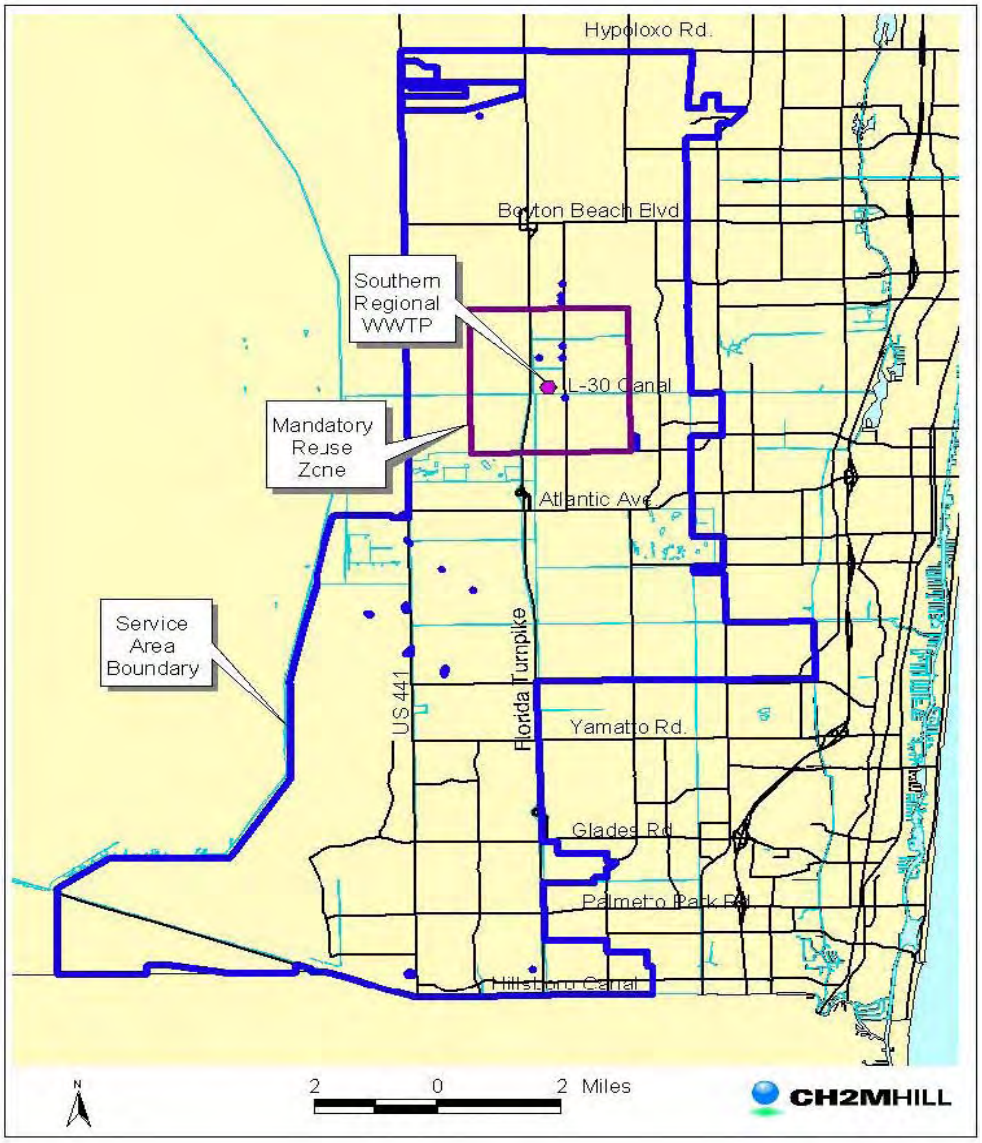


FIGURE D-1: STUDY AREA

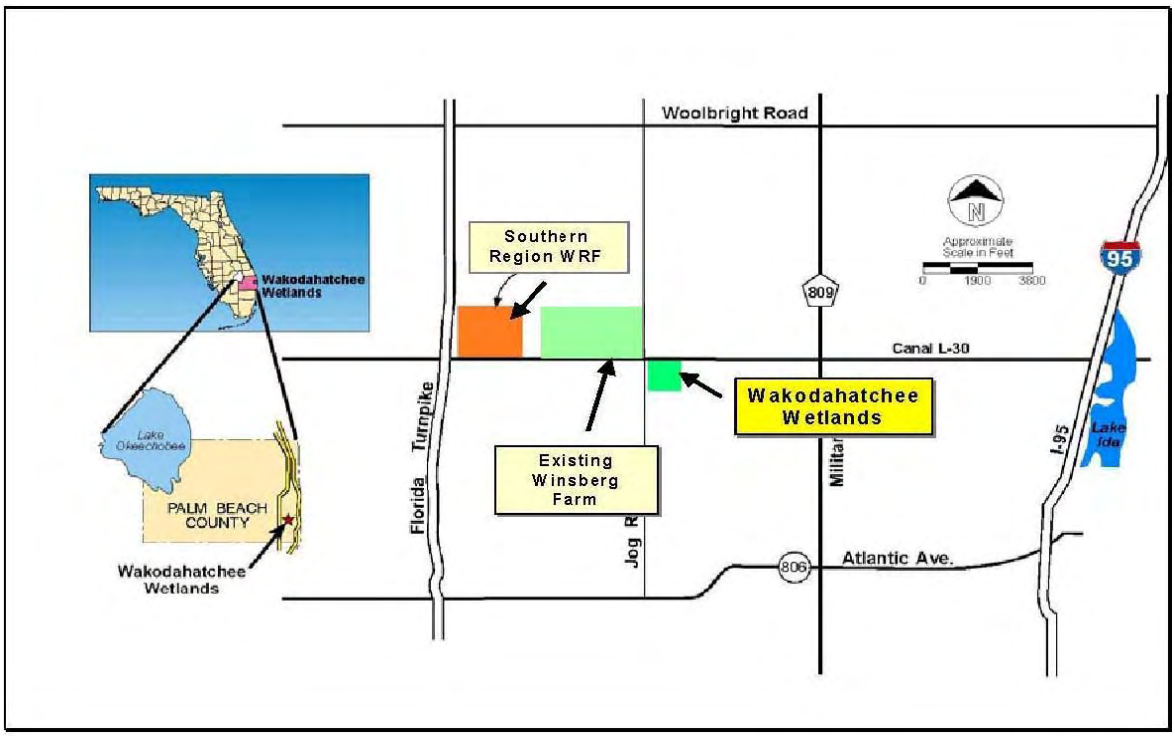


FIGURE D-2: PROJECT LOCATION MAP

D.4 PROJECT DESCRIPTION AND FEATURES

The purpose of the project is to create a wetland ecosystem using treated water which would normally be lost to deep-well injection. The wetland will reclaim a valuable resource, recharge the local aquifer system, create a new wildlife habitat, increase available green space, increase the abundance of native plant species and extend the function of the nearby Wakodahatchee Wetlands.

The tentatively selected wetland restoration project would be located on 165.4 acres of farmland just east of the Southern Region Water Reclamation Facility (SRWRF). About 114 acres of the site would be hydrated using treated wastewater from the SRWRF. The proposed plan would result in creation of a wetland system about three times the size of the Wakodahatchee Wetlands, and its location adjacent to the Wakodahatchee site would leverage the recently created ecosystem restoration benefits by expanding the constructed wetland into an integrated system having even greater regional significance.

- Total Project Wetland Footprint -- 165 Acres, more or less (Exterior Perimeter)

- Net Wetland Restoration -- 114 Acres, more or less (at water elevation 21 feet)

FIGURE D-3: GENERAL SITE PLAN

The configuration includes a Phase I design and construction, which includes about 102 acres of gross wetlands restoration to be created in the western half of

the project. The remaining 63 acres of project area on the eastern half of Winsberg Farm, considered Phase II, would contain the same habitat types as Phase I. The tentatively selected plan (TSP) is configured assuming constant inflow of water to maintain continuous inundation. Water levels will be allowed to fluctuate seasonally within a one- to two-foot range throughout the entire 114 acres of net wetlands in response to natural seasonal variations in rainfall. This variation in the depth and duration of flooding (i.e., hydroperiod) will influence the growth and distribution of plant species within the wetland.

Inflow from the SRWRF effluent enters the western half of the project (Phase I). The western half of the project is divided by an internal embankment, which creates a Cell 1 to the north and a Cell 2 to the south. Each cell's water level can be independently managed by operation of inflow gate and butterfly valves and outflow at control structures. Each cell has a gated control structure with a 24-inch RCP culvert.

The control structure can be operated to:

- Allow flow to the eastern half of the project (Phase II);
- Circulate flow in the western half of the project by a 15-HP recirculation pump; or
- Send flow to deep-well injection by a 250-HP discharge pump in the event pool elevations rise beyond a set point due to direct rainfall.

Table D-1 presents the main features, acreages and elevation plans, as follows:

Phase 1 encompasses 102.20 acres of the total 165.40 acres of the project site (see Plates G-2, G-3, A-1, A-2 and A-3 below). Recreational features include a visitor/nature center building, a system of elevated boardwalks and shelters above the wetlands, a parking lot and entrance, and other support facilities, such as a small maintenance building, dumpster stalls, a sanitary wastewater lift station, and HVAC/Chiller assembly. The nature/visitor center has a 14,000-square-foot footprint, or 0.30 acres. The system of elevated boardwalk and shelters are 1.25 miles long and covers 0.90 acres above the wetland area. The parking lot, entrance, maintenance building and other appurtenances cover a total of 12.90 acres. The exterior/perimeter embankment covers 13.80 acres, and the internal embankment covers 1.80 acres. There are 1.80 acres dedicated to the access road and other infrastructure. Therefore, the net area of restored wetlands (i.e. ,wet area at maximum operating level) is 71.60 acres.

TABLE D-1: PROJECT FEATURES AND COMPONENTS

Project Features/Components	Phase I		Phase II		Total
	Area (Acres)	@ Elev. (NGVD29)	Area (Acres)	@ Elev. (NGVD29)	Area (Acres)
Net Wetland Area (i.e., Wet Area at Maximum Operating Level	71.60		42.50		114.10
Includes: Shallow Marshes	(44.65)	19.00	(28.23)	19.00	
Deep zones and	(16.05)	15.00	(11.52)	15.00	
Tree Islands	(10.90)	20.5 to 25	(2.75)	22.00	
Internal Embankment	1.80	22.00	2.50	22.00	4.30
Exterior Embankment and Embankment (Include: Control Structures and	13.80	26.00	14.90	26.50	28.70
Pipe System, Pump Station and Appurtenances, and Piping)					
Other Structural Features					
Articulated Concrete Mattresses	0.00		0.90		0.90
Emergency Overflow Structure	0.00		0.90		0.90
Recreational Features					
Visitor/Nature Center	0.30	26.00	0.00		0.30
Parking and other Appurtenances	12.90	24.00	0.00		12.90
Elevated Boardwalk and Shelters (0.9 Acres)	0.00	23 to 25	0.00		0.00
Access and Perimeter Maintenance Roads	1.80		1.50		3.30
Total Project Area	102.20		63.20		165.40

FIGURE D-4: SITE PLAN PHASE 1

Phase II encompasses about 63.20 acres of the total 165.40 acres of the project site. Phase II proposes no recreational features (see Plate G-4 below). The exterior/perimeter embankment covers 14.90 acres, and the internal embankment covers 2.50 acres. There are 1.50 acres dedicated for access road and other infrastructure purposes. There are 1.80 acres dedicated to an emergency overflow spillway (0.90 acres) and erosion control articulated concrete mattresses (0.90 acres). The net area of hydrated wetlands encompasses 42.50 acres.

The overflow spillway will provide emergency flow from the Phase II wetland into the L-30 Canal across the L-30 right-of-way. Preliminary investigation indicates that the L- 30 Canal is owned and controlled by the Lake Worth Drainage District (LWDD), Palm Beach County. The spillway will be about 300 linear feet long in the direction of the south perimeter embankment of Phase II (east-west), and will extend about 200 linear feet from the crest of the south perimeter embankment, across the L-30 Canal north side right-of-way into the drainage canal and encompassing 0.90 acres. The L-30 Canal will be lined with articulated concrete mattresses covering the bottom and both banks, and extending 100 linear feet beyond both ends of the spillway's outflow end, and encompassing 0.90 acres.

The federal government will propose to the sponsor that an irrevocable permit or Memorandum of Understanding (MOU) be obtained from the LWDD for such lands that are owned and encumbered by Lake Worth Water District embankment lands in fee, and necessary for project purpose. However, if the LWDD owns such land in easement, then the sponsor will be required to obtain the necessary lands and certify a permanent flowage easement for such project purposes. Reference paragraph F.11, entitled "Construction features," and subparagraph 3(d), entitled "Emergency overflow spillway," for a discussion of the estate analysis.

- Deep Zones -- Total area is 14.27 acres, and the net deep-zone area is 11.52 acres, minus the 2.75 acres for the Tree Islands.
- Tree Islands -- 2.75 acres
- Embankment -- An embankment that is 7.5 feet high, with 3:1 side slopes and a 10-foot top width will surround all of Phase II. The embankment alignment was selected to maximize the wetland area. It was necessary to alter the embankment alignment from the original plan to account for a stormwater retention pond that will be constructed on the eastern edge of Phase II. It was also necessary to move the alignment of the embankment on the northwest corner of the project along the proposed Flavor Pict Road. This realignment allows for a proposed fire and rescue station.

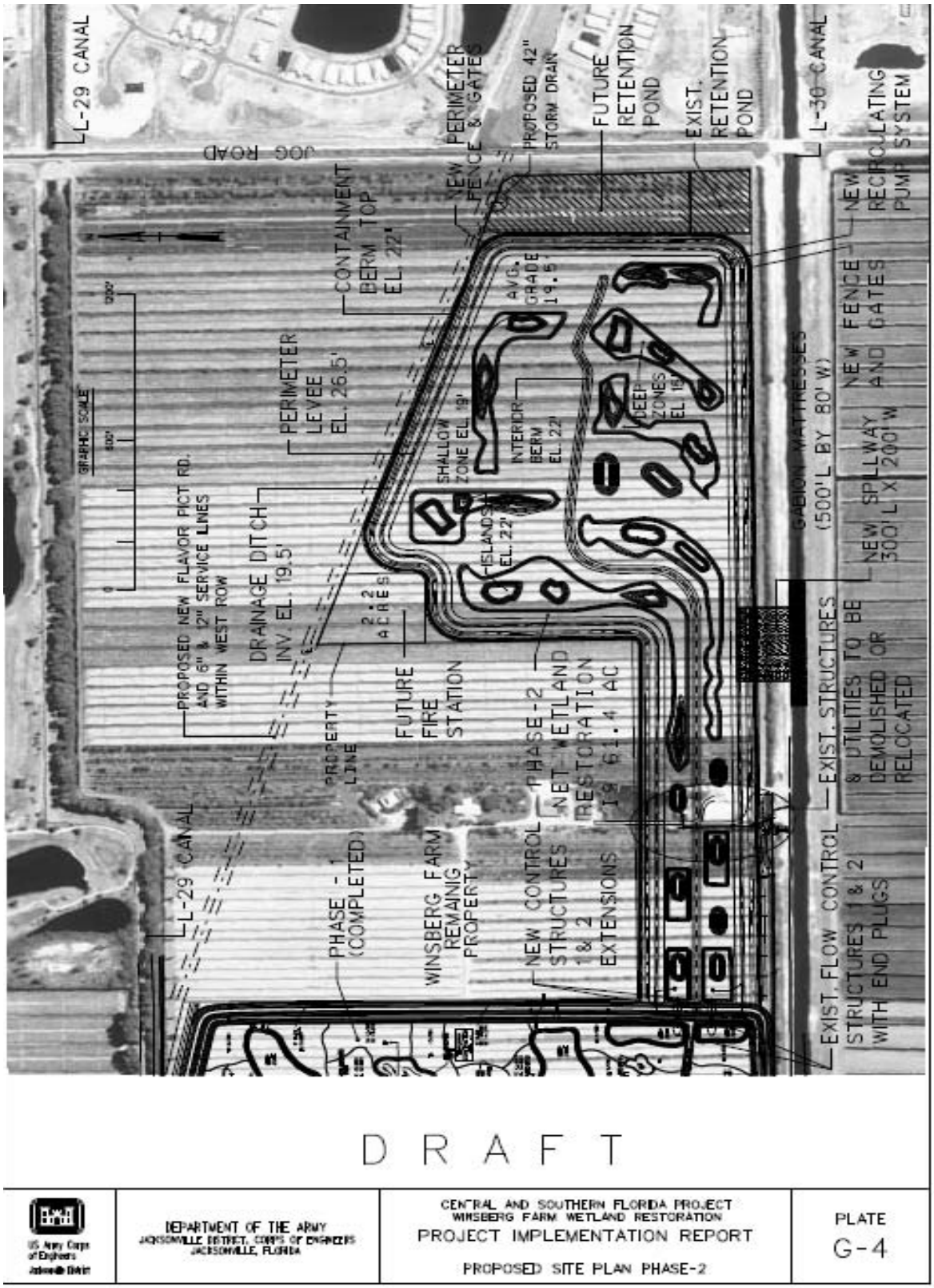


FIGURE D-5: SITE PLAN PHASE 2

- Twenty-four-inch RCP culverts with actuated gates -- Two 24-inch RCP culverts with actuated mechanical weirs and stub-outs were installed during Phase I of the project. These culverts are being used to control flows into Cells 3 and 4 of the project, and will be controlled remotely from the SRWRF, with the option of on-site operations. The design of the flow control structures allows flow from Phase II to Phase I for disposal, using deep-well injection.

- Fifteen-horsepower pump for wetland recirculation -- A 15-HP pump will be located in the southeast corner of the project to a line running to the head of Phase 2 to recirculate water in the wetlands and prevent stagnation. Discharge from the pump will be through two diffusers, one in each of the wetland cells. This pump will be similar to the pump used in Phase 1 of the project, and the specifications are provided in the mechanical portion of **Appendix A**.

D.5 TEMPORARY WORK AREAS

Temporary stockpile, construction and contractor's lay-down areas are all within the project's footprint; therefore, no additional lands are required for such purposes.

D.6 BORROW AND DISPOSAL SITES

No additional borrow or disposal sites outside the project area are required. Two types of materials will be used as borrow material. The topsoil layer scraped off to about six inches will be used for non-structural features, such as tree islands and the exterior ditch/embankment combination. The second type is the soil to be excavated during deep-zone construction to be used in the construction of the project's structural features, such as the perimeter and interior embankment.

D.7 ACCESS TO PROJECT AREA

Ingress and egress will be via federal, state, municipal, county and other roads available to the non-federal sponsor for project purposes. Access to the project site will be from the west side on Hagen Ranch Road, and from the east side on Jog Road. Both roads provide direct access to the project site.

D.8 FEDERAL GOVERNMENT-OWNED LAND

There is no federally owned land included within the lands, easements, or right-of-way (LER), and none is required for the project.

D.9 EXISTING FEDERAL PROJECTS

There is no existing federal project that lies fully or partially within the LER required for the project.

D.10 NON-FEDERALLY OWNED LAND

Palm Beach County acquired about 175 acres from the Winsberg property owners with certain restrictive covenants. The use of the property for this project was envisioned at the time of land sale to Palm Beach County. Additionally, use of the land consistent with these restrictive covenants would neither encumber the efficacy of the project nor would it be inconsistent with project purposes.

D.11 ESTATE ANALYSIS

At this time, project features remain in a state of flux while the design is being fully explored. As such, this analysis may have to be updated to encompass features beyond the scope of items discussed below.

The TSP for this wetland restoration project would be located on about 165 total acres of farmland just east of the Southern Region Water Reclamation Facility (SRWRF). About 114 of the 165 acres of the site would be hydrated using treated wastewater from the SRWRF and is considered to be the total net wetland restored area.

D.11.1 Minimum Real Estate Interest Factors

This analysis of the minimum real estate interests required for the Winsberg Farm Wetlands Restoration Project is completed in accordance with the Central and Southern Florida Project, Comprehensive Everglades Restoration Plan, Programmatic Regulations, and the Six Program-Wide Guidance Memoranda of April 2005. Those programmatic regulations state that fee simple title to the property is the general rule; however, those same regulations call for an examination of the following factors in reaching a final decision (Paragraph 1.9.3):

a) Identify all construction features and determine the minimum interest required to support construction and operation, maintenance, repair and replacement (OMR&R). Construction includes such items as dredging, digging or filling canals, altering contours, depositing materials, and erecting structures;
b) Evaluate any affirmative rights the government must secure over benefited lands to meet the defined restoration objectives. These are in areas where ecosystem functions and processes are being restored, or on lands required as a buffer to protect those restored lands. Examples of

such activities include the right to plant or remove vegetation, erect signs, or conduct periodic prescribed burns;

c) Identify the length of time that the affirmative rights or restrictive covenants are required for the project;
d) Determine whether constructed project features may need to be modified over time due to uncertainties in science, formulation or design (adaptive management);
e) Determine whether project land, or portions thereof, will be open for public use (either active or passive uses); and
f) Other factors, including a comparison of the cost/value of specific types of easements to fee value, assessment of potential for severance damages from fee acquisition; determination of whether public owners have the legal capability to convey fee; assessment of stewardship/OMRR&R considerations regarding the risk and consequences of encroachment on project land by adjacent owners; the risk and consequences of violation of easement terms by fee owners; monitoring and enforcement capabilities of the local sponsor; assessment of the negative perception by the public of private benefits or gain due to landowner reservations where easements are selected; and assessment as to whether the State Marketable Title Act requires re-recording of easement instruments;
g) Evaluate any restrictions on the existing landowner's use of benefited lands that are necessary to meet specifically defined restoration objectives for the project. Examples include limiting grazing or placing prohibitions on plowing, alteration of contours, placement of structures for human habitation, and use of pesticides or fertilizers;
h) Determine whether a Takings Analysis is appropriate in instances where there will be an increase in flooding or other hydrologic alterations to private lands that may have risen to the level of a property taking. This is particularly significant where the impacted lands are not otherwise needed for construction or project OMR&R, or where only a minimal interest is needed. A Takings Analysis is not required in all cases, such as those in which fee or a significant interest is already justified for construction or OMR&R.
i) When any of the above analyses indicate that less than a fee interest is required for the project, sound real estate practices traditionally dictate that fee acquisition is typically appropriate when the cost of easements is estimated at 75 percent of fee or higher. Ultimately, the decision of fee or easement needs to be fully supported, taking all factors into consideration.

D.11.2 Paragraph 1.9.3.a.

This project will consist of the construction of a low-perimeter embankment around project lands to create a wetland and upland habitat. The embankment will be about 7.5 feet high, elevation 26.5 feet, with a 10-foot wide crest and one

vertical on three horizontal side slopes. The wetlands will be designed to maximize the ecological benefit and will contain cells with varying pool depths and upland zone elevations to create a range of habitat environments.

Construction on the site will consist of four basic items, including (1) demolition of the existing site; (2) creation of uplands; (3) construction of certain features; and (4) the creation of recreational facilities. The paragraphs below discuss each of these items separately:

1. Demolition of the Existing Site: Construction on the site will presumably consist of the demolition of any existing structures, grading of project lands, etc. Current project documents do not fully address in detail the demolition process; however, it is reasonable to assume that since the lands were used as a farm, there would need to be site clearing and will most likely include the removal of any undesirable plants and shrubs by stockpiling and burning, if allowed. Certain areas of project lands will be excavated to create deep zones to create a variety of wetland habitats. A perimeter embankment will be constructed through the use of excavated fill material.

The area of the demolition would normally require a temporary easement for a borrow site; however, due to the local sponsor currently holding fee title to the proposed site, no temporary work area easements will be required for the demolition as long as the local sponsor certifies the land to USACE for construction.

2. Creation of Uplands: Uplands will be created from the placement of fill material excavated from the interior of the same tract to create a perimeter embankment. The proposed operations of the constructed wetlands are to maintain water surface elevations of 20 feet National Geodetic Vertical Datum 1929 (NGVD 29) with a seasonal fluctuation between one and two feet. This variation would occur in both wetland cells of Phase II. No surface-water discharges are allowed from the system which has been designed to retain the Probable Maximum Flood (PMF) rainfall event with no discharge. Should discharge from the system be required, an emergency overflow spillway will be constructed which will allow excess flows to enter the L-30 Canal by means of a 300-linear-foot spillway.

3. Construction of Features: Project features include two 24-inch RCP culverts with actuated gates, two wetland cells divided by an internal embankment, a 15-HP pump for wetland recirculation and an emergency overflow spillway.

a) The two 24-inch RCP culverts with actuated gates: Phase II of the project uses two 24-inch RCP culverts with actuated mechanical weirs on the western project boundary. These structures have already been constructed

with stub-outs in Phase I of the project. The culverts will be used to control flows into Cells 3 and 4, and will be controlled remotely from the SRWRF, with the option of on-site operations. The design of the flow control structures allows flow from Phase II to Phase I for disposal. Use of the emergency overflow spillway is an option during rare weather events to remove excess flows from Phases I and II.

b) Embankment: An embankment that is 7.5 feet high, with 3:1 side slopes and a 10-foot top width will surround all of Phase II. The embankment alignment was selected to maximize the wetland area. It was necessary to alter the embankment alignment from the original plan to account for a storm water detention pond that will be constructed on the eastern edge of Phase II. It was also necessary to move the alignment of the embankment on the northwest corner of the project along the proposed Flavor Pict Road. This realignment allows for a proposed fire and rescue station. Under Section 12-9, paragraph (c)(1) of Engineering Regulation 405-1-12, an embankment only requires a permanent easement as its minimum real estate interest.

c) The 15-HP pump for wetland recirculation: A 15-HP pump will be located in the southeast corner of the project with a line running to the head of Phase II to recirculate water in the wetlands and prevent stagnation. Discharge from the pump will be through two diffusers, one in each of the wetland cells. This pump will be similar to the pump used in Phase I of the project, and the specifications are provided in the mechanical portion of **Appendix A**.

d) Emergency overflow spillway: In addition, Phase II will have an overflow spillway that will provide emergency flow from the Phase II wetland into the L-30 Canal across the L-30 right-of-way. The spillway will be about 300 linear feet in the direction of the south perimeter embankment of Phase II (east-west), and will extend about 200 linear feet from the crest of the south perimeter embankment, across the L-30 Canal north-side right-of-way into the drainage canal. This structural feature will need an easement beyond the project's property and over the north-side LWDD right-of-way of 0.90 acres. The L-30 Canal will be lined with articulated concrete mattresses to cover the bottom and both banks, and to extend 100 linear feet beyond both ends of the spillway's outflow end (i.e., 500-feet long by 80-feet wide, or 0.9 acres). As an alternative to acquiring a permanent easement, USACE may consider a legally binding agreement or document for construction, as well as operations and maintenance (O&M) of this feature. Such an alternative might include an irrevocable permit from the Lake Worth Drainage District (LWDD), or possibly a memorandum of understanding between LWDD and the local sponsor, assuming that LWDD currently has a sufficient interest in the real estate to enter into such an agreement. To be acceptable, the terms of the document would have to provide substantially the same rights as a

permanent easement, allowing for the construction and O&M of this feature. If such an alternative acquisition method is sought by the local sponsor, USACE will document the legal sufficiency and acceptability of that document by means of a legal opinion executed by a real estate attorney authorized to approve title, concluding that the document constitutes an interest in land under the laws of the state of Florida and is acceptable under the Department of Justice Title Standards. At a minimum, the two culverts, the recirculation pump and the emergency overflow spillway cited above would require a permanent easement as cited in Section 12-9, paragraph (c)(1) of Engineering Regulation 405-1-12 for permanent structures. While a permanent easement would be the minimum estate for the culvert in accordance with the regulations, the recommended estate is fee.

4. Creation of Recreational Facilities: Project lands will be designed to include several recreational components, some of which are compatible with the project function and operation, including a 6,300-linear-foot boardwalk with interpretative signage and shade shelters, as well as a public interpretative center and small parking area. The minimum interest for a recreational area requires fee title under Section 12-9, paragraph (b)(5) of Engineering Regulation 405-1-12.

D.11.3 Paragraph 1.9.3.b.

The SFWMD has developed a list of benefits/affirmative rights regarding this project. These benefits consist of the following:

The project would create a wetland ecosystem that would grow a diverse and productive native emergent marsh, hardwood swamp, tropical hardwood hammock and pine flatwoods habitat. In addition to the wetlands aspect, the project should also trigger an expansion of habitat for wildlife. Such a habitat will help conserve regional native-wildlife populations in a secure, productive and high-quality habitat of native plant species. There will also be a recreation and aesthetics component to the project site which will allow passive recreation for the public, including birdwatching, hiking, nature photography and environmental education. Finally, such a project would limit urban sprawl and preserve green space in a densely populated and rapidly developing region.

D.11.4 Paragraph 1.9.3.c.

The constraints, prohibitions and restrictions on private use include, but are not limited to, the following:

A prohibition of all agricultural/farming activity is required for project lands, including all activities that would add nutrients to these wetlands, such as grazing, plowing, seasonal agriculture, etc. All plowing and planting activities would be restricted, as well as hot fires and the disturbance of flora. There can be no impedance of the overland surface flow within each wetland cell. Hence, there would be a prohibition against the use of fences, roads, embankments, fill areas and structures of any kind. Construction of infrastructure within any of the four wetland cells would be prohibited, such as roads, sewers, plumbing, etc.

It should also be noted that the Special Warranty Deed from the Winsbergs to Palm Beach County contains certain restrictive covenants that must be respected. These restrictions, in short, include the following items:

- Restricts use of the land as a constructed wetland treatment and/or groundwater recharge facility with additional restrictions;
- Restricts structure height;
- Restricts against public use, other than those specific uses cited in the deed; and
- Prohibits against use of the property for percolation ponds, except for final "polishing" of pre-treated wastewaters and stormwaters to maintain wetlands.

D.11.5 Paragraph 1.9.3.d.

The length of time of the affirmative rights and restrictions would be perpetual. This project is not limited to a certain length of time.

D.11.6 Paragraph 1.9.3.e.

It does not appear that the constructed project features would need to be modified over time, but wetland features could certainly be "tweaked" to accommodate future changes. It is feasible that if the project requires drastic modification in the future to change the essence of the property for other purposes, then any restrictions placed on the property could pose a problem. For instance, if the property is restricted by a conservation easement, that estate will limit the future use of the property and may prohibit the use of this land for other features, such as flood control, the purpose for which this land was originally envisioned. This problem would not be an issue if fee title ownership is required instead of an easement.

D.11.7 Paragraph 1.9.3.f.

The recreational components that are compatible with the site and project include the following list of items:

- 6,300 linear feet of boardwalk overlooking the wetlands;
- Shade shelters;
- Interpretative signage displays;
- A public interpretative center; and
- Small parking area.

D.11.8 Paragraph 1.9.3.g.

Palm Beach County currently owns the parcel of land in fee. The difference between fee and easement would roughly translate to an amount that is significantly higher than 75 percent of the fee value. There is no potential for severance damage associated with this tract. Palm Beach County would only certify the lands for construction and would retain title for operation and maintenance of the project. The project lands are protected from encroachment by the surrounding landowners by a perimeter embankment which will be significantly elevated above the surrounding properties. Since the local sponsor is the fee owner, violation of the easement terms should not be an issue. There will be no private benefits or gains involved since the county is the fee owner of project lands. The State Marketable Title Act does not require re-recording of easement documents since they are deemed to be perpetual and to run with the land.

D.11.9 Paragraph 1.9.3.h.

A review of project documents reveals no discharge of water into the surrounding lands. The only variance from this statement appears to be in the event that pool elevations rise beyond a set point due to direct rainfall. Should the water within the project area rise to a level that would harm project wetlands and pond to a certain elevation, an emergency overflow spillway will be constructed as a project feature to dispel any excess water. The local sponsor, in conjunction with another state agency, owns all lands that connect project lands to the L-30 Canal. All excess water will flow through these sponsor- and state-owned properties and will not discharge onto any private property outside of state government ownership. Therefore, in the opinion of Corps District Council, there will not be any increase in water emanating from project lands onto private lands surrounding the project lands. Hence, there would be no takings situation.

D.11.10 Paragraph 1.9.3.i.

After consideration of all affirmative rights required by the government and the restrictions on landowner use of the property, it was determined that a perpetual flowage/conservation easement would generally be the minimum interest required over the majority of project lands within the Winsberg Farm

Project. The lone exception is those specific features that are required by regulation to be owned in fee title as discussed above.

D.11.11 Paragraph 1.9.3 Conclusion

The purpose of this project is to create a passive wetlands system, which in turn will restore wildlife and vegetative communities, including habitat for protected species. To provide for these benefits, a perpetual flowage/conservation easement would appear to be the minimum estate required for the wetlands area of the property, a large portion of the existing site. However, the proposed changes to the property would directly impact the highest and best use of portions of the property from an agricultural to wetland site. In addition, due to the prohibitions placed on land usage, there will be little to no economic use for those areas except as a wetland in post-project conditions which could also inhibit incorporating future governmental changes or modifications to this site.

Certain portions of the property which make up a significant part of the property has been identified for recreational use. This portion of the site will require fee ownership. In addition, the local sponsor is the fee owner of the property and will not be required to acquire any additional lands for the project. Moreover, the value of a conservation easement would be significantly more than 75 percent of the fee value for the land. Therefore, it appears that a requirement for fee interest in the project lands is a sound policy decision. It is, thus, recommended that fee title to project lands be required.

PROPOSED ESTATES: FEE TITLE -- The fee simple title to (the land described in Schedule A) (Tracts Nos. ____, ____ and ___), subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines. (These will be completed during the design phase)

D.12 LERRD CREDITING

The CERP Congressional Authority reads, in part, that the non-federal sponsor will be responsible for all land, easements, rights-of-way, and relocations (LERRD) necessary to implement the Plan; and the sponsor will be afforded credit toward the non-federal share of the cost of carrying out the project. It also states that credit *"will be afforded to the non-federal sponsor, regardless of the date of acquisition, the value of lands or interests in land acquired by non-federal interests."*

Therefore, in accordance with this authority, Palm Beach County will be afforded credit for all land, easements, rights-of-way, relocations and disposal areas necessary and provided for construction, and operations and maintenance of the project. Also, in accordance with the Central and Southern Florida Project,

Comprehensive Everglades Restoration Plan, Programmatic Regulations, Six Program-Wide Guidance Memoranda dated April 2005, "*credit will be afforded to the sponsor based on the actual cost of the land needed for a project instead of what the land is worth at the time of a Project Cooperation Agreement signing. Consequently, the Project Delivery Team (PDT) should use actual acquisition costs in plan formulation, cost estimating, and crediting, subject to those costs being reasonable, allocable, and allowable."* Therefore, credit for the LERRD provided by Palm Beach County will be based on actual cost of the land, the administrative cost to purchase the lands, and the incidental cost for acquiring the LERRD.

The project footprint consists of 163.60 acres, plus the 1.80 acreages required for the emergency spillway structure and articulated concrete mattresses for a total of 165.40 acres and rounded to 165 acres, more-or-less. Therefore, the sponsor will be afforded credit for those lands provided and necessary for project purposes for construction, and operation and maintenance (O&M). For a breakdown of real estate costs, See **Table D-2** and **Table D-3** of this report entitled "SUMMARY OF THE BASELINE COST ESTIMATES AND MCASES COST ESTIMATES."

D.13 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

No Hazardous, Toxic, Radioactive Waste (HTRW) is anticipated. Phase I and II Environmental Audits of the Winsberg Farm property were conducted. These audits determined that the Winsberg site has been undeveloped and used for the growth and distribution of agricultural products for more than 30 years. Upon reviewing PBCWUD files and public data sources, CH2MHill determined that "there is no reason to believe (that) this site has been adversely impacted by past on-site practices or neighboring properties." The consultant further reported that no Leaking Underground Storage Tanks (LUST); Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); or Resource Conservation and Recovery Act (RCRA) sites were identified within a one-mile radius of the site. To ensure that the site was completely and defensibly assessed for HTRW, USACE contracted with Taylor Engineering to complete the Phase I activities in accordance with American Society for Testing and Materials (ASTM) guidance and to re-analyze samples at Phase II locations for remaining parameters of concern.

D.13.1 Contractor Recommendations

The recommendations from Taylor Engineering are:

1. The project site contains relatively low levels of some persistent pesticides throughout. Recommend further interpretation of the soil analytical

results to help determine potential ecological impacts that may occur during operation of the proposed project.

2. Assessment revealed no unbiased soil or groundwater analytical evidence of petroleum product contamination. No further action.

3. Elevated nitrate levels in the area of MW-2 were assumed to be, most likely, due to storage and handling of fertilizer localized around the fertilizer storage/mixing area. Since such storage practices have been discontinued, no further action is required.

D.13.2 USACE Recommendation

Actual exceedances of Florida Soil Clean-Up Target Levels are rare, marginal and/or disputed (biased, as proven by duplicate tests). Consequently, the only remaining concern is the widespread occurrence of chlorinated pesticides, particularly DDT (4,4'-DDT) and DDT byproducts (4,4'-DDD and 4,4'-DDE). Though analytical data revealed no apparent contamination hot spots for pesticides to minimize any potential leaching into the water, the top six inches (estimated) of the existing topsoil layer will be scraped off the entirety of the footprint and stockpiled within the project site to be subsequent used in the construction of the tree islands. At the same time the topsoil is being excavated, the exterior ditch/embankment combination feature will be constructed and capped.

D.14 UNIFORM RELOCATION ASSISTANCE ACT, PL 91-646

Preliminary investigations indicate that there were no persons, farms and businesses displaced during the acquisition of lands required for project purposes. Palm Beach County will be required to certify compliance with the requirements of PL 91-646, including landowners being properly advised of their rights under the program and appropriate benefit determinations, if any.

D.15 RELOCATIONS, ALTERATIONS, VACATIONS AND ABANDONMENT

Relocations, alterations, vacations and abandonment are defined In Public Law 85-500. An Attorney's Opinion of Compensability is unavailable for this draft REP but will be completed in accordance with Engineering Regulation 405-1-12, Chapters 12 and draft Chapter 17, and provided in the final REP, if necessary. Such a report will present the general nature of impact to each facility or utility, identity their owners and purpose, and whether owners have compensable real property interest.

Preliminary information shows the existence of electrical lines and other services. Electrical service to Winsberg Farm is provided by Florida Power & Light (FPL). An aerial 23 kV feeder line runs east-west along the L-30 Canal. Running east from Hagen Ranch Road, the feeder line is located on the northern side of the canal for 2,600 feet. The feeder line then crosses the canal and runs along the southern side of the canal for the remainder of the project area (see Plate F-1).

An aerial line running north-south is connected to this feeder line and supplies power to the Winsberg Farm residence at 12750 Hagen Ranch Road. Electrical relocation will be required for this north-south line where the line crosses the Phase II construction site. The shortest route of relocation will be to bury the segment of the line that cross into the Phase II construction site (see Plate F-2). The approximate burial distance is 500 feet. The electrical line will be enclosed in conduit inside a waterproof duck bank.

Communication Lines -- Telephone service to Winsberg Farm is provided by BellSouth. The telephone lines are located on the same poles carrying the aerial 23 kV feeder line and the line supplying power to the Winsberg Farm residence at 12750 Hagen Ranch Road (see Plate F-1). The relocation of telephone lines due to construction is about the same as described above for electrical lines for a total of about 500 feet. The telephone line can be buried in the same duct bank as the electrical line in a separate run of conduit (see Plate F-2).

Cable and fiber-optic lines owned by Adelphia Cable only run north-south along the west side of Hagen Ranch Road and do not cross into the Phase II construction site. Therefore, cable relocation will not be necessary (see Plate F-1).

D.16 INDUCED FLOODING

The purpose of this project is to create a new wetland ecosystem, and flooding outside the project limits is not anticipated. No modeling to study the effects of TSP on maintaining flood protection has been performed nor anticipated to be necessary. Under normal operating conditions, wetland cells will only receive as much effluent from the SRWRF as can be removed through the combined effects of evapotranspiration (ET) and percolation (seepage). The average daily flow from the TSP on an annual basis is estimated to be 3-5 MGD per day or 4.6-7.7 cfs. About 50-75 percent of this amount of water would be lost due to ET. The remainder will contribute to an off-site loss due to percolation, which will be negligible when compared to design flow rates of the adjacent LWDD L-29 and L-30 canals, which are roughly 100 cfs and 400-500 cfs, respectively. This small amount of off-site seepage by the TSP would have no adverse or significant impacts to existing levels of service for flood protection and does not justify flood

protection modeling. The TSP project has already received permits, and construction is nearly completed for Phase 1.

D.17 MINERAL AND TIMBER ACTIVITIES

Preliminary investigations indicate no known present or anticipated mineral activity within the vicinity of the proposed project that may affect construction, operation or maintenance.

D.18 ZONING ORDINANCES

No known enactments of zoning ordinances were proposed in lieu of or to facilitate acquisition in connection with the project.

D.19 NAVIGATIONAL SERVITUDE

Navigational servitude is not applicable to any components of the proposed project.

D.20 NON-FEDERAL AUTHORITY TO PARTICIPATE IN THE PROJECT

Information is currently being obtained and will be provided in the final REP.

D.21 PROJECT SUPPORT

No real estate issues relevant to planning, designing or project implementation are expected, nor are there any issues that may impact project schedules, budgets, PCA, or quality of deliverables since these lands are currently owned by Palm Beach County.

There is no known or anticipated opposition to the project by landowners in the project area, or any known or anticipated landowner concerns related to issues that could impact the acquisition process.

D.22 REAL ESTATE ACQUISITION SCHEDULE

Palm Beach County currently owns or controls the lands required for construction, operation, and maintenance of the project. Following execution of the PCA, the federal government will provide Palm Beach County with general written descriptions, including maps as appropriate, of the LER and the facility/utility relocations the government has determined the non-federal sponsor must provide and perform for project construction, operation and maintenance. LER descriptions will include the required estate, acreage,

location and schedule requirements in detail sufficient to enable the sponsor to fulfill its obligations to provide the LER and relocation, if any, in a timely manner.

D.23 BASELINE COST ESTIMATES AND MCASES COST ESTIMATES

Cost estimates are based on actual land and administrative costs provided by Palm Beach County. **Table D-2** provides the Baseline Cost Estimate for Real Estate costs as follows:

TABLE D-2: SUMMARY OF THE BASELINE COST ESTIMATE

Project: Winsberg Farm Wetlands Restoration Project					
Date: November 23, 2005					
Lands and Damages:					
Estate	Acres	Per Acre	Cost		
Fee	163.60	$14,142.00	$2,313,631		
Other	1.80	$0	$0		
Improvements	0		$0		
Severance:					
Subtotal			$0		
Minerals			$0	$0	
Subtotal Lands and Damages (RD)	165.40			$2,313,631	
Acquisition/Administration:					
Fed			$57,000		
Actual Acquisition Cost -- non-fed *			$257,143		
Future Acquisition Cost -- non-fed			$20,000		
PL 91-646			$0		
Contingency (RD) **			$0		
Subtotal Acq/Adm Cost				$334,143	
Total Estimated RE Costs (RD)					$2,648,000

* The sponsor has been requested to provide a breakdown of administrative and incidental costs.
** No contingency has been added since all lands are owned or controlled by the sponsor.

TABLE D-3: MCASES FOR REAL ESTATE

Estimated Project Real Estate Costs (163.60 Acres)			Date: Nov. 23, 2005
Project: Winsberg Farm Wetlands Restoration			
		Federal	Non-Federal Sponsor
01	Lands and Damages		
01AA	Project Planning	$30,000	
01B--	Acquisitions		
01B20	Actual Cost by Local Sponsor (LS) *	$0	$257,143
01B40	Review of LS	$10,000	$0
01C--	Condemnations		
01C20	By LS	$0	
01C40	Review of LS	$0	
01F--	Appraisals		
01E30	By LS	$0	
01E50	Review of LS	$3,500	
01F--	PL 91-646 Assistance		
01F20	By LS	$0	
01F40	Review of LS	$0	
01G--	Temporary Permits/Licenses/Rights-Of-Entry		
01G20	Future Work By LS	$0	$20,000
01G40	Review of LS	$10,000	
01G60	Damage Claims	$0	
01M00	Projected Related Administration		
	Real Estate Review of PCA	$3,500	
01R--	Real Estate Payments		
01R1	Actual Land Payments		$2,313,631
01R1B	By LS	$0	
01R2	PL 91-646 Assistance Payments		
01R2B	By LS	$0	
Total Project Real Estate Cost (RD)			$2,648,000

* The sponsor has been requested to provide a breakdown of administrative/incidental costs.

D.24 PROJECT MAP

The planimetric map shows the project area.

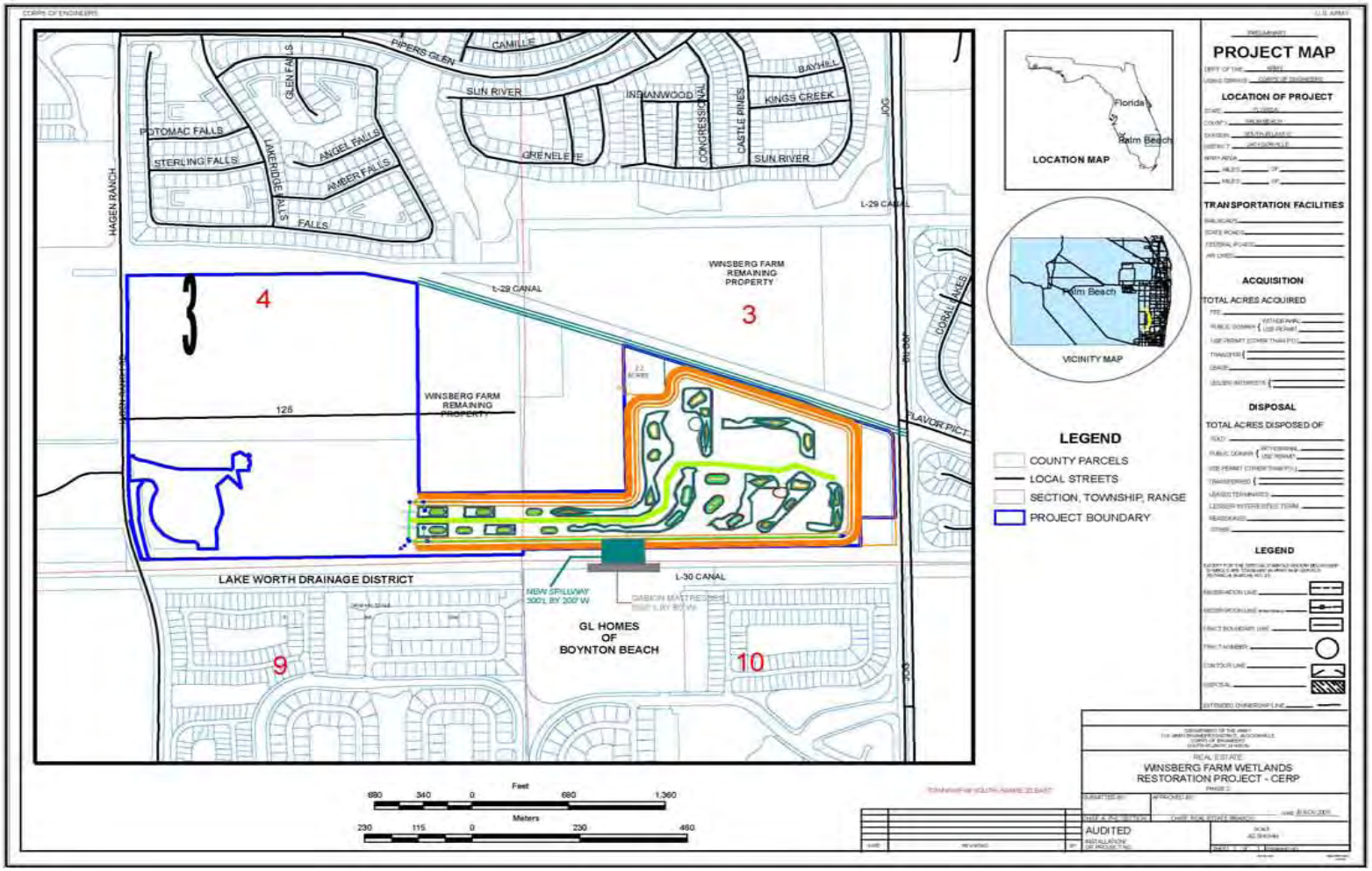


FIGURE D-6: PLANIMETRIC MAP OF THE PROJECT AREA

APPENDIX E
AGENCY AND PUBLIC COORDINATION

This page intentionally left blank

TABLE OF CONTENTS

E PUBLIC AGENCY COORDINATION E-1
E.1 PUBLIC/AGENCY COMMENTS FROM DRAFT REPORT E-1
E.2 SCOPING FOR THE WINSBERG FARM WETLANDS E-1
E.3 OTHER REQUIRED COORDINATION E-1
E.3.1 U.S. Fish and Wildlife Service E-1
E.3.2 U.S. Department of Agriculture Natural Resources Conservation Service E-2
E.3.3 Florida State Historic Preservation Officer E-2
E.4 ENVIRONMENTAL JUSTICE E-2
E.5 REVIEW OF THE DRAFT PIR/EA E-2
E.5.1 Comments and Responses E-3

This page intentionally left blank

E PUBLIC AGENCY COORDINATION

Public outreach efforts for the Winsberg Farm Wetlands Restoration project began during the Central and Southern Florida Project Comprehensive Review Study and have continued through the compilation of the Draft Project Implementation Report and Environmental Assessment (PIR/EA).

E.1 PUBLIC/AGENCY COMMENTS FROM DRAFT REPORT

Public involvement is a process by which interested and affected individuals, organizations, agencies and governmental entities are consulted and participate in the decision-making process. Public involvement in the Winsberg Farm Wetlands Restoration Project has two main functions: to inform the public about what the project team is planning and to generate input on key issues and concerns critical to resolving the challenges involved in the planning effort.

E.2 SCOPING FOR THE WINSBERG FARM WETLANDS

The scoping process for the Winsberg Farm Wetlands Restoration Project was initiated on February 13, 2002, by mailing a scoping letter to federal, state and local agencies; Native American tribes; private organizations, and interested parties to solicit their views, comments and information about resources, study objectives, alternatives and important features within the study area. Comments received (Annex B) were reviewed and incorporated in project planning.

E.3 OTHER REQUIRED COORDINATION

In addition to the scoping required by the National Environmental Policy Act, coordination required by other federal laws and regulations has been conducted with the following agencies:

E.3.1 U.S. Fish and Wildlife Service

Three Planning Aid Letters dated April 15, 2002, February 10, 2003, and June 21, 2004, were received from the U.S. Fish and Wildlife Service (USFWS) as part of the process for developing alternative plans. Additionally, USFWS provided a list of threatened and endangered species that may be present in the project area by facsimile on March 12, 2002. These letters can be reviewed in Annex A, and the information they contain has been incorporated in the plan formulation process. The USFWS is a member of the project delivery team.

E.3.2 U.S. Department of Agriculture Natural Resources Conservation Service

This project has been coordinated with the Natural Resources Conservation Service (NRCS) in accordance with the Farmland Protection Policy Act of 1981. In a letter dated September 3, 2003, the NRCS determined that Winsberg Farm, having been farmed over the past five years, is considered unique farmland and would be taken out of production if the project were implemented. In response to the September letter, USACE provided NRCS additional details related to the project in a February 7, 2005, submittal. These letters can be reviewed in Annex B.

E.3.3 Florida State Historic Preservation Officer

Based on coordination and the results of a Phase I cultural resources survey, the State Historic Preservation Office (SHPO) concurred with USACE's determination that the Winsberg Farm Wetlands Restoration Project will have no effect on cultural resources eligible for listing on the National Register of Historic Places, or otherwise of historical or archaeological value. Letters documenting USACE's determination, SHPO's concurrence, and related correspondence can be reviewed in Annex B.

E.4 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires the federal government to achieve environmental justice by identifying and addressing disproportionately high adverse effects of its activities on minority or low-income populations, and by involving potentially affected minorities in the public coordination process. It requires the analysis of information such as race, national origin, and income level for areas expected to be impacted by environmental actions. Winsberg Farm is currently in agricultural production, and the surrounding areas are not low-income or minority as defined by USEPA Region 4 categories for environmental justice. Outreach in this project has not discovered any concerns from local citizens regarding impacts to low-income and minority populations. Staff members working on this project also do not envision any potential for such impacts.

E.5 REVIEW OF THE DRAFT PIR/EA

The Draft PIR/EA will be sent to numerous local, state and federal agencies, and private interest groups for review and comment in accordance with the Council on Environmental Quality's National Environmental Policy Act regulations and related USACE guidance. Comments received during the review will be considered in preparing the final study documents and by subsequent reviewers

and decision-makers in the Washington-level federal review process. The agencies, groups and individuals listed in Annex B will be sent copies of the Draft PIR/EA.

E.5.1 Comments and Responses

The Draft PIR/EA will be made available to the public and government agencies. After the 45-day review period, comments received from local, state and federal agencies, Native American tribes, private interest groups, and concerned individuals will be incorporated. The comment letters received will be on file in the Jacksonville District, US Army Corps of Engineers.

This page intentionally left blank

APPENDIX F
PLAN FORMULATION AND EVALUATION

This page intentionally left blank

TABLE OF CONTENTS

F PLAN FORMULATION AND EVALUATION F-1
F.1 INITIAL APPROACHES FOR DEVELOPING ALTERNATIVES F-1
F.1.1 First Approach For Building a Suite of Alternatives F-1
F.1.2 Second Approach For Building a Suite of Alternatives F-3
F.2 LOCATION F-5
F.3 REAFFIRMING THE YELLOW BOOK PLAN F-7
F.3.1 Problems F-7
F.3.2 Opportunities F-7
F.3.3 Goals F-7
F.3.4 Objectives F-8
F.3.5 Existing Conditions F-8
F.3.6 Future Without-Project Conditions F-8
F.3.7 Constraints F-9

LIST OF TABLES

Table F-1: Cost to Acquire Land For Wetland Restoration F-6
Table F-2: General CERP Objectives F-8

LIST OF FIGURES

Figure F-1: Nutrient Assimilative Capacity F-5
Figure F-2: Locations of Group 1 Sites Considered F-6

This page intentionally left blank

F PLAN FORMULATION AND EVALUATION

F.1 INITIAL APPROACHES FOR DEVELOPING ALTERNATIVES

Prior to deciding to reaffirm the Winsberg Yellow Book plan, USACE and USFWS team members had considered two approaches to develop alternatives. In the first approach, alternatives were developed, in conjunction with the USFWS team member, as follows: The team recommended building the suite of alternatives based upon 1) a varied number of wetland cells, 2) the presence or absence of a buffer cell, and 3) an available source of water. A buffer cell would be designed for treatment. The second approach was developed by CH2MHill under contract with USACE, Jacksonville District. This approach involves a number of different hydroperiod designs for the site.

The approach that was ultimately used for alternative development was to reaffirm the Winsberg site and plan from the Yellow Book.

In evaluating these two approaches, it was noted that all 26 initial alternatives developed and listed below are various combinations of the basic management measures. These alternatives were developed before a more detailed engineering and real estate evaluation was conducted. Therefore, the acreages used in these alternative development approaches are different than those in the final approach used in the main body of the draft PIR. A third approach was used to develop the array of alternatives that was ultimately used. It is the approach described in the plan formulation portion of the report in Section 5.

F.1.1 First Approach For Building a Suite of Alternatives

These alternatives were developed in conjunction with the U.S. Fish and Wildlife Service (USFWS) team member.

Recommend building the suite of alternatives based upon 1) varied number of wetland cells 2) presence or absence of a buffer cell, and 3) source of water. A buffer cell would be designed for treatment rather than habitat, and would enhance the remaining wetland acreage by assimilating some of the nutrients and other pollutants in the source water. Estimates of the treatment capabilities of such a buffer cell will help determine the appropriate size of the cell. Consider as a starting point a 15-acre buffer (about 10 percent of the wetland area). Alternative 1 in this suite of alternatives is the No Action Alternative

- Alternative 2: One wetland cell with buffer cell. Source water from SRWRF.
- Alternative 3: One wetland cell with buffer cell. Route water first through Wakodahatchee, then Winsberg.

- Alternative 4: One wetland cell with buffer cell. Additional treatment at SRWRF.
- Alternative 5: One wetland cell without buffer cell. Source water from SRWRF.
- Alternative 6: One wetland cell without buffer cell. Route water first through Wakodahatchee, then Winsberg.
- Alternative 7: One wetland cell without buffer cell. Additional treatment at SRWRF.
- Alternative 8: Two wetland cells with buffer cell. Source water from SRWRF.
- Alternative 9: Two wetland cells with buffer cell. Route water first through Wakodahatchee, then Winsberg.
- Alternative 10: Two wetland cells with buffer cell. Additional treatment at SRWRF.
- Alternative 11: Two wetland cells without buffer cell. Source water from SRWRF.
- Alternative 12: Two wetland cells without buffer cell. Route water first through Wakodahatchee, then Winsberg.
- Alternative 13: Two wetland cells without buffer cell. Additional treatment at SRWRF.
- Alternative 14: Four wetland cells with buffer cell. Source water from SRWRF.
- Alternative 15: Four wetland cells with buffer cell. Route water first through Wakodahatchee, then Winsberg.
- Alternative 16: Four wetland cells with buffer cell. Additional treatment at SRWRF.
- Alternative 17: Four wetland cells without buffer cell. Source water from SRWRF.
- Alternative 18: Four wetland cells without buffer cell. Route water first through Wakodahatchee, then Winsberg.
- Alternative 19: Four wetland cells without buffer cell. Additional treatment at SRWRF.

Multiple cell use allows for operational flexibility. With regards to water quality, this flexibility allows the operator to maintain optimal water stages that promote better contaminant settling in the water column and entrapment at the sediment layer. Design-stage levels will promote the growth of various vegetation types that will enhance water quality by the removal of contaminants via, primarily, bioaccumulation.

In the first approach to building a suite of alternatives, we considered only water from the SRWRF because a major objective from the Yellow Book was "to create a wetland from water, which would be normally lost to deep-well injection and any future benefit." This refers to treated wastewater from the SRWRF. Using

water not going to deep-well injection would not meet that objective. As you will see in the discussion of the third and final approach that was used, we evaluated other sources of water to create the wetlands.

Long-hydroperiod wetlands were included to reflect the hydrologic regime of the Wakodahatchee Wetlands, a nearby, functioning, wetland constructed by Palm Beach County. Short-hydroperiod wetlands were included because they are perhaps more representative of the wetland communities that existed in the project vicinity prior to human disturbance. Two primary trade-offs exist between short- and long-hydroperiod wetlands. First, the two would support different plant communities, with a greater extent of emergent marsh in the long-hydroperiod wetland and wetter prairie in the short-hydroperiod wetland. Second, the two would support different water deliveries from the SRWRF; i.e., year-round deliveries of greater volumes would be possible with the long-hydroperiod wetland.

F.1.2 Second Approach For Building a Suite of Alternatives

Start with SRWRF as the water source, Winsberg Farm site for wetlands, and discharge to groundwater. Then use the remaining list of measures in various combinations to produce alternatives. The initial list of alternatives will be screened to a smaller subset, and this small set of alternatives will be evaluated in detail.

- *Alternative 2 (20) (corresponds to Alt 17): Long Hydroperiod Wetlands.* This alternative would send the same quality of water to Winsberg Farm as is sent to Wakodahatchee Wetland. About 150 acres of wetland and associated embankments would be constructed. The area would be inundated almost continuously. Water level would fluctuate +/- 1 foot except during large storms. Refer to DEP letter of August 2002 that presented sampling requirements, that if met, then the proposed Winsberg Farm could proceed. Sponsor sampled ground water and surface water at the edge of Wakodahatchee Wetlands and demonstrated that WQ criteria were not exceeded, except for odor and color.

- *Alternative 3 (21): short-hydroperiod wetlands.* About 150 acres of wetlands would be constructed. This alternative would use the same quality of water that is sent to Wakodahatchee. This alternative represents a large fluctuation of water levels, as compared to Alternative 2: Long Hydroperiod Wetlands. The area would be allowed to dry during part of the year. This would support different vegetation and different wildlife than alternatives with continuous inundation. The total water per year delivered under this alternative would be less than under alternatives with continuous inundation.

- *Alternative 4 (22): Long plus Short.* About 150 acres of wetlands would be constructed. The western 75 acres would be continuously inundated, long-hydroperiod wetlands. The eastern 75 acres would be short-hydroperiod wetlands. This alternative would use the same quality of water that is sent to Wakodahatchee. This alternative would provide some of the benefits of Alt 2 Long-Hydroperiod Wetlands and Alt 3 Short-Hydroperiod Wetlands. Water flow would be intermediate between these two alternatives.

- *Alternative 5 (23): Western Long-Hydroperiod Wetlands.* Construct 75 acres of wetland habitat on the western half of the Winsberg Farm property. The site would receive water from SRWRF that is the same quality as is sent to Wakodahatchee Wetland. (Refer to Florida Department of Environmental Protection [FDEP] letter of August 2002 that presented sampling requirements that, if met, allowed the proposed Winsberg Farm project to proceed. Sponsor sampled ground water and surface water at the edge of Wakodahatchee Wetlands and demonstrated that WQ criteria were not exceeded, except for odor and color. The area would be inundated nearly continuously. There would be a mix of trees, herbaceous and woody shrubs, and emergent plants. The water level in deep and shallow areas would fluctuate +- one foot except during large storms.

- *Alternative 6 (24): Western Short.* Construct 75 acres of short-hydroperiod wetlands in the western half of Winsberg. The site would receive water from SRWRF that is the same quality as is sent to Wakodahatchee Wetland.

- *Alternative 7 (25) (corresponds to Alt 14):* Construct Stormwater Treatment Area (STA) to focus on removing nitrogen from incoming water. Water would then flow to other cells designed for continuous inundation, with mix of shallow and deep areas, and mix of vegetation types. This alternative is proposed under the assumption that water with lower nitrogen and phosphorus would support different vegetation and provide different habitat quality than comparable alternatives that do not pre-reduce nutrients, such as Alternative 2: Long Hydroperiod Wetlands. There will be a need to estimate the size of STA necessary to process the nutrients in the expected 2-3 MGD average flow. The remaining 140 acres would be designed for wildlife habitat. This would require estimation of the STA size necessary to process nutrients (see graph). STA would be in the 2-3 MGD average flow range. The graph below and initial analysis suggest that about 85 acres would be needed to assimilate the ammonia

and phosphorus of the incoming water. It would require permitting under FAC Chapter 62-610, Part IV, and FAC 62-520.

- *Alternative 8 (26) (corresponds to Alt 19): Modify SRWR.F* The SRWRF would be modified to add structures and processes that would reduce nitrogen concentrations from discharged water. This reduced-nitrogen water would then be delivered to Winsberg Farm for habitat cells. This would require a substantial and costly upgrade of the SRWRF to remove nitrogen, an upgrade that may cost as much as $30 million. Assume the water could be discharged to ground water and/or surface water. Other permitting constraints besides nitrogen and ammonia may be imposed upon a discharge to the L-30, since it is on the 303(d) list. Surface-water discharge was screened early. Permit under 62-610, Part IV. This alternative is proposed under the assumption that water with lower nitrogen and phosphorus would support different vegetation and provide different habitat quality than comparable alternatives that do not pre-reduce nutrients, such as "Lake Wako.".

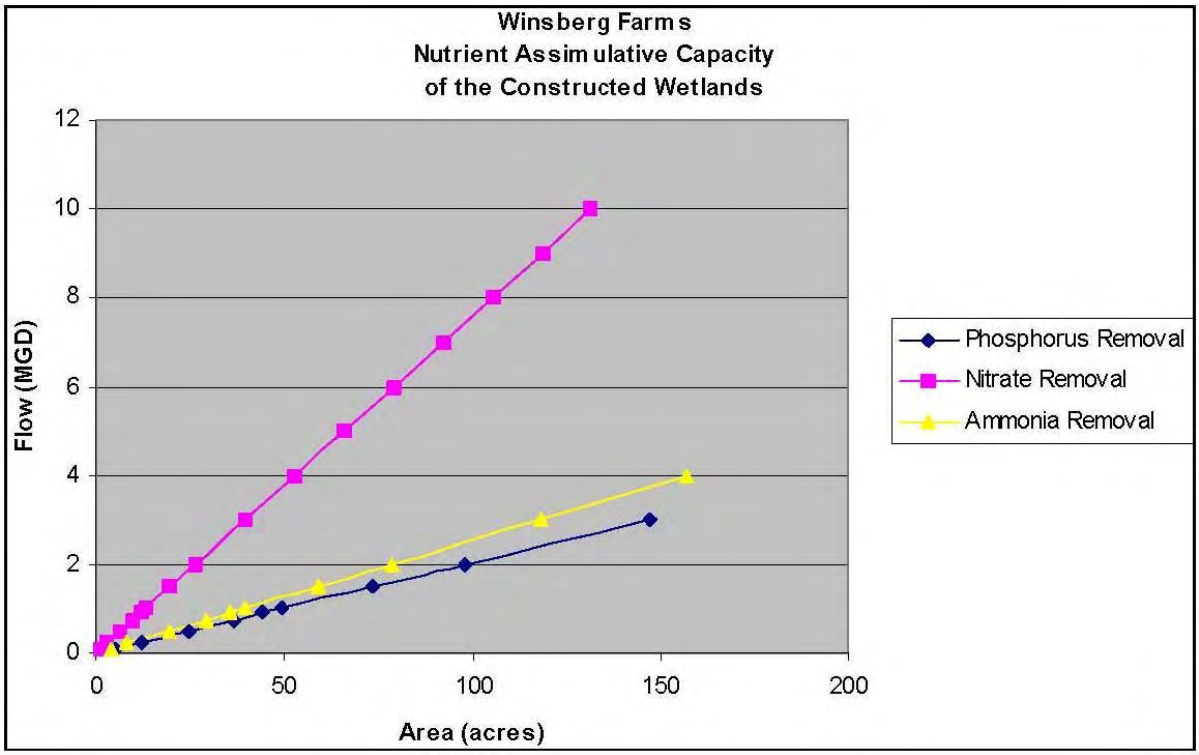


FIGURE F-1: NUTRIENT ASSIMILATIVE CAPACITY

F.2 LOCATION

The locations for Group 1 are depicted in **Figure F-2** are from 2002 aerial imagery. Pipeline costs represent the cost to deliver water from the SRWRF to

each site. Real estate costs in **Table F-1** represent the costs to acquire the identified acreage to use for wetland restoration.

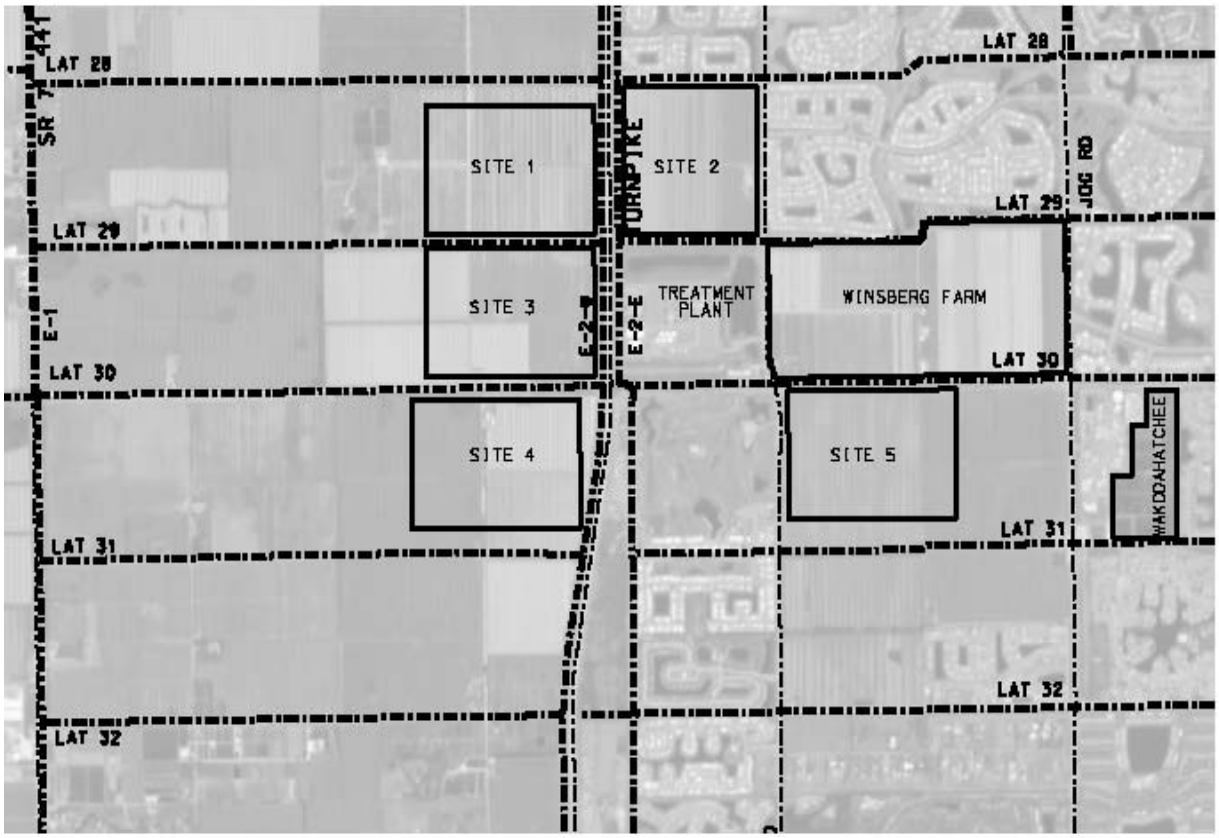


FIGURE F-2: LOCATIONS OF GROUP 1 SITES CONSIDERED

TABLE F-1: COST TO ACQUIRE LAND FOR WETLAND RESTORATION

Site	Acres	Pipeline Distance (feet)	Pipeline Total Cost	Real Estate Cost
1	150	2,900	$311K	$13.5 Million
2	140	2,400	$257K	$12.6 Million + recent residential and commercial development
3	150	1,400	$151K	$13.5 Million
4	150	3,100	$332K	$13.5 Million
5	150	2,600	$279K	$13.5 Million + recent residential and commercial development
Winsberg	150	200	$22K	$13.5 Million

F.3 REAFFIRMING THE YELLOW BOOK PLAN

In accordance with Guidance Memorandum No. 2 of the Six Program-Wide CERP Guidance Memoranda, Section 2.4 Plan Formulation, the following discussion is to reaffirm that the planning conditions for the Winsberg site have not changed from those described in the Yellow Book.

Conditions have not changed at the Winsberg Farm site from those in the Yellow Book.

F.3.1 Problems

The following problems discussed in the Yellow Book have generally not changed in the project area:

- Loss of wildlife and habitat in eastern Palm Beach County due to heavy development; and
- Water currently sent to deep-well injection is lost to the natural environment.

F.3.2 Opportunities

The opportunities described below have generally not changed in the project area from those discussed in the Yellow Book:

- Retain for the natural system some of the treated water from Palm Beach County's SRWRF that is currently disposed of by deep-well injection;
- Create a wetland to increase the spatial extent of the natural wetland habitat;
- Create populations of native wildlife;
- Increase water supply to meet consumptive water demand and create ecosystems; and
- Provide a high-quality environmental education experience. This would complement and/or expand the educational features of the Wakodahatchee Wetlands.

F.3.3 Goals

The following goals have generally not changed from those stated in the Yellow Book:

The goals of this project are to capture water from the Palm Beach County Southern Regional Wastewater Reclamation Facility (SRWRF) that is currently being lost from the ecosystem to deep-well injection and use this water to

construct wetlands and wildlife habitat in the area. These are the same goals as stated in the Yellow Book.

F.3.4 Objectives

The objectives shown below in **Table F-2**, developed by the Project Delivery Team (PDT), have not changed from those contained in the Yellow Book**:**

TABLE F-2: GENERAL CERP OBJECTIVES

CERP Objective: Increase habitat and functional quality.	
Winsberg Objective 2	Create wetlands in eastern Palm Beach County.
Winsberg Objective 3	Increase wildlife habitat.
CERP Objective: Increase species abundance and diversity.	
Winsberg Objective 2	Create wetlands in eastern Palm Beach County.
Winsberg Objective 3	Increase wildlife habitat.
CERP Objective: Increase availability of freshwater (agricultural/municipal/industrial).	
Winsberg Objective 1	Increase local water resource availability for natural systems and other uses.

Winsberg Farm specific objectives as discussed in the Yellow Book:

1. Create a wetland; and
2. Create the wetlands using water from the SRWRF that would normally be lost to deep-well injection. This will return water to the natural system.

F.3.5 Existing Conditions

The existing conditions generally have not changed from the Yellow Book. The Winsberg property was and continues to be a working vegetable farm. The sponsor has completed construction of a portion of the project described in the Yellow Book in anticipation of receiving cost-share credit.

F.3.6 Future Without-Project Conditions

The future without-condition generally has not changed from the Yellow Book. Although project lands were not discussed in the Yellow Book, it is reasonable to assume that project lands would be developed consistent with surrounding

lands. Surrounding lands are being developed as residential and commercial property.

The future without-condition assumes the Winsberg site will be fully developed as residential property with unencumbered land use.

F.3.7 Constraints

While constraints for this project area are not discussed in the Yellow Book, it is reasonable to assume that the constraints normally associated with the CERP project and with USACE projects in general apply. These constraints have not changed and the following assumptions remain valid:

- CERP – No elimination or transfer of waters;
- CERP – Maintenance of flood protection;
- CERP – No effect on tribal compact;
- No impact on listed species; and
- Meet all applicable environmental requirements.

This page intentionally left blank

APPENDIX G
ECONOMIC AND SOCIAL CONSIDERATIONS

This page intentionally left blank

TABLE OF CONTENTS

G APPENDIX G -- ECONOMIC AND SOCIAL CONSIDERATIONS G-1
G.1 SOCIO-ECONOMICS G-1
G.1.1 Purpose of this Investigation G-1
G.1.2 Methodology G-2
G.1.2.1 Without-Plan and With-Plan Conditions G-2
G.1.2.2 Sources and Causes of Economic Effects G-3
G.1.2.3 Methodology for Conducting Economic Analyses G-3
G.1.3 Prior Studies G-4
G.1.4 Organization of Report G-5
G.2 POPULATION AND ECONOMY G-5
G.2.1 Overview G-5
G.2.2 Study Area G-6
G.2.2.1 Forecasted Land Use Changes G-6
G.2.3 General G-7
G.2.4 Population G-9
G.2.4.1 Historic Population Trends G-9
G.2.4.2 Existing Population G-9
G.2.4.3 Population Projections G-11
G.2.5 Economy G-11
G.3 MUNICIPAL & INDUSTRIAL WATER DEMAND G-14
G.3.1 Overview G-14
G.3.2 Palm Beach County Water Demand G-14
G.3.2.1 Existing Municipal and Industrial Water Usage G-14
G.3.3 Agricultural Water Use G-19
G.4 COMMERCIAL NAVIGATION G-19
G.4.1 Overview G-19
G.5 RECREATION G-19
G.5.1 Overview G-19
G.5.1.1 Recreation Resources G-21
G.5.1.2 Aesthetic Resources G-22
G.5.1.3 Recreation Demand G-23
G.5.1.4 National Recreation Trends G-24
G.5.1.5 National Survey of Recreation and the Environment G-24
G.5.1.6 National Survey of Fishing, Hunting and Wildlife-Associated Recreation G-28
G.5.1.7 State Recreation Trends G-31
G.5.1.8 State Tourism Trends G-33
G.5.2 Recreation Benefits G-33
G.5.3 Recreational and Commercial Fishing G-36
G.6 COSTS G-36
G.7 SITE SELECTION COST EFFECTIVENESS G-38
G.7.1 Properties G-38
G.7.2 Costs and Benefits G-39

G.8 PLAN OPTIMIZATION G-39
G.8.1 Environmental Benefits G-41
G.8.1.1 Application G-43
G.8.1.2 Wetland Quality Index Methodology G-45
G.8.1.3 Application G-47
G.8.1.4 Combining the WRAP and WQI Analysis G-52
G.8.2 Cost of Alternatives G-52
G.8.3 Cost-Effective Analysis for Optimization G-53
G.8.4 Incremental Cost Analysis G-53
G.8.5 Tentatively Selected Plan G-54
G.9 REGIONAL ECONOMIC IMPACTS G-55
G.9.1 Introduction G-55
G.9.2 Defining the Study Area G-55
G.9.3 The Impact Categories G-56
G.9.3.1 Construction G-56
G.9.3.2 Operations and Maintenance G-56
G.9.3.3 Real Estate and Effects of Other Land Acquisitions G-56
G.9.3.4 Total Project Costs and Annual Project Costs G-57
G.9.4 The Method of Regional Impact Analysis G-57
G.9.4.1 The Regional Input-Output Structure G-57
G.9.5 Regional Economic Impacts G-59
G.9.5.1 Overall Impacts: Output, Jobs and Earnings G-59
G.10 OTHER SOCIAL EFFECTS G-61
G.10.1 Overview G-61
G.10.2 Potential Urban and Community Impacts G-62
G.11 ENVIRONMENTAL JUSTICE G-64
G.12 REFERENCES G-66

LIST OF TABLES

Table G-1: Palm Beach County Population G-9
Table G-2: Palm Beach & Broward Counties Population Estimates G-11
Table G-3: Florida, Palm Beach and Census Tract Demographics G-13
Table G-4: USGS-Estimated Total Water Use G-15
Table G-5: Estimated 2050 Service area 1 Conservation G-16
Table G-6: Entire Study Area, M&I Conservation G-18
Table G-7: Estimated Demand and Need For Outdoor Recreation G-22
Table G-8: Counties Potentially Affected by Alternative Restoration Plans G-23
Table G-9: Regional Outdoor Recreation Facilities Region X G-24
Table G-10: Participation Rates of Surveyed Recreational Activities G-26
Table G-11: Trends in U.S. Recreation Participation G-27
Table G-12: Total U.S. Wildlife-Watching Participation G-28
Table G-13: Residential and Nonresidential Wildlife-Watching Activities G-29
Table G-14: U.S. Nonresidential Wildlife-Watching by Species G-30
Table G-15: Participants in Wildlife-Related Recreation G-30
Table G-16: Florida Wildlife-Watching Expenditures G-31
Table G-17: Demand For Selected Recreation Activities G-32
Table G-18: Recreation Participation Rates G-32
Table G-19: Treasure Cost Demand and Facility Needs G-33
Table G-20: Summary of Costs and Benefits G-35
Table G-21: Costs Used in Cost Effectiveness For Site Selection G-38
Table G-22: Results of Cost-Effectiveness Analysis G-39
Table G-23: Costs Used in Cost-Effectiveness For Optimization G-40
Table G-24: WRAP Evaluation Summary for the Wakodahatchee and Winsberg Farm ... G-44
Table G-25: WRAP Analysis Average Annual Habitat Units G-44
Table G-26: Wetland Quality Index Analysis G-50
Table G-27: Combined Wetland Quality Index and WRAP analysis G-52
Table G-28: Best Buy Plan G-54
Table G-29: Summary of Total Project Costs and Annual Costs G-57
Table G-30: Overall Regional Economic Impacts of the Alternatives G-59
Table G-31: Regional Totals G-60
Table G-32: Construction Impacts vs. Actual Demographic Figures G-61
Table G-33: Socio-Economic Vulnerability Profile G-64

LIST OF FIGURES

Figure G-1: Future Land Use Determination G-8
Figure G-2: Affected Census Tract G-10
Figure G-3: Distribution of USGS G-16
Figure G-4: Distribution of Total Conservation G-17
Figure G-5: Conservation-Adjusted Forecast, by Water Use Sector G-17
Figure G-6: Average Annual Habitat Units For Winsberg G-45
Figure G-7: Cost-Effective Plans G-53
Figure G-8: Best-Buy Alternative Plans G-54

G APPENDIX G -- ECONOMIC AND SOCIAL CONSIDERATIONS

G.1 SOCIO-ECONOMICS

Although the Winsberg Farm selected plan is only a small piece of the larger South Florida ecosystem improvement effort, together they make up the overall Comprehensive Everglades Restoration Plan (CERP). This part of the Winsberg Farm report is concerned with the socio-economic issues of plan implementation. The primary effects of the project are the costs of implementation, and the ecosystem restoration and improvement effects. The net national economic development (NED) project cost represents the largest monetarily expressed impact of plan implementation. Project costs have regional impact dimensions, as well, as expenditures on the project can cause changes in local and regional earnings, sales and employment, due to the ripple effect of project-spending throughout the regional economy. The most significant beneficial effect of the project is the ecosystem improvement expected to result from the plan. This major benefit is not expressed in monetary terms, in accordance with policy. A cost-effective/incremental-cost analysis for optimization of the plan, along with a site-screening analysis, was utilized to determine the alternative that provides the greatest desired benefits at the lowest possible cost. Besides these two major effects of cost and ecosystem improvement, the many components that together embody CERP also affect recreation, fishing and water supply (agricultural and urban). The Winsberg Farm Plan's impacts in these areas are expected to be unsubstantial, however.

G.1.1 Purpose of this Investigation

This investigation assesses the economic effects of the alternative ecosystem restoration plans formulated in the feasibility phase of the Winsberg Farm project. The economic evaluation of the alternative restoration plans includes five principal elements.

1. Socio-Economic Profile of the Study Area: This profile includes population and economic forecasts for the region, as well as projections of future water demand.

2. Anticipated Effects of Alternative Plans on the National Economic Development (NED) Account: Alternative plans could result in positive or negative effects on net national economic efficiency due to project-induced impacts on the following economic activities in South Florida:

- Agricultural water supply;
- Municipal and industrial (M&I) water supply;
- Flooding potential;

- Recreation; and
- Commercial and recreational fishing

3. Evaluation of Project Costs: Project costs include all expenditures required to implement the alternative plans. The federal government and the state of Florida will share these costs. Project costs include those for initial construction; lands; relocations; rights of way; rehabilitation, replacement and repair; and operations and maintenance (O&M) (including the cost of post-construction monitoring and adaptive management).

4. Regional Economic Development (RED) Effects: The potential RED effects of the alternative plans include changes in income, employment or economic output of the region.

5. Other Social Effects (OSE): The potential social effects of the alternative restoration plans include effects on minority, elderly and disadvantaged groups, population displacement, and effects on community cohesion.

The economic analysis for the Winsberg Farm study was conducted consistent with federal statutes and USACE policy. Procedures for estimating NED and RED effects are specified in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council, May 10, 1983), Engineering Regulation (ER) 1105-2-100 (April 22, 2000), and other USACE guidance.

G.1.2 Methodology

A number of factors were considered prior to developing the methodologies used to evaluate the economic effects of the alternative restoration plans. These factors include: available analytical tools, economic theory, federal policy, obtainable data, and time and budgetary constraints. These factors are discussed below.

G.1.2.1 Without-Plan and With-Plan Conditions

Proper definitions of the without-plan and with-plan conditions are critical to the planning process. The without-plan condition is the most likely condition expected to exist in the future in the absence of a proposed project. The future without-plan condition (2050) is the benchmark against which alternative future with-plans are evaluated. National and regional socio-economic parameters that were considered include income, employment, population and other aggregate projections, such as land-use trends, water supply, and water demand. Comparisons of conditions with the implementation of alternative plans to

future without-plan conditions were performed to identify the beneficial and adverse effects of the proposed plans. Depending on the alternative and the type of economic impact, changes resulting from implementation of a restoration plan may be desirable or undesirable when compared to the future without-plan condition. For example, alternatives that include modifications to the current system to provide additional water-storage areas may result in fewer economic losses associated with agricultural (irrigation) water shortages. This would be a desirable ancillary benefit of restoration.

G.1.2.2 Sources and Causes of Economic Effects

The potential economic impact of the alternative restoration plans are secondary consequences of the environmental enhancements and hydrologic changes that are expected to result from the proposed structural and operational modifications to the Winsberg Farm study area. These projected impacts are contingent upon the successful implementation and operation of restoration plans and subsequent outputs, and are, therefore, subject to the uncertainties inherent in those ecosystem restoration activities. Due to the challenges inherent in quantifying NER benefits, quantifying the resulting NED benefits is also a challenge. Nonetheless, there are methods for evaluating the economic efficiencies of alternative restoration plans.

G.1.2.3 Methodology for Conducting Economic Analyses

Consistent with USACE guidance, a benefit-cost analysis is not required for national ecosystem restoration plans. For ecosystem restoration projects, a plan that reasonably maximizes ecosystem restoration benefits compared to costs, consistent with the federal objective, shall be selected. An incremental-analysis approach was used to examine increments of plans or project features to determine their incremental costs and benefits in a progressive manner until incremental benefits no longer exceed incremental costs The methodologies used to conduct economic analysis studies for the study were based on a combination of factors, including economic theory, USACE ecosystem restoration and economic evaluation policies, and the characteristics of methodologies used by economists to value ecosystem benefits. For this study, the alternative restoration plans were compared using information in monetary and non-monetary units. The economic analysis of the Winsberg Farm alternative restoration plans include: (1) NED costs (in monetary terms), (2) the anticipated environmental benefits resulting from restoration measures (in non-monetary terms), (3) NED benefits and impacts attributable to agricultural water supply, municipal and industrial water supply, commercial navigation, recreation and commercial fishing (in monetary and non-monetary terms), and (4) the positive and adverse regional economic effects (RED) resulting from project implementation.

This section of the report addresses items (1), (3) and (4) above, and includes a brief description of (2). Theoretically, the economic basis for making policy decisions about whether to invest public funds in ecosystem restoration in Winsberg Farm is the same as for any other government spending program. The monetary and non-monetary costs and benefits of any proposed government project should be compared to determine whether the expenditure is justified and to select the plan which maximizes the net benefits to society for the investment of public funds. The costs of ecosystem restoration projects include initial construction costs, major rehabilitation and repair costs, operations and maintenance (O&M) costs, post-construction monitoring costs, and adverse NED effects. Typically, these costs can be expressed in monetary (i.e., dollar) terms.

The principal challenge of ecosystem restoration economics is estimating the value of restoration benefits. The primary purpose (and therefore the primary benefit) of each alternative plan is ecosystem restoration. The benefits of ecosystem restoration are usually expressed by ecologists in non-monetary units, such as acres of specific habitat created or enhanced, indices of biological productivity associated with habitat improvement, or increased abundance and/or diversity of particular species of plants or animals. For decision-making purposes, it would be desirable to express ecosystem restoration benefits in monetary terms, in order to compare them with project costs. Expressing the costs and benefits of alternatives in a common, monetary metric would facilitate selection of the best restoration plan for a given site. However, calculating the monetary value of environmental amenities is difficult and controversial. Environmental amenities are public goods that are generally not exchanged in the marketplace. For marketable commodities (i.e., items that people buy and sell), the demand and prices paid for these goods can be used as “proxies” for determining their value to consumers.

As specified in USACE ecosystem restoration policy (EC 1105-2-210: Ecosystem Restoration in the Civil Works Program), ecosystem restoration projects are not subject to traditional benefit-cost analyses. An ecosystem restoration proposal must still be justified by comparing the monetary and non-monetary costs and benefits of restoring degraded ecosystems. USACE ecosystem restoration evaluation procedures focus on the non-monetary benefits of restoration, comparing these benefits to monetary costs using cost-effectiveness and incremental cost-analysis procedures.

G.1.3 Prior Studies

This study relied on the use of prior studies and other secondary information to the extent possible. These studies are contained in the reference list presented at the end of this appendix. The SFWMD has previously conducted a wide variety of studies that directly or indirectly support this investigation. Interviews with

SFWMD staff and review of SFWMD reports have contributed greatly to this investigation.

G.1.4 Organization of Report

The sections that follow evaluate the economic impacts of the alternative restoration plans. Section 2 develops a socio-economic profile for the region, and Section 3 contains the region's water demand forecasts. The following sections develop the basis for critical, physical and socio-economic effects of the future conditions, with-plan and without-plan. These effects were instrumental in the assessment of potential NED effects of the alternative restoration plans in subsequent sections, including agricultural water supply, M&I water supply, flooding, commercial navigation, recreation, and commercial and recreational fishing. The costs and incremental analyses of the alternative plans are presented in Sections 7 and 8. The regional economic effects and other social effects of the alternative plans are explored in Sections 9 and 10, respectively.

G.2 POPULATION AND ECONOMY

G.2.1 Overview

This section of the appendix includes a description of the local economy and demographics of the study area. This descriptive information provides insight into the study area's socio-economic characteristics, and provides part of the basis for different facets of the economic impact evaluation work in the rest of this appendix.

The people who live in the study area, and the economic activity in which they are engaged, comprise important components of the area's total environment. In addition to the direct use of this data for the water-use projections and other social effects mentioned above, they represent the socio-economic environment for the other impact topics of flooding, water-use shortages, fishing, recreation and navigation.

Any course of action forthcoming from this study will have effects throughout an economic system, as well as the natural ecosystem(s), the health and sustenance of which are the impetus for this investigation. The economic system is connected with the natural ecosystem and, in general, is ultimately dependent upon it for survival. This connection is especially strong in the study area. Adverse changes in the health and condition of the natural system can cause severe negative impacts on the economic system, particularly in the study area for this feasibility study. Conversely, in this study area, beneficial changes to the natural system are expected to have a strong positive effect on the economic system. It is significant, therefore, to describe and understand the general economic and social environment within which such changes could take place.

Although the main focus of economic impact evaluation efforts undertaken for this study has been to describe the economic impacts and benefits of alternatives being considered for implementation, describing the broader context for these evaluation efforts is also necessary and important.

G.2.2 Study Area

This study focused on the Winsberg Farm study area of the Lower East Coast region of South Florida, located in Palm Beach County. The existing Winsberg property consists of about 150 acres of actively managed row-crop fields and a native plant nursery. The available land surrounds an out-parcel where the current owners, Ted and Trudy Winsberg, currently reside. An unpaved road provides access from Jog Road to the Winsberg home. Several buildings, historically occupied by migrant farm workers, are located in the southwestern portion of the property.

Adjacent properties consist of agricultural lands and residential developments. The SRWRF is immediately west of the Winsberg property across Hagen Ranch Road, and the Wakodahatchee Wetlands are to the southeast across Jog Road. Land-use data for the study area were acquired from SFWMD and Palm Beach County. Examination of the land-use data revealed that the majority of the lands within the study area are currently in various stages of development. Residential developments (e.g., single family, condominiums, golf course communities, etc.) represent the largest land use category, accounting for about 58 percent of the area. Agricultural areas similar to the Winsberg Farm site (e.g., crops, orchards, pasture, etc.) account for about 25 percent of the land use within the study area. The final 17 percent is made up of a mixture of wetlands and open water. Based on data from the Palm Beach County parcel database, about 96 parcels in the study area are similar to the Winsberg Farm site in both agricultural land use and size (at least 175 acres).

G.2.2.1 Forecasted Land Use Changes

The future-without-project condition is based on the prevailing pattern of land-use change over time throughout southern Palm Beach County. Between 2000 and 2004, two farms adjacent to the Winsberg tract have been converted to residential developments. This is consistent with the historical pattern of land development in the area. Natural areas were typically cleared and converted to agricultural production. At some point, return on investment with continued agricultural production is too low to justify continued operations, and concurrently, the land value on the open market rises because of demand for commercial or residential properties. The typical pattern is for agricultural lands to eventually be sold to development interests and converted to a land use having a higher value per acre. Certainly by the year 2050, applying the surrounding rates of land-use change, it is reasonable to project that the

Winsberg Farm site would be converted to a further developed state. Presuming development would parallel that of similar large tracts in this part of the county, it is projected that the land would be converted to a residential development, leaving no more than a nominal percentage of the tract "preserved." It is entirely likely that off-site mitigation would be sought by a developer in light of the high unit value of lands in this area. For this reason, it is projected that the entire 150-acre tract would be developed and that no native wetland or upland habitat would be realized by the year 2050.

This projection is consistent with the land-use description found in the Palm Beach County Master Plan for the year 2020; a built-out condition by 2020 would be expected to persist through 2050 and beyond.

G.2.3 General

Socioeconomic and demographic data for the study area indicate higher-than-average income when compared to the rest of the state and nation, and much greater economic and population growth than for the rest of the nation. Additional characteristics of the study area include a strong service sector, fishing, tourism and recreation. Florida's economy is generally characterized by strong wholesale and retail trade, government and service sectors. Florida's warm weather and extensive coastline attract vacationers and other visitors and helps to make the state a significant retirement destination for people from all over the country. Agricultural production and fisheries, which are important sectors of the state's economy, are significant to portions of Palm Beach County. Easily developed land, accessible water supply, abundant natural resources, and the aesthetic beauty of the region are the fundamental building blocks of the local economy. Relative to the national economy, the manufacturing sector has played less of a role in Florida, including the study area. However, high-technology manufacturing has begun to emerge as a significant sector in the state over the last decade.

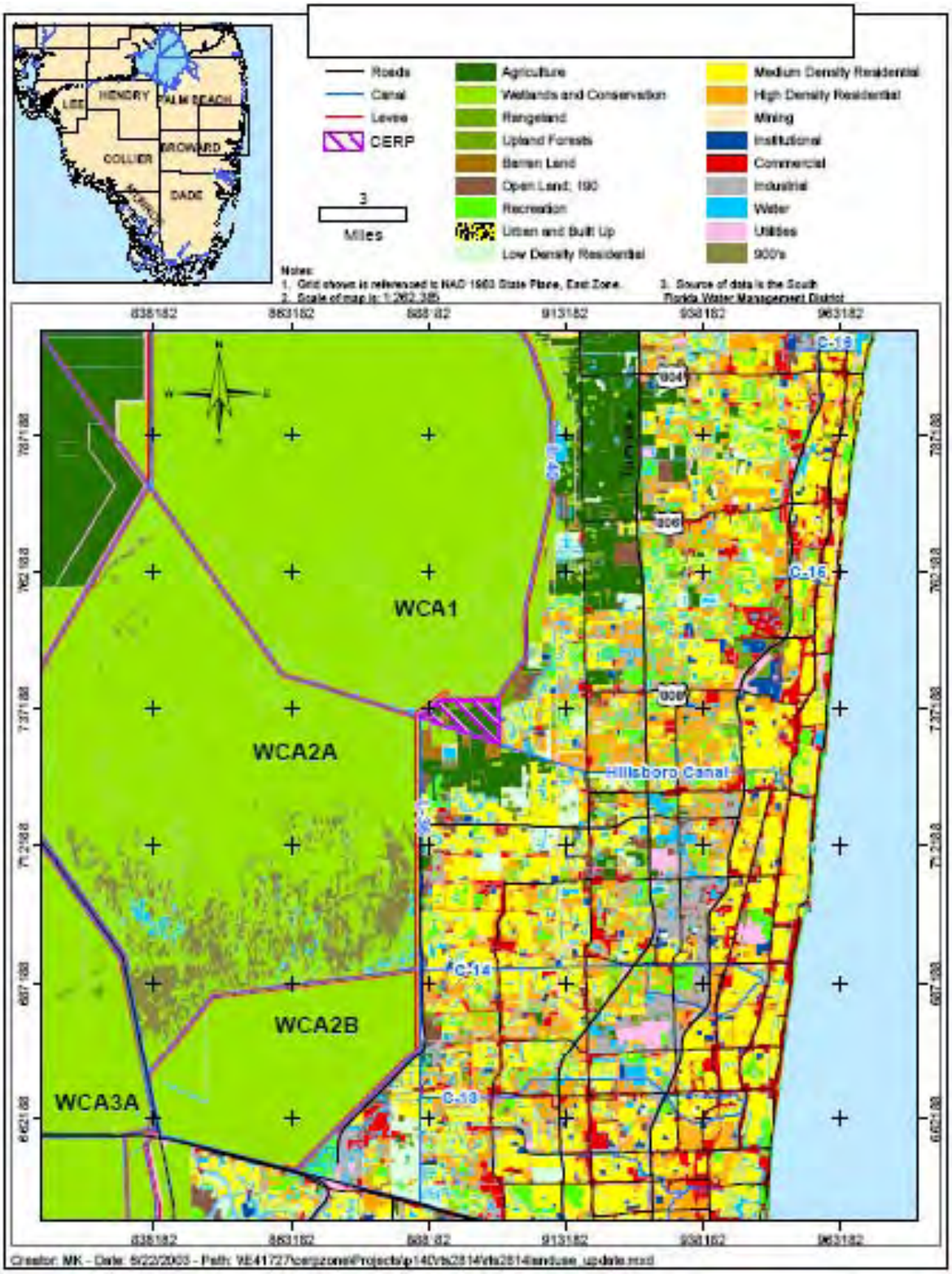


FIGURE G-1: FUTURE LAND USE DETERMINATION

Furnished by Palm Beach County Planning and Zoning

Effective years for future land use maps for Palm Beach County are to 2020

G.2.4 Population

G.2.4.1 Historic Population Trends

From 1950 to 2000, Florida achieved dynamic change in population. In relation to the remainder of the United States, Florida outgrew the other states by almost 400 percent.

Palm Beach County grew more than 880 percent in the 50 years preceding 2000. This growth can be attributed to Florida's ideal climate and historically low property costs.

TABLE G-1: PALM BEACH COUNTY POPULATION

Area	1950	1960	1970	1980	1990	2000	% change
U.S.	152,271	180,671	205,052	227,224	249,464	272,690	79.1
Florida	2,771	4,952	6,789	9,746	12,938	15,982	476.7%
Palm Beach County	114.7	228.1	348.8	576.9	863.5	1,131	886%

Source: U.S. Census (1950 – 2000)
* Multiply population values by 1000

A subset of Florida population, the summed total of these nine counties comprises percentage of the Florida population. Even though the populations of the counties increased in absolute numbers, their share of Florida's population has not changed over time. Alternatively, the proportional share of the population inside the nine-county lower east coast of Florida (LEC) area changed over the 50-year time period. The number of persons residing in each county increased over the 50-year period but at different rates. The share of population residing in Glades, Hendry, Martin, Monroe and Okeechobee counties remained relatively constant at or around .19 percent, .58 percent, 1.56 percent, 2.3 percent and .52 percent, respectively. Miami-Dade County's share of the nine-county total population has declined from 1950 to 39 percent in 2000. In contrast, Palm Beach and Lee County's share of the LEC population has increased 4.5 percent over the 50-year period; most dramatically Broward County's share of the nine-county population has increased 16 percent over the years. While each county has seen an increase in their populations, the growth has been increasingly concentrated in Broward, Palm Beach and Lee counties.

G.2.4.2 Existing Population

The Winsberg Farm study area is in a census tract that incorporates a populated area. The affected census tract is 59.28 in western Palm Beach County (**Figure G-2**). The study area lies on the southeastern fringe of the affected census tract.

The census tract provides a convenient area for which data is available. This data provides a blueprint for the surrounding area, but not exact characteristics of the project site.

The population of the relevant census tract had a 2000 census population of 5,065 (this figure lies entirely within tract 59.28). A corresponding figure from the 1990 census to measure growth is unattainable because, due to population growth and spatial expansion, previous census tracts were subdivided to create the current tract. In Palm Beach County, the population increased 31 percent during the 1990 to 2000 period. The population of Florida and the United States increased 23.5 percent and 13.1 percent, respectively, over the same period.

The Palm Beach County population is expected to increase more than 90 percent from 2000 to 2050. The projected growth of the South Florida nine-county area is anticipated to be 78 percent over that same, 50-year period.

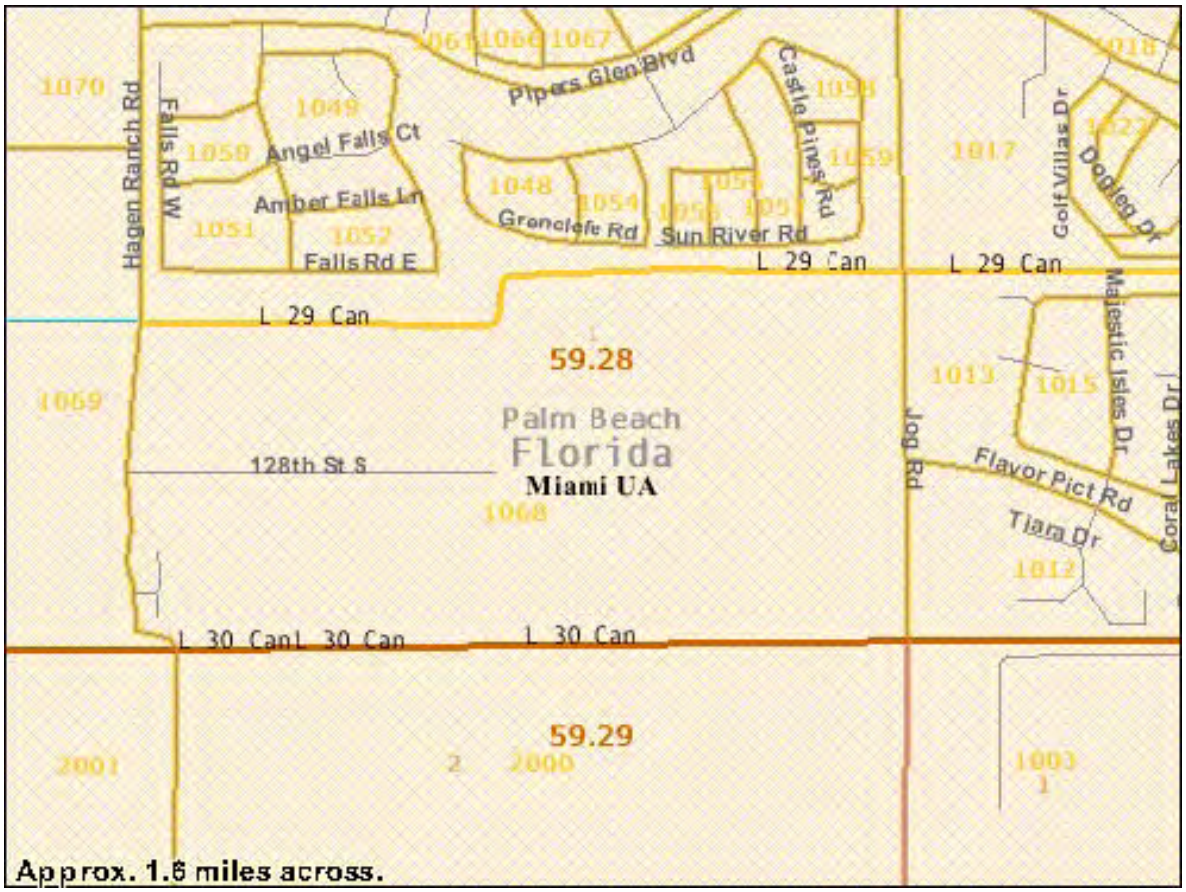


FIGURE G-2: AFFECTED CENSUS TRACT

*The affected census tract is 59.28 Acres as Shown Above

Of the 1.19 million residents in Palm Beach County during the year 2000, more than 12 percent are of Hispanic origin. Of the three large counties in the LEC, this Palm Beach County has the lowest percentage. Miami-Dade County

comprises nearly half of the state's Hispanic population (1.29 million). Broward County had a much smaller percentage of population that can claim Hispanic roots. At 16.7 percent, Broward County's Hispanic population mirrors the state's 16.8 percent Hispanic/Latino population.

Florida's African-American population is 2,333,427, which is 14.5 percent of the state's total population. In Palm Beach County, the African-American population is 164,273, which makes up 13.8 percent of the county's population. Palm Beach County has the lowest percentage of African-Americans in the LEC counties, with Broward and Miami-Dade at 20.3 percent and 20.5 percent, respectively.

Within the affected census tract, the total population is 5,065. Of that number, 4,931 identified themselves as Caucasian, while 57 (3.5 percent) identified themselves to be of African-American descent, and 48 identified themselves as having Hispanic roots.

G.2.4.3 Population Projections

The Palm Beach County population is expected to increase more than 90 percent from 2000 to 2050, while population in Broward County is estimated to increase 82 percent. Florida as a whole is projected to grow 86 percent by 2050. The projected growth of the South Florida nine-county area is anticipated to be 78 percent over the same 50-year period. **Table G-2** contains population projection estimates for Palm Beach and Broward counties vs. Florida as a whole. An accurate estimate of future population growth in Census Tract 59.28 is unattainable.

TABLE G-2: PALM BEACH & BROWARD COUNTIES POPULATION ESTIMATES

Area	2000	2010	2020	2030	2040	2050
Florida	15,982.4	18,866.7	21,792.6	24,528.6	27,118.7	29,714.5
Broward County	1,623.2	1,931.6	2,257.1	2,562.9	2,754.8	2,947.0
Palm Beach County	1,131.2	1,371.2	1,622.4	1,859.2	1,998.4	2,137.9

Source: BEBR Projections, U.S. Census (2000)
* Multiply population values by 1000

G.2.5 Economy

Generally, a strong wholesale and retail trade, government and service sectors characterize Florida's economy. Florida's warm weather and extensive coastline attract vacationers and other visitors and help make the state a significant

retirement destination for people all over the country. Agricultural production is also an important sector of the state's economy, and is especially significant to portions of the study area. Compared to the national economy, the manufacturing sector has played less of a role in Florida, but high-technology manufacturing has begun to emerge as a significant sector in the state over the last decade.

The three most significant employment sectors in the Palm Beach County economy are retail trade, administrative support, and guest services (accommodation and food service). In 1997, retail trade in Palm Beach County employed 61,563, administrative support employed 44,306 and guest services employed 41,031. These three top employers paid aggregate 1997 salaries of $1.13 billion, $.86 billion and $.44 billion, respectively.

The unemployment rate for Florida is 5.1 percent (2003, not seasonally adjusted), while the unemployment rate for Palm Beach County is 3.7 percent. In 1999, unemployment in the study-area census tracts was at 16 percent, which represented 65 persons over the age of 16 that are in the labor force. Complete data below the county level is unavailable beyond non-census years.

Personal, per capita money income in Florida was $21,557 (1999). Palm Beach County recorded a much higher per capita income level at $36,383. Miami-Dade and Broward counties remained more consistent with the state average at $21,688 and $23,170 respectively. The personal, per capita income in the census tract was higher than the rest of the state and the county at $36,439.

The 1999 median household income in Florida was $38,819. In Broward and Miami-Dade counties, the median household incomes were $41,691 and $35,966, respectively. The study-area census tract reported a much higher median household income at $56,383.

TABLE G-3: FLORIDA, PALM BEACH AND CENSUS TRACT DEMOGRAPHICS

Florida	
Population 2000	15,982,378
Change in population, 1990-2000	23.5%
Below poverty level, 1999 estimate	12.5%
White, 2000	78.0%
Black, 2000	14.6%
Hispanic origin, 2000	16.8%
Other, 2000	7.4%

Palm Beach County	
Population 2000	1,131,184
Change in population, 1990-2000	31.0%
Below poverty level, 1997 estimate	9.9%
White, 2000	79.1%
Black, 2000	13.8%
Hispanic origin, 2000	12.4%
Other, 2000	7.1%

Census Tract 59.28	
Population	5,065
Percent below poverty level	2.1%
White	97.4%
Black	1.1%
Hispanic origin, 2000	2.9%
Some other Race ("non-white other" share of population negligible)	1.5%

Source: 2000 U.S. Census

The average household size in Florida is 2.46 persons (1999). In the Lower East Coast, Palm Beach County had 2.34 per household, Miami-Dade County 2.84 persons and Broward averages 2.45. In the affected census tract, the average household size was 1.9.

In 1999, it was reported that 12.2 percent of Florida's population lived below the poverty level, while 9.9 percent of Palm Beach County was below the poverty level. In the rest of the LEC, Broward County had 11.5 percent living below the poverty threshold, while Miami-Dade County had 17.6 percent. The percentage of individuals in the highlighted census tract living below the poverty level is considerably lower at 2.1 percent.

G.3 MUNICIPAL & INDUSTRIAL WATER DEMAND

G.3.1 Overview

To analyze the impacts on water supply, the water demand must be estimated and forecasted. The basis for municipal and industrial (M&I) water-demand projections used in this study is a water-demand forecast prepared under contract for the Jacksonville District, USACE, by Gulf Engineers & Consultants, Inc., Baton Rouge, Louisiana (GEC).

IWR-MAIN Water-Demand Analysis software, Version 6.1, is the model that estimates current and future water demands for this study. The software was initially developed for the Office of Water Resources for the U.S. Department of the Interior in 1969. The system has been improved in subsequent versions and has been selected by the Institute for Water Resources (IWR) of USACE as a proven method of water-demand forecasting. The IWR-MAIN Water-Demand Forecasting model requires demographic, housing, and business statistics and water-use data aggregated by user classifications and seasonal variations for distinct geographical areas. The relevant geographical area for this study is Palm Beach County.

G.3.2 Palm Beach County Water Demand

In the study area, surficial aquifers supply the majority of water for urban use. Rainfall is the primary supporter of agriculture water demanded in South Florida. Surficial waters (canals, shallow groundwater and ponds) provide most of the irrigation demands in the watershed. Salinity intrusion is becoming a predominant problem for water supply. In the Lower East Coast area, salinity intrusion has resulted from two major events. The first is the lowering of the ground water table in the area due to drainage and reduced recharge, as well as increased withdrawal of water by pumping. The second reason is the construction of numerous drainage and navigation canals from inland areas to the coastal waters. Currently, water shortages and restrictions are implemented during low rainfall periods or droughts.

G.3.2.1 Existing Municipal and Industrial Water Usage

The U.S. Geological Survey (USGS) estimates annual water withdrawals for Florida at the county level every five years. The most recent publication of findings was entitled, *Water Withdrawals, Use, Discharge, and Trends in Florida, 1995*. Water-use estimates for 2000 were not published at the time of this analysis. However, unpublished water-use estimates for 2000 for the nine counties included in this analysis were obtained from the United States Geological Survey (USGS). These uses are distributed as public-supply and self-supply domestic (residential), commercial, industrial, government and

recreational water-use estimates, along with unaccounted-for, water-loss estimates. **Table G-4** presents the USGS-estimated 2000 water use for the nine-county area, excluding mining and power-generation water use. Total public-supply water use for the region is estimated at 960.51 million gallons a day (MGD), and total M&I water use is estimated at 1,176.79 MGG. The addition of the 1,901.14 MGD of agricultural water use (which will not be forecast in this analysis) increases total water demand for the region to 3,077.93 MGG. Agricultural water use accounts for 62 percent of the total use, and all M&I uses account for 38 percent.

TABLE G-4: USGS-ESTIMATED TOTAL WATER USE

County	Municipal and Industrial						Ag	Grand Total
	Public Supply	Self-Supply				Sub Total		
		Domes	Commer	Indust	Recreation			
Broward	258.06	2.11	0.54	0.00	37.00	297.71	4.10	301.81
Glades	0.55	0.61	0.04	0.00	0.42	1.62	69.02	70.64
Hendry	4.72	1.67	0.21	0.51	1.09	8.20	503.91	512.11
Lee	52.37	8.86	0.46	0.09	22.66	84.44	60.51	144.95
Martin	18.45	4.20	0.37	2.78	7.88	33.68	140.02	173.70
Miami-Dade	377.27	4.85	1.29	0.00	13.39	396.80	110.35	507.15
Monroe	17.02	0.08	0.10	0.00	1.85	19.05	0.03	19.08
Okeechobee	2.23	1.52	0.36	0.00	0.68	4.79	67.04	71.83
Palm Beach	229.84	10.17	0.59	15.81	74.09	330.50	946.16	1,276.66
Total	960.51	34.07	3.96	19.19	159.06	1,176.79	1,901.14	3,077.93

Source: USGS unpublished data, 2002.
NOTE: 1. Recreation self-supply water use includes golf course irrigation. 2. For Selected Counties, 2000 Excluding Mining and Power Generation. 3. Values in mgd.

On the county level, the largest water user in the study area in 2000 was Palm Beach County, mainly because of the large Everglades Agricultural Area. Palm Beach County used a total of 1,276.66 MGD, or more than 41 percent of the total regional water use. Of this amount, 946.16 MGD (74 percent) was agricultural use and 330.5 MGD was M&I water use. The county's public-supplied water use ranked first within the region. The large recreational water use results from the numerous golf courses within the county.

Figure G-3 presents the distribution of USGS-estimated 2000 total and M&I water use, by county, in the Lower East Coast.

Combined, total water use in the four counties of the LEC -- Broward, Miami-Dade, Monroe and Palm Beach -- was 2,104.7 MGD, which accounted for 68 percent of the nine-county region. The LEC M&I water use was estimated at 1,044.06 MGD, or 89 percent of the region's total M&I water use.

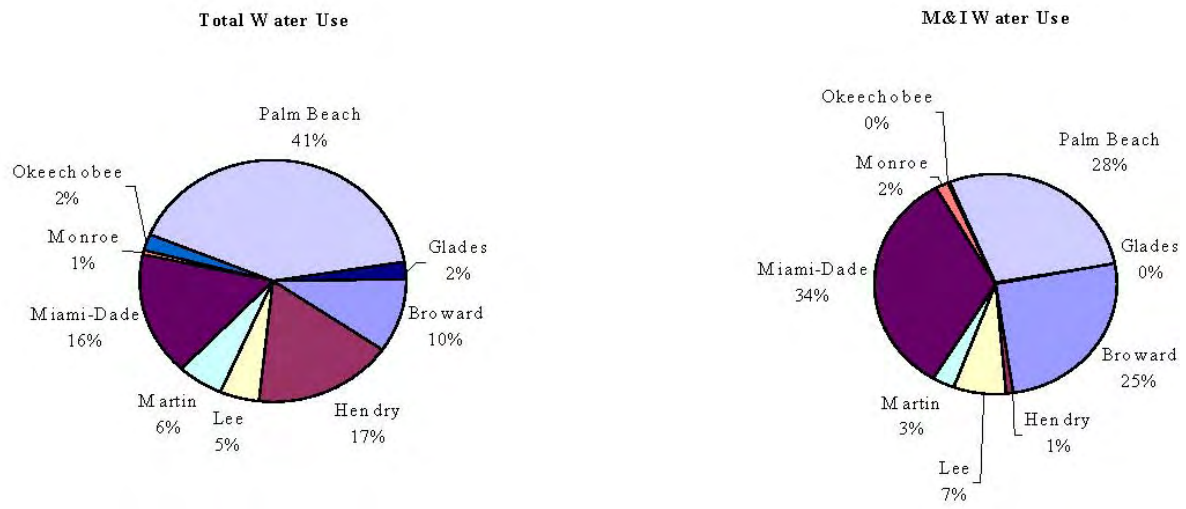


FIGURE G-3: DISTRIBUTION OF USGS

With the increase in population and infrastructure, the demand for water will increase, and the shortages and restrictions will become more prominent, leading to economic and environmental damage. In the Lower East Coast Region, groundwater is the predominant source of water for municipal and industrial uses. This trend is expected to continue in the future. Groundwater levels would continue to decrease, leading to increased shortages of water and increased salinity levels in wells in the study area. With more persons drawing water and less water available for recharge, shortages to wells and well fields would become more prevalent.

TABLE G-5: ESTIMATED 2050 SERVICE AREA 1 CONSERVATION

End Use	2000 Demand (mgd)	2050 Demand (mgd)
Service Area 1	263.9	429.3

*Adjusted, Most-likely Population Scenario

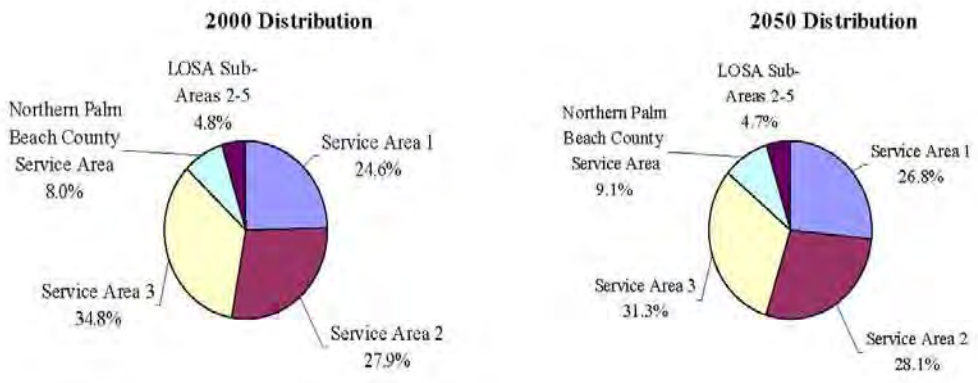


FIGURE G-4: DISTRIBUTION OF TOTAL CONSERVATION
*Adjusted M&I Water Use, by Service Area, 2000 and 2050, Most-Likely Population Scenario

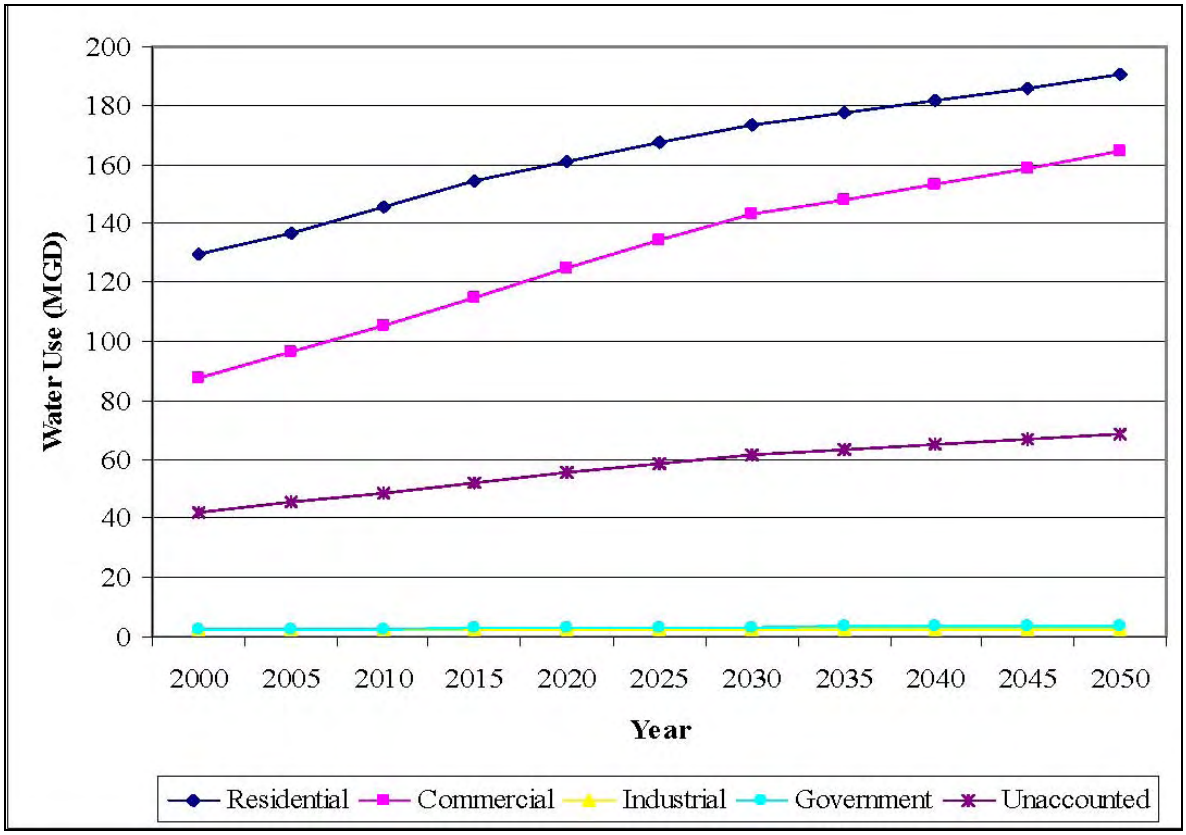


FIGURE G-5: CONSERVATION-ADJUSTED FORECAST, BY WATER USE SECTOR

The Lower East Coast (LEC) Region municipal and industrial water-demand forecast is shown in **Table G-6**. The LEC service areas consists of Service Areas 1 (eastern Miami-Dade County), 2 (most of eastern Broward County), and 3

(mostly Southeastern to East Central Palm Beach County), Northern Palm Beach County Service Area (NPBCSA), and Sub-areas 2 through 5 of the Lake Okeechobee Service Area (LOSA). Figures are derived from the University of Florida Bureau of Economic and Business Research population and employment projections, and were collected for the 2000 Initial CERP Update. The section of the Initial CERP Update that applies to the Winsberg Farm study area is Service Area 1, which includes the southeastern portion of Palm Beach County. Water-demand projections estimate the Service Area 1, depicted in **Table G-5** and **Figure G-5**, most-likely population scenario, conservation–adjusted water use in 2050 at 429.3 MGG. This accounts for 26.8 percent of the entire Lower East Coast study area (**Figure G-3**). Due to the exceptionally small rate of growth projected between 2050 and 2060, it is not expected that 2060's water demands will be substantially higher than in 2050, after taking into account conservation measures.

TABLE G-6: ENTIRE STUDY AREA, M&I CONSERVATION

	2000		2025		2050	
Area	MGD	Percent of Total	MGD	Percent of Total	MGD	Percent of Total
Service Area 1	263.9	24.6%	365.7	26.7%	429.3	26.8%
Service Area 2	299.2	27.9%	385.2	28.1%	450.5	28.1%
Service Area 3	373.2	34.8%	430.2	31.4%	502.3	31.3%
NPBCSA	85.6	8.0%	122.9	9.0%	146.1	9.1%
Sub-Area 2	31.1	2.9%	38.4	2.8%	43.5	2.7%
Sub-Area 3	3.1	0.3%	3.7	0.3%	4.4	0.3%
Sub-Area 4	16.9	1.6%	23.0	1.7%	27.2	1.7%
Sub-Area 5	0.6	0.1%	0.7	0.1%	0.8	0.1%
Total	**1,073.6**	**100.0%**	**1,369.9**	**100.0%**	**1,604.2**	**100.0%**

NPBCSA = Northern Palm Beach County Service Area.
*Adjusted water use and distribution by service area most-likely population scenario, 2000, 2025, and 2050

The SFWMD requires development of water conservation plans as a prerequisite for water utilities to obtain a water-use permit. With the implementation of conservation plans, water demand should change. Most conservation plans incorporate passive water conservation measures that include increasing block-rate structures, the required use of ultra-low-flow water fixtures on new or renovated construction, restrictions on lawn watering, required use of rain sensors on automatic sprinkler systems, a leak detection program, and public education concerning water conservation measures.

With the increase in population and infrastructure, the demand for water will increase and the shortages and restrictions will become more prominent, leading to economic and environmental damage.

G.3.3 Agricultural Water Use

Agriculture is a significant irrigated-land user of the Lower East Coast region. Agriculture represents less than one-quarter of land use in the service area, and in many areas will be virtually non-existent in the future.

Rainfall is the primary supporter of agriculture water demand in South Florida -- about 59 inches per year along the Lower East Coast. Surficial waters (canals, shallow groundwater and ponds) provide the majority of the irrigation demands in the watershed. Unfortunately, surficial supplies are inadequate at some time nearly every year. During droughts, agricultural water users have higher irrigation-water demands; however, water supplies are usually at their lowest levels during droughts. Consequently, water-shortage management policies are implemented which restricts use of water so that agricultural water users do not always receive as much water as they need. This can lead to reduced crop yields and economic damage.

The LEC receives significant groundwater recharge via easterly seepage from the Water Conservation Areas under the north-south embankment system; however, during prolonged droughts, significant volumes of water from Lake Okeechobee can be required by the LEC to supplement local water supplies and prevent saltwater intrusion into well fields.

As urban landscape and M&I water demands increase, shortages will become more prevalent, leading to greater restrictions.

G.4 COMMERCIAL NAVIGATION

G.4.1 Overview

Commercial navigation in the study area is nonexistent due to limited canal size, length, and inaccessibility to other bodies of water. Navigation will not be impacted by construction of the Winsberg Farm wetlands.

G.5 RECREATION

G.5.1 Overview

This section examines the potential effects of the selected plan on outdoor recreation in the study area. Outdoor recreation in Florida includes many different activities. A common way of differentiating outdoor recreation activities is to classify them as "user-oriented" or "resource-based" activities. User-oriented activities, such as individual and team sports, are not dependent on any natural resource setting and can be located, space permitting, on any open site. These

facilities are provided for the convenience of the user. For example, a basketball court can be added to a playground. Resource-based activities, such as hunting and fishing, depend on the existence and quality of supporting natural or historical resources. The economic value of resource-based recreation is determined by the user's willingness to pay for a recreation occasion. The willingness of current and potential users to pay for resource-based recreation of specific quantity and quality constitutes the demand for that type of recreation. The interaction of demand with the quantity and quality of recreation resources available determines the recreation use or "participation" levels for that resource-based activity. When the quantity or quality of recreation resources is modified by a project, such as the alternative restoration plans, the change in value of resource-based recreation is based on the difference in the willingness of users to pay under the with- and without-project conditions.

The Winsberg Farm wetlands provide a unique and extensive natural resource-based recreational resource. The restoration of the ecosystem could potentially have important impacts on the value of outdoor recreation in the study area. The hydrologic changes associated with alternative restoration plans have been designed to improve the structure and function of the ecosystems. These improvements can be expected to provide resource-based recreational opportunities compatible with the protection of natural systems. Many tourists and residents recreate in the natural areas surrounding the study area. If the alternative restoration plans improve the ecology of the study area, the quality of study-area-related recreation and/or the number of people who take part in study-area-related recreation could increase as well. Consequently, the value of outdoor recreation in the study area could also substantially increase.

However, precisely estimating the future value of recreation in the study area is problematic, and anticipating the incremental changes in value associated with restoration is even more challenging. There are four principal uncertainties that challenge forecasting the future quantity and quality of outdoor recreation under with- and without-project conditions. Perhaps the most important uncertainty concerns the timing and character of the ecological changes that are expected to result from the alternative restoration plans. At this time, the outcomes of restoration actions cannot be predicted. Consequently, secondary effects, such as associated changes in recreation patterns and the resulting effect on industries supporting recreation (e.g., marine industry), cannot be accurately quantified.

Another uncertainty regarding the future value of recreation is the marketing of tourism and study-area-related recreation. If the restored ecosystem is used to market tourism and recreation in the study area, the value of recreation could change dramatically relative to the without-project future conditions.

A third uncertainty is the degree to which recreational facilities and recreational access would be developed as part of a restoration plan. Recreation facilities and access, such as visitor centers, scenic overlooks, nature trails and roads, can greatly affect participation levels.

Finally, there are a variety of economic factors at the national level that can influence tourist and resident recreation demand. These factors include the health of the national economy, levels of disposable income, and the availability and costs of competing recreation opportunities. As described in the draft 2000 Florida Statewide Comprehensive Outdoor Recreation Plan (SCORP): "The state's 1996 tourist population (44.7 million) is expected to increase to 57 million visitors, a 25 percent increase, by 2005. However, Florida tourism and its economic implications are sensitive to national economic and energy policies. The dynamic nature of the industry causes uncertainty in tourism forecasting, making it difficult to accurately project visitation levels for more than one or two years at a time" (Florida Department of Environmental Protection, 2000). As evidence of the challenges of tourism and recreation forecasting, the Florida Tourism and Industry Marketing Corporation limits its tourism forecasts to three years, and the most recent SCORP (2000) used a 10-year forecast horizon (to the year 2010).

G.5.1.1 Recreation Resources

The study area lies in the South Florida Region (Region 10), as defined by the Florida State Comprehensive Outdoor Recreation Plan (SCORP). This region encompasses more than 3,600 square miles in Palm Beach, Indian River, St. Lucie and Martin counties. This region offers excellent opportunities for camping, hiking, swimming, bicycling, fishing, boating and saltwater beach activities. Currently, saltwater beach activities, bicycle riding and hiking are the most popular resource-based activities. Swimming pools and golf courses attract the most user-oriented activity in the South Florida region.

Recreation at the Winsberg Farm wetlands will greatly resemble the recreation opportunities at the Wakodahatchee wetlands, which averages 125,000 visitors annually. Recreation in Palm Beach County and within the vicinity of Winsberg Farm is prominent at the Loxahatchee National Wildlife Refuge. The various activities in this area include (and are legally allowed): waterfowl hunting (permitted in some areas), fishing, wildlife viewing, hiking, biking and boating. Boating and fishing are the most popular activities, with two adjacent boat ramps and air-boating facilities. A myriad of species of game fish (largemouth bass, bluegill, catfish and several species of exotic fish) make this area very attractive to sportsmen.

In addition to the game fishing provided in the Everglades Wildlife Management Area, the canal system helps preserve a habitat for smaller fish during periods of drought. These fish are prey for many species of wading birds.

Table G-7 demonstrates the various supply and needs for recreational resources in South Florida (Region 10). From the table, it is shown that bicycle riding, freshwater fishing areas, hiking trails and hunting areas have reached their current capacities, and require additional units for each participant to achieve maximum utility. Additionally, to a lesser extent, more camping sites and freshwater beaches are needed to fulfill current user demand. Destruction of existing recreational resources would have an adverse effect on current demand.

TABLE G-7: ESTIMATED DEMAND AND NEED FOR OUTDOOR RECREATION

Activity (User Occasions)	Demand (Units)	Resource Needs
Archaeological/Historic Site	1,303,665	0 Sites
Bicycle Riding	12,926,026	867.46 Miles
Camping (RV/Trailer)	1,706,273	0 Sites
Camping (Tent)	513,387	183 Sites
Freshwater Beach Activities	342,264	0 Miles
Freshwater Boat Ramp Use	85,544	0 Lanes
Freshwater Fishing	589,954	0 Feet
Hiking	1,464,722	291.60 Miles
Horseback Riding	156,045	0 Miles
Hunting	115,776	0 Acres
Nature Study	2,365,741	21.72 Miles
Picnicking	1,645,916	0 Tables
Saltwater Beach Activities	26,536,059	0 Miles
Saltwater Boat Ramp Use	845,598	0 Lanes
Saltwater Fishing	1,318,774	0 Feet

*Source: Florida Department of Environmental Protection and U.S. Fish and Wildlife Service
*South Florida (Region 10) Estimated Demand and Need For Outdoor Recreation Resource and Facilities, 2000

G.5.1.2 Aesthetic Resources

The areas directly surrounding the Winsberg Farm study area are primarily recreational, urban and agricultural. Easy access enables the indiscriminate use

of varied types of recreational vehicles. In addition to the legally allowed recreation activities noted previously, illegal dumping of trash, poaching, and the irresponsible use of firearms also occur under existing conditions within the study area.

G.5.1.3 Recreation Demand

The SCORP is the best source of information on recreation demand and supply at the state and regional scales. It divides the state into 11 planning regions, each with clusters of counties. As indicated in **Table G-8**, Region X is the planning region that encompasses the study area.

TABLE G-8: COUNTIES POTENTIALLY AFFECTED BY ALTERNATIVE RESTORATION PLANS

Region	Counties
Region X	Indian River
	St. Lucie
	Martin
	Palm Beach

*Source: Florida Department of Environmental Protection, 2000
*Counties Within SCORP Planning Regions Potentially Affected by Alternative Restoration Plans

The SCORP organizes outdoor recreation in Florida into 47 categories that encompass a variety of recreation activities, including team sports (e.g., basketball and baseball), individual sports (e.g., golf and tennis), hunting, fishing, swimming and boating. **Table G-9** presents descriptive information on the recreation facilities in SCORP's Region X for study-area-specific recreation categories. These resource-based categories were selected as those that could potentially be affected by the hydrologic or ecological changes associated with alternative restoration plans. This table also includes percentages of the statewide totals for the recreation categories that could potentially be affected though Winsberg Farm restoration.

Profiles of existing and future recreation demand in the study area can be developed by drawing on a variety of information at the national, state, regional and local levels. The discussions begin with the results of two national surveys on outdoor recreation. These illustrate the participation and expenditures of participants in outdoor recreation activities.

TABLE G-9: REGIONAL OUTDOOR RECREATION FACILITIES REGION X

Resource/Facility	Region X	% of State Total	State Total
Outdoor Recreation Areas	1.255	10%	13,097
Outdoor Recreation Acres	565,139	5%	10,850,904
Land Acres	501,342	6%	9,077,004
Water Acres	63,796	4%	1,773,900
Total Hunting Acres	333,527	5%	6,168,716
Hunting Land Acres	303,756	5%	6,046,955
Hunting Water Acres	29,771	24%	121,761
Camping			
RV/Trailer Camp Sites	5,385	4%	138,576
Tent Camp Sites	563	6%	10,214
Trails			
Hiking Trails (miles)	289	7%	3,904
Horseback Riding Trails (miles)	100	7%	1,443
Nature Trails (miles)	66	6%	1,043
Freshwater Catwalks	23	3%	748
Boating			
Canoe Trails (miles)	17	1%	2,587
Freshwater Boat Ramp Lanes	109	6%	1,973
Freshwater Marinas	18	4%	511
Freshwater Slips/Moorings	698	6%	11,758
Saltwater Marinas	200	18%	1123
Saltwater Marina Slips	5,457	12%	45,839

*Source: Florida Department of Environmental Protection, 2000.
*Regional Outdoor Recreation Facilities Region X, 1998

G.5.1.4 National Recreation Trends

National trends in recreation may help identify potential or expected changes in the demand for Florida recreation as the result of ecosystem restoration. The following two recent national surveys of outdoor recreation have particular relevance for this investigation (paragraphs C.5.1.5 and C.5.1.6).

G.5.1.5 National Survey of Recreation and the Environment

The Outdoor Recreation Coalition of America conducted a National Survey of Recreation and the Environment in 1994 and 1995. About 17,000 Americans were interviewed in a random-sample telephone survey, providing information

regarding their participation in 62 recreational activities organized into 13 broad categories.

Table G-10 presents 1994-1995 participation rates for 26 of the 62 surveyed recreational activities. The activities in this table were selected as those that potentially could be affected by the alternative restoration plans. Of the selected activities, the three most popular groups of activities were outdoor viewing, fitness activities, and outdoor social activities that had participation rates of 76.2 percent, 68.3 percent and 67.8 percent, respectively. Walking was identified as the most popular activity with about 134 million participating (66.7 percent of the population). About 124 million recreationists (62.1 percent) enjoy visiting a beach or other waterside facility and gathering outdoors with family members. Sightseeing also had a high level of participation (56.6 percent). Other very popular activities include hiking and backpacking, fishing, boating and camping.

TABLE G-10: PARTICIPATION RATES OF SURVEYED RECREATIONAL ACTIVITIES

Recreational Activity	Participants (millions)	Percent of U.S. Population
Fitness	136.9	68.3%
Walking	133.7	66.7%
Viewing/Studying	152.6	76.2%
Nature Centers	93.1	46.5%
Visitor Centers	69.4	34.6%
Bird Watching	54.1	27.0%
Wildlife Viewing	62.6	31.3%
Fish Viewing	27.4	13.7%
Other Wildlife Viewing	27.5	13.7%
Sightseeing	113.4	56.6%
Visiting Beach/Waterside	124.4	62.1%
Water-Based Nature Study	55.4	27.7%
Camping	52.8	26.4%
Developed Area	41.5	20.7%
Primitive Area	28	14.0%
Hunting	18.6	9.3%
Big Game	14.2	7.1%
Small Game	13	6.5%
Migratory Bird	4.3	2.1%
Fishing	57.8	28.9%
Freshwater	48.8	24.4%
Saltwater	19	9.5%
Warmwater	40.8	20.4%
Anadromous	9.1	4.5%
Catch and Release	15.5	7.7%
Boating	58.1	29.0%
Canoeing	14.1	7.0%
Kayaking	2.6	1.3%
Rowing	8.4	4.2%
Outdoor Adventure	73.6	36.7%
Hiking	47.8	23.9%
Off-Road Vehicle Driving	27.9	13.9%
Horseback Riding	14.3	7.1%

Source: Outdoor Recreation Coalition of America, 1997.

The Outdoor Recreation Coalition conducted a similar national survey of recreation and the environment in 1983-1984. **Table G-11** compares the results of the two surveys. The categories are somewhat different than in **Table G-12** due to differences in the surveys.

TABLE G-11: TRENDS IN U.S. RECREATION PARTICIPATION

Recreational Activity	1983-1984 (millions)	1994-1995 (millions)	% Change
U.S. POPULATION	234,868 (January '84)	261,575 (January '95)	11.4%
Fitness			
Walking	93.6	133.7	42.8%
Viewing/Studying			
Bird Watching	21.2	54.1	155.2%
Sightseeing	81.3	113.4	39.5%
Camping (overall)	42.4	52.8	24.5%
Camping, Developed	30	41.5	38.3%
Camping, Primitive	17.7	28	58.2%
Hunting	21.2	18.6	-12.3%
Fishing	60.1	57.8	-3.8%
Boating	49.5	58.1	17.4%
Swimming			
Pool Swimming	76	88.5	16.4%
River/Lake/Ocean Swimming	56.5	78.1	38.2%
Outdoor Adventure			
Hiking	24.7	47.8	93.5%
Backpacking	8.8	15.2	72.7%
Off-Road Driving	19.4	27.9	43.8%
Horseback Riding	15.9	14.3	-10.1%

Source: Outdoor Recreation Coalition of America, 1997
*Trends in U.S. Recreation Participation, 1982-1994

This table contains the actual number of participants, not participation rates. As indicated in this table, there has been an increase in the number of participants for almost all activities. The 11.4 percent increase in U.S. population during this period explains some of the change in numbers of participants. However, some

activities are clearly undergoing an increase in participation rates. For example, bird watching has the largest increase (155 percent) in number of participants from 1984 to 1995. Hiking and backpacking also experienced large increases in participation, 93.5 and 72.7 percent respectively. Walking activity increased 42 percent from 94 million to 134 million participants. Also, since 1984 there has been an increasing interest in specialized outdoor adventure activities, such as orienteering, mountain and rock climbing, caving and special types of wildlife viewing.

TABLE G-12: TOTAL U.S. WILDLIFE-WATCHING PARTICIPATION

Category	Participants	Expenditures
Residential	60.8 million	
Nonresidential	23.7 million	
Total*	62.9 million	$29 billion

*Total U.S. Wildlife-Watching Participation, 1996

In general, the variety of recreational interests in the United States appears to be increasing along with recreational participation rates. As future recreation needs and interests develop, it is important to recognize that participation in specific types of recreational activities is often linked to demographic factors, such as age and income. For example, participation in activities requiring vigorous exercise is considerably higher for young people than for senior citizens. However, the elderly population has increasing recreation participation because of the growing awareness of the importance of physical fitness. Participation in most activities is low for those with family incomes below $25,000 per year. Interestingly, participation is also low for those with family incomes greater than $100,000 per year. Most outdoor recreational activities appear to be enjoyed largely by the middle class, those with family incomes between $25,000 and $75,000 per year.

G.5.1.6 National Survey of Fishing, Hunting and Wildlife-Associated Recreation

The U.S. Fish and Wildlife Service conducted the National Survey of Fishing, Hunting and Wildlife-Associated Recreation in 1996. As part of this survey, 22,578 anglers and hunters, and 11,759 wildlife watchers were interviewed. The purpose of the survey was to gather information regarding participation and expenditures for wildlife-related activities, including fishing, hunting and wildlife watching. National participation and expenditure data for sportsmen and wildlife watchers are presented in **Table G-11**. The survey revealed that 77 million Americans aged 16 or older (40 percent of the adult population) enjoyed some form of wildlife-related recreation in 1996, with total expenditures exceeding $101 billion.

Wildlife-watching activities primarily included observing, photographing and feeding wildlife for two types of participants: residential and nonresidential. The residential category included those activities that occurred within one mile of the residents' homes, while the nonresidential group included those who took trips or outings for the primary purpose of observing, photographing or feeding wildlife. Based on the National Survey of Fishing, Hunting and Wildlife-Associated Recreation, in 1996 over 62.9 million people in the United States took part in wildlife watching. This figure is consistent with the 1995 participation of 62.6 million wildlife watchers reported in the National Survey of Recreation and the Environment.

The sum of residential and nonresidential subcategories does not equal the total due to an overlap in participation.

Table G-13 presents residential and nonresidential participation in various wildlife-watching activities. Among all wildlife-watching participants, 97 percent (60.8 million) watched wildlife within 1 mile of their home (residential). The most popular residential activities included feeding and observing wildlife, 54.1 and 44.1 million participants, respectively. Approximately 23.7 million people (38 percent of all wildlife-watchers) spent 314 million days in 1996 taking trips for the primary purpose of enjoying wildlife. Of all nonresidential wildlife watchers, 68 percent participated only within their home state, 13 percent traveled only to other states and 19 percent took wildlife-watching trips in their state of residence, as well as in other states.

TABLE G-13: RESIDENTIAL AND NONRESIDENTIAL WILDLIFE-WATCHING ACTIVITIES

Category	Participants (millions)	Average Days/Year (millions)	Average Days/ Participant
Total Wildlife Watching*	62.9 (100%)		
Residential*	60.8 (97% of total)		
Observed Wildlife	44.1		
Photographed Wildlife	16.0		
Fed Wildlife	54.1		
Maintained Plantings/ Natural Areas	13.4		
Visited Public Areas	11.0		
Nonresidential*	23.7 (38% of total)	314	13.2
Observed Wildlife	22.9	279	12.2
Photographed Wildlife	12.0	79	6.6
Fed Wildlife	10.0	90	9.0

Source: U.S. Fish and Wildlife Service, 1996.
*Residential and nonresidential wildlife-watching activities, 1996

Survey results indicated that wildlife-watching trips were evenly distributed among male and female participants. The types of sites visited by nonresidential wildlife watchers included woodlands (77 percent), lakes or streamside (69 percent), open field (63 percent), brush-covered (59 percent), wetland marsh or swamp (44 percent), manmade area (39 percent) and oceanside (27 percent). Of the 23.7 million nonresidential participants, 22.9 million enjoyed observing wildlife. Observing birds and land mammals was favored by 75 percent of wildlife observers.

Table G-14 presents a profile of wildlife observed by nonresidential participants by type. Waterfowl and songbirds were among the most popular species watched.

TABLE G-14: U.S. NONRESIDENTIAL WILDLIFE-WATCHING BY SPECIES

Category	Participants (millions)	% of Total
Nonresidential	23.7	
Birds	17.7	75%
Waterfowl	14.3	
Songbirds	12.9	
Birds of Prey	10.6	
Other Shorebirds	9.5	
Other Birds	6.5	
Land Mammals	17.7	75%
Fish	8.4	35%
Marine Mammals	3.5	15%
Other	11.5	49%

Source: U.S. Fish and Wildlife Service, 1996.
*U.S. Nonresidential Wildlife-Watching by Species, 1996

The National Survey of Fishing, Hunting and Wildlife-Associated Recreation also contains state-level information on recreation participation and expenditures. In 1996, about 3,642,000 of Florida's 11,239,000 residents (32 percent) took part in wildlife-related recreation with the following distribution: 2,840,000 wildlife watching (25 percent of the state population) and 1,988,000 hunting/fishing (18 percent of the state's population). According to the survey, 79 percent of the time spent wildlife watching by Florida residents is spent within the state of Florida.

TABLE G-15: PARTICIPANTS IN WILDLIFE-RELATED RECREATION

Participant	Residents	% of Total	Non-residents	% of Total	Total
Anglers	1,878,000	(66%)	986,000	(34%)	2,864,000
Hunters	170,000	(92%)	14,000	(8%)	184,000
Wildlife Watchers	1,050,000	(57%)	796,000	(43%)	1,846,000

Source: U.S. Fish and Wildlife Service, 1996.
*Participation in wildlife-related recreation in Florida, 1996

As indicated in **Table G-15**, there were an estimated 1,846,000 participants in wildlife-watching activities in Florida in 1996. About 1,050,000 (57 percent) of these participants were Florida residents and the remainder (796,000, or 43 percent) was from outside the state. Together, in-state and out-of-state participants spent a total of 14,658,000 days watching wildlife in Florida.

Table G-16 presents estimated expenditures associated with wildlife watching in Florida during 1996. As indicated in this table, in-state and out-of-state participants spent more than $1.6 billion in 1996 on wildlife watching. This includes trip-related and equipment expenditures. Wildlife-watching equipment includes binoculars, film, bird food and special clothing. Auxiliary-equipment expenditures accounted for items such as tents and backpacking equipment. Other expenditures include magazines and books, membership dues and contributions, land leasing and ownership, as well as plantings.

TABLE G-16: FLORIDA WILDLIFE-WATCHING EXPENDITURES

Expenditure Category	Total Expenditures (millions)	% of Total
Total Expenditures	$ 1,677.2	100%
Trip-Related Expenditures	$ 754.7	45%
Food and Lodging	$ 439.7	26%
Transportation	$ 189.4	11%
Other Trip Costs	$ 125.6	7%
Total Equipment Expenditures	$ 767.6	46%
Wildlife-Watching Equipment	$ 286.9	17%
Auxiliary Equipment	$ 65.4	4%
Other Expenditures	$ 154.8	9%

Source: U.S. Fish and Wildlife Service, 1996

G.5.1.7 State Recreation Trends

The Florida SCORP supplements the results of the two national recreation surveys described above with estimates of current and future recreation demand at the state and regional scales. Recreation demands were developed for the SCORP through surveys of residents and tourists. The Division of Recreation and Parks conducts periodic surveys of resident and tourist participation in recreation activities to estimate outdoor recreation in Florida. The Division did not have funds to conduct a new participation survey for the latest SCORP, so recreation participation information was derived from the 1992-1993 surveys conducted by the University of Florida's Department of Recreation, Parks and Tourism. Participation in outdoor recreation activities is expressed in terms of

user-occasions, which occur each time an individual takes part in a single outdoor-recreation activity. The number of user-occasions was calculated for each planning region, as well as the entire state by type of activity. Demand was estimated for 1997, 2000, 2005 and 2010 by applying per-capita participation rates to population projections.

Table G-17 presents 1992 statewide resident and tourist demand in Florida for selected outdoor recreation activities. The activities were chosen based on their potential for being affected by the alternative restoration plans. As indicated in this table, more than 45 million residents and tourists took part in these activities in 1992. Hiking, recreational vehicle (RV) camping, and nature study were popular with residents and tourists. With the exception of RV camping, participation by residents outnumbered tourist participation.

TABLE G-17: DEMAND FOR SELECTED RECREATION ACTIVITIES

Activity	Resident	Tourist	Resident & Tourist	% of Total
Hunting	1,656	34	1,690	4%
RV Camping	2,992	5,659	8,651	19%
Tent Camping	1,260	825	2,086	5%
Hiking	5,220	3,668	8,887	20%
Horseback Riding	3,155	491	3,647	8%
Nature Study	4,645	2,215	6,859	15%
Canoeing	846	555	1,401	3%
Total	27,235	18,271	45,506	100%

*Source: Florida Department of Environmental Protection, 1994
*Demand for Selected Recreation Activities in Florida User-Occasions (Thousands), 1992

TABLE G-18: RECREATION PARTICIPATION RATES

Activity	% of Residents Participating		% of Tourists Participating	
	1985	1992	1985	1992
Hunting	11%	2%	0%	0%
RV/Trailer Camping	8%	3%	4%	5%
Tent Camping	10%	3%	1%	1%
Hiking	10%	6%	3%	3%
Horseback Riding	8%	3%	0%	0%
Nature Study	17%	5%	4%	3%
Canoeing	10%	3%	1%	1%

Source: Florida Department of Environmental Protection, 1994
*Participation Rates For Selected Recreation Activities (1985, 1992)

Table G-18 presents participation rates for the same set of recreation activities during 1985 and 1992. In general, residents have higher participation rates than tourists, and participation rates for both groups have declined from 1985 to 1992.

Table G-19 presents 1997 and projected 2010 demands for selected recreation activities in SCORP Planning Region X. This table includes user-occasions, as well as facility/resource needs. As part of the without-project conditions, all of the regions are expected to have significant increases in demands for the selected recreation activities with a commensurate need to increase development of the region's recreation resources and facilities.

TABLE G-19: TREASURE COST DEMAND AND FACILITY NEEDS

Activity	Units	Demand (user-occasions)		Resources / Facility Needs	
		1997	2010	1997	2010
Hunting	Acres	6,921	8,774	0	0
RV/Trailer Camping	Camp Sites	501,288	656,161	0	0
Tent Camping	Camp Sites	155,069	204,538	0	0
Hiking	Miles	1,361,764	1,754,904	273	435
Freshwater Fishing	Feet	1,276,522	1,678,705	23,654	33,618
Nature Study	Miles	820,221	1,058,861	0	0
Bicycle Riding	Miles	11,247,561	14,417,186	781	1,043

*Source: Florida Department of Environmental Protection, 1994 and 2000
* Demand and Facility Needs (1997 and 2010) Selected Recreation Activities, Treasure Coast (SCORP Region X)

G.5.1.8 State Tourism Trends

As described in the SCORP, 49 million domestic and international visitors to Florida per year comprise a significant portion of the overall demand for outdoor recreation resources in Florida. Their participation in resource-based recreation and their relatively high incomes (compared to resident recreationists) make tourists a significant component of Winsberg Farm-related recreation in the study area. The Comprehensive Review Study detailed the importance of tourism on Florida recreation.

G.5.2 Recreation Benefits

Appendix H contains a conceptual plan of recreational features proposed for the Winsberg Farm Project, with recreation features being included as an incidental project benefit. The recreation benefits will not be used in the justification of the selected plan, however. Palm Beach County Water Utilities Department's

(PBCWUD) contractor, CH2MHill, provided the recreation plan which identified facilities and their locations. Phase I recreation facilities (interpretive center and 25-car parking, boardwalk with shade pavilions, and interpretive signage) have been constructed, and the local sponsor is requesting a credit for the recreation features, per WRDA 2000, Section 601. Plans and specifications were reviewed for adequacy of design (Americans with Disability Act [ADA] and Architectural Barriers Act [ABA]), specification, and constructability to ensure the public health, safety and welfare.

The Winsberg Farm wetlands can support a significant amount of outdoor recreation in the Lower East Coast of Florida. Because recreation experiences in the Everglades are unique and few substitutes are readily available, the proportions of income spent on them are very low and user-occasion frequent. Therefore, the price elasticity of demand for these recreational experiences is low. This means that the percentage change in the number of trips will be lower than any percentage change in the cost of recreating. For example, if there were a 1 percent increase in the cost of a recreation trip, then there would be a decrease in the number of trips by less than 1 percent. In other words, the demand for these relatively inexpensive recreational experiences will not be sensitive to price changes. Therefore, it is highly likely that the capacity of the recreation facility will be used to capacity.

The state of Florida's Department of Environmental Protection's Division of Recreation and Parks coordinated and developed the Florida Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2000. This information was used to derive and project total recreation participation, and allocate this participation from state to regional to local levels. SCORP includes guidelines for resource-based outdoor recreation activities. These guidelines are based on maximum levels of carrying capacity developed by the Division of Recreation and Parks for use and protection of state park resources. SCORP was determined to be the best available resource for estimating recreation usage capacity.

The current SCORP indicates Region X recreation resource deficits for the year 2010 to include bicycling, hiking, non-boat freshwater fishing, saltwater Beach activities and saltwater fishing. These deficits will likely increase a lot by the year 2050 as population almost doubles, but for economic justification purposes, user rates were calculated using the capacity projection for 2010. Utilizing the guidelines and demands available from the SCORP, reasonable-capacity rate projections can be determined. Since there is a sufficient recreation resource supply in Region 10 for nature study, according to the SCORP, the resource capacity approach could be used to determine the number of visits per year for these activities. The resource capacity approach recognizes that expanded supply of the new recreation facility would increase use to capacity because sufficient resources exists in the market area. The Winsberg Farm Wetland Restoration

Project would help supply environmental study and bird-watching resources that national trends show are becoming more popular with the American public.

The use guidelines for designated nature study were based on carrying capacity guidelines adopted by the SCORP and used by the state park system. The high-value nature study facility could provide the opportunity for two-20 groups per mile, with two users per group and a daily turnover rate of four per day, for a total of 40-160 users per mile of boardwalk per day. The proposed Winsberg Farm Wetland Restoration project consists of about 1.2 miles of high-value nature study boardwalks throughout the 75-acre project tract.

Current monthly visitation figures have ranged from 3,000 to 30,000 visitors which could produce annual visitation between 36,000 and 360,000. With population projections doubling by 2050 for the Lower East Coast region, annual visitation numbers could be much higher. Even though SCORP projections for Region 10 show no anticipated shortage of nature study in the region by the year 2010, the Winsberg Farm Wetland Restoration Phase I Recreation Proposal is planning to provide these activities as the study team believes potential users will increase over the project life. This recreation facility may also function as an outdoor education opportunity for local school students in the immediate project area.

TABLE G-20: SUMMARY OF COSTS AND BENEFITS

Annual Costs	
Total Recreation Costs	$1,329,000
Interest during PED and Construction	122,300
Total Investment Cost	$1,451,300
Average Annual Cost	$88,800
Interest	$74,400
OMRR&R	$14,400
Annual Benefits	
Unit Day Value	$5.63
Daily Use	125 users
Annual Use (125x 365)	70,080
Average Annual Benefit	$256,800
Benefit-to-Cost	2.89 to 1
Net Annual Benefits	$168,000

The justification of incurring additional costs for recreation features is derived by utilizing a benefit-to-cost ratio. The tangible economic justification of the proposed project can be ascertained by comparing the equivalent average annual charges with the estimate of the equivalent average annual benefits, which

would be realized over the period of analysis. These average annual recreation benefits and costs are summarized in **Table G-20**.

Engineering Regulation 1105-2-100 (The Planning Guidance Notebook) provides economic evaluation procedures to be used in all federal water resources planning studies. The guidelines specified in ER 1105-2-100, dated April 22, 2000, were observed in preparing this cost analysis. The federally mandated project evaluation interest rate of 5 3/8 percent, an economic period of analysis of 40 years, and current prices were used to evaluate economic feasibility.

This analysis leads to the conclusion that there are nearly 2.89 times the benefit than the cost. The benefit-to-cost ratio for the recreation features equals 2.89 to 1, with net annual benefits equaling $168,000.

G.5.3 Recreational and Commercial Fishing

Fishing in the vicinity of the study area can be substantial recreationally, but is non-existent commercially. The existing canals in the vicinity of the study area do not provide opportunities for commercial fishing. Recreation fishing is very popular and abundant in the nearby Loxahatchee Wildlife Refuge. Shore fishing, as well as canoes and small trolling boats, are used in the canals for recreational purposes. The boat ramps that are currently in existence will remain open so the impact on recreational fishing will be minimal. It should be noted that recreational fishing benefits will not cause a negative impact on the local economy, but the additional benefits will, in all likelihood, be too minimal to measurably impact the economy.

G.6 COSTS

Data for initial construction/implementation, land acquisition, monitoring and periodically recurring costs for operation, maintenance, repair, replacement and rehabilitation (OMRR&R) have been developed through engineering design and cost estimation, in addition to real estate appraisal efforts. Details of that data development are explained and discussed elsewhere in this report. For economic evaluation of alternative plans on a comparable basis, these cost estimates are further refined through present worth calculations, use of appropriate price levels, and consideration of the timing of project expenditures.

Costs represent the difference between conditions without any plan (the "without-project condition") and conditions with an alternative plan. For purposes of this report and analysis, NED costs (National Economic Development costs, as defined by federal and USACE policy) are expressed in 2005 price levels, and are based on estimated costs over a 50-year period of analysis. Costs of a plan represent the value of goods and services required to implement, operate and maintain the plan.

The timing of when a plan's costs are incurred is important. Construction and other initial implementation costs cannot simply be added to periodically recurring costs for project operation, maintenance and monitoring. Also, construction costs incurred in a given year of the project can't simply be added to construction costs incurred in other years if meaningful and direct comparisons of the costs of the different alternatives are to be made. A common practice of equating sums of money across time with their equivalent at an earlier single point in time in the process is known as discounting. Through this mathematical process, which involves the use of an interest rate (or discount rate) officially prescribed by federal policy for use in water resource planning analysis (currently set at 5.375 percent per year), cost time streams of each alternative are mathematically translated into a present worth value. This value, calculated for this study as of the beginning of the period of analysis (2010), can then be directly and meaningfully compared between the plans being considered in this study. An annual value, equivalent to the present worth, can also be computed for the 50-year period of analysis. This average annual value represents an equivalent way of expressing the costs of a plan. The various costs estimated to be incurred over time to put each plan into place and operating have been computed and expressed as a present worth value and an average annual equivalent value. USACE guidance (ER 1105-2-100) requires that average annual equivalent costs be used for cost-effectiveness and incremental-cost analyses (CE/ICA).

Engineering Regulation (ER) 1105-2-100 requires that interest during construction (IDC) be computed which represents the opportunity cost of capital incurred during the construction period. Interest was computed for construction and PED costs from the middle of the month in which the expenditures were incurred until the first of the month following the estimated construction completion date. Interest during construction was computed for real estate and construction costs, and for the total real estate cost starting from the month prior to construction commencing.

TABLE G-21: COSTS USED IN COST EFFECTIVENESS FOR SITE SELECTION

Winsberg Farm Wetlands Matrix	Winsberg	McMurrain	York	Bowman
Lands	$2,390,500	$5,521,800	$5,625,000	$6,159,150
Construction	$6,432,000	$7,214,000	$6,714,000	$6,214,000
Total First Cost	$8,932,000	$12,735,800	$12,339,000	$12,373,150
IDC Real Estate	$161,677	$373,456	$380,436	$416,152
IDC Construction	$215,130	$241,286	$234,960	$207,839
Total Investment	$9,199,307	$13,350,542	$12,954,396	$12,997,141
Annual Equivalent	$533,381	$774,073	$751,104	$753,582
O&M (yearly)	$140,000	$140,000	$140,000	$140,000
VegMon (yearly)	$11,370	$11,370	$11,370	$11,370
Total Annual Cost	$684,751	$925,443	$902,474	$904,952

The Winsberg Farm optimization process involves two different procedures for determining the NED/NER plan. The first of these processes is to determine the most cost-effective land to be a part of the study area. The costs for this analysis can be found in **Table G-21**. The second process is the cost-effectiveness and incremental-cost analysis for different alternatives on the selected study area; this is the optimization of the study-area site. These costs can be found in the section on CE/ICA in **Table G-22**.

G.7 SITE SELECTION COST EFFECTIVENESS

Cost effectiveness reveals information about good financial investments given the dollar costs and non-dollar outputs (benefits) of alternative investment choices. Cost-effectiveness analysis begins with a comparison of the costs and outputs of alternative plans to identify the least expensive plan for every possible level of output considered. The resulting least-cost alternative plans are then compared to identify those that would produce greater levels of output at the same cost, or at a lesser cost, as other alternative plans. Alternative plans identified through this comparison are the cost-effective alternative plans.

G.7.1 Properties

There were four properties used to confirm that the site selected during the Yellow Book planning process was a cost-effective site to choose. These sites are all undeveloped county-owned properties located within the closest geographic proximity to the water treatment plant. Following CERP Programmatic Guidance, the actual real estate cost of the Winsberg property was used, and for a valid comparison the actual purchase costs of the other county-owned properties were also used.

G.7.2 Costs and Benefits

The difference in costs for the various sites stems from real estate costs being different and piping costs increasing the further away from the treatment plant the site is located. Benefits for the site selection process are all considered to be exclusive of the site chosen. All properties will have benefits that are similar, so the cost-effectiveness determination will be made only on costs alone. The plan with the lowest annual cost is the only cost-effective plan. The optimization of the study area will be discussed in the CE/ICA section, and during this optimization alternatives will deliver differing benefits.

Table G-22 presents the results of cost-effectiveness analysis for the Winsberg Farm alternative plan. The table shows that only the Winsberg property is cost-effective. Since all sites provide similar benefits, the lowest-cost plan is the only plan that is cost-effective. All of the alternative plans are arrayed by increasing costs to clearly show the plans that provide the same output for less cost.

TABLE G-22: RESULTS OF COST-EFFECTIVENESS ANALYSIS

Plans	Variable Investment Costs	Cost Effective?
Winsberg 150	$684,751	YES
York 150	$902,474	NO
Bowman 150	$904,952	NO
McMurrian 150	$925,443	NO

*All Plans & Cost-Effective Plans Arrayed by Increasing Output

G.8 PLAN OPTIMIZATION

Plan optimization uses cost-effectiveness and incremental-cost analyses to determine the most cost effective solution. Cost-effectiveness and incremental cost-analysis (CE/ICA) begins with a comparison of the costs and outputs of alternative plans to identify the least-cost plan for every level of output considered. Alternative plans are compared to identify those that would produce greater levels of output at the same cost, or at a lesser cost, as other alternative plans. Alternative plans identified through this comparison are the cost-effective alternative plans. Next, through incremental-cost analysis, the cost-effective alternative plans are compared to identify the most economically efficient alternative plans; that is, the “Best Buy” alternative plans that produce the “biggest bang for the buck.” Cost-effective plans are compared by examining the additional (incremental) costs for the additional (incremental) amounts of output produced by successively larger cost-effective plans. The plans with the lowest incremental costs per unit of output for successively larger levels of output are

the "Best Buy" plans. The results of these calculations and comparisons of costs and outputs between alternative plans provide a basis for addressing the decision question "Is it worth it?" For example, are the additional outputs worth the costs incurred to achieve them?

Winsberg Farm utilized many performance measures to ascertain how well each alternative plan performed on various criteria indicative of ecosystem restoration. Habitat units were derived from each performance measure and selected by the PDT as the metric that best integrated information regarding the quality and quantity of improved hydrologic and ecologic function within the study area.

Sometimes it is difficult to summarize the results of CE/ICA when the analyses are performed separately for distinct performance indicators. This phenomenon often occurs simply because different management measures or alternative plans do different things, provide different types of output, and provide benefits to different biological communities. This is true for the Winsberg Farm features and alternatives. Environmental benefits were developed first for the site-specific area using WRAP analysis, and then for the three alternatives using the Wetland Quality Index (WQI) method. To estimate total benefits from the various alternatives, it is desirable to be able to perform CE/ICA on a metric that combines all performance indices output. This method enabled the use one total habitat unit score for each alternative.

TABLE G-23: COSTS USED IN COST-EFFECTIVENESS FOR OPTIMIZATION

Winsberg Wetland Matrix	Intermediate Hydroperiod	Short Hydroperiod	Long Hydroperiod
Lands	$2,390,500	$2,390,500	$2,390,500
Construction	$6,432,000	$6,254,900	$7,393,500
Total First Cost	$8,822,500	$8,645,400	$9,784,000
IDC Real Estate	$161,677	$161,677	$161,677
IDC Construction	$215,130	$209,207	$247,289
Duration	15 Months	15 Months	15 Months
Total Investment	$9,199,307	$9,016,283	$10,192,966
Annual Equivalent	$533,381	$522,770	$590,994
O&M (yearly)	$140,000	$140,000	$140,000
VegMon (yearly)	$11,370	$11,370	$11,370
Total Annual Cost	$684,751	$674,140	$742,364

Cost-effectiveness and incremental-cost analyses were conducted for each of the Winsberg Farm alternatives. The analyses compared the alternative plans' average annual costs against the appropriate average annual habitat unit estimates. The average annual outputs were calculated as the difference between with-plan and without-plan conditions over the period of analysis (through year 2050). Costs used for CE/ICA optimization are displayed in **Table G-23**. Outputs used for CE/ICA are displayed in **Tables G-24**, **G-25** and **G-26**. The basis for average, annual output calculations was previously explained. Note that the output values shown reflect the differences between without-project and with-project on an average, annual basis (i.e., ecological "lift" provided by each of the alternatives).

G.8.1 Environmental Benefits

The ecological benefits of alternative plans were assessed through two separate analyses. First, existing, future without-project, and future with-project conditions were assessed using a modified Wetland Rapid Assessment Procedure (WRAP) (Miller and Gunsalus, 1997). Biologists from the U.S. Fish and Wildlife Service (USFWS) and U.S. Army Corp of Engineers (USACE) conducted this assessment to quantify differences in habitat quality between a farm (the existing condition), residential development (the future without-project condition) and a created wetland (future with-project condition). This WRAP analysis was not refined enough to distinguish between differing hydroperiod operations at the wetlands, so an intermediate hydroperiod was utilized to determine the base habitat units associated with the creation of a wetland at the Winsberg Site. This second approach, analyzing alternative wetland designs, was assessed using the Wetland Quality Index (WQI) (Lodge, 1997) method. This assessment was conducted by CH2MHILL in partial fulfillment of a contract with USACE (CH2MHILL, 2003), and allowed for discrimination between three proposed wetland design alternatives:

6. Long hydroperiod wetland
7. Long/short hydroperiod wetlands in combination, and
8. Long hydroperiod wetlands in combination with deepwater habitat.

Modified Wetland Rapid Assessment Procedure

Introduction

WRAP is a tool that was originally developed by the South Florida Water Management District (SFWMD) for the regulatory evaluation of wetland mitigation sites. The procedure considers six variables to evaluate how well a wetland is functioning:

- Wildlife utilization
- Overstory/shrub canopy of desirable species
- Vegetative groundcover of desirable species
- Adjacent upland/wetland buffer
- Field indicators of wetland hydrology
- Water quality input and treatment

WRAP is presently utilized by USACE staff in the regulatory program in Jacksonville, and is being used to assess benefits and impacts in other CERP projects (e.g., Acme Basin B).

Two modifications of WRAP were deemed necessary for this application. First, since the wetlands envisioned here are not yet in existence, direct field observations could not be used. Instead, the proposed wetlands were evaluated based on assumptions about how they would function after construction, largely guided by observations of the nearby Wakodahatchee Wetland site. Second, since WRAP is designed specifically to evaluate wetland sites, changes were necessary to evaluate the range of upland conditions (agricultural fields, residential development) currently existing on the Winsberg site and predicted for that site in the future without-project condition.

The modified WRAP used for this analysis included the following variables:

- Wildlife utilization – Plans were evaluated based on their potential to provide breeding, feeding and sheltering areas for native wildlife. As the site under consideration currently provides little native habitat, direct observations of wildlife were not incorporated into the ranking methodology. Rather, the evaluators relied on observations of existing potential habitat within the site, and dispersal corridors from Arthur R. Marshall Loxahatchee National Wildlife Refuge (A.R.M. LNWR). Scores were based on a rationale that closely follows the WRAP manual guidelines.
- Vegetation – Two components of vegetative composition were used to evaluate each site: canopy and groundcover. The scoring scheme is based largely on WRAP, with minor modifications that allow for consideration of upland vegetation. Scores were calculated separately for each vegetative component and then combined as a weighted mean based on the ratio of canopy to groundcover area.
- Adjacent buffer – The impacts of neighboring land uses on an alternative condition were scored essentially as in WRAP.
- Impacts to water resources (land use and impervious surfaces). Two attributes contribute to the score for this variable. The Land Use Category follows the WRAP methodology. The Impervious Surface scores were based on the relationship between percent cover of impervious surface and

the impacts to water quality (Mesner, 2001). A third attribute, Consumptive Water Use, was considered as a potential evaluation criterion based on the water demand of different land use types. Preliminary calculations, however, indicated a high degree of variability in water demands for agriculture depending on season and rainfall conditions. This variability reduced the utility of the Consumptive Water Use attribute in differentiating alternative sites.

Each variable was assigned a score ranging from 0 to 3. A score of 3 for any variable indicates that a system is representative of pristine conditions, while a score of 0 indicates that a system has negligible ecological benefits.

G.8.1.1 Application

In total, two sites were visited and evaluated using the scoring scheme outlined above: the project site (Winsberg Farm) and a reference site (Wakodahatchee Wetlands). The reference site is a 50-acre wetland located southeast of Winsberg Farm and constructed by Palm Beach County in 1996. This site was evaluated because it serves as a model for the current project.

The reference site was evaluated first. Variables for the existing condition at Wakodahatchee Wetlands were scored based on a September 2003 visit to the site. Future-condition scores, estimated for 50 years after construction of the site, or 2060, were assumed to be generally the same as the existing-condition scores. Two exceptions to this rule did arise: the wildlife utilization and canopy variables are expected to increase in value in the future as wetland vegetation matures.

After establishing scores for Wakodahatchee, existing, future without-project, and future with-project conditions were evaluated for the Winsberg Farm property. The existing condition for this site was a row-crop vegetable farm, and the future with-project condition was assumed to be the same as Wakodahatchee's future condition. Based on prevailing land use in the area and the Palm Beach County Comprehensive Plan, the future without-project land use was assumed to be residential development.

TABLE G-24: WRAP EVALUATION SUMMARY FOR THE WAKODAHATCHEE AND WINSBERG FARM

Site	Condition	Assessments											WRAP Score
		Wildlife Utilization	Vegetation					Buffer	Impacts to Water Resources				
			Canopy	Wt.	Ground cover	Wt.	Wt. Ave.		Land use	Imper. surface	Consum use	Ave.	
Wakoda-hatchee	Existing	2.00	1.50	1	2.00	3	1.88	0.50	3.00	3.00	N/A	3.00	0.61
Wetlands	Future	2.25	2.00	1	2.00	3	2.00	0.50	3.00	3.00	N/A	3.00	0.65
Winsberg	Existing	0.75	0.00		0.00		0.00	0.75	1.00	2.50	N/A	1.75	0.27
	Future without Project	0.25	0.00		0.00		0.00	0.50	1.00	0.00	N/A	0.50	0.10
	Future with Project	2.25	2.00	1	2.00	3	2.00	0.50	3.00	3.00	N/A	3.00	0.65

Scores for each variable were added and then divided by the maximum possible score to yield a functional unit score (WRAP Score) ranging from 0 to 1 (**Table G-24**). For the Wakodahatchee site, the WRAP score increases slightly over time as vegetation matures. For the Winsberg site, the created wetland (future with-project condition) score greatly exceeds the farm (existing conditions) or residential (future without-project condition) scores. The following table (**Table G-25**) uses the acreage associated with the wetland area of Winsberg Farm alternatives and applies to the WRAP score to determine Habitat Units. The habitat units are determined for 10-year increments to demonstrate the growth trend on implementation. The future-with increase in habitat units and the future-without decline in habitat units are then utilized to determine an annual HU benefit. The future increase and decrease in habitat units can be noted in the following figure:

TABLE G-25: WRAP ANALYSIS AVERAGE ANNUAL HABITAT UNITS

Property	Scale	Habitat Unit (WRAP) Score (ecological quality of project* size)							Annual Benefit
	Acres	Existing	10 years after construc-tion	20 years. after construc-tion	30 years after construc-tion	40 years after construc-tion	50 years after construc-tion	Future without project	
Winsberg	120	32.50	73.75	77.50	77.50	77.50	77.50	12.50	49.79

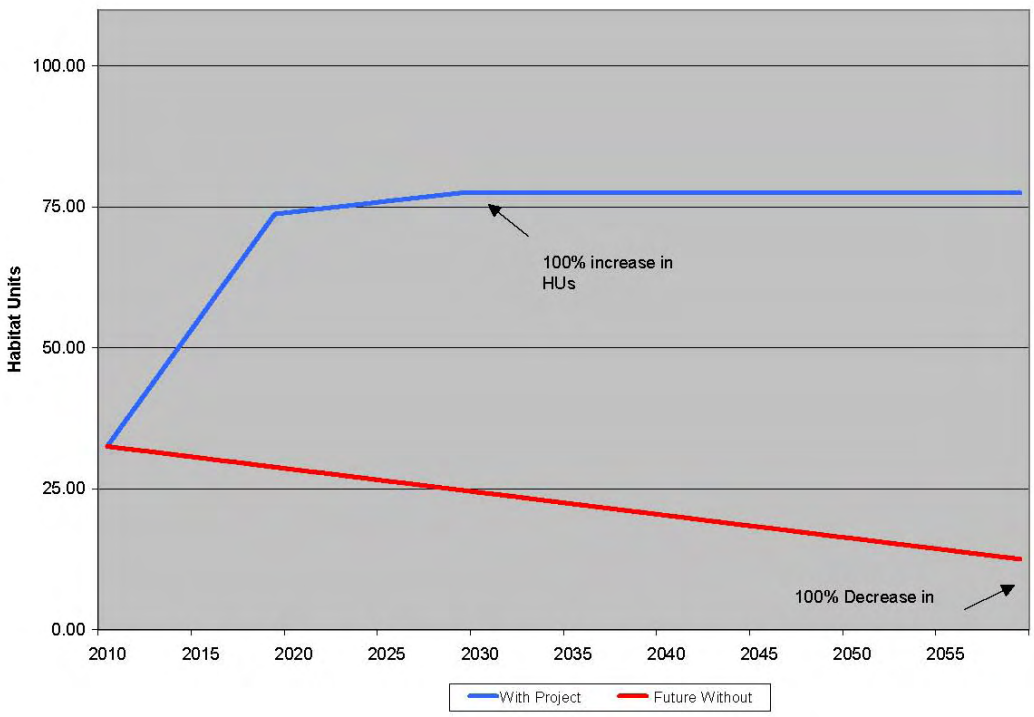


FIGURE G-6: AVERAGE ANNUAL HABITAT UNITS FOR WINSBERG
*Using WRAP Analysis

G.8.1.2 Wetland Quality Index Methodology

Introduction

The WQI method was developed to evaluate wetlands created for mitigation purposes. The methodology uses 17 parameters to assess wetland quality. Three alternative wetland designs were analyzed using this method. Since a Wakodahatchee-like system has already been constructed on the western portion of the project, all three alternatives share that design. Differences are found on the eastern portion of the project where Alternative 1 has a Wakodahatchee-like system, Alternative 2 has short hydroperiod wetlands, and Alternative 3 has deepwater habitat.

The expected ecological quality of the three short-listed alternatives was compared using the Wetland Quality Index (WQI), a wetland functional assessment methodology originally designed for Everglades-type habitats (Lodge, 1997). This method was selected for application to this analysis from a variety of wetland functional assessment methods because of its flexibility in allowing attributes of proposed conceptual plans to be compared. Other assessment methods require the analyst to perform an evaluation of the status of an existing wetland, rather than a proposed configuration. For example, the Wetland Rapid Assessment Procedure (WRAP) and Hydrogeomorphic (HGM) procedure are more appropriate for evaluating the success and condition of

existing wetlands, including the degree to which water quality improvements are observed, presence of preferred animal species, establishment of representative hydrology, and habitat productivity. The WQI methodology is appropriate for evaluation of proposed designs because criteria used include water levels, presence and diversity of wetland plant species, hydroperiod, surrounding environment, and other attributes measurable at the design level.

In some instances, the WQI did include criteria for assessing current conditions. In these cases, alternatives were typically scored equally. Brief descriptions of WQI criteria are as follows:

- Aquatic Prey Base Abundance – Prey species' abundance was measured in the field using throw-traps, where the number of fishes, crustaceans, mollusks, insects and others are counted in a semiannual assessment.
- Aquatic Prey Base Diversity – Total number of qualifying species were counted in at least half of the throw-trap samples collected during the Aquatic Prey Base Abundance procedure.
- Exotic Pest Plants – Percent cover of exotic species as defined by the Florida Department of Environmental Protection, Chapter 62C-52, Florida Administrative Code.
- Diversity of Macrophytes – Percent cover of vascular plants large enough to be observed without magnification representing more than 5 percent of the total area. For this alternatives analysis, all proposed plant types were included.
- Habitat Diversity within 1,000 feet – Habitats that offer significantly different conditions than the community being evaluated, such as other uplands and shallow, open water (sloughs, sawgrass marsh, cypress heads, etc.) For the purposes of this evaluation, this criterion was assumed to reflect the total number of habitat types in the east parcel.
- Hydropattern – Water level status, where conditions include:
  - Inundation greater than one foot for 2.5 months or more (but not exceeding two feet), followed by a seasonal reduction to less than 0.5 foot for a month; this reflects an Everglades-type seasonal habitat, and for the purposes of representing a natural wetland in the region is a relevant criterion for this evaluation
  - Depth does not exceed 0.5 foot or is greater than 2.5 feet for any period of the year
  - Conditions are between the above two
- Hydroperiod – Annual period of continuous inundation of at least 0.5 inch, where categories include inundation for five months or longer but drying at least once in five years, inundation for three to five months or greater than five years, or inundation for less than three months.
- Intactness of Wetland Resource – Criteria that include undisturbed, prior disturbance, or prior hydrologic and soil disruption (e.g., farming).

- Peat/Muck Soil Layer – Criteria include average depth more than one foot and covers more than 95 percent of the surface area, average depth six to 12 inches covering more than 95 percent of the surface area, and average depth less than six inches covering less than 95 percent of the surface area.
- Protected Animal Species – Number of protected animal species recorded during monitoring events; assumed equal among these three alternatives in the absence of data.
- Protected Plant Species – Species listed as endangered or threatened in state or federal listings.
- Proximity to Aquatic Refugia – Degree to which wetland habitat is connected to other sources of open water, whereby replenishment of aquatic life to repopulate wetlands after dry period or predation is desirable; assumed to be negligible for all alternatives, as the alternatives are all isolated habitats in a constructed site.
- Sheet Flow – Measure of the uniformity of water flow over wetland surface.
- Surrounding Landscape Condition – Criteria include undisturbed (near-natural), agricultural, rural or lightly urbanized, and highly urbanized.
- Water Quality – Visual inspection of potential indicators of poor water quality, such as excessive algal growth, odors, aquatic faunal indicators, etc. Because of the status of the Winsberg Farm Wetlands Restoration Project as a wetland demonstration project receiving secondary effluent, the wetlands are assumed to exhibit similar water quality.
- Wetland Vegetation Cover – Occurrence of obligate wetland species, as defined in the National List of Plant Species that Occur in Wetlands (Chapter 62-340.450(1), FAC).
- Wildlife Use – Observations of the counts of various bird species (e.g., wading birds, ospreys, anhingas, and others), mammals (e.g., round-tailed muskrat) and reptiles (e.g., alligator, Florida softshelled turtle), based on diversity observed at Wakodahatchee, and which was assumed to be equal among the three design alternatives under consideration.

G.8.1.3 Application

Results for the WQI analysis are provided in **Table G-26**. Combined scores for the WQI were 24, 23.5, and 24.5 for Alternatives 1, 2 and 3, respectively. The relatively close scoring by the three alternatives indicates that all would provide significant and comparable wetland habitat, and associated ecological functions. The following listing provides explanations and rationale for scores assigned to each alternative:

- Aquatic Prey Base Abundance – Aquatic prey abundance was considered highest for Alternative 3, where inundation is more consistent and occurs

at a greater magnitude than Alternatives 1 or 2. These other alternatives were scored equally. Despite the shorter hydroperiod of Alternative 2, it would still be expected to maintain at least low-to-moderate numbers of aquatic prey in deep-water areas.

- Aquatic Prey Base Diversity – The presence of at least seven different species would likely be observed in each alternative, particularly in a vigorous, managed wetland habitat. Thus, each alternative was assigned a score of 1.
- Exotic Pest Plants – As with Wakodahatchee, it is expected that exotic or invasive species would be physically removed by maintenance personnel. Thus, each alternative received a score of 1.
- Diversity of Macrophytes – Macrophytic vegetation coverage was evaluated by calculating the coverage of each habitat type for each alternative. As previously stated, habitat areas with multiple vegetation types were assumed to exhibit equal coverage among species. Scores of 1 were assigned to Alternatives 1 and 3, where no single species covered greater than 50 percent of the area, while a score of 0.5 was assigned to sawgrass-dominated Alternative 2.
- Habitat Diversity within 1,000 feet – By design, Alternatives 1, 2 and 3 all possessed at least two habitat types within 1,000 feet in any direction. Therefore, each alternative was assigned a score of 1.
- Hydroperiod – Alternative 2 was assigned a score of 1, as its short hydroperiod allowed drying at least once in five years, while Alternatives 1 and 3 were assigned 0.5 scores because of the assumption of continuous inundation despite meeting minimum requirements for duration of inundation. This assumption is somewhat conservative, because as shown at the Wakodahatchee site, wetland cells have been periodically drawn down for plant maintenance since the wetland was open to the public in 1996.
- Hydropattern – A score of 1 was assigned to each alternative because they all include habitats with water depths that are more than one foot for more than 2.5 months (e.g., open aquatic habitats), less than two feet maximum, and less than 0.5 foot for more than one month (e.g., cypress and hardwood hammock habitats).
- Intactness of Wetland Resource – All alternatives were assigned scores of 0 due to previous agricultural use of the site.
- Peat/Muck Soil Layer – Given that greater accumulation of peat will likely occur in the continuously inundated and more heavily vegetated alternatives, Alternatives 1 and 3 were assigned scores of 1. Alternative 2, which is largely a deep-water habitat, was assigned a score of 0.5.
- Protected Animal Species – Number of protected animal species recorded during monitoring events, assumed equal among the three alternatives in the absence of data.

- Protected Plant Species – The potential for serving as habitat for protected plant species, such as bromeliads and orchids or other endemic South Florida flora, is considered equal among the three design alternatives because of the assumption of exotic- and nuisance-plant maintenance, as well as the wide diversities of habitat in each. All alternatives were assigned a score of 0.5 for this category.
- Proximity to Aquatic Refugia – All three alternatives include deep, open-water or aquatic slough habitats which will serve as dry season refugia for mosquitofish and aquatic wildlife, and were assigned a score of 1.
- Sheet Flow – Due to the presence of deep-water areas and islands, Alternatives 1 and 3 were assigned scores of 0.5. Alternative 2, which is largely sawgrass-dominated, was assigned a score of 1.0, as it most accurately represents a sheet-flow, even-depth distribution of an Everglades-type system.
- Surrounding Landscape Condition – All three design alternatives received scores of 0.5, as the surrounding landscape will ultimately be residential or part of the Winsberg family agricultural reserve, depending upon the use of the Winsberg property not included in the parcels designated for wetland restoration habitat.
- Water Quality – Due to the absence of data, each design alternative received a score of 1. Based on experience at the Wakodahatchee site, it is assumed that nutrient concentrations in the wetland will be reduced by plant and microbial processes that are comparable regardless of the conceptual design variations under consideration.
- Wetland Vegetation Cover – The design of each alternative as wetland habitat and nature of the species selected for these designs indicates that they will be largely dominated by obligate wetland species. Thus, each alternative was assigned a score of 1.
- Wildlife Use – Experience at the Wakodahatchee site and similar habitats in the region suggest that a diverse set of animal species can be expected at the wetland. Alternatives 1 and 3, both fairly diverse habitats, should be expected to contain the full suite of resident wading birds and also be used by migratory species, based upon observations at the Wakodahatchee Wetlands. In spite of the more monotypic habitat in Alternative 2, the presence of deeper and shallower habitats still suggests that animal species will be diverse and abundant. Thus, all three alternatives are assigned a score of 1.

TABLE G-26: WETLAND QUALITY INDEX ANALYSIS

	Abbreviated Rating Criteria (see text)	Rating Points	Weighting Factor	Alt 1 Score	Alt 2 Score	Alt 3 Score
1 Aquatic Prey Base Abundance	High numbers of potential aquatic prey	1.00				
	Low-to-moderate numbers of potential aquatic prey	0.50	1	0.5	0.5	1
	Few-to-no aquatic prey	0.00				
2 Aquatic Prey Base Diversity	7 or more species commonly observed	1.00				
	3-6 species commonly observed	0.50	2	1	1	1
	2 or fewer species commonly observed	0.00				
3 Category I Exotic Pest Plant Species	<5% cover	1.00				
	Between 5% and 35% cover	0.50	2	1	1	1
	>35% cover	0.00				
4 Diversity of Macrophytes	No one species has >50% cover	1.00				
	One species has 51% to 90% cover	0.50	2	1	0.5	1
	One species has >90% cover	0.00				
5 Habitat Diversity Within 1,000 Feet	2 or more alternative habitats	1.00				
	One alternative habitat	0.50	1	1	1	1
	No alternative habitats	0.00				
6 Hydroperiod	5 months or longer, but drying at least once in 5 years	1.00				
	3 to 5 months, or >5 years continuous inundation	0.50	2	0.5	1	0.5
	Less than 3 months	0.00				
7 Hydropattern	> 1 ft. for > 2.5 months; < 2 ft. max.; and < 0.5 ft. for > 1 month	1.00				
	Between above and below	0.50	4	1	1	1
	Does not exceed 0.5 ft.; or does exceed 2.5 ft.	0.00				
8 Intactness of Wetland Resource	Undisturbed	1.00				
	Prior hydrologic disruption	0.50	1	0	0	0
	Prior hydrologic and soil horizon disruption (e.g., farming)	0.00				
9 Peat/Muck Soil Layer	Average depth > 12" and covers > 95% of surface area	1.00				
	Average depth 6" to 12" and covers at least 95% of surface area	0.50	2	1	0.5	1

	Average depth < 6" and covers < 95% of surface area	0.00				
10 Protected Animal Species Use	Verified or expected frequent use Occasional use but habitat not conducive to sustained presence	1.00 0.50	1	1	1	1
	No use expected	0.00				
11 Protected Plant Species	Significant population(s) reported or known present	1.00				
	Significant population(s) possible due to habitat	0.50	1	0.5	0.5	0.5
	Habitat not conducive to significant population(s)	0.00				
12 Proximity to Aquatic Refugia	Open connection to aquatic refugia less than 600 feet	1.00				
	Restricted connection to aquatic refugia, or >600 but <2,500 feet	0.50	3	1	1	1
	Isolated from aquatic refugia, or more than 2,500 feet	0.00				
13 Sheet Flow (During Inundation)	Uniform flow over most of the area observed or expected	1.00				
	Uneven flow due to uneven terrain, embankments, ditches, etc.	0.50	1	0.5	1	0.5
	Hydrologically isolated, no net lateral movement	0.00				
14 Surrounding Landscape Condition	Undisturbed, near-natural condition	1.00				
	Agricultural, rural or lightly urbanized	0.50	1	0.5	0.5	0.5
	Highly urbanized	0.00				
15 Water Quality	No visual indicators of poor water quality observed	1.00				
	Visual indicators of poor water quality questionable	0.50	1	1	1	1
	Visual indicators of poor water quality observed	0.00				
16 Wetland Vegetation Cover	>50% obligate wetland species	1.00				
	Between 10% and 50% obligate wetland species	0.50	1	1	1	1
	<10% obligate wetland species	0.00				
17 Wildlife Use (may be seasonal only)	High utilization by native wetland mammals, birds and reptiles	1.00				
	Moderate utilization by native wetland birds, mammals or reptiles	0.50	2	1	1	1
	Low utilization by native wetland birds, mammals or reptiles	0.00				
	Cumulative Score			24	23.5	24.5

*Wetland Quality Index Analysis Per Alternative Wetland Functional Assessment of Alternatives

G.8.1.4 Combining the WRAP and WQI Analysis

As mentioned in the previous section, the ecological benefits of alternative plans were assessed through two separate analyses. The existing, future without-project, and future with-project conditions were assessed first using a modified Wetland Rapid Assessment Procedure (WRAP) on an intermediate hydroperiod wetland of 120 acres at the Winsberg Site. This WRAP analysis was not refined enough to distinguish between differing hydroperiods so it became important to further refine the wetland alternative hydroperiods by using a second ecological model. This second approach involved using the Wetland Quality Index (WQI) method to scale the habitat units based on variations from the intermediate hydroperiod. This analysis utilizes the calculation of 49.79 average annual habitat units from the WRAP analysis and equating this with the WQI intermediate hydroperiod score of 24. The next step would be to examine the percent deviation from this WQI score for the long and short hydroperiods and adjusting the WRAP habitat unit score accordingly.

There are two different cells for each alternative. The first cell represents 75 acres of the total 120-acre wetland creation, and the second cell represents 45 acres. The first cell in all three alternatives will be operated as an intermediate hydroperiod, so the HUs attributed to this area will be the same for all alternatives. The variation will come into account when examining the second cell that contains different hydroperiods for the different alternatives. **Table G-27** includes the total average annual habitat units for all three alternatives.

TABLE G-27: COMBINED WETLAND QUALITY INDEX AND WRAP ANALYSIS

	Acres	Alternative 1 Intermediate	Alternative 2 Short Cell 2	Alternative 3 Long Cell 2
Cell 1	75	31.12	31.12	31.12
Cell 2 Adjusted for WQI	45	18.79	18.28	19.06
Total Annual Habitat Unit Lift	120	49.79	49.40	50.18

G.8.2 Cost of Alternatives

The three alternatives located on the Winsberg property all had the same costs for real estate, monitoring and O&M. The only costs that change for these various plans were for construction. Alternative 3, the long hydroperiod, had the highest construction cost, as it includes the greatest amount of earthwork to establish the predominant pond habitats; and Alternative 2, the short hydroperiod, had the lowest construction cost, as it requires the least amount of earthwork.

The following table and figures represent the results of cost-effectiveness analysis for the three Winsberg Farm alternatives:

G.8.3 Cost-Effective Analysis for Optimization

Figure G-7 represents the results of cost-effectiveness analysis for the Winsberg Farm alternative plan. Both the table and figure represent the short, long and intermediate hydroperiods as cost-effective alternatives. All alternative plans are arrayed by increasing costs to clearly show the plans that provide the same output for less cost.

FIGURE G-7: COST-EFFECTIVE PLANS

G.8.4 Incremental Cost Analysis

This section presents the results of incremental-cost analysis for the Winsberg Farm alternative plans for optimization of the site. All cost-effective plans are arrayed by increasing output to clearly show changes in cost (i.e., increments of cost) and changes in output (i.e., increments of output) of each cost-effective alternative plan compared to the without-plan condition. The plan with the lowest incremental costs per unit of output of all plans is the first Best Buy plan. After that plan is identified, all larger, cost-effective plans are compared to the first Best Buy plan in terms of increases in (increments of) cost and increases in (increments of) output. The alternative plan with the lowest incremental cost per unit of output (for all cost-effective plans larger than the first Best Buy plan) is the second Best Buy plan.

Table G-28 and **Figure G-8** show that there are three Best Buy plans -- the short, long and intermediate hydroperiod alternatives.

TABLE G-28: BEST BUY PLAN

	Average Annual Cost	Output	Average Cost Per Output	Increment Average Annual Cost	Increment Output	Increment Cost Per Output	Best Buy?
Habitat Units (HU)							
Without Plan	$0	0	N/A	N/A	N/A	N/A	
Short Hydroperiod	$674,139	49.40	$13,646	$674,139	49.40	$13,646	Best Buy
Intermediate Hydroperiod	$684,751	49.79	$13,752	$10,612	.39	$27,210	Best Buy
Long Hydroperiod	$742,364	50.18	$14,794	$57,613	.39	$147,725	Best Buy

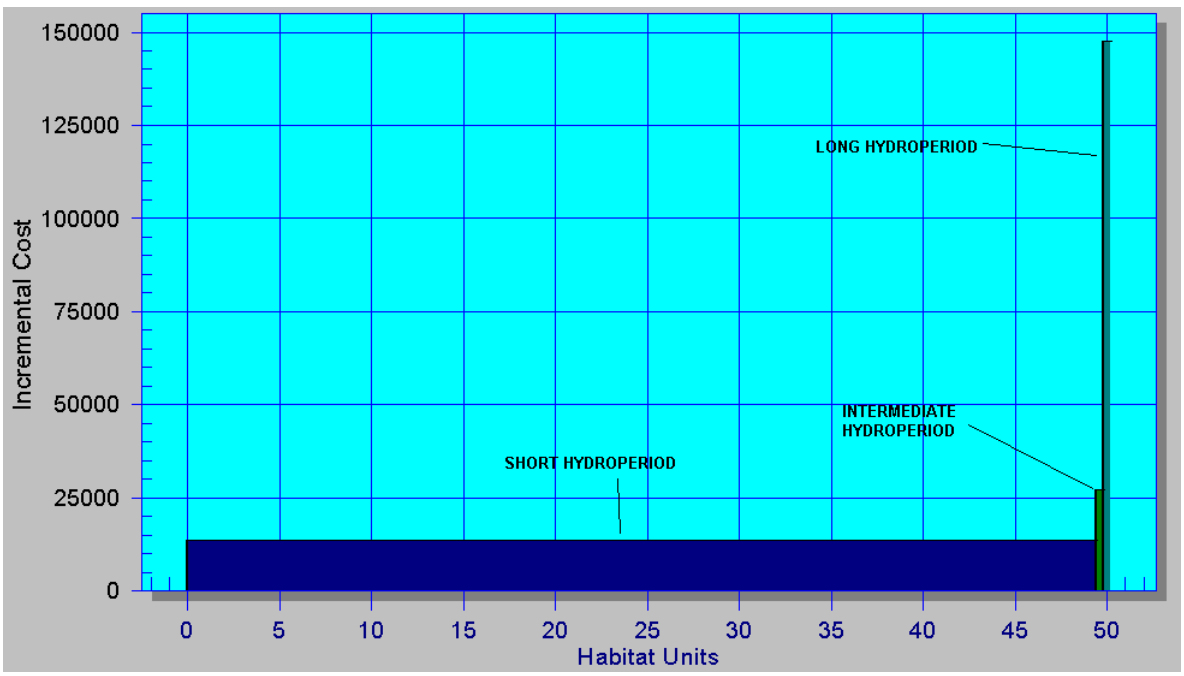


FIGURE G-8: BEST-BUY ALTERNATIVE PLANS

G.8.5 Tentatively Selected Plan

Every hydroperiod design for the Winsberg Farm site is a cost-effective and best-buy plan. It is estimated by CH2MHill that the intermediate hydroperiod design provides more water to the natural environment through infiltration than the short hydroperiod design and an amount similar to the long hydroperiod design.

Due to increased water usage and the fact that the intermediate hydroperiod costs less than 2 percent more than the short hydroperiod while providing more ecological benefits, the intermediate hydroperiod was selected as a better investment than the short hydroperiod. The long hydroperiod provides similar water to the natural environment but costs almost 10 percent more than the intermediate hydroperiod. As is noted in **Figure G-8**, there is a relative large increase in incremental costs between the intermediate and long hydroperiod. The intermediate hydroperiod was determined to be the plan that most effectively and efficiently accomplishes the objectives of the project.

G.9 REGIONAL ECONOMIC IMPACTS

G.9.1 Introduction

The purpose of this section is to evaluate and quantify the economic consequences of Winsberg Farm wetlands plan implementation. Its impacts on the regional economy are expected to primarily result from expenditures on construction and real estate.

The study region of the impact analysis is defined in the following section. Five types of economic impacts are defined and quantified in the section on impact categories. The general methodology used in the evaluation of regional impacts with simple numerical examples drawn from South Florida is explained in the Method of Regional Impact Analysis section. Computation results are presented in the final section.

G.9.2 Defining the Study Area

The Winsberg Farm study area is contained within Palm Beach County. The national and state statistical systems that provide data for the regional economic analysis make it impractical to isolate the economic activities of parts of counties, and the RIMS II multipliers available for our use are limited to specific regions in Florida. The regional economic impact multipliers of the Winsberg Farm plan are included in the South Region of RIMS II. The South Region provides multiplier data that corresponds to Miami-Dade, Palm Beach, Broward and Monroe counties.

The magnitude of economic impacts on the local region may be evaluated in relation to their causes. These cover a range of anticipated effects. First are the impacts due to the actual construction costs of all components of each alternative. Second are the impacts due to the costs of land purchases required by the components for each alternative. Two additional cost categories will occur on an annual basis once the project begins: the cost of monitoring the project and the cost associated with operating and maintaining the components of each alternative. Each of these categories is discussed in the next section.

G.9.3 The Impact Categories

The impact categories that will be considered are: impacts due to construction activities, and impacts due to operations, maintenance and monitoring costs.

G.9.3.1 Construction

Construction costs, the most significant of impact categories, were derived by summing up the costs of all plan features for each alternative. These were estimated by summing the detailed line items of each feature. These aggregate costs were categorized as new conservation and development facilities for RIMS II analysis.

G.9.3.2 Operations and Maintenance

Operation and Maintenance (O&M) costs were estimated for each alternative plan. These estimates were aggregated, and the total average annual O&M costs are represented in **Table G-29**. These costs were treated as "conservation and development facilities-O&M" for RIMS II analysis.

G.9.3.3 Real Estate and Effects of Other Land Acquisitions

Real estate sales may result in various impacts to the local economy. The sale of land may be regarded as a simple change in which the owner held the value in real estate and now holds an equal value in cash. If the cash is spent locally or reinvested in regional enterprise, then new economic activity might be stimulated in the region and even more funds might be leveraged by the enterprise.

Alternatively, a real estate transaction resulting in a transfer of funds into a regional bank may experience a general economic expansion in the region as supported through the banking multiplier if the funds are invested locally. If, however, landowners reside elsewhere or hold their funds in other regions, then the expansionary effects of large transfers of funds will not occur in the study area.

Due to the ambiguity of the ultimate use of real estate funds, the expenditures for land acquisition may be treated as purchases in the real estate sector and can be captured by the RIMS II model, thus generating employment and income similar to other "productive" sectors. For this analysis, only the impacts of expenditures for commissions, leases, appraisal fees, title fees, and other administrative activities involved with real estate could be used in the RIMS II analysis. Administrative costs associated with land purchase are relative minor and are not included in the regional impact analysis for this study.

G.9.3.4 Total Project Costs and Annual Project Costs

Total construction and real estate costs for each alternative plan are summarized in **Table G-29**, lines 1 and 2. Annual monitoring and O&M costs for the alternative plans are summarized in **Table G-29**, lines 4 and 5.

TABLE G-29: SUMMARY OF TOTAL PROJECT COSTS AND ANNUAL COSTS

Winsberg Wetland Matrix	Short Hydroperiod	Intermediate Hydroperiod	Long Hydroperiod
Lands	$2,390,500	$2,390,500	$2,390,500
Construction	$6,254,900	$6,432,000	$7,393,500
O&M (yearly)	$140,000	$140,000	$140,000
VegMon (yearly)	$11,370	$11,370	$11,370

G.9.4 The Method of Regional Impact Analysis

G.9.4.1 The Regional Input-Output Structure

The regional impacts analyzed in this report have been estimated using information from the U.S. Department of Commerce's Regional Input-Output Modeling System (RIMS II). The RIMS final-demand multipliers provide a way to estimate the consequences of economic activity stimulated by project implementation. Final-demand multipliers can be thought of as ways to calculate economic impact dollars spent by one industry on all industries in a given economy. For example, one dollar spent in one industry will generate financial activity for another industry within a community; i.e., to purchase food, clothing, housing or other goods, or to pay taxes.

The types of economic impacts that a new project can have on output (sales), earnings and employment in a region are known as "direct," "indirect," and "induced." The first round of expenditures for the project causes direct impacts. The indirect impacts count the inputs that are purchased as a result of first-round expenditures. Indirect effects will vary in significance depending on the complexity of production in the study area and the degree to which local producers supply required materials. Induced impacts are the cumulative economic effects that result from the spending of workers' earnings. These three impacts combine to form the final-demand impacts of a project in the study area.

The three RIMS final demand multipliers are as follows, where COSTS are the Project Costs as seen on **Table G-29**:

- OUTPUT MULTIPLIERS: Measure the dollars of total output generated in a defined geographic economy for each dollar of product produced or delivered by a given industry
- Total Output = Total Operating Expenses (COSTS) x Output Multiplier
- EARNINGS MULTIPLIERS: Measure the earnings/purchasing power that an industry generates through its payroll, and the multiplier effects to households employed in all local economies.
- Aggregate Housed Income = Total Operating Expenses (COSTS) x Earnings Multiplier
- EMPLOYMENT MULTIPLIERS: Measure the number of part-time and full-time (full-time-equivalent [FTEs] jobs generated within a given industry needed to deliver $1 million of products or services to the final demand market within a geographic area.
- FTE Jobs Supported = Total Operating Expenses (COSTS)/$1 Million x Employment Multiplier

In assessing the impacts presented in this report, the limits of the RIMS methodology should be recognized. Data used to develop the RIMS II multipliers were based on 1992 regional economic data. These data may not capture the variances in today's economy, but should provide a reasonable impact estimate. Proper use of RIMS II 1992 multipliers requires that total cost estimates first be price-adjusted to 1992 price levels using a USACE-published construction index (Civil Works Construction Cost Index System [CWCCIS], dated March 31, 2005). The effects of costs at the 1992 level were then calculated, using the 1992 RIMS II multipliers. These impacts were then price-adjusted to 2005 figures by utilizing the appropriate CPI index published by the Bureau of Labor Statistics.

Keeping these limitations in mind, it is important to recognize that RIMS multipliers are based on a formal and widely accepted national analysis of economic activity. The RIMS analysis continues to provide a consistent method to quantify the economic impact of construction projects at the regional level.

The RIMS II multipliers and CPI data used in this evaluation are described below.

1992 RIMS II Multipliers:

- South Region
    - Industry -- ("Conservation and development facilities – New")
    - Output – 1.9141
    - Earnings – 0.7545
    - Employment – 34.2

- Industry -- ("Conservation and development facilities – O&M")
- Output – 1.8566
- Earnings – 0.8092
- Employment – 36.0

- Construction Index:
  - 422.05 1992
  - 601.0 2005

- CPI Index:
  - 140.3 1992
  - 194.5 2005

G.9.5 Regional Economic Impacts

G.9.5.1 Overall Impacts: Output, Jobs and Earnings

The impact of all the expenditure categories on gross output (sales), jobs and earnings were computed for each alternative. The impacts represent the effects resulting from construction spending during project implementation and will occur during the construction period, expected to last about 1.5 years beginning in 2006.

At first glance, the figures in **Table G-30** look like significant impacts resulting from the construction spending required to implement the various project components. When placed in the context of the Lower East Coast, however, these effects generally represent a very small percentage of the total economic activity that takes place in this region.

TABLE G-30: OVERALL REGIONAL ECONOMIC IMPACTS OF THE ALTERNATIVES

Alternative	Project Component	Impacts			Project Costs($)
		Output ($1,000s)	Earnings ($1,000s)	Employment (FTE)	
Short Hydroperiod	Construction	11,578	4,563	150	$6,254,900
	O&M (Annual)	259	102	3	$140,000
Intermediate Hydroperiod	Construction	11,905	4,692	154	$6,432,000
	O&M (Annual)	259	102	3	$140,000
Long Hydroperiod	Construction	13,685	5,394	178	$7,393,500
	O&M (Annual)	259	102	3	$140,000

It is important to remember that construction is not just a one-year injection into the regional economy, but is broken up over a number of years. The effects of annual spending on the regional economy will prove even less significant than viewing the expenditures in total. Since the impacts are likely to occur in

varying magnitude over time, the summary effects given in **Table G-32** represent the upper limit if all these impacts were to occur simultaneously. In reality, the impacts of construction last only as long as those activities are actively carried out. The impacts represent the effects resulting from construction expenditures during project implementation that is expected to last 18 months beginning in 2006. The impact of monitoring and operations and maintenance costs begin at a relatively low level at the time the project is initiated, rise to a maximum, and then continue at a constant level once the project is completed.

These effects are noteworthy, to be sure, but the relative impact on the regional economy is quite small, mirroring the estimated regional impact of the overall CERP project estimated in the Comprehensive Review Study.

Table G-31 contains the labor employment and earnings of each county represented by the various projects. The gross state product (GSP) for Florida is presented for a comparison to the output (sales) created by the various construction projects.

TABLE G-31: REGIONAL TOTALS

Region	Earnings (2001)1 (1000s of dollars)	Employment (2000)2	Output (1999)3
Broward	47,997,268	834,398	
Miami-Dade	57,355,934	1,271,031	
Palm Beach	46,589,443	645,965	
Monroe	2,812,631	54,200	
South Total	154,755,276	2,818,594	
Florida			$442,895,000,000

1. Bureau of Economic Analysis, Regional Accounts Data, Local Personal Income, 1999
2. Bureau of Economic Analysis, Regional Accounts Data, 2000
3. Bureau of Economic Analysis, U.S. Department of Commerce, June 2001

When comparing the impacts of construction, as shown in **Table G-32**, to the actual total figures for the counties and state, it is important to recognize that the latest earnings data available were from the 2000 census data. These figures have increased since 2000, but are considered sufficient for this analysis. It should be noted that these calculated comparison percentages will appear larger than the actual representative percentages based on up-to-date earnings and output data, meaning the impact will not be as great. The comparison percentages of the total regional economy to construction impacts involved in the various projects are represented in the following table. Since the total output

(sales) for the counties and the South Region is not available at this time, the total output for the state of Florida will be used for this generalization. The impacts are compared to the figures of the respective region. It can be seen that the impact on the region from the construction of either of the alternatives will be similar. There will be no major long-term impact, and the short-term impacts will be insignificant compared to the economy of South Florida.

TABLE G-32: CONSTRUCTION IMPACTS VS. ACTUAL DEMOGRAPHIC FIGURES

Alternative		Employment	Earnings ($1,000s)	Output ($1,000s)
Short Hydroperiod	Annual Impact to the South Region Published Current Amount	150 2,818,594	$4,563 $154,755,276	
	Percent of Regional Economy	0.005%	0.003%	
	Florida Regional Effect Published Current Amount			$11,578 $442,895,000
	Percent of Regional Economy			0.003
Intermediate Hydroperiod	Annual Impact to the South Region Published Current Amount	154 2,818,594	$4,692 $154,755,276	
	Percent of Regional Economy	0.005%	0.003%	
	Florida Regional Effect Published Current Amount			$11,905 $442,895,000
	Percent of Regional Economy			0.003%
Long Hydroperiod	Annual Impact to the South Region Published Current Amount	178 2,818,594	$5,394 $154,755,276	
	Percent of Regional Economy	0.006%	0.003%	
	Florida Regional Effect Published Current Amount			$13,685 $442,895,000
	Percent of Regional Economy			0.003

G.10 OTHER SOCIAL EFFECTS

G.10.1 Overview

The Other Social Effects (OSE) account considers the effects of alternative plans in areas that are not already contained in the NED and RED accounts. The categories of effects contained within the OSE account include:

- Urban and community impacts;
- Life, health and safety factors;

- Displacement;
- Long-term productivity; and
- Energy requirements and energy conservation

The Winsberg Farm alternative restoration plans could result in beneficial and adverse OSE within the study area. As is evident throughout this appendix, a variety of positive and adverse NED impacts on water supply (agricultural and urban), flood-damage reduction and recreation are expected to result from Winsberg Farm restoration. Similarly, alternative restoration plans could have positive or adverse OSE impacts on the study area associated with (1) plan implementation, including land acquisition, project construction, and operations and maintenance (O&M) activities, and (2) operation of the modified C&SF system. As in the case of the NED effects, the OSE account is concerned with the net effects of the alternative plans (i.e., the differences between the with- and without-project future conditions).

Some of the potential OSE impacts would occur primarily at the regional scale, and others would have more localized effects. At both scales, there may be some individuals and communities that are positively affected by Winsberg Farm restoration, some that are adversely affected, and many that are not affected at all. Relative to the size of the regional or local economies, the OSE effects may be minimal. However, if these effects occur predominantly within a limited geographic area, or affect a relatively small or vulnerable population, then the impacts can be disproportionately large. Therefore, the purposes of OSE analysis include not only determining the total magnitude of potential impacts, but also identifying the population (and its characteristics) that would be affected by any proposed action.

Some of the categories of effects typically included in the OSE account do not pertain to alternative restoration plans. For example, the alternative plans are not expected to affect energy use or energy conservation in the study area. As should be noted, other categories of potential OSE impacts have been addressed previously in this appendix.

G.10.2 Potential Urban and Community Impacts

An urban and community impact is the principal category of potential OSE impacts associated with the alternative restoration plans. This category of impacts includes effects on income distribution, employment distribution, population distribution and composition, and quality of community life. Some urban and community impacts have previously been addressed in this appendix. For example, regional income effects and fiscal impacts were discussed in the Regional Economic Development analysis. In addition, the impacts of agricultural water supply and municipal and industrial water supply were

discussed in detail in earlier sections. The OSE assessment of urban and community impacts considers both the potential for exposure to the effects of alternative restoration plans and the degree of vulnerability to potential impacts. Exposure refers to whether an individual or community is subject to other social effects of the alternative plans. Vulnerability refers to the ability of that individual or community to respond or adjust to those effects.

Potential urban and community impacts of the alternative restoration plans could result from: (1) land acquisition and potential relocation of populations for wetlands and other project construction features, (2) reduced agricultural activity associated with taking targeted farmlands out of cultivation, and (3) construction activity associated with plan implementation. In general, construction activity is considered to have positive impacts. At the local scale, construction and O&M activities associated with the alternative restoration plans can have positive effects to local residents and communities by providing jobs, increasing local wages, increasing local sales, increasing tax revenues and generally benefiting the local economy.

There are a variety of social and economic factors that are important determinants of an individual's or community's ability to cope with adversity. One of the most important economic factors is the ability of individuals and groups to respond to the number of employment alternatives available locally. The ability to find another job depends on the education and training of the work force, as well as the needs of local economic concerns, such as other farms, agricultural-related services, or some other local business. The socio-economic makeup of the community is also an important consideration of the ability of individuals and the community at large to cope with the adverse effects of large-scale agricultural land conversion. Some groups in society are recognized as having less opportunity to respond to adversity. These groups include ethnic and racial minorities, the elderly, and the poor. **Table G-33** presents a socio-economic vulnerability profile for each of the study-area counties. This profile contains information that indicates the ability of the county population to respond to social and economic adversity. It is important to recognize that the county scale may not accurately reflect the ability of any given community or groups within a community to accommodate potential changes associated with alternative restoration plans. More detailed studies of individual communities are not warranted until the potential wetlands have been sited.

Table G-33 contains Palm Beach County demographics from the 2000 census, including the racial/ethnic mix of each of the study-area counties, as well as the over-65 population, 2000 unemployment, per capita income, and the percentage of inhabitants below the poverty level.

The study-area counties have a wide range of ethnic compositions, proportions of elderly population, unemployment rates, and per capita incomes. These socio-economic characteristics suggest that the rural counties of the study area are locations that are least able to accommodate the associated economic and social effects on local communities. However, in these rural areas the affected populations should be relatively small.

Although restoration of the Winsberg Farm ecosystem is a unique undertaking, there have been other projects and programs with similar goals and socio-economic contexts. One study conducted by the U.S. Department of the Interior assessed the national and regional economic impacts of not allowing timber harvests in certain old-growth forests in Oregon to protect the Northern Spotted Owl. One aspect of this study investigated the re-employment of timber workers who had been displaced by the cessation of local logging activities. Surveys of displaced loggers found that 57 percent of displaced workers reported post-displacement wages equal to or above their previous wages. According to the Bureau of Labor Statistics, 92 percent of displaced workers find new jobs within one year, and the remaining 8 percent find jobs within two years.

TABLE G-33: SOCIO-ECONOMIC VULNERABILITY PROFILE

County	White	Black	American Indian	Hispanic*	Other	Population Over 65	Unemploy-ment Rate (2000)	1997 Per Capita Income**	Percent of Popula-tion Below Poverty Level
Palm Beach	79.1	13.8	0.2	16.8	3.0	23.2	2.8	147%	9.9

Source: Fedstats.gov
*Hispanic can be any race.
**(Percentage relative to state average)

G.11 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires the federal government to achieve environmental justice by identifying and addressing high, adverse and disproportionate effects of its activities on minority and low-income populations. It requires the analysis of information such as race, national origin, and income level for areas expected to be impacted by environmental actions. It also requires federal agencies to identify the need to ensure the protection of populations relying on subsistence consumption of fish and wildlife, through analysis of information on such consumption patterns, and the communication of associated risks to the public.

The Winsberg Farm project will provide benefits to quality of life by improving the natural environment we live in. Although the Winsberg Farm project is in a location of high urban populations, it is sited so that negative impacts are eliminated for all communities.

The Winsberg Farm project does not present any environmental impacts that are high, adverse and disproportionate to low-income, minority or tribal populations. As a result of outreach's public participation process and NEPA scoping, no high or adverse impacts have become known. There was sufficient public input to feel confident that scoping was successful and that the breadth of the potential impacts were communicated and understood by the public. Therefore, with no high or adverse impacts, there is nothing that would require a disproportionate impact analysis. Thus, this NEPA process has found no evidence of high, adverse or disproportionate impacts.

Project sites are located based upon hydrologic characteristics, land availability and interconnection to existing canals and structures to optimize operations. Furthermore, in the consideration of the project site, urban areas are avoided to eliminate the negative impacts typically associated with site location of large projects. Through “willing-seller agreements,” a variety of land rights have been or will be acquired that allow the use of land for the resulting improvements to the human quality of life and the intended environmental benefits intended by the Winsberg Farm wetlands.

These environmental benefits provide quality-of-life improvements to all people, primarily to people in the communities within the Winsberg Farm study area. By design, this operating procedure will maintain, if not improve, flood control, and will improve quality of human life by providing increased wildlife activity; a special bonus for those who appreciate seeing increases in fish and bird populations. This logically translates to increased benefits in enjoyment, aesthetics and economics for sport fishing.

Finally, lands acquired for the Winsberg project will not cause a significant number of persons to relocate. Since the land has been managed for agricultural uses, specifically row-crop fields and a native plant nursery, no relocation of local inhabitants has been required. Census data applies only to residents and, thus, has limited value in fully portraying the demographics of those affected.

G.12 REFERENCES

Bureau of Economic and Business Research, 1997 Florida Statistical Abstract. Tallahassee, Florida. 1997.

Florida Department of Environmental Protection. Outdoor Recreation in Florida, Florida's Statewide Comprehensive Outdoor Recreation Plan. 1994.

Florida Department of Environmental Protection. Outdoor Recreation in Florida, Florida's Statewide Comprehensive Outdoor Recreation Plan. 2000.

Florida Tourism Industry Marketing Corporation. 1996 Florida Visitor Study. Tallahassee. 1997.

Milon, J.W., Thunberg, G. A Regional Analysis of Current and Future Florida Resident Participation in Marine Recreational Fishing. Florida Sea Grant Report 112. University of Florida, Gainesville. 1993.

National Parks and Conservation Association. The Economic Importance of National Parks: Effects of the 1995-1996 Government Shutdowns on Selected Park-Dependent Businesses. 1997.

National Park Service. National Park Service Statistical Abstract. 1995.

Outdoor Recreation Coalition of America. Emerging Markets for Outdoor Recreation in the United States. Results of the National Survey of Recreation and the Environment. 1997.

Planning and Management Consultants, Ltd. (PMCL), IWR-MAIN Water Demand Analysis Software User's Manual and System Description. April 1995.

Recreation Roundtable. Outdoor Recreation in America 1997. Prepared by Roper/Starch. Washington, D.C. 1998.

Snyder, G.H., and Davidson, J.M. "Everglades Agriculture: Past, Present, and Future" in Everglades: The Ecosystem and Its Restoration. S.M. Davis and J.C. Ogden (Eds.). (1994): 85-115.

South Florida Water Management District. Draft Documentation for the South Florida Water Management Model. West Palm Beach. 1997a.

South Florida Water Management District. Twenty Year Evaluation: Economic Impacts from Implementing the Marjory Stoneman Douglas Everglades

Restoration Act and United States vs. SFWMD Settlement Agreement. Hazen and Sawyer. 1993.

South Florida Water Management District. Water Supply Needs and Sources 1990-2010. July, 1992b.

University of Florida, Bureau of Economic Analysis and Business Research, Florida Population Studies.

University of Florida, Bureau of Economic Analysis and Business Research, The Florida Long-Term Economic Forecasts 1995, Volume 2 – State & Counties, September 1997.

University of Florida, Bureau of Economic Analysis and Business Research, The Florida Long-Term Economic Forecasts 1997, Volume 2 – State & Counties, September 1997.

U.S. Army Corp. of Engineers, Ecosystem Restoration in the Civil Works Program. (EC 1105-2-210).

U.S. Army Corp. of Engineers, Waterborne Commerce of the United States.

U.S. Army Corp. of Engineers, Jacksonville District. Central and Southern Florida Reconnaissance Report: Comprehensive Review Study. (Volume I-III). 1994a.

U.S. Congress, Comprehensive Report on Central and Southern Florida for Flood Control and Other Purposes. House Document No. 643. 6 May 1948.

U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Regional Economic Analysis Division, County Projections to 2040, 1992.

U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Statistical Abstract of the United States. 1992.

U.S. Department of Labor. Monthly Unemployment Surveys. Bureau of Labor Statistics. July 1998.

U.S. Fish and Wildlife Service. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Department of the Interior. 1996.

Van Os, G., Carroll, J.G., and Dunn, J. Creel Census and the Effects of Freshwater

Waddington, G., Boyle, K., and Cooper, J. 1991 Net Economic Value for Bass and Trout Fishing, Deer Hunting, and Wildlife Watching. Report 91-1. U.S. Fish and Wildlife Service.

APPENDIX H
RECREATION

This page intentionally left blank

TABLE OF CONTENTS

H RECREATION H-1
H.1 AUTHORIZATION H-1
H.2 INTRODUCTION TO RECREATION FOR WINSBERG FARM WETLANDS RESTORATION H-1
H.3 BENEFIT CATEGORIES H-3
H.3.1 Study Area H-3
H.4 RECREATION BENEFITS H-4
H.4.1 Determining Value Per Visit H-5
H.4.2 Estimating Visitation H-8
H.5 ECONOMIC JUSTIFICATION OF RECREATION H-9
H.6 SENSITIVITY ANALYSIS H-11

LIST OF TABLES

Table H-1: Recreation Features of Cell One Location H-4
Table H-2: Guidelines for Assigning Points for General Recreation H-6
Table H-3: Conversion of Points to Dollar Values H-8
Table H-4: Summary of Costs and Benefits H-10
Table H-5: Potential recreation participation user-day projections H-10
Table H-6: Sensitivity Analysis Using Multiple Scenarios H-11

LIST OF FIGURES

Figure H-1: Winsberg Farm Wetlands Restoration Conceptual Recreation Plan H-3

This page intentionally left blank

H RECREATION

H.1 AUTHORIZATION

The Comprehensive Everglades Restoration Plan (CERP), authorized by the Water Resources Development Act of 2000 (WRDA 2000), will involve modifying the Central and Southern Florida (C&SF) Project, which was constructed with extensive congressional authorizations from the 1944 Flood Control Act to the Water Resources Development Act of 1996. The Federal Water Project Recreation Act (Public Law 89-72) and the Water Resources Development Act of 1986 (PL 99-662) provide additional guidance. Further, specific CERP design guidance was signed on May 12, 2000, in the form of the Department of the Army and South Florida Water Management District Design Agreement for Everglades and South Florida Ecosystem Restoration Project.

Additional authorization and guidance for the proposed ancillary recreation resources development is contained in CECW-AG, June 11, 1998, Memorandum, Policy Guidance Letter No. 59, Recreation Development at Ecosystem Restoration Projects and EP 1165-2-502. Despite austere budgets and policy requirements, recreational developments can and do contribute to community health and well-being (CECW, 1998). The recreation resources that are being proposed as part of Winsberg Farm Wetlands Restoration would comply with the philosophy and inclusion of the CESAD-PD-J September 15, 2004, Memorandum, are economically justified, and fall within the 10 percent rule.

H.2 INTRODUCTION TO RECREATION FOR WINSBERG FARM WETLANDS RESTORATION

The recreation resources appendix contains a description of the environmental restoration project, public access, high quality environmental interpretation and educational recreation features. The Winsberg Farm Wetlands Restoration Project was authorized by Section 528 of the WRDA of 1996 and Other Project Elements (OPEs) identified as crucial to overall CERP ecosystem restoration. The Winsberg Farms aerial photograph below displays the Phase I (75 acres) constructed wetland and recreation facilities of the wetland restoration project footprint (150 acres). This analysis will determine the net recreation benefits for the Phase I wetland (cell one and wetland cell 2) restoration. This area is bordered by Hagen Ranch Road, and Canals L-29 and L-30. No recreation access for environmental education or interpretation is proposed for Phase II construction.

Recreation features are being included in the Winsberg Farm Wetlands Restoration Project as an incidental project benefit. However, the recreation benefits will not be used to help justify the selected plan. Palm Beach County Water Utilities Department's (PBCWUD) contractor, CH2MHill, provided the

recreation plan which identified facilities and their locations. The Phase I recreation facilities (visitor center and 25-car parking, boardwalk with shade pavilions and interpretive signage) has been constructed and the local sponsor is requesting credit for the recreation features, as per WRDA 2000, Section 601. Construction costs are displayed in **Table H-4**. Sponsor-prepared plans and specifications were reviewed for adequacy of design (Americans with Disability Act [ADA] and Architectural Barriers Act [ABA]), specifications and constructability to ensure public health, safety and welfare. Total recreation construction costs are provided as $3,816,000.

The sponsor is interested in cost-sharing the visitor center and parking lot as included on Exhibit E-2, Recreation Facilities Checklist, Page E-293 of ER 1105-2-100, April 2000. The combined total cost of the visitor center and parking lot would be $2,492,632 which would exceed the 10 percent limit rule, since the total project cost is $19,135,351. The 6,300 linear feet of boardwalk, constructed for $1,329,000, is a necessary and integral project component that is more reasonably priced and is within the 10 percent limit rule. The sponsor would appreciate the appropriate credit for the allowed amount in compliance with the USACE recreation cost-sharing policy.

The adjacent Wakodahatchee Wetland treatment area boasts an annual visitation rate of about 125,000 people. Visitors come from all over the state of Florida, nation and foreign countries. School children, professional societies, conference attendees and general public visit the facilities. Based on the current recorded public visitation to the Winsberg Farm Wetlands Treatment Facility over the past seven months, annual visitation is expected to exceed 130,000 visitors per year. The Winsberg Farm Wetlands Restoration impoundments are likely to experience increased visitation due to high-quality environmental education and interpretive opportunities, as well as an increasing public interest in bird watching and environmental education. As available adjacent lands are developed, the local draw of visitors to the Winsberg impoundments will increase, and it is conservatively projected the restoration cells will experience local, regional, state and international visitors. The project location is in an urban area with excellent transportation routes in the immediate vicinity, including interstates, state and county roads, city arteries and collectors/distributor roads.

The proposed features of the Winsberg Farm Wetlands Restoration recreation plan will not require additional real estate to be purchased or project restoration plan to be modified. All features will be compatible with the environmental purposes of the restoration project and will not detract from the environmental or socio-economic benefits being generated by the project. The activities that will be permitted in the restoration cell impoundments (nature study, wildlife viewing, walking, environmental interpretation and education) are all well-

suited to the environmental purposes of the project. A major recreation attraction of the Winsberg Farm Wetlands Restoration project will be the visitor center, followed by the 6,300 linear feet of boardwalk with interpretive signage and shade shelters that will provide a high-quality environmental interpretive and education opportunity.

FIGURE H-1: WINSBERG FARM WETLANDS RESTORATION CONCEPTUAL RECREATION PLAN

H.3 BENEFIT CATEGORIES

H.3.1 Study Area

The study area for the recreation benefit analysis is specific to Palm Beach County, Florida. The 2000 Florida Statewide Comprehensive Outdoor Recreation Plan (SCORP) identifies the proposed project area as part of Region 10, comprised of Indian River, St. Lucie, Martin and Palm Beach counties. Resources-based, recreation activity deficits identified by the SCORP for this region include bicycle riding, freshwater fishing, hiking, saltwater beach activities and saltwater fishing (SCORP, 2000). A National Survey of Recreation and Environment, conducted by the Outdoor Recreation Coalition of America, 1997, determined that recreational walking and bird watching interest in the United States increased 43 percent and 155 percent, respectively, between 1984

and 1995. The National Survey of Fishing, Hunting and Wildlife-Associated Recreation, conducted by the U.S. Fish & Wildlife Service, 1996, determined 32 percent of Florida residents took part in wildlife-related recreation, with 25 percent focused on wildlife watching. To date, 100 different species of birds have been identified in the completed wetlands of Phase 1. The visitor center and parking lot would provide access to 6,300 liner feet of boardwalks with shade shelters and interpretive signage providing a high-quality environmental education experience focused to meet increasing public demands in the wildlife watching arena.

TABLE H-1: RECREATION FEATURES OF CELL ONE LOCATION

Feature	Quantity	Unit Cost	Total Cost
Parking Lot	100,000 SF	$4.87/SF	$487,000
Visitor Center	1	JOB	$2,005,632
Interpretive Signage	4	$6,250	$25,000
*ADA Accessible Boardwalk with Shade Shelters	6,300 LF	JOB	*$1,329,000
Site Total			$3,846,632
Cost-Sharable Total			$2,517,632

* Cost-Shareable Recreation Facilities as listed in ER 1105-2-100, Exhibit E-2, Page E-293

H.4 RECREATION BENEFITS

The national economic development (NED) benefit evaluation procedures contained in ER 1105-2-100 (April 22, 2000), Appendix E, Section VII, include three methods of evaluating the beneficial and adverse NED effects of project recreation: travel cost method (TCM), contingent valuation method (CVM), and unit day value (UDV) method.

The UDV method was selected for estimating recreation benefits associated with the creation of Winsberg Farm Wetlands Restoration. The UDV approach in recreation-benefit analysis consists of two parts: determining value per visit and estimating visitation.

H.4.1 Determining Value Per Visit

When the UDV method is used for economic evaluations, planners will select a specific value from the range of values provided annually. Application of the selected value to estimated annual use over the project life, in the context of the with- and without-project framework of analysis, provides the estimate of recreation benefits.

The without-project condition in this analysis has no recreation value since the Winsberg Farm Wetlands Restoration impoundments would not exist and the land would not be open to the public. It is presumed that the impoundments must be opened to the public to realize the recreation benefits being claimed. The with-project condition will be the expected value of the recreational activities based on the UDV method. **Table H-2** illustrates the method of assigning a point rating to a particular activity. The table also shows the point values assigned based on measurement standards described for the five criteria of activities, facilities, relative scarcity, ease of access, and aesthetic factors.

Point-value assignments for **Table H-2** above are based on Economic Guidance Memorandum (EGM) 04-03. The Criteria and Judgment Factors for General Recreation were specifically used as the basis of the estimated point values for the proposed recreation area. Judgment factors were based on site visits and coordination with local agencies. The following selection factors were used for the criteria outlined in **Table H-2**:

- Winsberg Farm Wetlands Restoration Phase I recreation resources provide opportunities for several general-recreation activities afforded by the project setting and wildlife resources associated with the project. The site offers solitude and a very specific setting in a growing urbanized area. It provides specific recreation amenities (as outlined in **Table H-2**) for the expanding regional population and increasing demands for recreation. The environmental restoration component (water treatment and release) would help educate visitors on water treatment and reuse goals. Bird watching and environmental education and interpretation would also be available. High-quality environmental education and interpretation activities would be available to all visitors. Therefore, a mid-range point value of 11 is scored.

TABLE H-2: GUIDELINES FOR ASSIGNING POINTS FOR GENERAL RECREATION

Criteria	Judgment Factors				
Recreation experience Total Points: 30	Two general activities	Several general activities	Several general activities: one high quality value activity	Several general activities; more than one high quality high activity	Numerous high quality value activities; some general activities
Point Value: 11	0-4	5-10	11-16	17-13	24-30
Availability of opportunity 4 Total Points: 18	Several within 1 hr. travel time; a few within 30 min. travel time	Several within 1 hr. travel time; none within 30 min. travel time	One or two within 1 hr. travel time; none within 45 min. travel time	None within 1 hr. travel time	None within 2 hr. travel time
Point Value: 3	0-3	4-6	7-10	11-14	15-18
Carrying capacity Total Points: 14	Minimum facility for development for public health and safety	Basic facility to conduct activity(ies)	Adequate facilities to conduct without deterioration of the resource or activity experience	Optimum facilities to conduct activity at site potential	Ultimate facilities to achieve intent of selected alternative
Point Value: 10	0-2	3-5	6-8	9-11	12-14
Accessibility Total Points: 18	Limited access by any means to site or within site	Fair access, poor quality roads to site; limited access within site	Fair access, fair road to site; fair access, good roads within site	Good access, good roads to site; fair access, good roads within site	Good access, high standard road to site; good access within site
Point Value: 15	0-3	4-6	7-10	11-14	15-18
Environmental Total Points: 20	Low esthetic factors that significantly lower quality	Average esthetic quality; factors exist that lower quality to minor degree	Above average esthetic quality; any limiting factors can be reasonably rectified	High esthetic quality; no factors exist that lower quality	Outstanding esthetic quality; no factors exist that lower quality
Point Value: 9	0-2	3-6	7-10	11-15	16-20

- The availability-of-opportunity rating is based upon current local recreation facilities near the project area in the proposed recreation resource location. A 25-mile radius around the proposed project area represents a fairly dense urban population to the east. A 50-mile radius

would include more of the Everglades and a couple of other parks with similar opportunities. The proposed visitor center and educational boardwalk would provide high-value environmental education opportunities in the restored wetland project area. Recreation resources will help to provide centrally located facilities for current national recreation trend participation in a growing urbanized area. Since there are a couple similar recreation opportunities available within a one-hour travel time and a few within a 30-minute travel time, the point value given to this criterion is 3.

- Carrying capacity values are based on the optimum, potential use of the site, without overuse of the recreation resources. High-value environmental education and interpretation comprise a large part of the projected recreation-resource use. Optimum facilities will be constructed to conduct these activities without deteriorating the resource or activity experience. Peak use is expected to occur during half of the calendar year. Therefore, the point value given to this criterion was 9.
- The accessibility rating is based upon the availability of local highways, roads and streets in good condition that would provide access to the proposed recreation facilitates. The project is located in an urbanized area with good primary and secondary road access. The project is located on Hagen Ranch Road which provides good access to the site with paved access and parking once on the site. Hence, the point value given to this criterion is 15.
- The environmental quality rating is based upon existing aesthetic values. The site possesses above-average aesthetic resources at initial construction. Once the wetland restoration and surrounding landscape embankment matures, aesthetic values will increase. The best aesthetics of the proposed project areas are views from the visitor center out over wetland restoration to the north, northeast and east. Hence, the point value given to this criterion is 7.

The value of a day of general recreation at the proposed recreation sites for the Winsberg Farm Wetlands Restoration Project Phase I was determined using the guidelines for Assigning Points for the General Recreation in **Table H-2**. The points were then converted to dollar values using conversion factors included in Economic Guidance Memorandum 04-03, Unit Day Values for Recreation, 2001, which is based on ER 1105-2-100. **Table H-3** was used to convert **Table H-2** points to a UDV Fiscal Year 2003 dollar amount. The total point value for the recreation sites was determined to be 45. The user-day value conversion equivalent is $6.

TABLE H-3: CONVERSION OF POINTS TO DOLLAR VALUES

Point Values	General Recreation Values
0	$3.00
10	3.57
20	3.94
30	4.50
40	5.63
50	6.38
60	6.94
70	7.32
80	8.07
90	8.63
100	9.01

H.4.2 Estimating Visitation

The Winsberg Farm Wetlands Restoration impoundments can support a significant amount of outdoor recreation in the Lower East Coast of Florida. Recreation experiences in the Everglades are unique, few substitutes are readily available, the proportions of income spent on them are very low, and user occasion are frequent. Therefore, the price elasticity of demand for these recreational experiences is low. This means that the percentage change in the number of trips will be lower than any percentage change in the cost of recreating. For example, if there were a 1 percent increase in the cost of a recreation trip, then there would be a decrease in the number of trips by less than 1 percent. In other words, the demand for these relatively inexpensive recreational experiences will not be sensitive to price changes. Therefore, it is highly likely that the capacity of the recreation facility will be used to capacity.

The State of Florida's Department of Environmental Protection's Division of Recreation and Parks coordinated and developed the Florida SCORP for 2000. This information was used to derive and project total recreation participation and allocate this participation from state to regional to local levels. The SCORP includes guidelines for resource-based outdoor recreation activities. These guidelines are based on maximum levels of carrying capacity developed by the Division of Recreation and Parks for use and protection of state park resources.

SCORP was determined to be the best available resource for estimating recreation usage capacity.

The current SCORP indicates Region X recreation resource deficits for the year 2010 to include bicycling, hiking, non-boat freshwater fishing, saltwater beach activities, and saltwater fishing. These deficits will likely increase by the year 2050 as area population almost doubles. For economic justification purposes, user rates were calculated using the capacity projection for 2010. Utilizing the guidelines and demands available from the SCORP, reasonable capacity-rate projections can be determined. Since there is sufficient recreation resource supply in Region X for the nature study according to the SCORP, the resource-capacity approach could be used to determine the number of visits per year for these activities. The resource-capacity approach recognizes that expanded supply of the new recreation facility would increase use to capacity because sufficient resources exists in the market area. The Winsberg Farm Wetland Restoration Project would help supply environmental study and birdwatching resources that national trends show are becoming more popular with the American public.

Use guidelines for the designated nature study were based on carrying capacity guidelines adopted by the SCORP and used by the state park system. The high-value nature study facility could provide the opportunity for 5–20 groups per mile, with two users per group and a daily turnover rate of four per day for a total of 40-160 users per mile of boardwalk per day. The Winsberg Farm Wetlands Restoration Phase I project consists of a high-value visitor center and about 1.2 miles of high-value nature study boardwalks throughout the 75-acre project tract.

Current monthly visitation figures have ranged from 3,000 to 30,000 visitors which could produce annual visitation between 36,000 and 360,000 people. With population projections doubling by the year 2050 for the Lower East Coast region, annual visitation numbers could be much higher. Even though the SCORP Projections for Region 10 show no projected shortage of nature study in the region by the year 2010, Winsberg Farm Wetlands Restoration Phase I recreation resources are planned to provide these activities. The study team believes potential users will increase over the project life. This recreation facility may also function as an outdoor education opportunity for local school students in the immediate project area.

H.5 ECONOMIC JUSTIFICATION OF RECREATION

The justification of incurring additional costs for recreation features is derived by utilizing a benefit-to-cost ratio. The tangible economic justification of the proposed project can be ascertained by comparing the equivalent average annual

charges with the estimate of the equivalent average annual benefits, which would be realized over the period of analysis. These average annual recreation benefits and costs are summarized in **Table H-4**.

TABLE H-4: SUMMARY OF COSTS AND BENEFITS

Total Project Costs	$19,135,351
Total Recreation Costs	$4,508,149
'10 Percent Recreation Cost Limit Rule' Total Federal Share	$4,783,000
Annual Costs	
Interest during PED and Construction	$134,900
Total Investment Cost	$1,600,800
Average Annual Cost	$97,700
Interest	$80,900
OMRR&R	$15,500
Annual Benefits	
Unit Day Value (Table H-3)	$6.00
Daily Use (Table H-5)	125 users
Annual Use (125x 365)	45,625
Average Annual Benefit	$273,800
Benefit to Cost	2.80 to 1
Net Annual Benefits	$179,100

Engineering Regulation 1105-2-100 (The Planning Guidance Notebook), APR 2000, provides economic evaluation procedures to be used in all federal water resources planning studies. The guidelines specified in the regulation were used to prepare this cost analysis. The federally mandated project evaluation interest rate of 5 3/8 percent, an economic period of analysis of 40 years and current prices were used to evaluate economic feasibility.

TABLE H-5: POTENTIAL RECREATION PARTICIPATION USER-DAY PROJECTIONS

Activity	Units Provided	Maximum Area Requirements	Turnover Rates	Guidelines	SCORP Region 10 Resource Deficits (Needs)(2010)		Winsberg Farm Expected Users
					User Occasions	Units	
Visitor Center/ Nature Study	1.2 miles	5-20 groups per mile	4/day	40-160 users per mile of trail/day	1,058,861	0 miles	125

This analysis leads to the conclusion that there are nearly 2.8 times the benefits than the costs. The benefit-to-cost ratio for the recreation features equals 2.8 to 1, with net annual benefits equaling $179,100.

H.6 SENSITIVITY ANALYSIS

A sensitivity analysis was conducted to further reinforce expected benefits and provide extra support for the justification of recreation features. **Table H-6** includes a sensitivity analysis which contains the expected average annual benefits from the above table, a worst-case scenario depicting the number of annual visitors required for benefits to equal costs, and a scenario in which SCORP guidelines are utilized as they are presented. As can be noted from this sensitivity analysis, a minimum average rate of 45 users per day would be required to justify the proposed costs for recreation, and following the minimum guidelines from SCORP the expected minimum benefits from the site could be $3.5 million.

TABLE H-6: SENSITIVITY ANALYSIS USING MULTIPLE SCENARIOS

Scenario	Annual Users	Daily Users	Annual Benefit
Worst-Case Scenario	16,425	45	$98,550
Projected Scenario	45,625	125	$179,100
SCORP	1,058,861	2,900	$4,156,537

This page intentionally left blank.

US Army Corps of Engineers ®

Palm Beach County Water Utilities