112th Congress, 2d Session – – – – – – – – – – – – House Document 112–145

BISCAYNE BAY COASTAL WETLANDS FINAL INTEGRATED PROJECT IMPLEMENTATION REPORT AND ENVIRONMENTAL IMPACT STATEMENT

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, THE DEPARTMENT OF DEFENSE

TRANSMITTING

PROPOSAL FOR THE BISCAYNE BAY COASTAL WETLANDS PHASE 1 PROJECT

VOLUME 6 OF 6

SEPTEMBER 25, 2012.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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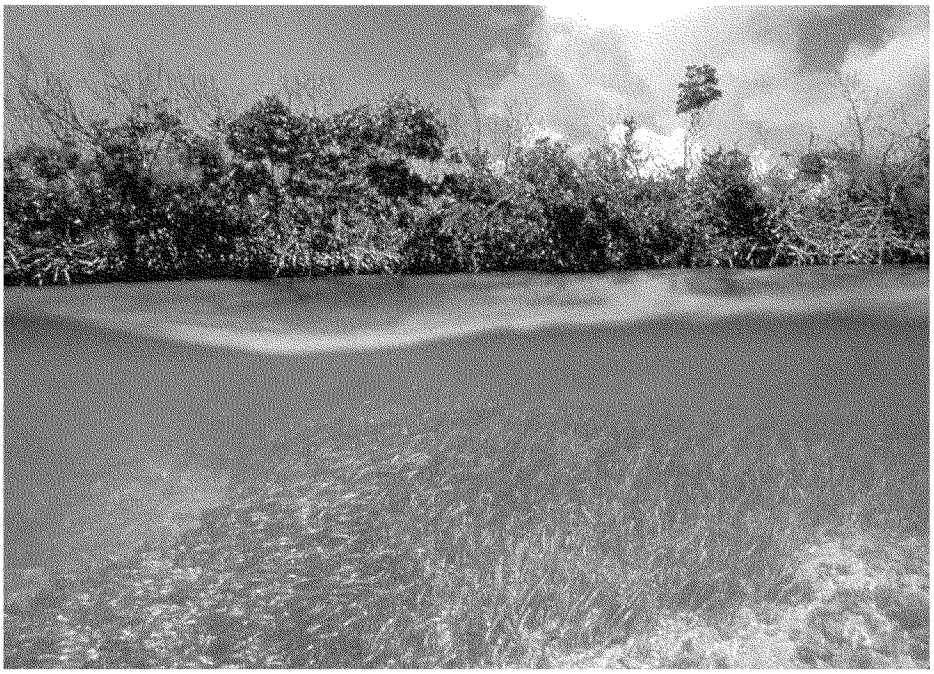
CENTRAL AND SOUTHERN FLORIDA PROJECT
COMPREHENSIVE EVERGLADES RESTORATION PLAN
BISCAYNE BAY COASTAL WETLANDS PHASE 1

FINAL INTEGRATED
PROJECT IMPLEMENTATION REPORT AND
ENVIRONMENTAL IMPACT STATEMENT



Volume 6 – Appendices D-H **July 2011 – revised March 2012**

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SOUTH FLORIDA WATER
MANAGEMENT DISTRICT

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CENTRAL AND SOUTHERN FLORIDA PROJECT
BISCAYNE BAY COASTAL WETLANDS
PHASE 1

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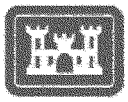

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MANAGEMENT DISTRICT

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APPENDIX D

REAL ESTATE

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D.0 REAL ESTATE

D.1 SCOPE

The scope of this report for the Project Implementation Report (PIR) identifies the land, easements, right of way, relocations, borrow and disposal issues and status of real estate activities for the Selected Plan, for the Biscayne Bay Coastal Wetlands project, Alternative O Phase I. The information presented in this report is based on available information provided by the Project Delivery Team (PDT) members. It presents an estimate of the land, easements, right of way, relocations, borrow and disposal requirements and a description of the nature and scope of the non-Federal sponsor's responsibility. The information presented in this report is tentative in nature and is to be used for planning purposes only.

D.2 STATEMENT OF PURPOSE OF THE REAL ESTATE PLAN

The purpose of the Real Estate Plan completed for the PIR is to estimate the overall real estate requirements, costs, acquisition schedules, and other real estate requirements necessary for the Central and Southern Florida (C&SF) Flood Control Project, Comprehensive Everglades Restoration Plan (CERP), Biscayne Bay Coastal Wetlands, Phase 1, as required by Engineering Regulation 405-1-12, Chapter 12.

D.3 DESCRIPTION OF PRIOR REAL ESTATE PLAN FOR THE PROJECT

The Biscayne Bay Coastal Wetlands project was discussed in the Central and Southern Florida Project, Comprehensive Review Study (Yellow Book or Restudy), dated April 1999, in Appendix A, Plan Formulation, pages A-24 through A-26; and, in Appendix F - Real Estate Plan, pages F-75 through F-77.

D.4 PROJECT AUTHORIZATION

The authority for this project is contained within the Water Resources Development Act (WRDA) 2000. The "Design Agreement between the Department of the Army and the South Florida Water Management District (SFWMD) for the Design of Elements of the Comprehensive Plan for the Everglades and South Florida Ecosystem Restoration Project" contains additional guidance.

The WRDA of 2000 provides guidance and authority for implementing the CERP. Section 601, of the Act states:

(b) CERP -

(1) APPROVAL

(A) IN GENERAL.—Except as modified by this section, the Plan is approved as a framework for modifications and operational changes to the 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. 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.

(c) ADDITIONAL PROGRAM AUTHORITY-

(1) IN GENERAL- *To expedite implementation of the Plan, the Secretary may implement modifications to the Central and Southern Florida Project that--*

(A) *are described in the Plan; and*

(B) *will produce a substantial benefit to the restoration, preservation and protection of the South Florida ecosystem.*

(2) PROJECT IMPLEMENTATION REPORTS- *Before implementation of any project feature authorized under this subsection, the Secretary shall review and approve for the project feature a project implementation report prepared in accordance with subsections (f) and (h).*

(d) AUTHORIZATION OF FUTURE PROJECTS-

(1) IN GENERAL- *Except for a project authorized by subsection (b) or (c), any project included in the Plan shall require a specific authorization by Congress.*

(2) SUBMISSION OF REPORT- *Before seeking congressional authorization for a project under paragraph (1), the Secretary shall submit to Congress--*

(A) *a description of the project; and*

(B) *a project implementation report for the project prepared in accordance with subsections (f) and (h).*

D.5 PROJECT PURPOSE

The Biscayne Bay Coastal Wetlands project was authorized to restore or enhance freshwater wetlands, tidal wetlands, and nearshore bay habitat. The primary purpose of the Biscayne Bay Coastal Wetlands project is to redistribute freshwater runoff from the watershed into Biscayne Bay, away from canal discharges that currently exist and provide a more natural and historic overland flow through existing and or improved coastal wetlands. The geographic extent of the project is along the mainland coast of southern Biscayne Bay from the Deering Estate at C-100C mouth to the undeveloped areas south of Homestead and Florida City known as the Model Lands Basin.

D.5.1 C-100 Basin

There are four major C&SF project canals in the C-100 Basin: C-100, C-100A, C-100B, and C-100C. These canals have three functions: (1) to provide drainage and flood protection for the C-100 Basin, (2) to supply water to the basin for irrigation, and (3) to maintain a groundwater table elevation near the lower reach of C-100 adequate to prevent saltwater intrusion to local groundwater.

D.5.2 C-1 Basin

There are four C&SF project canals in the C-1 Basin: C-1, C-1W, C-1N and the L-31N Borrow Canal. These canals have three functions: (1) to provide drainage and flood protection for the C-1 Basin, (2) to supply water to the C-1 and the C-100 basins for irrigation, and (3) to maintain a groundwater table elevation near the lower reach of C-1 adequate to prevent saltwater intrusion to local groundwater.

D.5.3 C-102 Basin

There are two C&SF project canals in the C-102 Basin: C-102 and C-102N. These canals have three functions: (1) to provide drainage and flood protection for the C-102 Basin, (2) to supply water to the basin for irrigation, and (3) to maintain a groundwater table elevation adequate to prevent intrusion of saltwater into local groundwater.

D.5.4 C-103 Basin

There are three C&SF project canals in the C-103 Basin: C-103, C-103S, and C-103N. These canals have three functions: (1) to provide drainage and flood protection for the C-103 Basin, (2) to supply water to the basin for irrigation, and (3) to maintain a groundwater table elevation adequate to prevent intrusion of saltwater into local groundwater.

D.6 PROJECT LOCATION AND DESCRIPTION OF THE SELECTED PLAN

D.6.1 Project Location and Description

Biscayne Bay is a shallow saline tropical bay/coastal lagoon located along the southeastern coast of Florida. It is bordered to the west by the mainland of Florida, which includes the densely populated areas of Miami-Dade County. To the east, the Biscayne Bay is bordered by a series of barrier islands and the northern Florida Keys. The Biscayne Bay is connected to the Atlantic Ocean by a series of channels and cuts, some natural and some manmade, and it contains a number of islands, the majority of which are manmade as well.

The Biscayne Bay Coastal Wetlands study area lies in southeast Miami-Dade County. The project area falls within the South Dade Wetlands, southeast of the Miami Rock Ridge. The South Dade Wetlands form a contiguous habitat corridor with Everglades National Park (ENP), Biscayne National Park (BNP), Crocodile Lakes National Wildlife Refuge, the north Key Largo Conservation and Recreational Land purchases, John Pennekamp State Park and the existing National Marine Sanctuary. Approximately 80 percent of the land in the South Dade Wetlands has not been directly disturbed for human use. Where physical disturbance has occurred, the most frequent cause is agriculture. Essentially all of the farming activities within the management area have ceased. Previously farmed lands have re-vegetated, in some cases with invasive exotic species.

The western portion of the Model Lands is made up of the wetlands in the north C-111 Basin, located adjacent to the C-111 Canal, east of ENP, west of U.S. Highway 1, north of SW 424th Street and south of State Road 9336, with the exception of active agricultural land. The eastern portion includes the wetlands south of SW 344th Street (Palm Drive), east of U.S. Highway 1, and south to Biscayne Bay, Card Sound and Barnes Sound.

Alternative O was derived from components of Alternatives M and Q and is intended to make use of common water management features to attain the objectives of the Biscayne Bay Coastal Wetlands project (see ***Section 5, Formulation of Alternative Plans*** for additional information on alternatives). Alternative O includes the use of flow ways, spreader canals, culverts, piping, weirs, canal plugs, 102 mosquito control ditch plugs and pumps to achieve the overall project goals of restoring and enhancing wetlands and nearshore bay habitat by minimizing point source discharges and improving the quantity, quality, timing, and distribution of water to freshwater and tidal wetlands and Biscayne Bay. Alternative O reduces cost by removing the southern spreader canal which has high real estate costs. Alternative O was evaluated in the final array of alternatives as described in Appendix F, ***Section F.2.3***. Based on the initial Cost-Effectiveness/Incremental Cost Analyses, Alternative O was

identified as the desired end state for the project to be implemented via two separate reports. A subset of features for Alternative O, designated Alternative O, Phase 1 reflects a first step to executing Alternative O. Alternative O Phase 1 includes all of the State's Expedited Construction program, formerly Acceler8, features. This option generally incorporates the more northerly and easterly elements of Alternative O, and defers the riskier elements for a subsequent study. Alternative O Phase 1 was identified as the Selected Plan.

D.6.2 Alternative "O" Phase 1

The Selected Plan is Alternative O Phase 1. Alternative O Phase 1 includes the use of flow ways, spreader canals, culverts, piping, weirs, canal plugs, mosquito ditch plugs and pumps to achieve the overall project goals of restoring and enhancing wetlands and nearshore bay habitat by minimizing point source discharges and improving the quantity, quality, timing, and distribution of water to freshwater and tidal wetlands and to the Biscayne Bay. The lands required for the Selected Plan are based on the benefits assessment modeling and on the analysis of the lands needed for construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R) of the project. Details regarding the relationship between the land requirements and the benefits assessment are found in ***Sections 7.9.1 and 7.9.2***.

The Selected Plan includes features in three of the five sub-components set forth in the Yellow Book or Restudy: Deering Estate/Shoal Point; Lennar Flow Way; Cutler Wetlands; and L-31 East Flow Way (Homestead North Freshwater and Tidal Wetlands and Homestead South Freshwater and Tidal Wetlands). The project footprint requires approximately 3,761 acres of land. Of the total acreage required, approximately 1,412.32 acres would be required in fee and approximately 148.90 acres would require perpetual easement interest. Additionally, approximately 1,262.56 acres would be provided through the execution of Supplemental Agreements between the SFWMD and the State of Florida and local Miami-Dade County government entities. Approximately 937.32 acres are currently owned by the United States; National Park Service for the Biscayne National Park (BNP) which is will provide a Memorandum of Agreement to the SFWMD for the use of these lands. Generally, the Selected Plan includes the following major features (see ***FIGURE D-1*** and ***TABLE D-1***)

- Deering Estate – Construction of pump station S-700, (pump mix includes: one 50 cfs and two 25 cfs pumps), pipe, culverts and approximately 500 foot extension of the C-100A Spur Canal through the Power's Addition Parcel, construction of a freshwater wetland on the Power's Parcel and delivery of fresh water to the Cutler Drain and ultimately to coastal wetlands along Biscayne Bay.

- Cutler Wetlands – Construction of pump station S-701 (pump mix includes: four 100 cfs pumps), a lined conveyance canal (C-701), a spreader canal (C-702), culverts and mosquito control ditch plugs. The pump station, located on C-1, would deliver water to a 7,000 +/- linear feet of lined conveyance canal that will run under SW 97th Avenue and SW 87th Avenue (L-31E Levee), and across the L-31E Canal via concrete box culverts and deliver water to the spreader canal located in the saltwater wetlands. This spreader canal is divided into four segments. Approximately 2,500 linear feet of mosquito control ditches will be plugged to discourage the unnatural channelization of the water delivered to the area by the spreader canals.
- L-31 East Flow Way — Features in this region will isolate the L-31 E Canal from the major discharge canals (C-102, Military Canal and C-103) and allow freshwater flow through the L-31 E Levee to the saltwater wetlands. Gated culverts and inverted siphon structures will isolate L-31 E Levee from these canals, allowing the L-31 E Levee to maintain higher water levels. Two pump stations and a series of culverts will move fresh water directly to the saltwater wetlands east of L-31 E Levee. Two more pump stations and a spreader canal will deliver water to the freshwater wetlands south of C-103.

Specific features are described below.

D.6.3 Sub-component 1–Deering Estate/Shoal Point

The Deering Estate/Shoal Point sub-component includes features to route surface water from the C-100A Canal into a historical slough located on publicly owned lands to restore more natural flows into Biscayne Bay and the nearshore environment in this region. This component consists of extending an existing canal from the C-100A Spur Canal to the topographically lower area of the historic slough. Water flow into the slough would be pumped and then managed passively by a weir within the slough to impound water in strategic locations restoring freshwater wetlands and productive nursery habitat along the shoreline.

D.6.3.1 Pumping Station S-700

When flow is available at S-123, the S-700 pump station (pump mix includes: one 50 cfs and two 25 cfs pumps) delivers water from the C-100A Spur Canal under Old Cutler Road to a spreader structure and east through the Powers Wetland towards the Deering Estate. The pump would discharge to a surcharge chamber then into a discharge pipe finally into a spreader structure. The intent is to capture water that is otherwise lost to tide via C-100 Spur Canal and the S-123 Coastal Structure and deliver it to a historic flow way located on the Deering Estate.

D.6.3.2 Flow Way

A flow way will be constructed as a way to deliver flow from C-100A Spur Canal to S-700 pump station. The flow way will have both a main channel to ensure conveyance and shallow littoral shelves promoting wetland areas.

D.6.4 Sub-component 2–Cutler Wetlands/Lennar Flow Way

Cutler Wetlands includes a 400 cfs pump station, an open conveyance channel, a discharge structure and a spreader canal (there will be three segments of continuous spreader canal designed under the State's Expedited Construction program and one segment that the USACE will be designing).

D.6.4.1 Pumping Station S-701

The S-701 pump station (pump mix includes four 100 cfs pumps), will deliver water from the C-1 Canal (Black Creek Canal) and divert it via a lined open conveyance channel and a discharge spreader structure to a spreader canal and a rehydration area. The water being diverted would otherwise flow to tide through the S-21 Structure.

D.6.4.2 Lined Canal C-701

The C-701 Canal is a trapezoidal shaped, concrete-lined, open conveyance channel approximately 1,400 feet in length. It would connect the S-701 pump station, located west of SW 97th Avenue, to the discharge structure located just east of SW 87th Avenue. Box culverts would deliver the flows under SW 97th and SW 87th Avenues.

D.6.4.3 Spreader Canal C-702

After passing through a concrete spreader structure that acts as an energy dissipater, flows would enter the spreader canal system. Section 1 would parallel SW 87th Avenue and extend approximately 3,000 feet to the south. Section 2 would parallel SW 87th Avenue and extend approximately 1,700 feet to the north. Section 3 would extend approximately 5,650 feet from the north end of Section 2 and curve to minimize impacts to white mangroves in the area. Section 4 would intersect Section 3 and extend approximately 2,800 feet to the northeast.

D.6.5 Sub-component 3 – L-31 E Area/Homestead North Tidal Wetlands/Homestead South Freshwater and Tidal Wetlands

These project features would restore a more natural flow of freshwater to the Biscayne Bay by transporting freshwater through flow ways and spreader swales to wetlands and remnant creek systems located between the C-1 Canal north of control structure S-21 and the C-100 Canal south of S-123. By restoring creek flow, a more natural flow pattern of freshwater will be conveyed into Biscayne Bay and BNP restoring historical tidal creeks, minimizing point source discharges, improving near shore salinity regimes and estuarine habitat.

L-31E Area includes five pump stations ranging from 40 to 100 cfs, an inverted siphon, several flap-gated culverts and a spreader canal to manage water flows from the C-102, C-103 and the L-31E canals to nearby saltwater wetland restoration areas.

D.6.5.1 Pumping Station S-703

The S-703 Pump Station would have a capacity of 50 cfs (pump mix includes two 25 cfs pumps) and be located along the east bank of the L-31E Canal, approximately 200 feet north of the C-102 Canal. It would capture flows from the C-102 Canal that would otherwise be released to Biscayne Bay via the S-21A Coastal Structure and divert them to the saltwater wetlands east of the L-31E Levee.

D.6.5.2 Pumping Station S-705

The S-705 Pump Station would have a capacity of 100 cfs (pump mix includes one 50 cfs and two 25 cfs pumps) and would be located in the L-31E Canal, just south of the intersection with the C-102 Canal. It will capture flows from C-102 Canal that would otherwise be released to Biscayne Bay via the S-21A Coastal Structure and divert them into the L-31E Canal.

D.6.5.3 L-31E Culverts (S-706A, B, C, S-708 and S-712A, B, S-23A, B, C, D)

These are 36-inch diameter, corrugated aluminum alloy, flap-gated culverts approximately 50 feet in length connecting the L-31E Canal to the saltwater wetlands located to the east. The upstream end (L-31E Canal side) would be equipped with a manatee protective barrier, while the downstream end would be equipped with an aluminum flap-gate to prevent saltwater intrusion into the L-31E Canal. Further design of these flap-gates may be required during final design to equalize the flows through each structure. This may be accomplished by increasing the weight of the flap-gates.

D.6.5.4 Siphon S-707

The S-707 Siphon would connect the segment of the L-31E Canal located between the C-102 and Military Canals with the segment located between Military Canal and the C-103 Canal. It will provide flexibility to the system, allowing water to be moved both from the north end (C-102) to the lower reaches of L-31 E Canal and from the south end (C-103) to the northern reach of L-31E Canal, depending on current conditions.

D.6.5.5 Pumping Station S-709

The S-709 Pump Station will have a capacity of 40 cfs and be located in the L-31E Canal, just north of the intersection with the C-103 Canal. It would capture flows from the C-103 Canal that would otherwise be released to Biscayne Bay via the S-20F Coastal Structure and divert them into the L-31E.

D.6.5.6 Pump Station S-710

The S-710 Pump Station will have a capacity of 40 cfs and be located along the south bank of the C-103 Canal, approximately 0.7 miles west of the L-31E Canal. It would capture flows from the C-103 Canal that would otherwise be released to Biscayne Bay via the S-20F coastal structure and divert them into an outlet structure used to hydrate the freshwater wetland located between the C-103 and the North Canal.

D.6.5.7 Pump Station S-711

The S-711 Pump Station will have a capacity of 40 cfs and be located along the south bank of the C-103 Canal, approximately 1.4 miles west of the L-31E Canal. It will capture flows from the C-103 Canal that would otherwise be released to Biscayne Bay via the S-20F coastal structure and divert them into the C-711 Spreader Canal used to hydrate the freshwater wetland located between the C-103 and the North Canal.

D.6.5.8 Spreader Canal C-711E and C-711W Seepage Collection Ditch

The C-711 Spreader Canal is located between the C-103 Canal and North Canal and runs parallel to SW 112th Avenue. The spreader canal is approximately 2,600 feet in length and would be bordered by a berm and seepage canal to the west.

D.6.5.9 S-712 A and B Culverts

This set of flap-gated riser culverts (one at 48 inch) conveys water from L-31E Borrow Canal into the coastal wetlands that lie south of C-103 Canal and north of Florida City Canal (North Canal).

D.6.5.10 Freshwater Wetlands

The Freshwater Wetlands (approximately 400 acres) is located between C-103 canal and the North Canal. It is bordered on the west by the C-711 Spreader Canal feature and on the east by the L-31E Levee borrow canal. These freshwater wetlands will be rehydrated by the S-710 and S-711 pump stations which will discharge C-103 canal water into the area. These wetlands are surrounded by existing berms which were constructed using spoil from the excavation of the C-103, L-31 and North Canals and a berm that will result from the planned C-711 Spreader Canal. Construction of engineered levees surrounding the rehydrated wetland is not included in the plan because the hydrologic analysis indicated that it would not be necessary given the presence of the existing berms and high groundwater seepage rates. Approximately 50% of the targeted freshwater wetland is vegetated with exotic/invasive plants that are incompatible with the goal of restoring native wetland vegetation conditions. To address this, the plan includes grubbing 200 acres of exotics/invasives as part of the construction efforts. The restored hydrology, supplemented with frequent monitoring and low-level control efforts to prevent re-establishment of exotic plants, is expected to result in the recruitment of native vegetation in the grubbed areas. Therefore, planting of vegetation is not included as part of construction.

TABLE D-1: SUMMARY OF FEATURES-ALTERNATIVE O PHASE 1

Structure Number	Structure Type	Design Capacity (cfs)	Location	Tech Specs & Notes
DEERING ESTATE				
S-700	Pump Station	100	East of C-100A Spur Canal, Power's Addition Parcel	Delivers water from C-100A Spur Canal to historic flow way on Deering Estate, Culvert from pump station under Old Cutler road, including outlet spreader structure
C-100A	Canal Extension	100	Extension of Existing C-100A Spur Canal Power's Addition Parcel	Delivers water to historic flow way on Deering Estate
Pipe	60" pipe	100	South of new pump station running under Old Cutler Road to Outlet	Delivers water from pump station to Spreader canal
Deering Estate Spreader Structure	Spreader Canal	100	East side of Old Cutler Road	Delivers water to coastal wetlands in Deering Estate
CUTLER WETLANDS				
S-701	Pump Station	400	On C-1 Canal	Delivers water from C-1 to C-701 and eventually to C-702 (Spreader Canal)
C-701	Lined Canal	400	Lennar Property	Delivers water from S-701 Pump Station to the Cutler Spreader Canal (C-702)
C-702	Spreader Canal	400	Cutler Wetlands	Delivers water to the saltwater wetlands via overland sheetflow
L-31 EAST				
S-703	Pump Station	50	On L-31 E Canal, just north of C-102	Delivers water to the saltwater wetlands, utilizes an outlet spreader structure
S-705	Pump Station	100	On L-31 E Canal, just south of C-102 intersection	Delivers water from C-102 to southern reach of L-31 E Borrow Canal
S-706A, B, C	Culvert	Varies	L-31E Levee	Delivers water from L-31 E Canal to saltwater wetlands to the east
S-708	Culvert	Varies	L-31 E Levee	Delivers water from L-31 E Canal to saltwater wetlands to the east
S-23 A, B, C, D	Culvert	Varies	L-31 E Levee	Delivers water from L-31 E Canal to saltwater wetlands to the east
S-707	Inverted Siphon	Varies	Intersection of L-31 E Canal and Military Canal	Will connect L-31 E Canal on the north and south sides of Military Canal while isolating flows from Military Canal

Structure Number	Structure Type	Design Capacity (cfs)	Location	Tech Specs & Notes
S-709	Pump Station	40	On L-31 E Canal, just north of C-103 intersection	Delivers water from C-103 north to L-31 E Canal
S-710	Pump Station	40	Approximately 0.7 miles west of L-31 E Canal on south bank of C-103	Delivers water from C-103 to the freshwater wetland (between C-103 and North Canal, west of L-31 E Canal) via a spreader structure
S-711	Pump Station	40	Approximately 1.4 miles west of L-31 E Canal on south bank of C-103	Delivers water from C-103 to the freshwater wetland (between C-103 and North Canal, west of L-31 E Canal) via a spreader canal (C-711)
C-711E	Spreader Canal	40	Approximately 1.4 miles west of L-31 E Canal, between C-103 and North Canal	Delivers water from S-711 Pump Station to the freshwater wetland via overland sheetflow
C-711W	Seepage Collection Ditch	Varies	Approximately 1.4 miles west of L-31 E Canal, between C-103 and North Canal	Collects seepage from C-711E spreader canal and delivers it back to C-103
S-712A&B	Culvert	Varies	L-31 E Levee	Delivers water from L-31 E Canal to saltwater wetlands to the east

Key: cfs =cubic feet per second

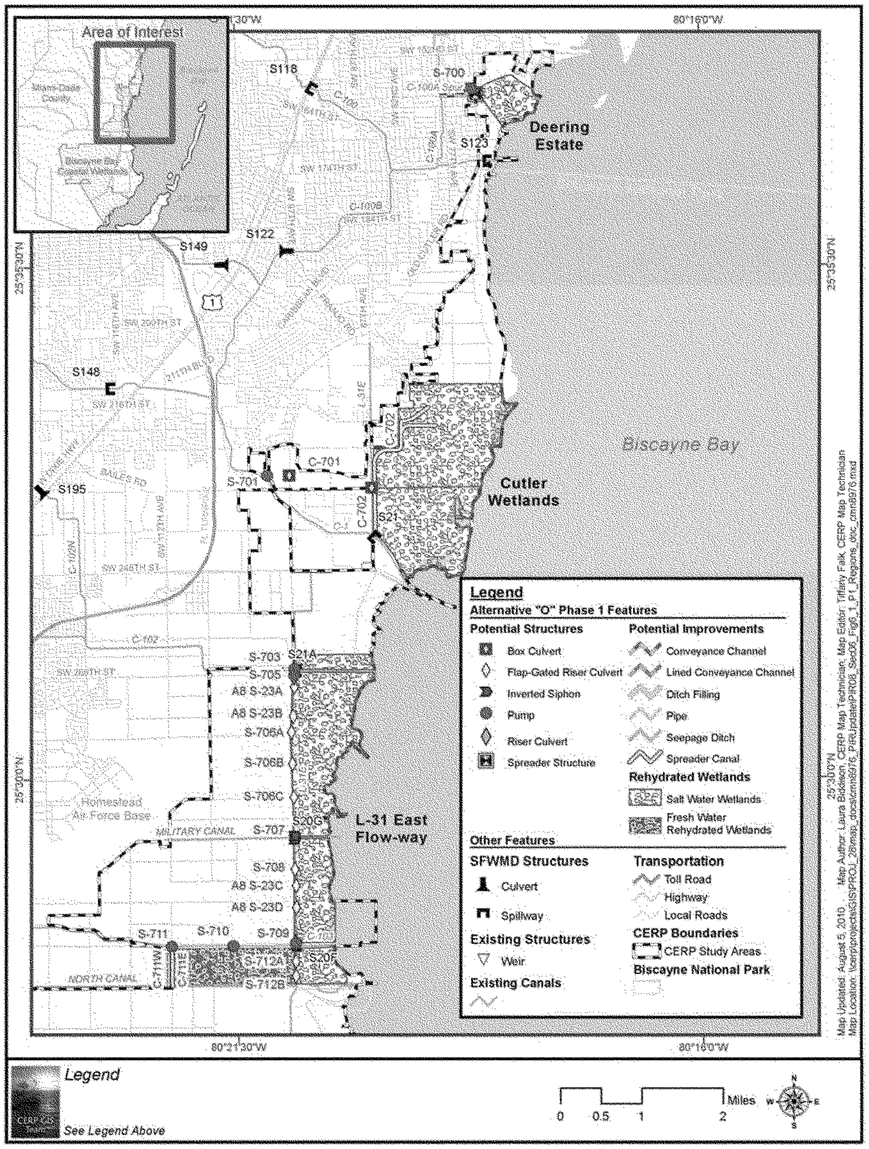

FIGURE D-1: BISCAYNE BAY COASTAL WETLANDS SELECTED PLAN-ALTERNATIVE O PHASE 1

D.7 DESCRIPTION OF REAL ESTATE REQUIRED FOR PROJECT

D.7.1 Project Features

The project footprint requires approximately 3,761 acres of land. Of the total acreage required, approximately 1,412.32 acres would be required in fee and approximately 148.90 acres would require perpetual easement interest. Additionally, 1,262.56 acres would be provided through the execution of Supplemental Agreements between the SFWMD and State of Florida and local government entities. Approximately 937.32 acres are currently owned by the United States; National Park Service for the BNP which is expected to provide a Letter of Agreement or Memorandum of Agreement to the SFWMD for the use of these lands.

The SFWMD has acquired approximately 934.14 acres within the footprint of the project; an additional approximately 414.83 acres would have to be acquired from private landowners. These acres would be provided in fee.

Florida Power and Light (FP&L) owns approximately 148.90 acres within the footprint of the project and is expected to convey a perpetual flowage easement to the SFWMD.

It is anticipated that all features for the project would be constructed within the proposed approximately 3,761 acres. See Analysis of Estates Required for Biscayne Bay Coastal Wetlands project section of this appendix, for a discussion of how the estates required for the project have been determined. Approximate real estate acreage for some of the main features is shown in ***TABLE D-2*** also see Real Estate Project Maps.

TABLE D-2: TOTAL ACRES REQUIRED FOR ALTERNATIVE O PHASE

Alternative O Phase 1			
	Acres	**# Improvements**	**# Parcels**
West of L-31E Levee (Generally Freshwater Wetlands)			
Deering/Shoal Point			
Miami-Dade Parks and Recreation	10.85		1
Lennar Flow Way			
SFWMD	29.86		5
L-31 East Culverts-Homestead South			
Private	34.95		5
SFWMD	252.61		16
FP&L	148.90	0	4
Sub-total	**476.17**		**31**
East of L-31E Levee (Mixed Freshwater and Tidal Wetlands)			
Shoal Point			
Miami-Dade DERM	185.65		1
Cutler South			
Miami-Dade DERM	118.05		3
Miami-Dade Parks & Recreation	79.60		3
Miami-Dade Sewer & Water	403.40		1
Private	32.25		1
SFWMD	651.67		4
State of Florida	111.06		2
USA	308.04		4
L-31 East Culverts-Homestead North Tidal			
Miami-Dade Parks & Recreation	92.58		1
Private	252.82		3
Miami-Dade DERM	309.20		2
USA	308.05		3
L-31 East Culverts-Homestead South Tidal			
Miami-Dade Parks & Recreation	16.52		1
Private	94.80		
USA	321.23		5
Sub-total	**3288.93**		**36**
TOTAL	**3761**		**67**

Key: FP&L Florida Power & Light
SFWMD South Florida Water Management District
Miami-Dade DERM Miami-Dade County Department of Environmental Resources

D.7.2 Facility, Utility Relocations

Preliminary Attorney's Opinions of Compensability have been completed and used for the purpose of completing this section. Final Attorney's Opinions of Compensability and final relocation determinations will be completed as required by Engineering Regulation 405-1-12, chapter 12, paragraph 12-22 prior to completion of the Project Partnership Agreement or 100 percent design of the Biscayne Bay Coastal Wetlands project.

D.7.2.1 Deering Estate

A utility search was conducted for this project and all utilities are located along the right of way of Old Cutler Road owned by Miami-Dade County, within the limits of the Powers Addition (URS, 2006b).

Underground utilities consist of a Florida City Gas natural gas line which is currently abandoned, capped and reportedly charged with nitrogen gas. Florida City Gas stated that the utility service line can be taken out of service during construction but must be returned to a serviceable condition following completion of the work. Records indicate that Florida City Gas has an easement for gas line transmission.

FP&L has an underground electrical distribution line, rated at 23 kilo volt amperes (kVA), located below grade approximately five feet west of the western edge of pavement and within the right of way of Old Cutler Road. FP&L as-built drawings indicate the location of this line to be approximately four feet below existing grade. FP&L has overhead power lines aligned parallel to and inside the current western Old Cutler Road right-of-way. The overhead power is three-phase service suspended on concrete poles located at approximately 400-foot intervals. The above-grade electric service located in the central portion of the Powers Addition property enters the property from the west and is identified as single-phase service likely intended to provide power to the well pump and the old residential structure on the property. It is intended that the two power poles within the Powers Addition Parcel along with the overhead line between them will be demolished and removed in coordination with FP&L.

Review of the water service drawings provided by Miami-Dade County indicated that water service is available along the west shoulder and within the Old Cutler Road right-of-way; however, this service line does not continue across the front of the Powers Addition Parcel and will therefore not be affected by the Biscayne Bay Coastal Wetlands project.

Sewer service is available along the western shoulder and within the Old Cutler Road right-of-way, but does not cross along the frontage of the Powers Addition Parcel. This may be due, in part, from service lines being brought both north

and south to serve the adjacent residential developments with service lines "stubbed out" at the Powers Addition Parcel for future connection in the event the Powers Addition Parcel was subdivided and developed.

D.7.2.2 Cutler Wetlands

Utilities that exist in the Cutler Wetlands project area include: overhead electric lines, 20-inch water main, a 60-inch and two 72-inch wastewater force mains, a 600 pound per square inch natural gas line, and telephone lines.

FP&L has overhead power lines running alongside the western edge of the bike path to the west of SW 87th Avenue, along the southern right-of-way of SW 232nd Street, and also parallel and to the east of SW 97th Avenue. The overhead power along SW 97th Avenue is three-phase service suspended on concrete poles located at approximately 400-foot intervals. There will be no conflicts with the power-line locations and this project.

A 20-inch water line, belonging to Miami-Dade Sewer and Water Authority, runs along the northern side and within the right-of-way of SW 232nd Street and turns north to run along the western side and within the SW 87th Avenue right-of-way. This pipe will be relocated in the vicinity of the culvert crossing of SW 87th Avenue. Miami-Dade County has fee title to both the SW 232nd Street and the SW 87th Avenue right-of-ways.

72-inch wastewater force-mains are located along the SW 87th Avenue, SW 97th Avenue and SW 232nd Street right-of-ways. There will be no conflict with these lines, as the box culverts will be located above the force-main elevation at both the SW 97th Avenue and the SW 87th Avenue crossings. The 60-inch wastewater force-main crosses the project between SW 97th Avenue and SW 87th Avenue, but will cross below the bottom on the discharge channel and will not conflict with the project.

Florida City Gas operates a four-inch, 600 pounds per square inch natural gas service line along the eastern edge of SW 97th Avenue and has confirmed that the gas line can be relocated as needed to support construction activities. Records indicate that Florida City Gas has an easement for gas line transmission along a portion of SW 97th Avenue and a permit from the SFWMD for other portions of the gas service line. For those areas where Florida City Gas has only a permit from SFWMD, it will be required to relocate the gas service line. For those portions where it has an easement, the relocation will be part of the project costs and a relocation agreement will be obtained by the SFWMD.

D.7.2.3 L-31E Culverts

Power poles and power lines exist along the eastern toe of slope of the L-31E Levee, providing power to the S-21A, S-20F and S-20G water control structures. There are no other utilities in the vicinity of this project and therefore no relocations will be needed and no impacts will occur.

"ANY CONCLUSION OR CATEGORIZATION CONTAINED IN THIS REPORT THAT AN ITEM IS A UTILITY OR FACILITY RELOCATION TO BE PERFORMED BY THE NON-FEDERAL SPONSOR AS PART OF ITS LERRD RESPONSIBILITIES IS PRELIMINARY ONLY. THE GOVERNMENT WILL MAKE A FINAL DETERMINATION OF THE RELOCATIONS NECESSARY FOR THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE PROJECT AFTER FURTHER ANALYSIS AND COMPLETION AND APPROVAL OF FINAL ATTORNEY'S OPINIONS OF COMPENSABILITY FOR EACH OF THE IMPACTED UTILITIES AND FACILITIES."

Final Attorney's Opinions of Compensability and final relocation determinations will occur later as required by Engineering Regulation 405-1-12, chapter 12, paragraph 12-22.

D.7.3 Temporary Work Areas

Preliminary analysis indicates that all required temporary staging and stockpile areas would occur within the lands to be acquired for project purposes. Therefore, no additional lands are anticipated to be required for temporary purposes outside the footprint of the project lands.

D.7.4 Borrow and Disposal Sites

Borrow Areas: Preliminary analysis indicates that no off-site borrow or disposal sites will be required.

Disposal Areas: It is anticipated that excavated material from the construction of the wetlands would be utilized for borrow material; therefore, no additional disposal material or borrow site will be required.

D.7.5 Access to the Project Area

Preliminary analysis indicates that no additional lands would be required for access, ingress and egress purposes. Ingress and egress would be via federal, state, municipal, county roads, and roads and SFWMD canal rights-of-way available to the non-Federal sponsor for project purposes.

D.7.6 Recreation Feature

The study area for the recreation benefit analysis for this project includes Miami-Dade, Broward and Monroe counties. The 2000 Florida Statewide Comprehensive Outdoor Recreation Plan identifies eight recreation deficits (bike riding, tent camping, hiking, hunting, fresh water beach activities, fresh water fishing [non-boat], saltwater beach activities, public swimming pool use) for the Statewide Comprehensive Outdoor Recreation Plan Region 11.

Some existing recreational facilities within the study region include: historic and natural area parks; two national parks; state parks; wildlife management areas; botanical gardens; preserves; MetroZoo; amusement parks; beach access; boat ramps; multi-use trails; greenways; blueways; regional, community and neighborhood parks; as well as many other recreation facilities.

The recreation activities proposed for the selected plan include: biking/walking trails, environmental interpretation, canoeing/kayaking, bank fishing, tent camping, nature study. Proposed facilities include: interpretive signage and shade shelter, handicapped accessible waterless restrooms, handicapped parking, tent platforms, pedestrian bridge, benches, bike rack, trash receptacles, park security gate, trail signage, portable water source and a bird watching platform. All recreation facilities will be constructed on lands owned or acquired in fee by the SFWMD.

D.8 EXISTING FEDERAL PROJECTS

D.8.1 Central and Southern Florida Project

Approximately 57.57 acres of the right of way of Canal 103 and the L-31E levee of the Central & Southern Florida project lie within the Homestead South Freshwater Wetlands portion of the project and will be provided for constructing of the Biscayne Bay Coastal Wetlands Project. As these lands were acquired for and previously provided for the Canal 103 and the L-31E levee, C&SF project, SFWMD will not be afforded credit for these lands. Other portions of the C&SF project that are within the project area are: the Canal C-102 right of way; and Levee L-31N and its adjacent borrow canal. The SFWMD will not be afforded credit for any of these lands if they are required for this project as they were acquired, provided and certified for the C&SF project.

D.8.2 Biscayne Bay National Park

Portions of the lands owned by the National Park Service are within the project area as set forth below.

D.9 FEDERALLY OWNED LANDS

The United States of America acting by and through the National Park Service owns approximately 937.27 acres in the project area, some of which would be affected by the hydrological and salinity changes induced by the project. Any lands already owned by the United States of America will be provided to the project with no cost incurred to the project through a Memorandum of Agreement.

D.10 NON-FEDERAL SPONSOR OWNED LANDS

South Florida Water Management District Owned Land: Property ownership information provided by the SFWMD indicates that they currently own approximately 934.14 acres of land, in fee or with a perpetual easement interest sufficient for project purposes required for the project.

D.10.1 Other Government Agency-Owned Lands

Miami-Dade County: Department of Environmental Resources Management (DERM), Miami-Dade County Parks and Recreation, and Miami-Dade County Water and Sewer Authority Owned Lands: Property ownership information provided by the SFWMD indicates that Miami-Dade County Parks and Recreation Department owns approximately 198.55 acres, Miami-Dade County DERM owns or controls approximately 612.90 acres, and Miami-Dade County Sewer and Water Authority owns approximately 403.40 acres in fee required for the project. Additional lands owned by Department of Environmental Resources Management would not be required for project purposes.

State of Florida, Trustees of Internal Improvement Owned Lands: Property ownership information indicates that the State of Florida currently owns approximately 111.06 acres of land, in fee required for the project.

D.11 UNIFORM RELOCATION ASSISTANCE ACT, PUBLIC LAW 91-646

In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Public Law 91-646), relocation assistance would be required to be provided to affected residents and business. Information provided by the SFWMD would indicate that there are no relocation or displacements. Upon certification of the land, easements, right of way, relocations, borrow and disposal, the SFWMD would be required to demonstrate compliance with the requirements of Public Law 91-646 including that

landowners have been properly advised of their rights under the program. To include:

- Number of persons, farms and businesses displaced
- Estimate of all Public Law 91-646, Title II costs and contingencies
- Discuss/describe availability of replacement housing and any need for last resort housing benefits

Based on current information, there are no relocation assistance payments anticipated.

D.12 NAVIGATIONAL SERVITUDE

It is not necessary to exercise the navigational servitude for the project. Portions of lands owned by the National Park Service, lie below the ordinary high water line of the Atlantic Ocean (Biscayne Bay). Those lands will be provided to the project, free of cost, by Memorandum of Agreement between the National Park Service and the SFWMD.

D.13 MINERAL AND TIMBER ACTIVITIES

SFWMD Environmental Resource Permit applications within the boundaries of the project will be processed on a case-by-case basis and will face a high level of scrutiny to ensure that the proposed use does not have potential impacts to the project. Preliminary investigations indicate that there are several limestone mines in the vicinity of the proposed project; however, it should be noted that limestone is not classified as a mineral under Florida law. There is no limestone mining within the project footprint. There are no other mining operations currently in operation or currently contemplated within the project footprint. There are no known merchantable timber stands located in the project area. FPL is requesting a permit to construct borrow pits adjacent to the project boundaries. It will be the responsibility of the non-Federal sponsor to insure that the property rights acquired and certified for the project protect the integrity of the project and that no mining or alteration of the surface on the land (including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to cause significant pollution of any surface) would be allowed that would interfere with the construction, operation and maintenance of the Federal project.

D.14 NON-FEDERAL AUTHORITY TO PARTICIPATE IN THE PROJECT

The SFWMD was created by virtue of Florida Statutes, Chapter 373, Section .069 to further the state policy of flood damage prevention, preserve natural resources of the state, including: fish and wildlife and to assist in maintaining the navigability of rivers and harbors. (There are other enumerated purposes but they are not directly applicable to this project). See ***Exhibit C*** of this Appendix.

The SFWMD is authorized by Florida Statute 373.139 to acquire fee or less than fee title by purchase, gift, devise, lease, eminent domain, or otherwise for flood control, water storage, water management, conservation and protection of water resources, aquifer recharge, water resource and water supply development, and preservation of wetlands, streams, and lakes. See ***Exhibit D***.

D.15 LAND VALUATION

D.15.1 CECW-SAD Memorandum dated July 30, 2009; SUBJECT: CERP Land Valuation and Crediting

In accordance with CECW-SAD memorandum dated July 30, 2009 signed by the Director of Civil Works, U.S. Army Corps of Engineers the current guidance for the CERP, Land Valuation and Crediting is as follows:

a. Consistent with long-standing USACE practice, and as supported by the unique land credit provision for CERP contained in Section 601 (e)(5)(A) of WRDA 2000, tracts acquired by the SFWMD that are acquired and provided in furtherance of a CERP project should be valued and credited as individual tracts regardless of whether the acquisition was prior to or after execution of the PPA for that project. This general principle would not apply where the SFWMD acquired contiguous tracts that are required for a CERP project but it acquired such tracts prior to the PPA for a reason and use other than for implementation of the CERP project. A determination that a tract was acquired "in furtherance of a CERP project" should be supported by documentation existing at the time of acquisition.

b. The unique statutory land credit provision for CERP projects is clear that the non-Federal sponsor will be afforded credit for the value of lands, or interests in lands, that it provides in accordance with a PIR "regardless of the date of acquisition." *See* Section 601 (e)(5)(A) of WRDA 2000. To effectuate the clear intent of Congress reflected in this credit provision, land use restrictions imposed in furtherance of a CERP project after acquisition of a tract by the SFWMD should not be considered in valuing that tract for crediting purposes.

c. For the same reasons as expressed in subparagraph b. above, demolition of improvements after a tract was acquired in furtherance of a CERP project should not change the approach to value from that applicable at the time of acquisition. Accordingly, the tract should be valued for crediting purposes as it was improved when acquired by the SFWMD. To accomplish this result, the contributory value of the improvements, as of the date of the SFWMD's acquisition, should be added to the market value of the land on the date it is provided for the project as appraised in accordance with its highest and best use on the date of acquisition.

3. Incidental Costs. The SFWMD has requested that it be afforded credit for the costs incurred by other non-Federal governmental entities incidental to acquisition of project lands by such entities. The wording of Section 601 (e)(5)(A) is clear that credit may be afforded only for "incidental costs for land acquired by a non-Federal sponsor." Credit may be afforded for traditional incidental acquisition costs that are incurred by SFWMD (such as appraisal costs, mapping costs, or relocation assistance benefits) as well as costs actually incurred by SFWMD in obtaining the required real property rights from other non-Federal governmental entities. However, to be eligible for credit to be afforded to the SFWMD for incidental acquisition costs, SFWMD must have, in fact, incurred those costs.

For the "determination that a tract was acquired "in furtherance of a CERP project" should be supported by documentation existing at the time of acquisition." For planning purposes and for land valuation in the PIR, pursuant to paragraph a. above, the Jacksonville District and SFWMD agreed that lands acquired after April 30, 1999, the date of publication of the Comprehensive Everglades Restoration Plan, was the date when lands were acquired for a CERP Project. For crediting purposes, the SFWMD will be required to submit the SFWMD Governing Board resolution, authorizing the acquisition of the lands, parcels or tracts of land, which will show the CERP project or SFWMD project for which the lands were acquired.

D.15.2 CERP Master Agreement Between the Department of the Army and the South Florida Water Management District for Cooperation in Constructing and Operating, Maintaining, Repairing, Replacing and Rehabilitating Authorized Projects under the Comprehensive Everglades Restoration Plan, dated August 13, 2009

In accordance with the terms and conditions of Articles III and IV, for those lands or real estate interests provided by the State of Florida or another Florida governmental entity, the real estate interests are valued as follows:

For real estate interests owned by the State of Florida or another Florida governmental entity on the effective date of the PPA for this project (and obtained by the Non-Federal Sponsor and dedicated to this Project by means of

supplemental agreement pursuant to Article III.E. of the Master Agreement) which are required for construction by the Government, the fair market value of such real estate interests shall be as of the date the Non-Federal Sponsor provides the Government with authorization for entry thereto for construction. For such real estate interests owned by the State of Florida or another Florida governmental entity on the effective date of the PPA for this project (and obtained by the Non-Federal Sponsor and dedicated to this Project by means of supplemental agreement pursuant to Article III.E. of the Master Agreement) which are not required for construction but are otherwise required for the OMRR&R of this Project, the fair market value of such real estate interests shall be as of the date that the Non-Federal Sponsor provides land certification documentation to the Government.

D.16 INDUCED FLOODING

Section 601(h)(5) contains a Savings Clause that provides protection for existing legal sources of water that will be eliminated or transferred due to project implementation and for no significant and adverse reduction in the level of service for flood protection that was in existence on the date of enactment and in accordance with applicable law. Section 601(h)(5) provides:

> *(5) SAVINGS CLAUSE.--*
> *(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.*

To ensure the levels of service of flood protection would not be diminished by this project, hydrologic and hydraulic analysis would be performed using surface water and groundwater modeling. The results of the preliminary analyses indicate that the project is not expected to result in stage increase in canal systems adjacent to the project site; however, additional analyses would be undertaken during detailed design work to further identify project features and operations necessary to ensure that the level of service of flood protection in areas adjacent to the project site is maintained.

The purpose of the Savings Clause is to insure the levels of service for flood protection existing as of December 2000 are protected with the Project in place. The expected performance refers to the performance of the system in place as of December 2000 when modeled against the period of record. It does not refer to specific design flood targets such as the 10-year flood.

D.16.1 Homestead South Freshwater Wetland

The analysis for assessing the impacts to the level of service for flood protection for the Freshwater Wetlands portions of the Biscayne Bay Coastal Wetlands project were based on model output from the MODBRANCH model. The PDT determined modeling the full period of record was impractical, and that modeling a subset of the full period of record was an adequate substitute. For Biscayne Bay Coastal Wetlands Project a dry year, an average year, and a wet year were simulated with the MODBRANCH model. The dry year simulated was 1989, the average year simulated was 1978, and the wet year simulated was 1995.

MODBRANCH is a hybrid code that couples MODFLOW, a three-dimensional groundwater flow model with Branch, a one-dimensional canal routing model. The model code was originally developed by the United States Geological Survey (USGS). E. D. Swain and E. J. Wexler of the USGS coupled the models. More information on the creation of MODBRANCH may be found in "A Coupled Surface-Water and Ground-Water Flow Model for Simulation of Stream-Aquifer Interaction," (Swain and Wexler, USGS Open File Report 92-138). The U.S. Army Corps of Engineers further modified the model to more accurately represent the characteristics of the South Florida area.

It has been determined that for there to be an impact on the level of service of flood protection that it must be "significant and adverse." However there is no real definition of what is significant and adverse. One way to address significant and adverse effects on the level of service of flood protection due to CERP Implementation is to consider acquisition of affected property.

Section 385.35(a) of the Programmatic Regulations requires the development of a pre-CERP baseline 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 would be eliminated or transferred and to demonstrate that the levels of service of flood protection in existence on the date of enactment of WRDA 2000 and in accordance with applicable law would not be reduced by implementation of a 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 would be submitted to the Secretary of the Army for approval and concurrence by the Secretary of the Interior and the Governor of the State of Florida.

Preliminary modeling analysis indicates that no flooding would occur outside the project due to the construction or the operation and maintenance of the project. However, if further studies for the Selected Plan reveal that flooding is anticipated, then a Physical Takings Analysis will be conducted. The analysis would result in a written legal opinion as to whether flooding induced by construction, operation, or maintenance of the proposed project would result in a taking of an interest in real property for which just compensation must be paid to the owner. The opinion would describe the analysis, to include hydrologic data incorporating depth, frequency, duration, velocity, and extent of induced flooding based on economic data, as well as relevant state and Federal law, and present a conclusion on the takings issue, if applicable.

The freshwater wetland system consists of an impounded area, two pump stations, a spreader canal, a small berm and a seepage collector ditch. The first pump (S-711 Pump Station) is located on the northwestern edge of the wetland and delivers 40 cfs from C-103 to the spreader canal. The spreader canal (C-711W) extends from C-103 to the North Canal, approximately 2,619 feet. The spreader canal will deliver overland flow of water into the impounded wetland. The seepage management system is intended to constrain water elevations from changing to the west of the impounded area. A small berm and seepage collector ditch would be constructed immediately to the west of the spreader canal. Both components are 2,619 feet, which is the same length as the spreader canal. The seepage collector ditch would discharge via gravity to C-103. A second pump (S-710 Pump Station) for the wetland is located approximately halfway from the first pump to L-31E Canal, and would deliver an additional 40 cfs to the wetland. No spreader canal is associated with this pump and instead will deliver directly to a spreader ditch. Both pumps will be used to hydrate the freshwater wetland.

The Takings analysis is based on an analysis as to whether the level of service of flood protection existing as of December 2000 has been impacted; whether the impacts are "significant and adverse" and whether there is a takings requiring acquisition. The takings analysis uses data similar to that contained in Section 3.11.3.1 of the draft July 2007 Six-Program CERP Guidance Memorandum. The only difference is that where the analysis for determining the changes to the "level of service for flood protection" compares the stage-duration curves for the Initial Operating Regime and Existing Conditions Baseline to determine if the Initial Operating Regime reduces the levels of service for flood protection to one or more of the basins, for the Takings analysis the project level effect on the level of service for flood protection is evaluated based on a comparison of the with-project condition versus the Existing Condition base and an analysis of the hydrologic changes from the without project condition versus the with project condition. The analysis compared traditional takings under both Federal and Florida State law. Florida State law would be applicable because the

responsibility for the provision of lands in a South Florida Water Management District obligation and responsibility. Federal law would be applicable in Federal court.

The analysis compared modeling data from the changes in hydropattern conditions in existence in December 2000 (Existing Condition Base-Alt &R) to Alternative O, Phase 1 (with Project condition). The comparison accounted for both groundwater (half foot below ground impacts) and surface water impacts (At Ground) in the proposed Freshwater Wetland to be created in Project implementation. Most of the lands are now in ownership of the SFWMD or Florida Power and Light Company with only 34.95 acres in private ownership. The SFWMD owns 251.61 acres which were purchased between the years 2000 and 2006. The Florida Power and Light lands comprising 148.75 acres were acquired in 2001 by FPL.

For evaluation to determine potential impacts in the freshwater wetlands area, the Draft Project Operating Manual Annex D was first considered to determine how the freshwater wetland system is proposed to be operated. The hydropattern target for this wetland is to maintain water levels between -0.5 feet and +2.0 feet, in relation to ground surface, for 28 weeks to 32 weeks (a minimum of 18 weeks and a maximum of 48 weeks). If water level in the wetland has been between -0.5 feet and +2.0 feet for less than 340 days, pumps on when possible; otherwise pumps off. Quantities of flow are affected by both wet season and dry season operational strategies implemented and downstream topographic limitations (wetland elevations) at each culvert location. Performance of each culvert would be measured through monitoring of the downstream wetland ecosystem. In considering that intent of the draft operational plan for the Freshwater Wetlands is to maintain a hydropattern target for this wetland with water levels between -0.5 feet and +2.0 feet, in relation to ground surface, for 28 weeks to 32 weeks (a minimum of 18 weeks and a maximum of 48 weeks). If water level in the wetland has been between -0.5 feet and +2.0 feet for less than 340 days, pumps on when possible; otherwise pumps off.

The lands impacted and required for the Project in the Freshwater Wetlands were determined by a comparison of the changes in MODBranch hydroperiod data from Alt 7R (Existing Condition Base) and the recommended plan hydroperiod data. The comparisons had to account for changes in hydrology that would be significant and adverse enough that land acquisition would be required. The comparison accounted for both groundwater and surface water impacts.

The biggest problem in the Freshwater Wetland area is that prior to acquisition of these lands by the SFWMD or FPL, most if not all of the lands were zoned agricultural and could therefore be farmed.

A MODBRANCH model application simulated operation of the Freshwater Wetland facility for a wet, dry and average rainfall year. Due to the long simulation times, only three distinct years were simulated using MODBRANCH. These were 1978, 1989, and 1995, which represent average, dry and wet rainfall years, respectively. The 1995 year included an event which approximates a 1-in-10 year rainfall event. The results of each year were compared in both the Dry Season (October 16 to April 29) and Wet Season (April 30 to October 15) both at ground level and a half foot below ground level because the lands are still zoned as agriculture. For the Average Year, Dry Season it was clear that project operations would substantially increase the hydropatterns in the proposed wetland at ground level for the middle to western portion and in some areas in the eastern portion. For the Average Year, Dry Season at half foot below ground the impacts from project operations substantially increased the hydropatterns in the proposed wetland over almost the entire proposed wetland area with increases from 30 to over 120 days in different areas. Determining impacts at half foot below ground or higher is important because root zones of row crops are impacted at the half foot below ground.

For the Average Year Wet Season At Ground, there was again a substantial increase in hydropatterns in the proposed wetland at ground level for the middle to western portion and in some areas in the eastern portion. For the Average Year, Wet Season at half foot below ground the impacts from project operations substantially increased the hydropatterns in the proposed wetland over almost the entire proposed wetland area with increases from 30 to over 120 days in different areas.

For the Dry Year, Dry Season it was clear that project operations would substantially increase the hydropatterns in the proposed wetland at ground level for the middle to western portion and in some areas in the eastern portion. For the Dry Year, Dry Season at half foot below ground the impacts from project operations substantially increased the hydropatterns in the proposed wetland over almost the entire proposed wetland area with increases from 30 to over 120 days in different areas.

For the Dry Year Wet Season At Ground there was again a substantial increase in hydropatterns in the proposed wetland at ground level for the middle to western portion and in some areas in the eastern portion. For the Dry Year, Wet Season at half foot below ground the impacts from project operations there were increases the hydropatterns in the proposed wetland over almost the entire

proposed wetland area in different areas, but most increases were not as substantial as the other years and seasons.

For the Wet Year, Dry Season it was clear that project operations would substantially increase the hydropatterns in the proposed wetland at ground level for the middle to western portion and in some areas in the eastern portion. For the Wet Year, Dry Season at half foot below ground the impacts from project operations substantially increased the hydropatterns in the proposed wetland over almost the entire proposed wetland area with increases from 30 to over 120 days in different areas.

For the Wet Year Wet Season At Ground there was again a substantial increase in hydropatterns in the proposed wetland at ground level for the middle to western portion and in some areas in the eastern portion. For the Wet Year, Wet Season at half foot below ground the impacts from project operations there were increases the hydropatterns in the proposed wetland over almost the entire proposed wetland area in different areas, but most increases were not as substantial as the other years and seasons. In fact, hydroperiods were actually reduced in certain areas but not substantially.

Conclusion: It is clear that operation of the project will cause increases in the duration and frequencies of water on the entire proposed Freshwater wetland area. The substantial increase in water on the lands will be as a direct and proximate result of the Government action. It is the intent of the government that the flooding will be of a permanent character. The increase in water will rise to the magnitude of a taking or appropriation of the lands for a public purpose.

D.16.2 Tidal Wetland - Deering Estate, Cutler, Homestead North And Homestead South

For the areas east of the L-31East Levee, the modeling data was insufficient to show hydrologic changes to these areas. The models used to determine the project benefits, WASH123 and TABS as well as the MODBranch model cannot predict the changes in either groundwater or surface water hydrology. Therefore the following is an analysis of how the project operations will potentially impact the various areas. ***TABLE D-3*** shows the lands in the Deering Estate determined to be required for the Project, with a total of approximately 196.5 acres required. Of that approximately 25.85 acres are required for construction. The remaining approximately 170.65 acres will be impacted by Project hydrologic impacts approximately 1.1 foot per day when the pumps are discharging. It was determined that this is a Moderate to Significant impact on these lands. ***TABLE D-4*** shows the lands in the Cutler Ridge portion of the project with approximately 1,733.93 acres required. Of that approximately 109.86 acres are required for construction of project features. For the remaining

1,624.07 acres hydrologic impacts are considered Moderate to Significant with approximately 0.5 feet of freshwater being discharged onto the area on a daily basis. ***TABLE D-5*** shows the L-31E Culverts-Homestead North area comprised of approximately 962.66 acres, with only approximately 5.3 acres required for construction. For the remaining 957.36 acres, impacts are considered moderate with approximately 0.25 feet of freshwater flow across the lands on a daily basis. ***TABLE D-6*** shows the L-31E Culverts Homestead South Tidal Wetlands totaling approximately 432.55 acres with only 2.16 acres required for construction. For the remaining 430.39 acres, impacts are considered moderate with approximately 0.20 feet of freshwater being discharged onto the area on a daily basis.

Conclusion: It is clear that operation of the project will cause increases in the duration and frequencies of water on the entire tidal wetland areas. The moderate to significant increases in freshwater on the lands will be as a direct and proximate result of the Government action. It is the intent of the government that the inundation will be of a permanent character. The increase in water will rise to the magnitude of a taking in certain areas where it is significant. In those areas where the increase is only moderate, an interest would be required for other purposes including access for project monitoring, removal of exotics, prohibition of use by others, and likely an appropriation of the lands for a public purpose. The Analysis of Estates Required paragraph D-17 below discusses the recommended estates required to serve the project purposes.

D.16.3 Land Assessment And Land Requirements For Alternative O, Phase 1

After identification of Alternative O, Phase 1 as the Tentatively Selected Plan, the PDT determined the acreage required for construction features in each component of the alternative and then evaluated what acres were required for project operations in each component. The lands required for project operation were determined by reviewing the magnitude of project induced hydrologic impact together with potential risk to the project benefits if the lands were not acquired. The PDT also considered the existing condition of the properties and the current use. Land risk assessment tables were developed for each of the component areas.

Activities included in the OMRR&R which relate not only to areas where permanent construction facilities will be located but also to lands required for continued operational purposes. These are outlined below:

- Pump and facility maintenance which are per manufacturer's recommendations and schedules. (Permanent facilities).

- Erosion control to make sure banks and areas around culverts and other structures are not compromised by weather, plant or animal forces. (Permanent facilities).
- Mowing to ensure there are no maintenance issues being hidden by high grass vegetation. Mowing also reduces the ability of woody plants to gain a foothold and lead to larger issues. (Permanent facilities)
- All monitoring required under the Terms and Conditions contained in the USFWS Biological Opinion. Specifically for the BBCW project, this monitoring consists of observations for the presence and avoidance of indigo snakes during project construction. Temporary access would be required to all areas of construction. (Permanent facilities)
- Invasive, exotic, native, and nuisance vegetation control. Vegetation control will be performed both to control underwater infestations and surface infestations. Invasive plants can prevent correct project function and can damage vital structural components if allowed to grow unchecked. Exotic vegetation removal will be conducted by herbicidal spraying during the first year of construction, and then repeated infrequently, as needed. Controlled burning, another methodology often employed to keep exotic species in check, may be required in the limited uplands and freshwater wetland habitats west of L-31, but not utilized in the extensive mangrove forests that dominate the coastal wetland communities north of Turkey Point and east of L-31. Temporary access would be required in both the freshwater and coastal wetlands within the project area. See Annex E, Part 5 for specific details on the nuisance and exotic vegetation control plan. (Permanent facilities)
- Adaptive Management (AM) measures needed to ensure project benefits and restoration goals are achieved; or to avoid violating one or more project constraints. Once the project is operational and freshwater is redirected from canal point source discharges to more of an overland flow rehydrating the coastal wetlands, the specific types and locations for adaptive management actions can be determined. Some of these actions could include operational adjustments to ensure desirable freshwater flow patterns; plugging, filling and/or removing woody vegetation in existing mosquito and drainage ditches to obtain desirable freshwater distribution; along with oyster spat and larval stocking to ensure reproduction success. Access would be potentially required along the major drainage ditches, primarily in the Cutler Wetlands and areas adjacent to the C-1, C-102, C-103 and Military canals (***FIGURE D-2***). Lands within the L-31E component of the project area, just east of the L-31E borrow canal, also have mosquito and drainage ditches as these are abandoned farm lands. Filling the mosquito and drainage ditches would change the flow patterns of fresh water across adjacent properties; therefore, access to these areas may be required. See Annex E, Part 4 for specific details on the adaptive management plan.

Project-level monitoring includes water quality, hydrologic and ecological monitoring activities to ensure that the intended purposes of the project would be achieved through long-term operations.

All proposed monitoring parameters are described in detail in ***Annex E*** (Project Monitoring Plan). Water quality monitoring involves sample collection and analysis for baseline, startup, and operational phases of the project. Access to the sampling stations have already been obtained since most are being sampled as part of an existing monitoring network(s) maintained by SFWMD and Miami-Dade DERM. However, five new stations will be added: pumps S-700 (Deering Estate), and S-701 (Cutler Flow-way), at the mouth of Cutler Creek (CC01), in the L-31E borrow canal north of C-102 and in the L-31E borrow canal south of C-103.

Hydrologic monitoring includes measurements of stage and elevation (groundwater) and flow at water control structures. The majority of the monitoring sites will be located at existing or proposed structures, such as pumps, water control structures or weirs. There are a few additional water level monitoring locations in canals or wetlands. Much of the hydrometerological monitoring will be supported by the existing monitoring network. A total of fifteen (15) new surface water level monitoring sites are proposed to be installed. With exception of upstream of S-703, S-705, and S-709, new surface water level monitoring sites will be established upstream and downstream of each of proposed six new pump stations. Three (3) new surface monitoring sites will also be established within wetlands. Access to these locations will be required.

The project-specific ecological monitoring plan proposes a continuation of the existing long-term monitoring efforts presently being conducted through the Monitoring Assessment Plan of RECOVER. This monitoring program focuses on estuarine performance measures that include oysters, submerged aquatic vegetation (SAV), estuarine fishes, juvenile crocodiles, nearshore salinity, wetland vegetation and wetland algae. This long-term monitoring program has resulted in a comprehensive database by which project effects can be quantified. Since this monitoring was initiated prior to CERP, access to all monitoring sites has already been established. See Annex E, Part 3 for specific details and station locations for each monitoring parameter.

MAGNITUDE OF PROJECT INDUCED HYDROLOGIC IMPACT

In the land assessment tables, the magnitude of hydrologic impact was determined by computing the ratio of acreage to maximum daily pump capacity. For instance, for the 185 acre targeted wetland in Deering Estates, the maximum daily pump capacity is 100 cfs or 198 acre-ft per day. Given these values, the average depth of inundation during maximum pumping at Deering

Estates is 1.07 ft per day. For Cutler Wetlands, the average depth of inundation in the targeted wetlands area is approximately 0.50 ft per day during maximum pumping. For L-31E North, the average depth of inundation in the targeted wetland area is approximately 0.25 ft/day. For L-31E South – Freshwater wetlands, the average depth of inundation in the targeted freshwater wetland area is approximately 0.40 ft/day. For L-31E South – Tidal area, the average depth of inundation in the targeted freshwater wetland area is approximately 0.20 ft/day.

POTENTIAL RISK TO BENEFITS W/O LAND INTERESTS

The "Potential Risk to Benefits w/o Land Interests" column in the land assessment tables was assessed by considering the location of the parcel relative to the source of diverted water and relative to the coastline. Parcels with degraded freshwater wetlands that are located directly adjacent to a source of diverted water were considered to present a high risk to project success if land interests could not or were not acquired. The reasoning for this is that these lands are where the greatest wetland habitat lift is expected to occur and where the potential for development exists given that much of this acreage has been farmed in the past. These "high risk" lands are where access for monitoring, backfilling of smaller drainage ditches, and/or periodic exotic vegetation control is required to ensure project success. Also these lands are critically located between the water diversion structure and the bay coastline where nearshore salinity benefits are expected to occur. Implementation of the nuisance and exotic vegetation control plan is critical in controlling the spread of exotic species, and necessary in reducing competition with the native flora; an essential component of re-establishing pre-drainage wetland habitat. Applying adaptive management strategies after assessing ecological responses will allow for the necessary management actions to ensure that maximum restoration goals are achieved.

Parcels located directly adjacent to the bay were considered to present a moderate risk to project success if lands interests are not secured. The reasoning for this is that these lands have extensive mangrove forest so the lands are not considered to be readily developable. Thus, the risk that the landowner will convert the lands to a use that is adverse to the project success is not as likely as it is for areas without mangroves that have been farmed in the past. Though these are "moderate risk" lands, they are part of the critical path from the diversion structures to the nearshore bay zone where significant salinity benefits are expected from this project. If some action in the future limits the use of these lands as part of the flow path, not only are the expected tidal wetland benefits potentially compromised, the adjacent nearshore salinity benefits are at risk.

TABLE D-3: DEERING ESTATE REQUIRED LANDS

Deering Estate										
Tract/ Parcel	Current Property Ownership	# Acres	Existing Condition of Property (hydrology)	Current Use	Required for Construction (est. acres)	Operational Use Requirement (est. acres)	Magnitude of Project Induced Hydrologic Impact	Estate	Potential Risk to Benefits w/o Land Interests	Remarks
1a	Miami-Dade (DERM)	185.65	Degraded FW Wetlands	Park (passive recreation)	15		NA	Fee/SA	High	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land to be provided Fee thru exchange with SFWMD or by Supplemental Agreement pursuant to Master Agreement.
1b			Freshwater to Tidal Wetlands transition	Park (passive recreation)		170.65	≈1.1 ft/day when discharging Significant to Moderate	Esmt / SA	High to Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land to be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities compromises benefits used to justify project. Infrequent access to wetlands east of L-31 E will be necessary to conduct exotic vegetation removal and control. Additionally, as part of the adaptive management protocol, periodic access may be required to fill existing mosquito and/or drainage ditches east of the L-31 levee.
2	Miami-Dade (Parks & Rec)	10.85	Uplands	Abandoned Farm	10.85		NA	Fee/SA	High	Miami-Dade Ordinances prohibit conveyance of Fee witihout exchange. Land to be provided Fee thru exchange with SFWMD or by Supplemental Agreement pursuant to Master Agreement.
Acreage Totals		196.5			25.85	170.65				

TABLE D-4: CUTLER RIDGE REQUIRED LANDS

Cutler Ridge										
Tract/ Parcel	Current Property Ownership	# Acres	Existing Condition of Property (hydrology)	Current Use	Required for Construction (est. acres)	Operational Use Requirement (est. acres)	Magnitude of Project Induced Hydrologic Impact	Estate	Potential Risk to Benefits w/o Land Interests	Remarks
1a	SFWMD	29.86	Degraded FW Wetlands	Abandoned Farm	29.86		NA	Fee	High	Land required for construction of project features.
1b		651.67	Degraded Tidal wetland	Abandoned Farm	20		NA	Fee	High	Land required for construction of project features.
1c			Degraded Tidal wetland	Abandoned Farm		631.67	≈0.5 ft/day Significant	Fee	High	Loss of ability to flow water, and perform other activities on land compromises benefits used to justify project.
2	NPS	308.04	Degraded Tidal wetland	Park		308.04	≈0.5 ft/day Moderate	Esmt / MOA	Moderate	Land required to flow water only. Loss of ability to flow water, and perform other activities compromises benefits used to justify project. Provided by Memorandum of Agreement (MoA).
3a	Private	32.25	Degraded FW Wetlands	Abandoned Farm		32.25	≈0.5 ft/day Moderate	Fee	High	Loss of ability to flow water, and perform other activities on land compromises benefits used to justify project.
4	State	111.06	Degraded FW Wetlands	Abandoned Farm		111.06	≈0.5 ft/day Significant	Esmt / SA	High	State law prohibits conveyance of Fee. Land will be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities on land compromises benefits used to justify project.
5a	Miami-Dade (Water/Sewer)	403.4	Degraded Tidal wetland	Abandoned Farm	20		NA	Fee/SA	High to Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided in Fee thru exchange with SFWMD or by Supplemental Agreement

										pursuant to Master Agreement
5b			Degraded Tidal wetland	Abandoned Farm		383.4	≈0.5 ft/day Significant	Esmt / SA	High to Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities on land compromises benefits used to justify project. Infrequent access to wetlands east of L-31 E will be necessary to conduct exotic vegetation removal and control. Additionally, as part of the adaptive management protocol, periodic access may be required to fill existing mosquito and/or drainage ditches east of the L-31 levee.
6a	M-D P&R	79.6	Degraded FW Wetlands	Abandoned Farm	20		NA	Fee/SA	Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided in Fee thru exchange of land with SFWMD or by Supplemental Agreement pursuant to Master Agreement
6b			Degraded FW Wetlands	Abandoned Farm		59.6	≈0.5 ft/day Significant	Esmt / SA	Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided in easement by deed or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities on land compromises benefits used to justify project.

7a	M-D DERM	118.05	Degraded FW Wetlands	Abandoned Farm	20		NA	Fee/SA	Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided in Fee thru exchange with SFWMD or by Supplemental Agreement pursuant to Master Agreement
7b			Degraded FW Wetlands	Abandoned Farm		98.05	≈0.5 ft/day Moderate	Esmt / SA	Moderate	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities on land compromises benefits used to justify project.
Acreage Totals		1733.9			109.86	1624.07				

TABLE D-5: L-31E CULVERTS-HOMESTEAD NORTH REQUIRED LANDS

L-31E Culverts - Homestead North										
Tract/ Parcel	Current Property Ownership	# Acres	Existing Condition of Property (hydrology)	Current Use	Required for Construction (est. acres)	Operational Use Requirement (est. acres)	Magnitude of Project Induced Hydrologic Impact	Estate	Potential Risk to Benefits w/o Land Interests	Remarks
1a	Miami-Dade (Parks & Rec)	92.58	Degraded Tidal wetland	Abandoned Farm	2.5		NA	Fee/SA	High	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided in Fee thru exchange with SFWMD or by Supplemental Agreement pursuant to Master Agreement
1b			Degraded Tidal wetland	Abandoned Farm		90.08	≈0.25 ft/day Moderate	Esmt / SA	High	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities on land compromises benefits used to justify project.
2	NPS	308.05	Degraded Tidal wetland	Park		308.05	≈0.25 ft/day Moderate	Esmt / MoA	High	Land required to flow water only. Loss of ability to flow water, and perform other activities on land compromises benefits used to justify project. Land to be provided by Memorandum of Agreement (MoA).
3a	Private	252.83	Degraded Tidal wetland	Abandoned Farm	2.8		NA	Fee	High	Land required for construction of project features.
3b			Degraded Tidal wetland	Abandoned Farm		250.03	≈0.25 ft/day Moderate	Fee	High	Loss of ability to flow water, and perform other activities on land compromises benefits used to justify project.
4	Miami-Dade DERM	309.2	Degraded Tidal wetland	Abandoned Farm		309.2	≈0.25 ft/day Moderate	Esmt / SA	High	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring.

Acreage Totals	962.66			5.3	957.36				prohibit uses, and perform other activities on land compromises benefits used to justify project. Infrequent access to wetlands east of L-31 E will be necessary to conduct exotic vegetation removal and control. Additionally, as part of the adaptive management protocol, periodic access may be required to fill existing mosquito and/or drainage ditches east of the L-31 levee.

TABLE D-6: L-31E CULVERTS HOMESTEAD SOUTH REQUIRED LANDS

L-31 E Culverts - Homestead South Tidal Wetlands										
Tract/ Parcel	Current Property Ownership	# Acres	Existing Condition of Property (hydrology)	Current Use	Required for Construction (est. acres)	Operational Use Requirement (est. acres)	Magnitude of Project Induced Hydrologic Impact	Estate	Potential Risk to Benefits w/o Land Interests	Remarks
1a	Private	94.8	Degraded FW Wetlands	Abandoned Farm	2.16		≈0.20 ft/day Moderate	Fee	High	Land required for construction of project features.
1b			Degraded Tidal wetland	Abandoned Farm		92.64	NA	Fee	High	Loss of ability to flow water, and perform other activities on land compromises benefits used to justify project.
2	Miami-Dade (Parks & Rec)	16.52	Degraded Tidal wetland	Abandoned Farm		16.52	≈0.20 ft/day Moderate	Esmt / SA	High	Miami-Dade Ordinances prohibit conveyance of Fee without exchange. Land will be provided by easement or by Supplemental Agreement pursuant to Master Agreement. Loss of ability to flow water, conduct monitoring, prohibit uses, and perform other activities on land compromises benefits used to justify project. Infrequent access to wetlands east of L-31 E will be necessary to conduct exotic vegetation removal and control. Additionally, as part of the adaptive management protocol, periodic access may be required to fill existing mosquito and/or drainage ditches east of the L-31 levee.
4	NPS	321.23	Degraded Tidal wetland	Park		321.23	≈0.20 ft/day Moderate	Esmt / MoA	High	Land required to flow water only. Loss of ability to flow water and perform other activities on land compromises benefits used to justify project. Land to be provided by Memorandum of Agreement (MoA).
Acreage Totals		432.55			2.16	430.39				

D.17 ANALYSIS OF ESTATES REQUIRED FOR PROJECT

The Programmatic Regulations for the CERP, 33 Code of Federal Regulations (CFR) 385, Part 385.5, require the development of Six Program-Wide Guidance Memorandum. After completion of the Takings Analysis to determine the lands impacted by project operations, the July 2007 draft of the Six Program-Wide Guidance Memoranda in Section 1.10.3 provides that an analysis to determine the estates required for implementation of a project should be determined using the following guidelines.

D.17.1 Estates Required for Comprehensive Everglades Restoration Plan Projects

For all lands determined to be required for the CERP projects, the interests required for implementation generally will be fee simple, based on assumptions that all or a significant portion of the rights in the land will be required for project purposes. Although fee acquisition should be the standard estate for CERP projects, lesser estates such as flowage or conservation easements should be considered, as appropriate, if the benefits of the project can still be achieved with the lesser estate. The PIR should provide the rationale for such lesser estates.

To verify the appropriateness of fee simple acquisition or less than fee acquisition, the PIR must include the following analysis and the conclusions must be reflected in the appropriate report sections. The level of detail required for the analysis will vary depending on the project feature involved.

Determine the rights that are required to construct and perform operation, maintenance, repair, rehabilitation, and replacement for the Biscayne Bay Coastal Wetlands project:

- Identify the affirmative rights on the land that are required to implement the project.
- In addition to affirmative rights that may be required, identify restrictions on use (restrictive covenants) by the fee owner that are required so as not to interfere with project purposes and outputs.
- Identify the length of time that the affirmative rights or restrictive covenants are needed for the project.
- Determine whether constructed project features may need to be modified over time due to uncertainties in science, formulation, or design (adaptive management).
- Determine whether project land, or portions thereof, will be open for public use (either active or passive uses).

Other factors to be considered:

- Compare the cost/value of specific types of easements to fee value.
- Assess potential for severance damages from fee acquisition.
- Determine whether public owners have legal capability to convey fee.
- Assess stewardship/operation, maintenance, repair, rehabilitation, and replacement 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; and monitoring and enforcement capabilities of sponsor.
- Assess negative perception by public of private benefits or gain due to landowner reservations where easements are selected.
- Assess whether State Marketable Title Act requires re-recording of easement instruments.

D.17.2 Estates Analysis

For the analysis, the estates for each of the four project areas were determined independently utilizing the factors above as set forth in the July 2007 draft of the Six Program-Wide Guidance Memoranda in Section 1.10.3.

D.17.2.1 Deering Estate/Shoal Point

Within the Deering Estate/Shoal Point (Deering Estate) portion of the Biscayne Bay Coastal Wetlands project, there are approximately 196.50 acres required for the project. Miami-Dade County Parks and Recreation Department owns 10.85 acres in fee, which are required for the construction of pump station S-700, pipe, culverts, a portion of the C-100A Spur Canal through the Power's Addition Parcel and the freshwater wetland on the Power's Parcel. All lands required for construction of the pump station, pipes, culverts and canal will have to be provided in fee. Similarly, Miami-Dade County ordinances prohibit the conveyance of fee title or an easement for lands acquired for parks and recreation purposes by Miami-Dade County. Therefore, Miami-Dade County Parks and Recreation Department and the South Florida Water Management District will execute an exchange of lands to allow the SFWMD to acquire this 10.85 acres in fee.

The remaining approximately 185.65 acres is owned in fee by the Board of Trustees of the Internal Improvement Fund of the State of Florida (the State of Florida) and leased to Miami-Dade County for public recreational use and for protection of natural resources. The land is managed by Miami-Dade County Department of Environmental Resources Management. There are approximately 15 acres required for construction of the spreader canal which will be required in fee. For the remaining approximately 170.65 acres, Miami-

Dade County DERM will execute a Supplemental Agreement to provide a perpetual flowage/conservation easement over these lands and the State of Florida, Board of Trustees of the Internal Improvement Fund will execute a Supplemental Agreement to provide a perpetual flowage/conservation easement over these lands or will execute a perpetual flowage/conservation easement over these lands.

Affirmative Rights and Restrictions/Prohibitions Required: The affirmative rights required over the approximately 170.65 acres include the right to flow water across the lands together with rights to conduct the certain all monitoring activities which will require continuous access to all portions of the property; the right to clear and remove any brush, debris and natural obstructions which, in the opinion of the representative of the Grantee in charge of the Project, may be detrimental to the Project, and the right to plug and/or fill any and all existing ditches within the premises.

Restrictions and Prohibitions required include:

a) The right to prohibit construction or maintenance of all structures and/or above or below ground on the property.
b) The right to prohibit any and all commercial or industrial activities
c) The prohibition of all dumping of refuse, wastes, sewage, or other debris
d) The prohibition of harvesting wood products
e) The prohibition of commercial recreational activities
f) The prohibition of activities detrimental to flood damage reduction, water management, conservation, environmental restoration, water storage, erosion control, soil conservation, reclamation, fish and wildlife habitat preservation, and allied purposes
g) The prohibition of any mining or alteration of the surface of the land, including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to cause significant pollution of any surface; and
h) The prohibition of all agricultural activity

Miami-Dade County and the State of Florida will either convey a perpetual flowage/conservation easement to the SFWMD sufficient for the operation, maintenance, repair, replacement and rehabilitation of the Biscayne Bay Coastal Wetlands project or will execute a Supplemental Agreement in accordance with the terms of Article III, paragraph E. of the Master Agreement between the Department of the Army and South Florida Water Management District for Cooperation in Constructing and Operating, Maintaining, Repairing, Replacing and Rehabilitating Authorized Projects under the Comprehensive Everglades Restoration Plan, entered into on August 13, 2009.

Length of Time for Which Affirmative Rights and Restrictions/ Prohibitions are Required: The affirmative rights and restrictions/ prohibitions will be required for the life of the project or until Congress de-authorizes the project.

Need for Modification of Project Features Over Time: Each CERP Project including the Biscayne Bay Coastal Wetlands project is required to assess the need for Adaptive Management. The U.S. Fish and Wildlife Service played a role in the development of an Ecological and Water Quality Monitoring Plan for the BBCW Project. The intent of the plan is to determine if the anticipated hydrologic, vegetative, wildlife, and estuarine benefits of the project are being achieved and to support the adaptive management process over the life of the project. This plan would provide for baseline, construction, and post-restoration monitoring of water quality, ground and surface waters, salinity, wetland vegetation and periphyton, submerged aquatic vegetation, aquatic fauna, oysters, and crocodiles. This plan has been integrated and coordinated, to the extent possible, with the RECOVER Monitoring and Assessment Plan. An adaptive management plan for the project has also been developed, which is critical to defining steps that can be taken in the event that expected restoration results are not realized. This plan helps assure that anticipated project benefits will be realized.

Public Use: The PIR recommends construction of a 2.07 acre educational wetland adjacent to S-700 pump station at the Deering Estates (Powers Addition) wetlands site. The educational wetland, which will be operated and maintained by Dade County Parks and Recreation, will be consist of 0.92 acres of deep marsh (el. -1.0 to 0.0), 0.5 acres of mid marsh (el. 0.0 to 1.0), 0.35 acres of high marsh (el. 1.0 – 2.0), 0.12 acres of forested wetland (el. 0.0 to 2.0), and 0.18 acres of upland buffer (el > 2.0). The facility will be excavated from disturbed areas and each zone will be planted with native vegetation indigenous to these types of conditions. The created wetland is intended to educate the public about native flora and fauna, historic conditions, and the importance of freshwater in coastal ecosystems. When not being used for educational purposes the site can also serve as a place to commune with nature.

D.17.2.2 Cutler South/Lennar Flow Way

In the Lennar Flow Way, which is located west of the Cutler South area, there are 29.86 acres owned by the SFWMD which will be required in fee as pump stations and the flow way will be constructed on these lands.

Of the remaining acreage in the Cutler South Wetland portion of the Biscayne Bay Coastal Wetlands project, the lands (approximately 1,704.07 acres) are owned in fee as follows: SFWMD (approximately 651.67 acres); Miami-Dade

County DERM (approximately 118.05 acres); Miami-Dade County Parks & Recreation (approximately 79.60 acres); Miami-Dade County Water & Sewer Department (approximately 403.40 acres); the United States of America (National Park Service (approximately 308.04 acres); the State of Florida, Trustees of the Internal Improvement Trusts Fund (approximately 111.06 acres), and private landowners (approximately 32.25 acres).

South Florida Water Management District Lands: For the lands owned by SFWMD consisting of approximately 651.67 acres, approximately 20 acres are required for construction with the remainder of approximately 631.67 acres required for Project operations.

Privately Owned Lands: For the privately owned lands, all of the approximately 32.25 acres are required for Project operations.

Miami-Dade County and State Lands: For the lands owned by Miami-Dade County Department of Environmental Resources Management consisting of 118.05 acres Miami-Dade County ordinances and bond issues prohibit the conveyance of fee title for lands acquired by Miami-Dade County Department of Environmental Resources Management to the SFWMD, unless an exchange of like land is completed. For those lands managed by Miami-Dade County Department of Environmental Resources Management within the Cutler South portion of the Biscayne Bay Coastal Wetlands project and required for pumps, berms or other structures, Miami-Dade County will convey fee title to the SFWMD in exchange for lands in other areas outside the Biscayne Bay Coastal Wetlands project footprint. There are approximately 20 acres owned by Miami-Dade County DERM that will be required for construction of spreader canal (C-702), which will be required in fee for the project. For the remaining approximately 98.05 acres not required for structures, Miami-Dade County DERM will either convey a perpetual/conservation easement or will execute a Supplemental Agreement in accordance with the terms and conditions of the Master Agreement.

For the approximately 79.60 acres owned by Miami-Dade County Parks and Recreation Department, Miami-Dade County ordinances prohibit the conveyance of fee title for lands acquired by Miami-Dade County Parks and Recreation Department to the SFWMD, unless an exchange of like land is completed. Only approximately 20 acres of these lands are required for construction of the spreader canal (C-702), which will be required in fee for the project. For the remaining approximately 59.60 acres, Miami-Dade County Parks and Recreation Department will either convey a perpetual/conservation easement or will execute a Supplemental Agreement in accordance with the terms of the Master Agreement.

For the approximately 403.40 acres owned in fee by the Miami-Dade County Water & Sewer Department, approximately 20 acres are required for construction of the spreader canal (C-702), which will be required in fee for the project. Miami-Dade County ordinances prohibit the conveyance of fee title for lands acquired by Miami-Dade County Water & Sewer Department to the SFWMD, unless an exchange of like land is completed. For the remaining approximately 383.40 acres, Miami-Dade County Water & Sewer Department will either convey a perpetual/conservation easement or will execute a Supplemental Agreement in accordance with the terms of the Master Agreement.

For the lands owned by the State of Florida (approximately 111.06 acres) the State will either convey a perpetual/conservation easement or will execute a Supplemental Agreement in accordance with the terms of the CERP Master Agreement.

Affirmative Rights and Restrictions/Prohibitions Required: The affirmative rights required over the Miami-Dade County and State owned lands would include the right to flow water across the lands together with rights to conduct the certain all monitoring activities which will require continuous access to all portions of the property; the right to clear and remove any brush, debris and natural obstructions which, in the opinion of the representative of the Grantee in charge of the Project, may be detrimental to the Project, and the right to plug and/or fill any and all existing ditches within the premises.

Restrictions and Prohibitions required include:

a) The right to prohibit construction or maintenance of all structures and/or above or below ground on the property.
b) The right to prohibit any and all commercial or industrial activities
c) The prohibition of all dumping of refuse, wastes, sewage, or other debris
d) The prohibition of harvesting wood products
e) The prohibition of commercial recreational activities
f) The prohibition of activities detrimental to flood damage reduction, water management, conservation, environmental restoration, water storage, erosion control, soil conservation, reclamation, fish and wildlife habitat preservation, and allied purposes
g) The prohibition of any mining or alteration of the surface of the land, including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to cause significant pollution of any surface; and
h) The prohibition of all agricultural activity

Miami-Dade County and the State of Florida will either convey a perpetual flowage/conservation easement to the SFWMD sufficient for the operation, maintenance, repair, replacement and rehabilitation of the Biscayne Bay Coastal Wetlands project or will execute a Supplemental Agreement in accordance with the terms of Article III, paragraph E. of the Master Agreement between the Department of the Army and South Florida Water Management District for Cooperation in Constructing and Operating, Maintaining, Repairing, Replacing and Rehabilitating Authorized Projects under the Comprehensive Everglades Restoration Plan, entered into on August 13, 2009.

United States of America, National Park Service Lands

For the lands owned by the United States of America, National Park Service, as part of the Biscayne National Park, approximately 308.04 acres that would be directly impacted by the project, the United States of America, National Park Service, will provide a letter agreement or Memorandum of Agreement to the SFWMD that allows the flow of water from the project across the lands of the BNP.

Private and South Florida Water Management District Lands

For those lands owned by private landowners (approximately 32.25 acres) and SFWMD (approximately 651.67 acres), fee title will be required.

A Gross Appraisal was completed by the Jacksonville District to determine the market value of the required interests for the project on October 30, 2009. The Gross Appraisal was approved by Headquarters, CEMP-CR on June 29, 2010. Among the estates valued was a "Perpetual Conservation and Flowage Easement" estate as the minimal interest required to support the Alternative "O", Phase 1.

The Gross Appraisal provides the following language: "A review of the proposed easement indicates that the interest acquired by the government severely limits the utility of the remainder. The affirmative rights established by the proposed easement include the right of the government to "flow water across and over the lands at all time". The appraisal process indicates that the remainder, subject to such a Perpetual Conservation and Flowage Easement, would have no market value. In addition, the easement would represent a liability to the underlying property owner. Where the utility of the property is destroyed and the remainder could pose a nuisance to the remainder interest, such a taking could potentially exceed 100 percent of market value.

Therefore, it has been determined that acquisition of the "fee simple" interest is in the best interest. In addition, the evaluation of the "fee simple" estate establishes the most sever scenario in estimating the real estate costs associated with this project.

Perpetual Conservation and Flowage Easement

The perpetual right, power, privilege and easement perpetually overflow, flood and submerge the land described on Schedule A, Tract No. ___ in connection with the operation and maintenance of the _____, Florida Project, as authorized by the Water Resources Development Act of _____, Public Law _____, and the continuing right to clear and remove any brush, debris and natural obstructions which, in the opinion of the representative of the Grantee in charge of the Project, may be detrimental to the Project, together with all right, title and interest in and to the timber, structures and improvements situated on the lands, and provided that no structures and improvements of any kind or nature shall be constructed or maintained above or below ground on the property. In addition, there is conveyed a perpetual conservation easement over, and across the land for the purpose of maintaining the land in its natural, open, or wooded condition; and retaining such land as suitable habitat for fish, plants, or wildlife; together with the right to conduct controlled burns on the land. The following activities are prohibited: (a) commercial or industrial activities; (b) construction of any kind within the reservoir; (c) dumping of refuse, wastes, sewage, or other debris; (d) harvesting wood products; (e) commercial recreational activities: (f) activities detrimental to flood damage reduction, water management, conservation, environmental restoration, water storage, erosion control, soil conservation, reclamation, fish and wildlife habitat preservation, and allied purposes; (f) any mining or alteration of the surface of the land, including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to cause significant pollution of any surface; and (g) any and all agricultural activity. The above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the Project for the purposes authorized by Congress or abridging the rights and easement hereby acquired.

Leaving any rights outstanding in third parties would also inhibit future operational changes and would also impact project operations, because constant monitoring of the use of the property by the third parties would be required to ensure that their uses are consistent with the easement terms. After consideration of all the affirmative rights required by the government and the restrictions on the landowner(s) use of the properties, it was determined that fee is the minimum interest required.

Length of Time for Which Affirmative Rights and Restrictions/Prohibitions are Required: The affirmative rights and restrictions/prohibitions will be required for the life of the project or until Congress de-authorizes the project.

Need for Modification of Project Features Over Time: Each CERP Project including the Biscayne Bay Coastal Wetlands project is required to assess the need for Adaptive Management. The U.S. Fish and Wildlife Service played a role in the development of an Ecological and Water Quality Monitoring Plan for the BBCW Project. The intent of the plan is to determine if the anticipated hydrologic, vegetative, wildlife, and estuarine benefits of the project are being achieved and to support the adaptive management process over the life of the project. This plan would provide for baseline, construction, and post-restoration monitoring of water quality, ground and surface waters, salinity, wetland vegetation and periphyton, submerged aquatic vegetation, aquatic fauna, oysters, and crocodiles. This plan has been integrated and coordinated, to the extent possible, with the RECOVER Monitoring and Assessment Plan. An adaptive management plan for the project has also been developed, which is critical to defining steps that can be taken in the event that expected restoration results are not realized. This plan helps assure that anticipated project benefits will be realized.

Public Use: The PIR recommends the project levees and dike systems would be used for hiking and biking access. The construction staging areas for this site would be used after project completion to provide parking and handicapped accessible facilities. Pedestrian and bicycle access to the levee trail would be provided by a pedestrian bridge. The trailhead features would include benches, refuse receptacles, bicycle rack and waterless toilet facilities. The trailhead would provide access to a three-mile multiuse trail on the canal levee for wildlife viewing and bank fishing opportunities. Linkage to the south Dade Greenway Network of Trails is possible at this site. The proposed access point would include perimeter fencing and gates to limit vehicular traffic and provide security to the facilities after nightfall. Implementation of the proposed Cutler Flow Way/C-1 Canal Wetlands Recreation Area would help to fill SCORP projected recreation deficits within the proposed project area.

D.17.2.3 L-31 East Culverts-Homestead North Tidal

In the L-31 East Homestead North Tidal Wetlands portion of the project, the lands (approximately 962.66 acres) are owned in fee as follows: Miami-Dade County DERM (approximately 309.20 acres); Miami-Dade County Parks and Recreation (92.58 acres); the United States of America (National Park Service (approximately 308.05 acres); and private landowners (approximately 252.83 acres).

For the lands owned by the United States of America, National Park Service, as part of the Biscayne National Park, (approximately 308.05 acres) that would be directly impacted by the project, the United States, National Park Service, will provide a letter agreement or Memorandum of Agreement to the South Florida

Water Management District that allows the flow of water from the project across the lands of the Biscayne National Park.

For the lands owned by the Miami-Dade County Parks and Recreation Department approximately 2.5 acres will be required for construction of culverts and will be required in fee. For the remaining approximately 90.08 acres, Miami-Dade County Parks and Recreation Department will execute a Supplemental Agreement in accordance with the terms of the Master Agreement to provide a perpetual flowage/conservation easement estate.

For the lands owned by Miami-Dade County DERM (approximately 309.20 acres), none of the land is required for construction of structures, Miami-Dade County DERM will execute a Supplemental Agreement in accordance with the terms of the Master Agreement to provide a perpetual flowage/conservation easement estate.

For those lands owned by private landowners (approximately 252.83 acres), approximately 2.8 acres are required for construction; however, all privately owned lands will be required in fee title.

A Gross Appraisal was completed by the Jacksonville District to determine the market value of the required interests for the project on October 30, 2009. The Gross Appraisal was approved by Headquarters, CEMP-CR on June 29, 2010. Among the estates valued was a "Perpetual Conservation and Flowage Easement" estate as the minimal interest required to support the Alternative "O", Phase 1.

The Gross Appraisal provides the following language: "A review of the proposed easement indicates that the interest acquired by the government severely limits the utility of the remainder. The affirmative rights established by the proposed easement include the right of the government to "flow water across and over the lands at all time". The appraisal process indicates that the remainder, subject to such a Perpetual Conservation and Flowage Easement, would have no market value. In addition, the easement would represent a liability to the underlying property owner. Where the utility of the property is destroyed and the remainder could pose a nuisance to the remainder interest, such a taking could potentially exceed 100 percent of market value.

Therefore, it has been determined that acquisition of the "fee simple" interest is in the best interest. In addition, the evaluation of the "fee simple" estate establishes the most sever scenario in estimating the real estate costs associated with this project.

Perpetual Conservation and Flowage Easement

The perpetual right, power, privilege and easement perpetually overflow, flood and submerge the land described on Schedule A, Tract No. ___ in connection with the operation and maintenance of the _____, Florida Project, as authorized by the Water Resources Development Act of _____, Public Law _____, and the continuing right to clear and remove any brush, debris and natural obstructions which, in the opinion of the representative of the Grantee in charge of the Project, may be detrimental to the Project, together with all right, title and interest in and to the timber, structures and improvements situated on the lands, and provided that no structures and improvements of any kind or nature shall be constructed or maintained above or below ground on the property. In addition, there is conveyed a perpetual conservation easement over, and across the land for the purpose of maintaining the land in its natural, open, or wooded condition; and retaining such land as suitable habitat for fish, plants, or wildlife; together with the right to conduct controlled burns on the land. The following activities are prohibited: (a) commercial or industrial activities; (b) construction of any kind within the reservoir; (c) dumping of refuse, wastes, sewage, or other debris; (d) harvesting wood products; (e) commercial recreational activities: (f) activities detrimental to flood damage reduction, water management, conservation, environmental restoration, water storage, erosion control, soil conservation, reclamation, fish and wildlife habitat preservation, and allied purposes; (f) any mining or alteration of the surface of the land, including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to cause significant pollution of any surface; and (g) any and all agricultural activity The above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the Project for the purposes authorized by Congress or abridging the rights and easement hereby acquired.

Leaving any rights outstanding in third parties would also inhibit future operational changes and would also impact project operations, because constant monitoring of the use of the property by the third parties would be required to ensure that their uses are consistent with the easement terms. After consideration of all the affirmative rights required by the government and the restrictions on the landowner(s) use of the properties, it was determined that fee is the minimum interest required.

Length of Time for Which Affirmative Rights and Restrictions/Prohibitions are Required: The affirmative rights and restrictions/prohibitions will be required for the life of the project or until Congress de-authorizes the project.

Need for Modification of Project Features Over Time: Each CERP Project including the Biscayne Bay Coastal Wetlands project is required to assess the need for Adaptive Management. The U.S. Fish and Wildlife Service played a role in the development of an Ecological and Water Quality Monitoring Plan for the BBCW Project. The intent of the plan is to determine if the anticipated hydrologic, vegetative, wildlife, and estuarine benefits of the project are being achieved and to support the adaptive management process over the life of the project. This plan would provide for baseline, construction, and post-restoration monitoring of water quality, ground and surface waters, salinity, wetland vegetation and periphyton, submerged aquatic vegetation, aquatic fauna, oysters, and crocodiles. This plan has been integrated and coordinated, to the extent possible, with the RECOVER Monitoring and Assessment Plan. An adaptive management plan for the project has also been developed, which is critical to defining steps that can be taken in the event that expected restoration results are not realized. This plan helps assure that anticipated project benefits will be realized.

Public Use: There will be no public use except for those portions of the Biscayne National Park open to such use.

D.17.2.4 L-31 East Culverts - Homestead South Freshwater and Tidal Wetlands

Homestead South Freshwater Wetland Area

In the L-31 East Homestead South Freshwater Wetlands portion of the Biscayne Bay Coastal Wetlands project, the lands (approximately 435.46 acres) are owned in fee as follows: SFWMD (approximately 251.61 acres); Florida Power & Light (FP&L) (approximately 148.90 acres); and private landowners (approximately 34.95 acres). All the lands are within the footprint of the Freshwater Wetland and will be required in fee. See paragraph below entitled Gross Appraisal evaluation.

For lands owned by FP&L (approximately 148.90 acres), as part of its proposed Nuclear Reactors at FP&L's Turkey Point Site, FP&L had to get approval from Miami-Dade County. The Miami-Dade County Board of County Commissioners granted land use approval (zoning and comp plan consistency) for the FP&L project subject to a number of conditions, including the following condition (which was included to insure consistency with Objective CON-7, policy CON-7C and Objective CM-1, policy CM-1B of the Miami-Dade County Comprehensive Development Master Plan). These comp plan citations relate to restoration and maintenance of natural surface water flow regimes to the maximum extent possible in the wetland areas around Turkey Point. One of the conditions was that FP&L provide draft flowage easements to Miami-Dade County Department of Environmental Resources Management for review. The FP&L flowage

easements will provide for the maintenance of existing flow across the north/south transmission corridors as well as the east/west transmission corridors located within the Biscayne Bay Coastal Wetlands CERP project boundaries. The easements shall also provide for and allow improvements to sheet flow conveyance of surface waters over these features consistent with planned local, state, and Federal restoration projects in this area. Improvements to sheet flow such that the corridors do not impede the flow of ground or surface waters will also be required where transmission corridor upgrades in this area are necessary for power distribution as a result of this project. FP&L shall improve sheet flow during construction of the improvements. The flowage easements shall be in favor of county, state and the Federal government and Miami-Dade County Department of Environmental Resources Management, which shall coordinate the review with the applicable government agencies for acceptance of the final easement language. FP&L shall modify the language in a timely manner as necessary based on Miami-Dade County Department of Environmental Resources Management's coordinated review. The flowage easements shall be executed by FP&L prior to construction and recorded by Miami-Dade County Department of Environmental Resources Management after acceptance of the finalized language. The subject easements shall be consistent with FP&L requirements for, and not interfere with, the construction, maintenance, operation of and access to, the electrical system within the above referenced transmission corridors. Negotiations of the terms and conditions of these easements have not been finalized, but will be consistent with the requirements of the Project.

Homestead South Tidal Wetlands

In the L-31 East Homestead South Tidal Wetlands portion of the Biscayne Bay Coastal Wetlands project, the lands (approximately 432.55 acres) are owned in fee as follows: Miami-Dade Parks and Recreation (approximately 16.52 acres), Private landowners (approximately 94.80 acres) and the United States of America, National Park Service (approximately 321.23 acres).

For the lands owned by Miami-Dade County approximately 16.52 acres, Miami-Dade County Parks and Recreation Department will execute a Supplemental Agreement in accordance with the terms of the Master Agreement to provide a perpetual flowage/conservation easement estate.

For the lands owned by the United States of America, National Park Service, as part of the BNP, approximately 321.23 acres that would be directly impacted by the project, the United States, National Park Service, will provide a Memorandum of Agreement to the South Florida Water Management District that allows the flow of water from the project across the lands of the Biscayne National Park.

For those lands owned in fee by private landowners (approximately 94.80 acres), approximately 2.16 acres are required for construction of the culverts and therefore fee title will be required. For the remaining approximately 92.64 acres fee title is also the recommended estate for the reasons set forth in the Gross Appraisal paragraph below.

GROSS APPRAISAL:

A Gross Appraisal was completed by the Jacksonville District to determine the market value of the required interests for the project on October 30, 2009. The Gross Appraisal was approved by Headquarters, CEMP-CR on June 29, 2010. Among the estates valued was a "Perpetual Conservation and Flowage Easement" estate as the minimal interest required to support the Alternative "O", Phase 1.

The Gross Appraisal provides the following language: "A review of the proposed easement indicates that the interest acquired by the government severely limits the utility of the remainder. The affirmative rights established by the proposed easement include the right of the government to "flow water across and over the lands at all time". The appraisal process indicates that the remainder, subject to such a Perpetual Conservation and Flowage Easement, would have no market value. In addition, the easement would represent a liability to the underlying property owner. Where the utility of the property is destroyed and the remainder could pose a nuisance to the remainder interest, such a taking could potentially exceed 100 percent of market value.

Therefore, it has been determined that acquisition of the "fee simple" interest is in the best interest. In addition, the evaluation of the "fee simple" estate establishes the most sever scenario in estimating the real estate costs associated with this project.

Perpetual Conservation and Flowage Easement

The perpetual right, power, privilege and easement perpetually overflow, flood and submerge the land described on Schedule A, Tract No. ___ in connection with the operation and maintenance of the _____, Florida Project, as authorized by the Water Resources Development Act of _____, Public Law _____, and the continuing right to clear and remove any brush, debris and natural obstructions which, in the opinion of the representative of the Grantee in charge of the Project, may be detrimental to the Project, together with all right, title and interest in and to the timber, structures and improvements situated on the lands, and provided that no structures and improvements of any kind or nature shall be constructed or maintained above or below ground on the property. In addition, there is conveyed a perpetual conservation easement over,

and across the land for the purpose of maintaining the land in its natural, open, or wooded condition; and retaining such land as suitable habitat for fish, plants, or wildlife; together with the right to conduct controlled burns on the land. The following activities are prohibited: (a) commercial or industrial activities; (b) construction of any kind within the reservoir; (c) dumping of refuse, wastes, sewage, or other debris; (d) harvesting wood products; (e) commercial recreational activities: (f) activities detrimental to flood damage reduction, water management, conservation, environmental restoration, water storage, erosion control, soil conservation, reclamation, fish and wildlife habitat preservation, and allied purposes; (f) any mining or alteration of the surface of the land, including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to cause significant pollution of any surface; and (g) any and all agricultural activity The above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the Project for the purposes authorized by Congress or abridging the rights and easement hereby acquired.

Leaving any rights outstanding in third parties would also inhibit future operational changes and would also impact project operations, because constant monitoring of the use of the property by the third parties would be required to ensure that their uses are consistent with the easement terms. After consideration of all the affirmative rights required by the government and the restrictions on the landowner(s) use of the properties, it was determined that fee is the minimum interest required.

Length of Time for Which Affirmative Rights and Restrictions/Prohibitions are Required: The affirmative rights and restrictions/prohibitions will be required for the life of the project or until Congress de-authorizes the project.

Need for Modification of Project Features Over Time: Each CERP Project including the Biscayne Bay Coastal Wetlands project is required to assess the need for Adaptive Management. The U.S. Fish and Wildlife Service played a role in the development of an Ecological and Water Quality Monitoring Plan for the BBCW Project. The intent of the plan is to determine if the anticipated hydrologic, vegetative, wildlife, and estuarine benefits of the project are being achieved and to support the adaptive management process over the life of the project. This plan would provide for baseline, construction, and post-restoration monitoring of water quality, ground and surface waters, salinity, wetland vegetation and periphyton, submerged aquatic vegetation, aquatic fauna, oysters, and crocodiles. This plan has been integrated and coordinated, to the

extent possible, with the RECOVER Monitoring and Assessment Plan. An adaptive management plan for the project has also been developed, which is critical to defining steps that can be taken in the event that expected restoration results are not realized. This plan helps assure that anticipated project benefits will be realized.

Public Use: There will be no public use except for those portions of the Biscayne National Park open to such use.

D.18 PROPOSED ESTATES

Based on the analysis set forth above, the following estates will be required:

D.18.1 Standard Estates

D.18.1.1 Standard Estate Fee

The fee simple title to (the land described in Schedule A), subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

D.18.1.2 Channel Improvement Easement

A perpetual and assignable right and easement to construct, operate, and maintain channel improvement works on, over and across (the land described in Schedule A) for the purposes as authorized by the Act of Congress approved (will need to add appropriate water resources development act authorization), including the right to clear, cut, fell, remove and dispose of any and all timber, trees, underbrush, buildings, improvements and/or other obstructions there from; to excavate, dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; and for such other purposes as may be required in connection with said work of improvement; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

D.18.1.3 Temporary Work Area and/or Disposal Area Easement

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A), for a period not to exceed (THE APPROPRIATE TERM OF YEARS AREA IS REQUIRED FOR CONSTRUCTION PURPOSES), beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a

(borrow area) (work area), including the right to borrow and/or deposit fill, spoil and waste material thereon) (move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Biscayne Bay Coastal Wetlands project, together with the right to trim, cut, fell and remove all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

D.18.2 Non-Standard Estates

D.18.2.1 Property of Miami-Dade County Department of Environmental Resources Management, Miami-Dade County Parks & Recreation Department and Miami-Dade County Water and Sewer Department - NOTE can be provided by Supplemental Agreement

D.18.2.1.1 Perpetual Conservation and Flowage Easement

The perpetual right, power, privilege and easement perpetually overflow, flood and submerge the land described on Schedule A, Tract No. ___ in connection with the operation and maintenance of the _____, Florida Project, as authorized by the Water Resources Development Act of _____, Public Law _____, and the continuing right to clear and remove any brush, debris and natural obstructions which, in the opinion of the representative of the Grantee in charge of the Project, may be detrimental to the Project, together with all right, title and interest in and to the timber, structures and improvements situated on the lands, and provided that no structures and improvements of any kind or nature shall be constructed or maintained above or below ground on the property. In addition, there is conveyed a perpetual conservation easement over, and across the land for the purpose of maintaining the land in its natural, open, or wooded condition; and retaining such land as suitable habitat for fish, plants, or wildlife; together with the right to conduct controlled burns on the land. The following activities are prohibited: (a) commercial or industrial activities; (b) construction of any kind within the reservoir; (c) dumping of refuse, wastes, sewage, or other debris; (d) harvesting wood products; (e) commercial recreational activities: (f) activities detrimental to flood damage reduction, water management, conservation, environmental restoration, water storage, erosion control, soil conservation, reclamation, fish and wildlife habitat preservation, and allied purposes; (f) any mining or alteration of the surface of the land, including any substance that must be quarried or removed by methods that will consume or deplete the surface, including, but not limited to, the removal of topsoil, sand, gravel, rock, and peat; any use or activity that causes or is likely to

cause significant pollution of any surface; and (g) any and all agricultural activity The above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the Project for the purposes authorized by Congress or abridging the rights and easement hereby acquired.

D.18.2.1.2 Perpetual Flowage, Inundation, Water Storage, Impoundment and Access Easement

This easement is given for any and all purposes deemed by SFWMD to be necessary, convenient, or incident to, or in connection with, the unrestricted right to regularly, or at any time, and for any length of time overflow, flood, inundate, submerge, store water, impound water, and/or flow water on, across, and through the premises, which the SFWMD may deem necessary, convenient, incident to or in connection with the implementation of Biscayne Bay Coastal Wetlands State Expedited Construction program on the premises, or in connection with the CERP, Biscayne Bay Coastal Wetlands project (hereinafter the "CERP Project"), or in connection with the construction, maintenance, replacement and operation of any project in the interest of flood control, reclamation, conservation, water storage, water quality, environmental restoration or enhancement, water impoundment, water management, and/or allied purposes that may be conducted now or in the future by the SFWMD in carrying out the purposes and intents of the Statutes of the State of Florida relating to the SFWMD presently existing or that may be enacted in the future pertaining thereto. The SFWMD shall also have the continuing right, in the SFWMD's discretion, to enter upon and access the premises with any and all vehicles and equipment, (1) clear and remove any brush, debris, silt, spoil, vegetation and natural obstructions that interfere with the purpose of this easement and (2) plug and/or fill any and all existing ditches within the premises.

This easement shall at no time be obstructed by any object which would in any manner interfere with the purposes of this easement. Miami-Dade County shall neither construct nor maintain any structure or improvements on the premises, nor re-grade, excavate or place fill on the premises.

D.18.2.1.3 Supplemental Agreement

In accordance with the terms of ARTICLE III - LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS AND COMPLIANCE WITH PUBLIC LAW 91-646, AS AMENDED of the MASTER AGREEMENT BETWEEN THE DEPARTMENT OF THE ARMY AND SOUTH FLORIDA WATER MANAGEMENT DISTRICT FOR COOPERATION IN CONSTRUCTING AND OPERATING, MAINTAINING, REPAIRING, REPLACING AND REHABILITATING AUTHORIZED PROJECTS UNDER THE

COMPREHENSIVE EVERGLADES RESTORATION PLAN, entered into on August 13, 2009.

D.18.2.2 Perpetual Flowage Easement (Florida Power and Light)

The perpetual, unrestricted, right, power, privilege, and easement to regularly, or at any time, and for any length of time, flow water on, across, and through the Premises for the purpose of maintaining the existing flow of surface water across such Premises which are located within the Biscayne Bay Coastal Wetlands Comprehensive Everglades Restoration Project Study Area Boundary; together with right to use said Premises for purposes incidental to such flowage easement, and in such manner as may be necessary for the operation of equipment utilized in the construction and maintenance of drainage improvements, including but not limited to the right to provide for and allow improvements to sheet flow conveyance of surface waters over the Premises. The estate granted herein is taken subject to all existing easements of record. Grantor, for itself, its successors and assigns, expressly reserves all rights and privileges, consistent herewith, as may be used and enjoyed on the Premises, provided that such rights and privileges do not interfere with, impact, or affect, the uses for which this easement is granted. The Premises shall at no time be obstructed by any object or activity which would in any manner interfere with the purposes of this Easement, without the written consent of Grantees. This Easement may be assigned in whole or in part by the Grantees for use in connection with any of the purposes above mentioned. All covenants, terms, and agreements herein contained run with the land, and shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.

D.19 ZONING ORDINANCES

Preliminary investigation indicates that no enactments of zoning ordinances are proposed in lieu of, or to facilitate, acquisition in connection with the project.

D.20 ACQUISITION SCHEDULES

The SFWMD currently owns some of the land, or would acquire the lands required for construction, operations, and maintenance of the project. Following execution of the PPA, the Federal government would provide the SFWMD with general written descriptions, including maps as appropriate, of the lands, easements, rights-of-way and the facility/utility relocations that the government has determined the non-Federal sponsor must provide and perform for the construction, operation, and maintenance of the project. The lands, easements, and rights-of-way descriptions would include the required estate, acreage,

location, and schedule requirements in detail sufficient to enable the SFWMD to fulfill its obligations to provide the lands, easements, and rights-of-way in a timely fashion. If relocation is required then the descriptions would include sufficient detail to enable the non-Federal sponsor to perform its relocation responsibilities in a timely fashion. In addition, a written notice to proceed with acquisition of such additional lands, easements, and rights-of-way would be provided to the SFWMD. The real estate acquisition schedule will be coordinated with the PDT. The real estate required for each construction contract must be acquired and certified by the Chief, Real Estate Division prior to advertisement for construction, finally, the schedule will be adjusted to allow time between land being requested and certified. It is estimated the land acquisition and certification would occur within 18 months from the date of the executed PPA.

D.21 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES /RESIDUAL AGRICULTURAL CHEMICALS

During the plan formulation phase of the study, the project delivery team developed and/or modified project alternatives in an effort to minimize and avoid lands that were likely to contain materials potentially regulated by CERCLA. The selected plan avoids HTRW to the extent possible by limiting the use of more intensely farmed acreage west of L-31E Levee, using a lined channel to cross the Cutler lands west of the L-31E Levee, and elimination of a freshwater wetland rehydration feature located at Cutler west of the L-31E Levee. Phase 1 and 2 environmental site assessments (ESAs) have been completed by the SFWMD on approximately 2,900 acres out of the approximately 3,761 acres of project lands included in the proposed BBCW selected plan. The audit reports with more than 500 pages of information are included in Appendix A Part II. The short summary provided here touches on the decision critical aspects of the available site investigations as it pertains to human health and the ecological risks associated with the "impacted soils" which remain on project lands. The term "impacted soil" refers to soils that contain concentrations of chemicals above human health regulatory criteria as defined by Florida Administrative Code 62-777, and/or an ecological guideline established by the Florida Department of Environmental Protection (FDEP) or the U.S. Fish and Wildlife Service (USFWS).

The Phase II ESA activities conducted to date have identified 27 CERCLA regulated substances in the surficial soil/sediment across the recommended plan's (Alt O Phase I) project area that exceed either human health criteria or ecological guidelines (See Section 7.9.3). Of the detected substances, 26 exceeded ecological screening criteria [Sediment Quality Assessment Guidelines (SQAGs)], which in most cases (with the exception of arsenic) are significantly lower than the human health based Soil Cleanup Target Levels (SCTLs). A

screening level ecological risk assessment (SLERA) was performed to further evaluate risk associated with those chemicals exceeding the SQAGs. This SLERA was reviewed by the FDEP and USFWS and they have indicated that none of the SQAG or SCTL exceedances found to date pose an unacceptable risk to ecosystem resources under pre- or post-project land use conditions.

Arsenic is the contaminant that was most frequently detected on project lands. On ten parcels totaling 1097 acres, the highest concentration of collected samples indicate arsenic concentrations exceed 2.1 mg/Kg which is the Florida residential (human health) direct exposure criteria for arsenic (SCTL-RDE). On three parcels totaling 366 acres, the highest concentration of collected samples indicate arsenic concentrations exceed 12.0 mg/Kg which is the Florida commercial/industrial (human health) direct exposure criteria for arsenic (SCTL-CDE). Samples from one 50 acre grid cell, located east of the L-31E levee and not within the construction footprint, exceed 33 mg/Kg which is the Florida ecological impact criteria for arsenic in sediments (SQAG). The USFWS reviewed the data from this 50 acre cell and determined that the areal extent of this high concentration of arsenic did not pose an unacceptable risk to fish and wildlife resources.

The SFWMD is nearing completion of construction of the Deering Estates features. Approximately 3,000 cubic yards of soils with residual agricultural chemicals were incorporated into project features at Deering Estate. An additional, 7,000 cubic yards of soils impacted with residual agricultural chemicals were moved from this site and stockpiled on non-project lands at Cutler. This material is expected to be used during the construction of the Cutler features.

An above-ground construction debris landfill was located just south of the Cutler Wetlands Flow-way alignment on Tract TA500-062. Historic aerial photography indicates that this property was used for agricultural prior to its use as a landfill. The landfill is assumed to have operated as a licensed RCRA facility since it was operational as late as 1992. The property owner, Lennar Homes, has completed removal of the landfill. Quarterly groundwater monitoring was conducted for several years subsequent to the landfill removal. The monitoring indicated that ammonia was above the groundwater quality standard. After several quarterly samples showed no more exceedances of groundwater quality standards, the local regulatory authority issued a no-further action letter indicating that site cleanup has been completed. It is possible that the construction of the flow-way on lands directly adjacent to the former landfill site might result in the disturbance of residual landfill pollutants in the groundwater that might have migrated off of the former landfill site. The USACE will work with the SFWMD to evaluate and document the risks and liability associated with constructing in the vicinity of the former landfill site. After project

completion, the flow-way will not have a significant impact on soil and groundwater conditions at the former landfill site since the planned flow-way will be lined with 6" of concrete to limit seepage losses into the groundwater.

West of the former landfill site at Cutler Wetlands, a soil sample collected from Tract TA500-062, Property Identification Number 3660170000080 found high concentrations of DDE, chlordane, and pyrene at concentrations indicating a "hot spot" rather than legal application of a agricultural chemical. The SFWMD instructed its contractor to perform a hot spot removal action to remove the soils from this site for off-site disposal. Follow-up testing indicated that all impacted soils were removed. In the L-31 Wetlands component, two parcels (PINs 3070180010390, and 3070180010380) have a history of prior agricultural use; however, evidence of illegal solid waste disposal was found on these two parcels which comprise approximately 20 acres. Prior to lands certification, the SFWMD will remove the solid waste from these parcels and conduct additional soil / groundwater testing.

With the exception of the HTRW sites discussed in the two paragraphs above, the soils with residual agricultural chemicals found on lands with a history of agricultural use are below actionable CERCLA concentrations for the present agricultural land use classification. Absent the conversion of the project lands to an aquatic restoration purpose, no CERCLA or RCRA response actions would be required on these lands.

All Phase I/II studies and corrective actions completed to date have been coordinated with the Florida Department of Environmental Protection (FDEP) and the United States Fish and Wildlife Service (USFWS). The FDEP is EPA's delegated RCRA authority in Florida so regulatory review will be coordinated through the FDEP rather than through the USEPA. In addition, Phase I/II reports have been reviewed by the USFWS to assess potential impacts to fish and wildlife resources. For the project lands evaluated to date, no significant risks to ecological receptors as a result of the arsenic and other residual agricultural chemical have been identified for the proposed project by either the USFWS or the FDEP. In addition, no significant risks to human health receptors were identified by the FDEP based on the current or projected future land use. Of the remaining 800 acres of land not yet acquired, the SFWMD and the USACE expect that the audits conducted on approximately 400 acres that lie east of the L-31E levee are not likely to result in any requirements from FDEP to conduct HTRW corrective actions. The remaining 400 acres of un-surveyed land that lies west of the L-31E Levee was farmed for several decades so it is probable that some residual arsenic contamination above residential and commercial/industrial thresholds will be found in this area. It is also possible, although not as likely, that other agricultural chemicals may be present at levels

exceeding applicable ecological guidelines as established by FDEP (i.e. SQAGs) or USFWS.

The USACE HTRW policy (ER 1165-2-132) directs that Construction of Civil Works projects in HTRW-contaminated areas should be avoided where practicable. On September 14, 2011, the ASA(CW) provided guidance on application of the HTRW policy to CERP Projects, with regard to certification of lands containing residual agricultural chemicals (Memorandum for Deputy Commanding General for Civil and Emergency Operations, Subject: Comprehensive Everglades Restoration Plan (CERP) – Residual Agricultural Chemicals, Dated September 14, 2011). If specific criteria are met, this policy memorandum allows residual agrichemicals to remain on project lands and allows the USACE to integrate response actions directly into the construction plan.

Pursuant to the ASA(CW)'s CERP Residual Agricultural Chemical Policy, the SFWMD has formerly requested that the USACE include a section on "Residual Agricultural Chemicals" in Section 7.16 of the main document of this PIR. Section 7.16 provides details regarding the portion of the project lands that are likely to comply with the policy and those that may not fit the policy. The section includes sufficient documentation necessary to demonstrate that applying this policy is prudent and cost-effective.

D.22 PROJECT SUPPORT

There is no known or anticipated opposition to the project by landowners in the project area or any known or anticipated landowner concerns related issues that could impact the acquisition process. If the sponsor is unable to negotiate the purchase of the lands from willing sellers, they do possess the authority to acquire lands by condemnation if necessary.

D.23 BASELINE COST ESTIMATE AND MCACES COST ESTIMATES BASED ON GROSS APPRAISAL

TABLE D-7 is the MCASES Cost Estimate and

TABLE D-8 is the BASELINE cost estimate associated with Alternative O Phase 1. The baseline cost estimate is generated based on a gross appraisal performed by CESAJ and verified through USACE South Atlantic Division (CESAD).

Engineering Regulation 1110-2-1302, paragraph 20.a states that: "cost risk analysis is the process of identifying and measuring the cost impact of project uncertainties of the estimated Total Project Cost (TPC). It shall be accomplished as a joint analysis between the cost engineer and the designers or appropriate PDT members that have specific knowledge and expertise on all possible project risks." The Engineering Regulation defines TPC as "all Federal and authorized non-Federal costs represented by the Civil Works Work Breakdown Structure features and respective estimates and schedules, including the lands and damages, relocations, project construction costs..."

As mandated in the 19 September 2007 memorandum, Subject: Initiatives to Improve Accuracy of Total Project Costs in Civil Works Feasibility Studies Requiring Congressional Authorization, NWW will direct the Agency Technical Review (ATR) "of cost estimates, construction schedules, and contingencies included in all decision documents requiring Congressional authorization." A Project Cost and Schedule Risk Analysis Report (CSRA) was completed by the Jacksonville District, Cost Engineering Branch, Engineering Division on December 28, 2010.

The Jacksonville District vetted the CSRA through the ATR process and NWW approved the contingencies. The report, located in Appendix B of the PIR, describes the methodology, process, key assumptions, and limitations of the risk analysis. It also explains the results, major findings, observations, and recommendations of the risk analysis.

Based on the CSRA a contingency of 32 percent or $19,655,000 was applied to the Real Estate cost estimates on the Selected Plan.

TABLE D-7: ALTERNATIVE O PHASE 1 MCASES COST ESTIMATE

MCASES PROJECT REAL ESTATE COSTS				
PROJECT: Biscayne Bay Coastal Wetlands, Phase 1, Alternative O, Phase 1				
DATE: FY 2011 Price Levels				
01A	PROJECT PLANNING	FEDERAL	NON-FEDERAL	TOTALS
	Other	131,000	0	131,000
	Project Partnership Agreement	15,000	0	15,000
	Subtotal	146,000	0	**146,000**
01B	LANDS AND DAMAGES/PERMITS			
01B40	Acquisition/Review of PS	455,967	0	455,967
01B20	Acquisition by PS	0	2,292,920	2,292,920
01B20	Prior Acquisition by PS	0	1,068,200	1,068,200
	Subtotal	455,967	3,361,120	**3,816,087**
01F	PL 91-646 ASSISTANCE			
01F20	By PS	0	0	0
	Subtotal	0	0	**0**
01R	REAL ESTATE LAND PAYMENTS			
01R1B	Land Payments by PS	0	57,366,878	57,366,878
01R2B	PL91-646 Relocation Payment by PS			0
01R2D	Review of PS		0	0
	Subtotal	0	57,366,878	57,366,878
	SUBTOTALS	**601,967**	**60,727,998**	**61,329,965**
	SUBTOTALS ROUNDED	602,000	60,728,000	61,330,000
	Contingency 32% (ROUNDED)	193,000	19,462,000	19,655,000
	TOTALS ROUNDED	**795,000**	**80,190,0000**	**80,985,000**

TABLE D-8: ALTERNATIVE O PHASE 1 BASELINE COST ESTIMATE

SUMMARY OF BASELINE COST ESTIMATE				
PROJECT: BISCAYNE BAY COASTAL WETLANDS				
DATE: FY 2011 Price Levels				
LANDS AND DAMAGES:				
ESTATE	ACRES	NON-FEDERAL COST	FEDERAL COST	TOTAL
FEE-Private	414.83	$5,377,420	$0	
FEE-Miami -Dade Parks & Recreation	18.35	$4,433,750	$0	
FEE-Miami –Dade DERM	35	$800,000		
FEE-Miami –Dade Water & Sewer	20	$300,000		
FEE-SFWMD	933.14	$19,647,898	$0	
OTHER				
USA-Provided by Letter Agreement or Memorandum of Agreement	937.27	$0	$0	
EASEMENT			$0	
FP&L	148.90	$0	$0	
Miami –Dade Parks and Recreation to be provided by Supplemental Agreement	181.20	$1,603,135		
Miami -Dade DERM to be provided by Supplemental Agreement	577.90	$17,214,425		
Miami -Dade Water & Sewer to be provided by Supplemental Agreement	383.40	$5,751,000		
State of Florida to be provided by Supplemental Agreement	111.06	$2,079,250	$0	
SUBTOTAL (Rounded)	3761	$57,206,878	$0	$57,206,878
IMPROVEMENTS	1	$160,000	$0	
SEVERANCE:	0	$0	$0	
MINERALS		$0	$0	
SUBTOTAL	0	$160,000	$0	$160,000
TOTAL LANDS AND DAMAGES				**$57,366,878**
ACQ/ADMIN				
FED			$601,967	
NON-FED EXPENDED		$1,068,200	$0	
NON-FED FUTURE		$2,292,920	$0	
SUBTOTAL		$3,361,120	$601,967	
SUBTOTAL		**$60,727,998**	**$601,967**	
SUBTOTAL (ROUNDED)		$60,728,000	$602,000	
CONTINGENCY = 32% (ROUNDED)		$19,462,000	$193,000	
TOTAL PROJECT COSTS (ROUNDED)		**$80,190,000**	**$795,000**	
TOTAL ESTIMATED RE COSTS (ROUNDED)				**$80,985,000**

D.24 REAL ESTATE MAPS

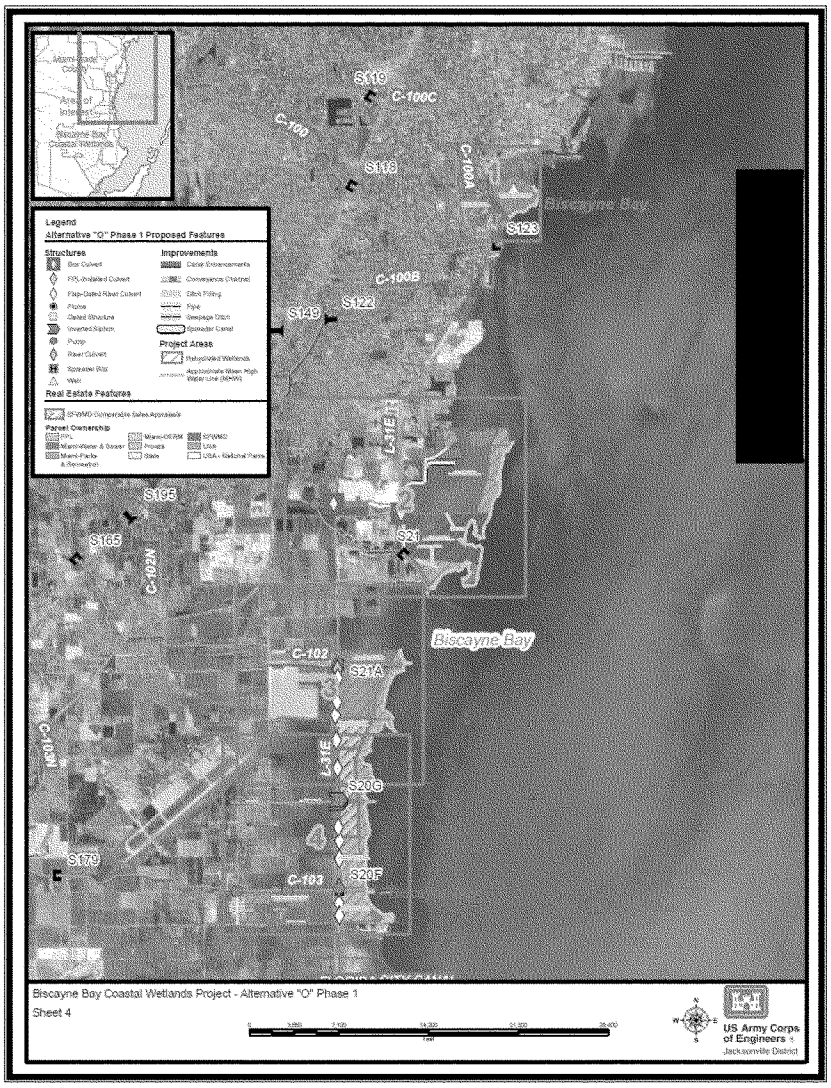

FIGURE D-2: BISCAYNE BAY COASTAL WETLANDS – OVERALL PROJECT

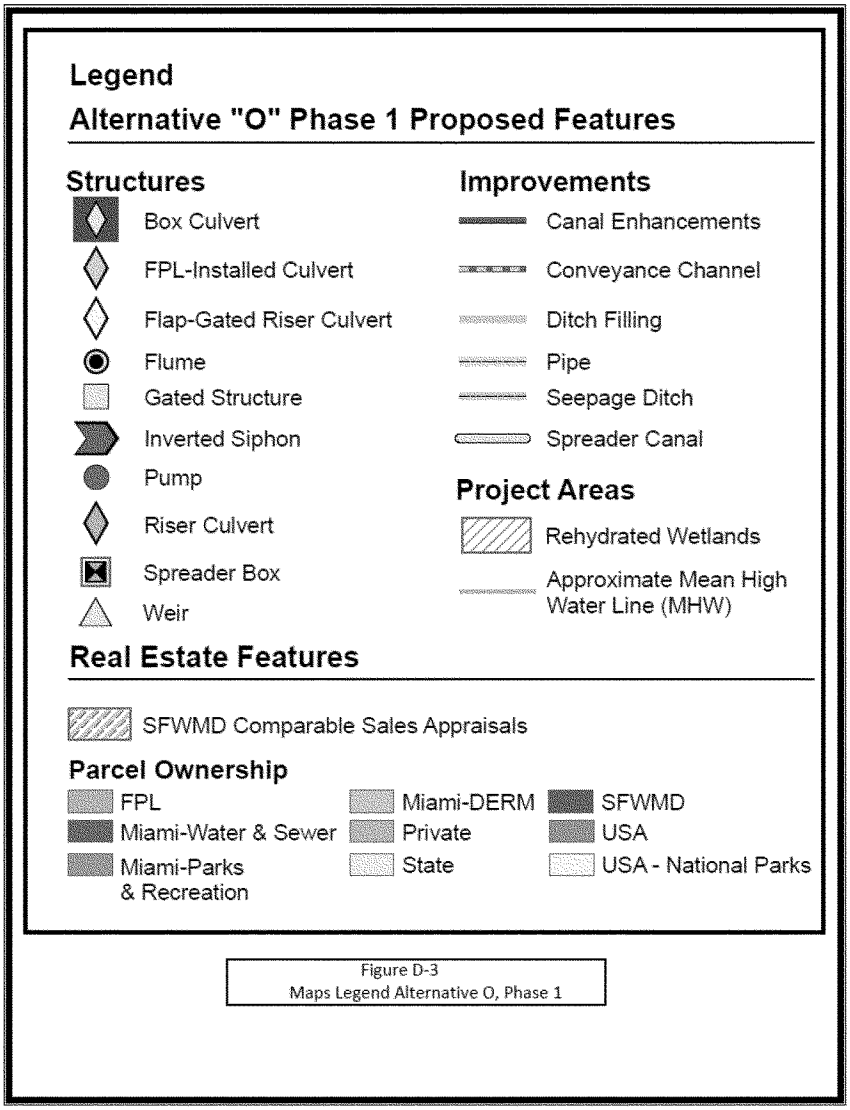

FIGURE D-3: MAPS LEGEND - BBCW ALTERNATIVE O, PHASE 1

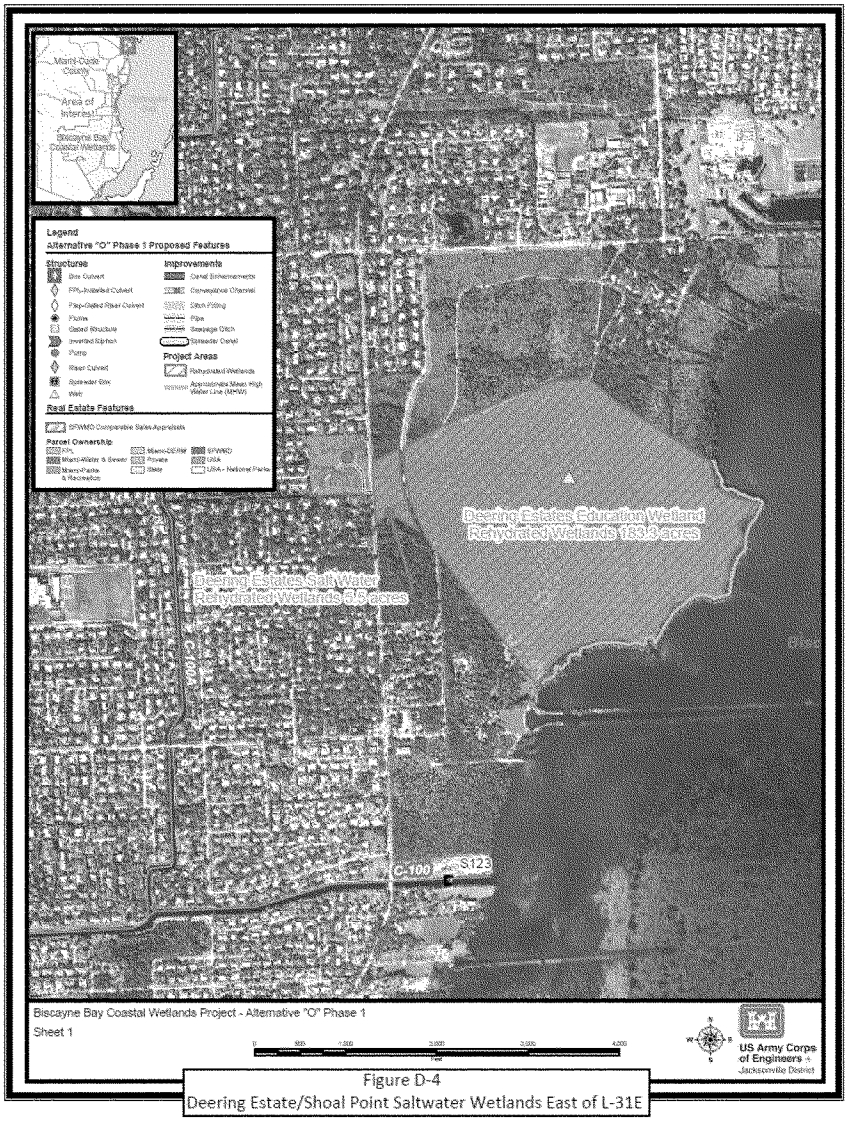

FIGURE D-4: DEERING ESTATE / SHOAL POINT - SALTWATER WETLANDS EAST OF L-31E

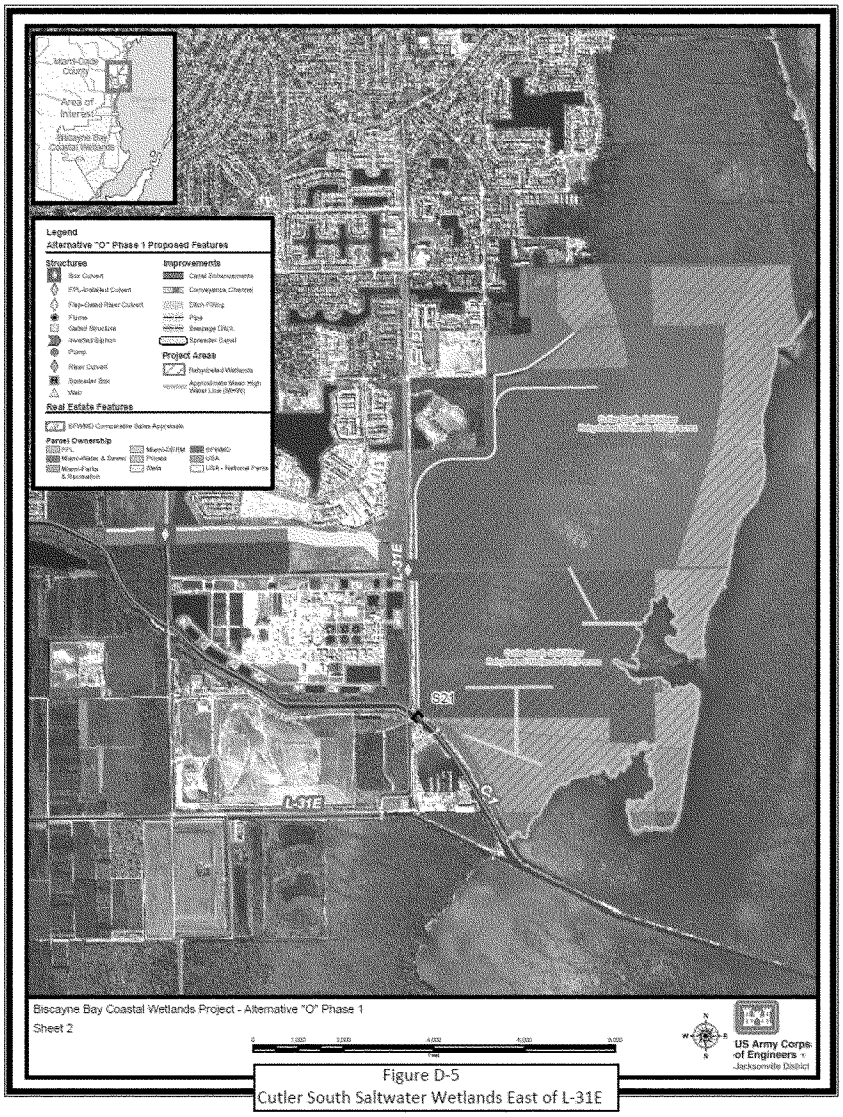

Figure D-5
Cutler South Saltwater Wetlands East of L-31E

FIGURE D-5: CUTLER SOUTH - SALTWATER WETLANDS EAST OF L-31E

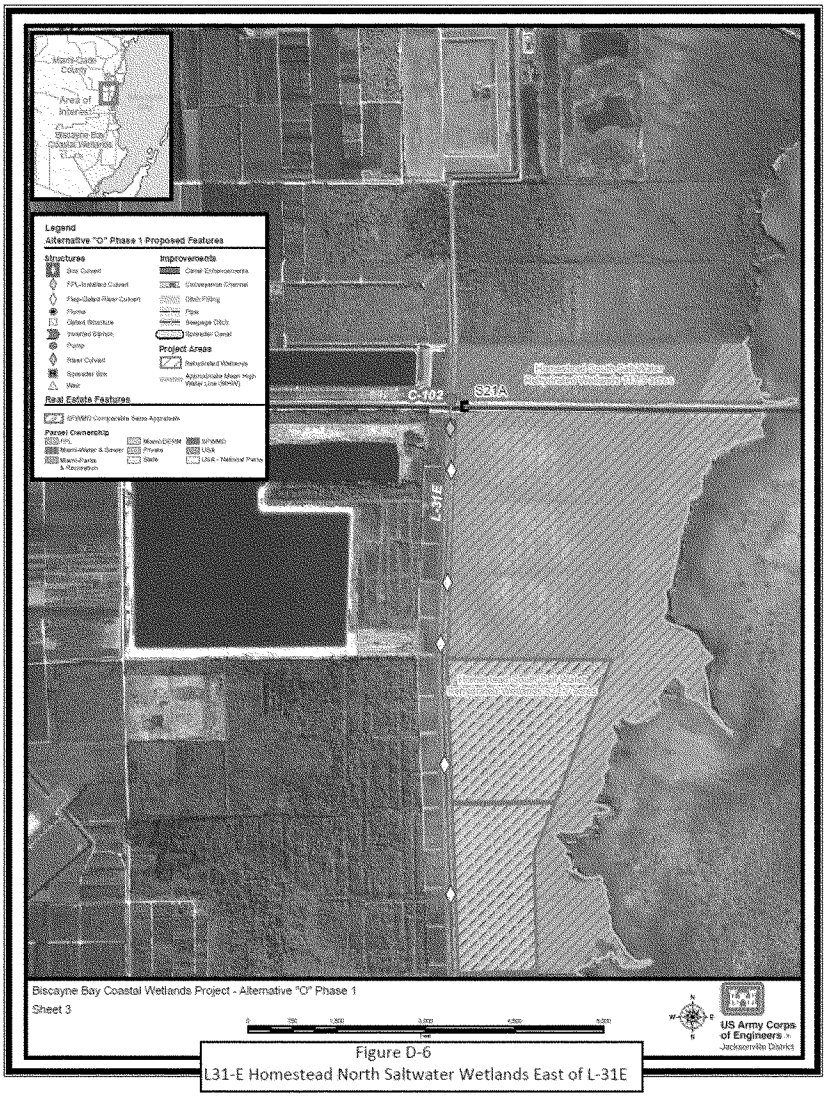

Figure D-6
L31-E Homestead North Saltwater Wetlands East of L-31E

FIGURE D-6: L-31E HOMESTEAD NORTH – SALTWATER WETLANDS EAST OF L-31E

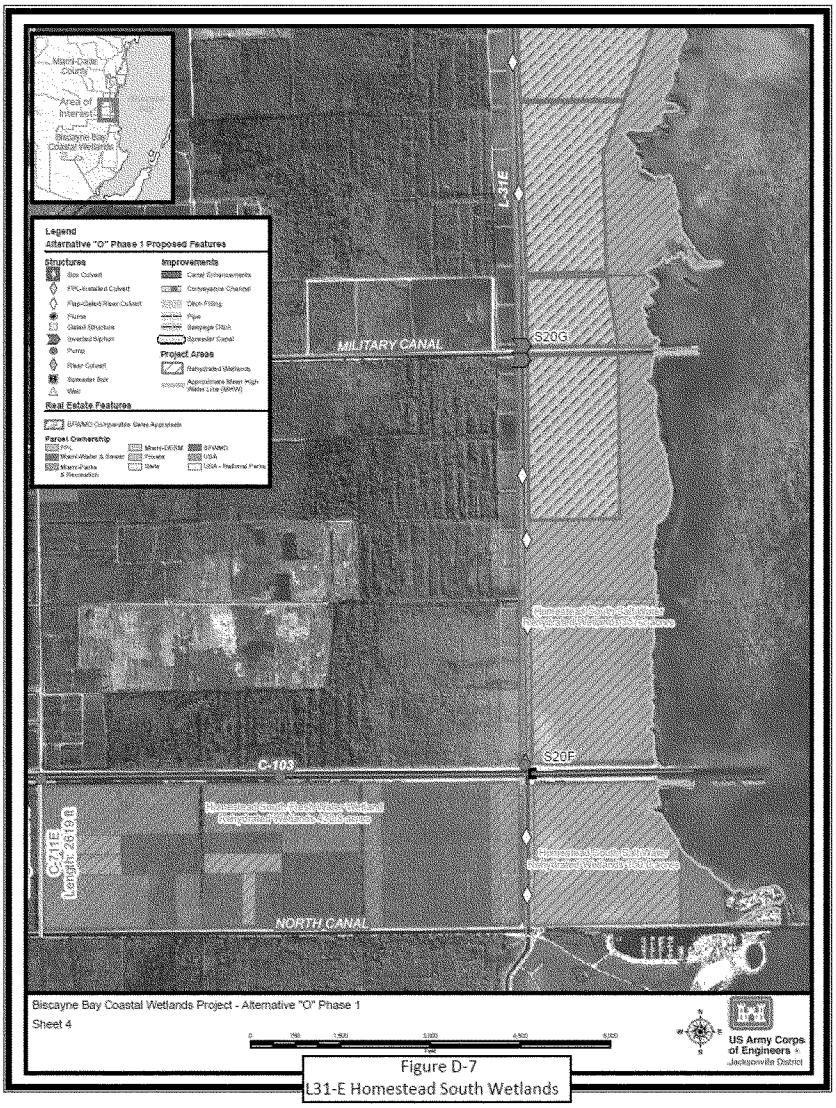

FIGURE D-7: L-31E HOMESTEAD SOUTH – WETLANDS

D.25 EXHIBITS

Exhibit "A"
SEC. 390: EVERGLADES ECOSYSTEM RESTORATION

(a) IN GENERAL.--On July 1, 1996, out of any funds in the Treasury not otherwise appropriated, the Secretary of the Treasury shall provide $200,000,000 to the Secretary of the Interior to carry out this section.
(b) ENTITLEMENT.--The Secretary of the Interior (referred to in this section as the "Secretary")--
(1) shall be entitled to receive the funds made available under subsection (a);
(2) shall accept the funds; and
(3) shall use the funds to--
(A) conduct restoration activities in the Everglades ecosystem in South Florida, which shall include the acquisition of real property and interests in real property located within the Everglades ecosystem; and
(B) fund resource protection and resource maintenance activities in the Everglades ecosystem.
(c) SAVINGS PROVISION.--Nothing in this subsection precludes the Secretary from transferring funds to the Army Corps of Engineers, the State of Florida, or the South Florida Water Management District to carry out subsection (b)(3).
(d) DEADLINE.--The Secretary shall use the funds made available under subsection (a) for restoration activities referred to in subsection (b)(3) not later than December 31, 1999.
(e) REPORT TO CONGRESS.--For each of calendar years 1996 through 1999, the Secretary shall submit an annual report to Congress describing all activities carried out under subsection (b)(3).
(f) SEPARATE AND ADDITIONAL EVERGLADES RESTORATION ACCOUNT.--
(1) ESTABLISHMENT.--There is established in the Treasury a special account (to be known as the "Everglades Restoration Account"), which shall consist of such funds as may be deposited in the account under paragraph (2). The account shall be separate, and in addition to, funds deposited in the Treasury under subsection (a).
(2) SOURCE OF FUNDS FOR ACCOUNT.--
(A) PROCEEDS FROM SURPLUS PROPERTY.--
(i) IN GENERAL.--Subject to subparagraph (B), the Administrator shall deposit in the special account all funds received by the Administrator, on or after the date of enactment of this Act, from the disposal pursuant to the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471 et seq.) of surplus real property located in the State of Florida.
ii) AVAILABILITY AND DISPOSITION OF FEDERAL LAND.--
(I) IDENTIFICATION.--Any Federal real property located in the State of Florida (excluding lands under the administrative jurisdiction of the Secretary that are

set aside for conservation purposes) shall be identified for disposal or exchange under this subsection and shall be presumed available for purposes of this subsection unless the head of the agency controlling the property determines that there is a compelling program need for any property identified by the Secretary.
(II) AVAILABILITY.--Property identified by the Secretary for which there is no demonstrated compelling program need shall, not later than 90 days after a request by the Secretary, be reported to the Administrator and shall be made available to the Administrator who shall consider the property to be surplus property for purposes of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471 et seq.).
(III) PRIORITIZATION OF DISPOSITION.—The Administrator may prioritize the disposition of property made available under this subparagraph to permit the property to be sold as quickly as practicable in a manner that is consistent with the best interests of the Federal Government.
(B) LIMIT ON TOTAL AMOUNT OF DEPOSITS.--The total amount of funds deposited in the special account under subparagraph (A) shall not exceed $100,000,000.
(C) EFFECT ON CLOSURE OF MILITARY INSTALLATIONS.--Nothing in this section alters the disposition of any proceeds arising from the disposal of real property pursuant to a base closure law.
(3) USE OF SPECIAL ACCOUNT.--Funds in the special account shall be available to the Secretary until expended under this paragraph. The Secretary shall use funds in the special account to assist in the restoration of the Everglades ecosystem in South Florida through--
(A) subject to paragraph (4), the acquisition of real property and interests in real property located within the Everglades ecosystem; and
(B) the funding of resource protection and resource maintenance activities in the Everglades ecosystem.
(4) STATE CONTRIBUTION.--The Secretary may not expend any funds from the special account to acquire a parcel of real property, or an interest in a parcel of real property, under paragraph (3)(A) unless the Secretary obtains, or has previously obtained, a contribution from the State of Florida in an amount equal to not less than 50 percent of the appraised value of the parcel or interest to be acquired, as determined by the Secretary.
(5) DEFINITIONS.--In this subsection:
(A) ADMINISTRATOR.--The term "Administrator" means the Administrator of General Services.
(B) BASE CLOSURE LAW.--The term "base closure law" means each of the following:
(i) The Defense Base Closure and Realignment Act of 1990 (part A of title XXIX of Public Law 101-510; 10 U.S.C. 2687 note).
(ii) Title II of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526; 10 U.S.C. 2687 note).
(iii) Section 2687 of title 10, United States Code.

(iv) Any other similar law enacted after the date of enactment of this Act.
(C) EVERGLADES ECOSYSTEM.--The term "Everglades ecosystem" means the Florida Everglades Restoration area that extends from the Kissimmee River basin to Florida Bay.
(D) EXCESS PROPERTY.--The term "excess property" has the meaning provided in section 3 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 472).
(E) EXECUTIVE AGENCY.--The term "executive agency" has the meaning provided in section 3 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 472).
(F) SPECIAL ACCOUNT.--The term "special account" means the Everglades Restoration Account established under paragraph (1).
(G) SURPLUS PROPERTY.--The term "surplus property" has the meaning provided in section 3 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 472).
(g) REPORT TO DETERMINE THE FEASIBILITY OF ADDITIONAL LAND ACQUISITION AND RESTORATION ACTIVITIES.--
*(1) IN GENERAL.--The Secretary shall conduct an investigation to determine what, if any, unreserved and unappropriated Federal lands (or mineral interests in any such lands) under the administrative jurisdiction of the Secretary are suitable *1025 for disposal or exchange for the purpose of conducting restoration activities in the Everglades region.*
(2) CONSERVATION LANDS.--No lands under the administrative jurisdiction of the Secretary that are set aside for conservation purposes shall be identified for disposal or exchange under this subsection.
(3) FLORIDA.--In carrying out this subsection, the Secretary shall, to the maximum extent practicable, determine which lands and mineral interests located within the State of Florida are suitable for disposal or exchange before making the determination for eligible lands or interests in other States.
(4) PUBLIC ACCESS.--In carrying out this subsection, the Secretary shall consider that in disposing of lands, the Secretary shall retain such interest in the lands as may be necessary to ensure that the general public is not precluded from reasonable access to the lands for purposes of fishing, hunting, or other recreational uses.
(5) REPORT.--Not later than 1 year after the date of enactment of this Act, the Secretary shall submit a report to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate describing the results of the investigation conducted under this subsection. The report shall describe the specific parcels identified under this subsection, establish the priorities for disposal or exchange among the parcels, and estimate the values of the parcels.

Exhibit "B"
SECTION 601 (E)(3) OF THE WATER RESOURCES DEVELOPMENT ACT OF 2000, (PL 106-541)

(e) COST SHARING.
(3) FEDERAL ASSISTANCE.
(A) IN GENERAL.--The non-Federal sponsor with respect to a project authorized by subsection (b), (c), or (d) may use Federal funds for the purchase of any land, easement, rights-of-way, or relocation that is necessary to carry out the project if any funds so used are credited toward the Federal share of the cost of the project.
(B) AGRICULTURE FUNDS.--Funds provided to the non-Federal sponsor under the Conservation Restoration and Enhancement Program (CREP) and the Wetlands Reserve Program (WRP) for projects in the Plan shall be credited toward the non-Federal share of the cost of the Plan if the Secretary of Agriculture certifies that the funds provided may be used for that purpose. Funds to be credited do not include funds provided under section 390 of the Federal Agriculture Improvement and Reform Act of 1996 (110 Stat.1022).

Exhibit "C"
FLORIDA STATUTES

TITLE XXVIII. NATURAL RESOURCES; CONSERVATION, RECLAMATION, AND USE CHAPTER 373. WATER RESOURCES

PART I. STATE WATER RESOURCE PLAN

373.1501. South Florida Water Management District as local sponsor
(1) As used in this section and s. 373.026(8), the term:
(b) "Department" means the Department of Environmental Protection.
(c) "District" means the South Florida Water Management District.
(f) "Project" means the Central and Southern Florida Project.
(g) "Project Component" means any structural or operational change, resulting from the restudy, to the Central and Southern Florida Project as it existed and was operated as of January 1, 1999.
(h) "Restudy" means the Comprehensive Review Study of the Central and Southern Florida Project, for which Federal participation was authorized by the Federal Water Resources Development Acts of 1992 and 1996 together with related Congressional resolutions and for which participation by the South Florida Water Management District is authorized by this section. The term includes all actions undertaken pursuant to the aforementioned authorizations which will result in recommendations for modifications or additions to the Central and Southern Florida Project.
(2) The Legislature finds that the restudy is important for restoring the Everglades ecosystem and sustaining the environment, economy, and social wellbeing of South Florida. It is the intent of the Legislature to facilitate and support the restudy through a process concurrent with Federal Government review and Congressional authorization. Nothing in this section is intended in any way to limit Federal agencies or Congress in the exercise of their duties and responsibilities. It is further the intent of the Legislature that all project components be implemented through the appropriate processes of this chapter and be consistent with the balanced policies and purposes of this chapter, specifically s. 373.016.
(4) The district is authorized to act as local sponsor of the project for those project features within the district as provided in this subsection and subject to the oversight of the department as further provided in s. 373.026. The district may:
(a) Act as local sponsor for all project features previously authorized by Congress;
(b) Continue data gathering, analysis, research, and design of project components, participate in preconstruction engineering and design documents for project components, and further refine the Comprehensive Plan of the restudy as a guide and framework for identifying other project components;
(c) Construct pilot projects that will assist in determining the feasibility of technology included in the Comprehensive Plan of the restudy; and

(d) Act as local sponsor for project components.
(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 combination 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 for 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 for 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.
(6) The department and the district shall expeditiously pursue implementation of project modifications previously authorized by Congress or the Legislature, including the Everglades Construction Project. Project components should complement and should not delay project modifications previously authorized.
(7) Notwithstanding any provision of this section, nothing herein shall be construed to modify or supplant the authority of the district or the department to prevent harm to the water resources as provided in this chapter.
(8) Final agency action with regard to any project component subject to s. 373.026(8)(b) shall be taken by the department. Actions taken by the district

pursuant to subsection (5) shall not be considered final agency action. Any petition for formal proceedings filed pursuant to ss. 120.569 and 120.57 shall require a hearing under the summary hearing provisions of s. 120.574, which shall be mandatory. The final hearing under this section shall be held within 30 days after receipt of the petition by the Division of Administrative Hearings.

Exhibit "D"
SEC. 373.139: ACQUISITION OF REAL PROPERTY

(1) The Legislature declares it to be necessary for the public health and welfare that water and water-related resources be conserved and protected. The acquisition of real property for this objective shall constitute a public purpose for which public funds may be expended.
(2) The governing board of the district is empowered and authorized to acquire in fee or less than fee title to real property, easements and other interests or rights therein, by purchase, gift, devise, lease, eminent domain, or otherwise for flood control, water storage, water management, conservation and protection of water resources, aquifer recharge, water resource and water supply development, and preservation of wetlands, streams, and lakes. Eminent domain powers may be used only for acquiring real property for flood control and water storage or for curing title defects or encumbrances to real property owned by the district or to be acquired by the district from a willing seller.
(3) The initial 5-year work plan and any subsequent modifications or additions thereto shall be adopted by each water management district after a public hearing. Each water management district shall provide at least 14 days' advance notice of the hearing date and shall separately notify each county commission within which a proposed work plan project or project modification or addition is located of the hearing date.
(a) Appraisal reports, offers, and counteroffers are confidential and exempt from the provisions of s. 119.07(1) until an option contract is executed or, if no option contract is executed, until 30 days before a contract or agreement for purchase is considered for approval by the governing board. However, each district may, at its discretion, disclose appraisal reports to private landowners during negotiations for acquisitions using alternatives to fee simple techniques, if the district determines that disclosure of such reports will bring the proposed acquisition to closure. In the event that negotiation is terminated by the district, the appraisal report, offers, and counteroffers shall become available pursuant to s. 119.07(1). Notwithstanding the provisions of this section and s. 259.041, a district and the Division of State Lands may share and disclose appraisal reports, appraisal information, offers, and counteroffers when joint acquisition of property is contemplated. A district and the Division of State Lands shall maintain the confidentiality of such appraisal reports, appraisal information, offers, and counteroffers in conformance with this section and s. 259.041, except in those cases in which a district and the division have exercised discretion to disclose such information. A district may disclose appraisal information, offers, and counteroffers to a third party who has entered into a contractual agreement with the district to work with or on the behalf of or to assist the district in connection with land acquisitions. The third party shall maintain the confidentiality of such information in conformance with this section. In addition, a district may use, as its own, appraisals obtained by a third party provided the appraiser is selected

from the district's list of approved appraisers and the appraisal is reviewed and approved by the district.

(b) The Secretary of Environmental Protection shall release moneys from the appropriate account or trust fund to a district for pre-acquisition costs within 30 days after receipt of a resolution adopted by the district's governing board which identifies and justifies any such pre-acquisition costs necessary for the purchase of any lands listed in the district's 5-year work plan. The district shall return to the department any funds not used for the purposes stated in the resolution, and the department shall deposit the unused funds into the appropriate account or trust fund.

(c) The Secretary of Environmental Protection shall release acquisition moneys from the appropriate account or trust fund to a district following receipt of a resolution adopted by the governing board identifying the lands being acquired and certifying that such acquisition is consistent with the 5-year work plan of acquisition and other provisions of this section. The governing board also shall provide to the Secretary of Environmental Protection a copy of all certified appraisals used to determine the value of the land to be purchased. Each parcel to be acquired must have at least one appraisal. Two appraisals are required when the estimated value of the parcel exceeds $1 million. However, when both appraisals exceed $1 million and differ significantly, a third appraisal may be obtained. If the purchase price is greater than the appraisal price, the governing board shall submit written justification for the increased price. The Secretary of Environmental Protection may withhold moneys for any purchase that is not consistent with the 5-year plan or the intent of this section or that is in excess of appraised value. The governing board may appeal any denial to the Land and Water Adjudicatory Commission pursuant to s. 373.114.

(4) The governing board of the district may purchase tax certificates or tax deeds issued in accordance with chapter 197 relating to property eligible for purchase under this section.

(5) This section shall not limit the exercise of similar powers delegated by statute to any state or local governmental agency or other person.

(6) A district may dispose of land acquired under this section pursuant to s. 373.056 or s. 373.089. However, no such disposition of land shall be made if it would have the effect of causing all or any portion of the interest on any revenue bonds issued pursuant to s. 259.101 or s. 259.105 to fund the acquisition programs detailed in this section to lose the exclusion from gross income for purposes of Federal income taxation. Revenue derived from such disposition may not be used for any purpose except the purchase of other lands meeting the criteria specified in this section or payment of debt service on revenue bonds or notes issued under s. 373.584.

(7) The districts have the authority to promulgate rules that include the specific process by which land is acquired; the selection and retention of outside appraisers, surveyors, and acquisition agents; and public notification. Rules adopted pursuant to this subsection shall be submitted to the President of the

Senate and the Speaker of the House of Representatives, for review by the Legislature, no later than 30 days prior to the 2001 Regular Session and shall become effective only after legislative review. In its review, the Legislature may reject, modify, or take no action relative to such rules. The districts shall conform such rules to changes made by the Legislature, or, if no action was taken by the Legislature, such rules shall become effective.

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

I. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? **YES**

b. Does the sponsor have the power of eminent domain for this project? **YES**

c. Does the sponsor have "quick-take" authority for this project? **YES**

d. Are any of the lands/interests in land required for the project located outside the sponsor's political boundary? **NO**

e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? YES, Lands owned by the United States of America, National Park Service will be provided by Memorandum of Agreement and the lands owned by the State of Florida will be provided by Supplemental Agreement in conformity with the terms of ARTICLE III - LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS AND COMPLIANCE WITH PUBLIC LAW 91-646, AS AMENDED of the MASTER AGREEMENT BETWEEN THE DEPARTMENT OF THE ARMY AND SOUTH FLORIDA WATER MANAGEMENT DISTRICT FOR COOPERATION IN CONSTRUCTING AND OPERATING, MAINTAINING, REPAIRING, REPLACING AND REHABILITATING AUTHORIZED PROJECTS UNDER THE COMPREHENSIVE EVERGLADES RESTORATION PLAN, entered into on August 13, 2009.

II. Human Resource Requirements:

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? **NO**

b. If the answer to II.a. is "yes," has a reasonable plan been developed to provide such training? **N/A**

c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? **YES**

d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? **YES**

e. Can the sponsor obtain contractor support, if required in a timely fashion? **YES**

f. Will the sponsor likely request USACE assistance in acquiring real estate? **NO**

III. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site? **YES**

b. Has the sponsor approved the project/real estate schedule/milestones? **YES**

IV. Overall Assessment:

a. Has the sponsor performed satisfactorily on other USACE projects? **YES**

b. With regard to this project, the sponsor is anticipated to be: highly capable/fully capable/moderately capable/marginally capable/insufficiently capable. **HIGHLY CAPABLE**

V. Coordination:

a. Has this assessment been coordinated with the sponsor? **YES**
b. Does the sponsor concur with this assessment? **YES**

Prepared by:

_____
KARL J. NIXON
Chief, Appraisal Branch
REAL ESTATE DIVISION
JACKSONVILLE DISTRICT

Reviewed and approved by:

_____
JOHN M. BAKER
Chief, Real Estate Division
REAL ESTATE DIVISION
JACKSONVILLE DISTRICT

APPENDIX E

AGENCY AND PUBLIC COORDINATION

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E.0 PUBLIC AND AGENCY COODINATION

E.1 COOPERATING AGENCIES

In accordance with regulations pertaining to the National Environmental Policy Act (NEPA) (Title 40 of the Code of Federal Regulations [C.F.R.], part 1501.6), the following agencies were formally invited to become a cooperating agency for an Environmental Impact Statement (EIS) on the Biscayne Bay Coastal Wetlands (BBCW) project:

- US Environmental Protection Agency (EPA),
- US Fish and Wildlife Service (FWS),
- National Park Service (NPS),
- Florida Fish and Wildlife Conservation Commission (FWC),
- Florida Department of Environmental Protection (FDEP),
- US Geological Survey (USGS),
- Miami-Dade Department of Environmental Resources Management (DERM), and
- National Oceanographic and Atmospheric Administration / National Marine Fisheries Service (NOAA Fisheries Service)

The invitations to become a cooperating agency for this project were sent by letter. An example of that letter is attached in this section. Two responses have been received as of the time of the generation of this report: 1) the EPA conditionally accepted the invitation to be a cooperating agency and 2) the FWS declined the invitation (see attached letters). The other state and Federal agencies that were formally invited have not responded.

The following state and Federal agencies are not officially noted as cooperating agencies for the purposes of the NEPA, but are members of the Project Development Team (PDT). As PDT members, they have contributed to the development of the integrated Project Implementation Report and Environmental Impact Statement (PIR/EIS):

- FWS,
- FDEP,
- NPS, and
- DERM.

These agencies are considered partners in the Comprehensive Everglades Restoration Plan (CERP) projects. The EPA is an officially noted cooperating agency, member of the PDT, and contributor to the development of the PIR/EIS.

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

Regional Director
U.S. Fish and Wildlife Service
1875 Century Blvd
Atlanta, Georgia 30345-3301

Dear Sir/Madam:

In accordance with regulations pertaining to the National Environmental Policy Act (Title 40 of the Code of Federal Regulations, part 1501.6), I am formally inviting your agency to become a cooperating agency for an Environmental Impact Statement (EIS) on the Biscayne Bay Coastal Wetlands project. The goal of the Biscayne Bay Coastal Wetlands project is to redistribute freshwater runoff from the watershed into Biscayne Bay, away from the canal discharges that exist today and provide a more natural and historic flow through existing and or improved coastal wetlands. The plan formulation for this project focused on providing the proper quality, timing, and distribution of available water to meet the goals, objectives, and purposes for the project as described in the Restudy. Please see the enclosed figure of the Biscayne Bay Coastal Wetlands project study area.

Please note that cooperating agency status involves actions and responsibilities beyond that normally associated with a commenting or permitting agency. We appreciate and acknowledge your participation and cooperation in the project formulation to this point, and look forward to your continued cooperation in the preparation of the Draft Project Implementation Report / Environmental Impact Statement.

The formulation of the project, alternatives, and mitigation have been in accordance with Engineer Regulation ER 1105-2-100 and have fully considered a range of environmental, economic, and social factors. As a cooperating agency, you must fully consider the views, needs, and benefits of competing interests.

No cooperating agency will have "veto" over the selection of the project plan, alternatives, or mitigation measures. Under your status as a commenting agency, you may recommend actions not ultimately adopted or implemented by the lead agency. You may also impose requirements to the extent allowed under your legal authority as a permitting agency. Conflict with the lead agency may be resolved through mediation, placing a dissenting opinion in the EIS, withdrawing your cooperating agency status, or the Lead agency pursuing an EIS without you as a cooperating agency. For additional information see the enclosed "Rights and Responsibilities of Lead and Cooperating Agencies" (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Council on Environmental Quality, 1981).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

July 23, 2007

Mr. Stuart J. Appelbaum
Chief, Planning Division
Environmental Branch
U.S. Army Corps of Engineers – Jacksonville
P.O. Box 4970
Jacksonville, FL 32232-0019

SUBJ: U.S. Army Corps of Engineers' (COE) Cooperating Agency Request for Biscayne Bay Coastal Wetlands EIS; Biscayne Bay, FL

Dear Mr. Appelbaum:

The U.S. Environmental Protection Agency (EPA) has received your letter dated June 28, 2007, offering this Agency an opportunity to be a cooperating agency for the subject EIS. The goal of this proposed project "...is to redistribute freshwater runoff from the watershed into Biscayne Bay, away from the canal discharges that exist today and provide a more natural and historic flow through existing and/or improved coastal wetlands."

As you know, EPA is strongly supportive of Everglades restoration efforts and has been a cooperating agency for a number of the Jacksonville District's CERP EISs. In an effort to continue such cooperation, EPA accepts the COE's offer to be a cooperating agency for the proposed EIS. However, our acceptance for this effort is conditioned in terms of our level of involvement. Due to staff and travel resource limitations, EPA does not expect to have the same level of involvement as on previous endeavors. However, to the extent feasible, we can offer NEPA scoping comments and our early review/technical expertise for water quality/wetland sections, and we can also participate in teleconferences and meetings with stakeholders to discuss important milestones.

It should also be noted that our status as a cooperating agency has no effect on our review responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) or Section 309 of the Clean Air Act. Similarly, although we continue to support Everglades restoration, our being a cooperating agency should not imply that EPA will necessarily concur with all aspects of the COE EIS.

2

We appreciate your coordination with us. The EPA technical contact will be Eric Hughes (904/232-2464) located in your Jacksonville District office, while our NEPA contact will be Chris Hoberg (404/562-9619) of my staff in the EPA Atlanta regional office.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

United States Department of the Interior

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

August 17, 2007

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

Attention: Brad Tarr

Service Federal Activity Code: 41420-2006-FA-0261
Date Received: July 9, 2007
Project: Biscayne Bay Coastal Wetlands Project
Counties: Miami-Dade

Dear Mr. Appelbaum:

Thank you for your letter dated June 28, 2007, in which you formally invited the Fish and Wildlife Service (Service) to become a cooperating agency for an Environmental Impact Statement (EIS) on the Biscayne Bay Coastal Wetlands Project (BBCWP).

The goal of the BBCWP is to redistribute freshwater runoff from harmful point source discharges into Biscayne Bay through major conveyance canals to a more natural and historic flow through coastal wetlands. This redistribution should provide ecological benefits to the coastal wetlands and nearshore bay areas. The plan formulation for the project is focused on providing the proper quality, timing, and distribution of available water to meet the goals and objectives of the project as described in the Central and Southern Florida Project Comprehensive Review Study.

The Service has been fully involved in all aspects of the planning of this project since its inception, including the development of performance measures, formulation of project alternatives, determination of ecological benefits, development of monitoring plans, and other project planning components. We have submitted numerous Planning Aid Letters and Planning Aid Reports in support of this project. The U.S. Army Corps of Engineers, the South Florida Water Management District, the National Park Service, Miami-Dade County Department of Environmental Resource Management, and the Service continue planning in a collaborative environment to maximize ecological benefits of the BBCWP while minimizing potential adverse impacts to our valuable natural resources and ecosystem services. The biologists and resource managers on this study team have reached consensus on many planning components for the study, but other issues must be addressed through communication at future steps along the process.

TAKE PRIDE IN AMERICA

Stuart J. Appelbaum Page 2

Although we intend to continue our work on the study team, the Service declines your invitation to become a cooperating agency for the development of the EIS on this project. We will continue to take a broad system-wide perspective and a balanced approach in our evaluation of the ecological effects of the proposed action. The Service must balance its role as a Project Delivery Team member with its statutory responsibilities to independently review this proposed action under the Fish and Wildlife Coordination Act and the Endangered Species Act.

Thank you for the opportunity to provide comments on this very important and timely project. The Service greatly appreciates your efforts in helping to protect the fish and wildlife resources of south Florida. If you have questions regarding this letter, please call Patrick Pitts at 772-562-3909, extension 250.

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

cc:
District, West Palm Beach, Florida (Matt Morrison)
NPS, Homestead, Florida (Ed Kearns)
Miami-Dade DERM, Miami, Florida (Steve Blair)
FWC, Vero Beach, Florida (Dr. Joseph Walsh)
Service, Jacksonville, Florida (Miles Meyer)
Service, Atlanta, Georgia (Jeff Weller)

E.2 NATIONAL ENVIRONMENTAL POLICY ACT PUBLIC MEETINGS

NEPA coordination began with a three-day workshop from October 28-30, 2002 at the Deering Estate, in Miami, Florida. The workshop, advertised through newspapers, radio news releases, and email notices, introduced the project's goals and objectives, discussed preliminary ecological performance measures, facilitated numerous presentations by non-agency scientists on the history and the present status of the Biscayne Bay area, and provided opportunities for the public to voice their concerns on an array of project issues. On March 7, 2003 a Notice of Intent to prepare an EIS was published in the Federal Register (Vol. 68, Number 45). A stakeholders meeting, consisting of concerned members of agricultural, fishing, and environmental groups, was held on October 22, 2003 at the Chamber South Conference Center on 6410 SW 80th Street, in Miami, Florida. Additionally, a public workshop, discussing issues, concerns, opportunities and constraints related to the project, was held on October 28, 2003; at the John D. Campbell Agricultural Center, located at SW 288th Street, Homestead, Florida. This information-gathering workshop served to exchange information among team members and helped assist in the development of alternative plans, as well as pointing out potential constraints to project development.

A Notice of Availability (NOA) of a draft PIR/EIS was published in the Federal Register on March 19, 2010. Concurrent to the 45-day public and agency review, a public meeting was held on April 21, 2010 at the Deering Estate in Miami-Dade County, Florida. The meeting provided information on the Selected Plan, along with an opportunity for the public to ask questions about the project. A comment/response matrix from that meeting is contained in Annex B of this report.

A number of subsequent meetings open to the public have been held to date. CERP policy is for advance notification of meetings on the CERP website and digital calendar. The meetings generally include updates and discussion by the PDT, followed by a public comment period. The following is a list of public meetings held to date.

NEPA Scoping Meeting	October 28, 2002
Biscayne Bay Coastal Wetlands PDT Meeting	May 14, 2004
Regional PDT Meeting	July 13-15, 2004
Regional PDT Meeting	August 23-24, 2004
Regional PDT Meeting	October 26, 2004
Regional PDT Meeting	November 23, 2004
Regional PDT Meeting	January 25-27, 2005
Regional PDT Meeting	February 24, 2005

Biscayne Bay Coastal Wetlands Monitoring Sub-Team Meeting	August 21, 2006
Biscayne Bay Coastal Wetlands Monitoring Sub-Team Meeting	September 19, 2006
Biscayne Bay Coastal Wetlands Monitoring Sub-Team Meeting	October 25, 2006
Biscayne Bay Coastal Wetlands Monitoring Sub-Team Meeting	November 3, 2006
Biscayne Bay Coastal Wetlands PDT Meeting	November 6, 2006
Biscayne Bay Coastal Wetlands PDT Meeting	November 13, 2006
Biscayne Bay Coastal Wetlands PDT Meeting	March 21-23, 2007
Biscayne Bay Coastal Wetlands Benefits Sub-Team Meeting	April 4, 2007
Biscayne Bay Coastal Wetlands Benefits Sub-Team Meeting	April 11-13, 2007
Biscayne Bay Coastal Wetlands Benefits Sub-Team Meeting	May 9-10, 2007
Biscayne Bay Coastal Wetlands PDT Meeting	May 21, 2007
Biscayne Bay Coastal Wetlands Benefits Workshop	August 02, 2007
Biscayne Bay Coastal Wetlands PDT Meeting	February 20, 2008
Biscayne Bay Coastal Wetlands PDT Meeting	February 24, 2009
Biscayne Bay Coastal Wetlands PDT Meeting	March 26, 2009
Biscayne Bay Coastal Wetlands PDT Meeting	August 27, 2009
Biscayne Bay Coastal Wetlands Monitoring Plan Sub-Team Meeting	October 08, 2009
Biscayne Bay Coastal Wetlands PDT Meeting	November 19, 2009
Biscayne Bay Coastal Wetlands PDT Meeting	January 27, 2010
Biscayne Bay Coastal Wetlands PDT Meeting	March 30, 2010
Biscayne Bay Coastal Wetlands NEPA Public Meeting	April 21, 2010
Biscayne Bay Coastal Wetlands	

PDT Meeting
April 22, 2010
Biscayne Bay Coastal Wetlands
PDT Meeting June 29, 2009

Subject bar: Public meeting April 21 for Biscayne Bay Coastal Wetlands Project

E-mail text:

The U.S. Army Corps of Engineers, Jacksonville District will host a public meeting for the Biscayne Bay Coastal Wetlands Project April 21 in Miami-Dade County. The purpose is to present the Draft Project Implementation Report (PIR) and Environmental Impact Statement (EIS) and take public comments. Public and agency comments may be submitted in writing through May 2, as well.

The Biscayne Bay Coastal Wetlands Project is a component of the Comprehensive Everglades Restoration Plan (CERP). The project goal is to improve the ecology of Biscayne Bay, including the freshwater wetlands, tidal creeks and near-shore habitat. The project team will accomplish this by adjusting the quantity, quality, timing and distribution of fresh water entering the bay and Biscayne National Park. The project includes pump stations, spreader swales, storm water treatment areas, flow ways, levees, culverts and backfilling canals in southeast Miami-Dade County.

The Corps is hosting the public meeting Wednesday, April 21 at the Deering Estate at Cutler, 16701 S.W. 72nd Ave., Miami, Fla. An open house begins at 6:30 p.m., followed by the public meeting at 7 p.m. Persons needing special assistance such as Spanish-language translation are asked to call 561-472-8885.

A public comment period is open through May 2, 2010. The draft PIR/EIS is available online at http://tinyurl.com/ydg4mkf. People may submit comments online at BBCWDPIRComments@evergladesplan.org or via mail to Brad Tarr, U.S. Army Corps of Engineers, Jacksonville District, P.O. Box 4970, Jacksonville, Fla. 32232-0019.

This is a project of the U.S. Army Corps of Engineers and South Florida Water Management District. For more information, please contact Eunice Ford, Corps of Engineers project manager, at 904-232-3618 or eunice.ford@usace.army.mil; or John Shaffer, SFWMD project manager, at 561-681-2563 or jshaffe@sfwmd.gov. More is available online by visiting www.evergladesplan.org, and clicking Projects on the top right. For information on the public meeting, please call 561-472-8885.

###

Public Meeting Draft Integrated Project Implementation Report and Environmental Impact Statement for the

Biscayne Bay Coastal Wetlands Restoration Project

Where: Deering Estate at Cutler, 16701 S.W. 72nd Ave., Miami, Fla.

When: Wednesday, April 21, 2010
6:30 p.m. – Open House • 7 p.m. – Public Meeting

The Biscayne Bay Coastal Wetlands Restoration Project is a component of the **Comprehensive Everglades Restoration Plan**. The project goal is to improve the ecology of **Biscayne Bay**, including the freshwater wetlands, tidal creeks and near-shore habitat. This will be accomplished by adjusting the quantity, quality, timing and distribution of fresh water entering the bay and **Biscayne National Park**. The public meeting is to present the draft report and proposed restoration plan, and take public comments.

For more information or special assistance such as Spanish translation, please call **561-472-8885** or visit **www.evergladesplan.org.**

E.2.1 Review of the Project Implementation Report and Environmental Impact Statement

The PIR/EIS 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 NEPA regulations and associated U.S. Army Corps of Engineers (USACE) guidance (Reference ***Section 9.22*** for a list of these recipients.) The review period will last 30 days and all comments received will be on file in the USACE, Jacksonville District office. Comments received will be considered in preparing the Final PIR/EIS. Comments received on the review of the Draft PIR/EIS are contained within ***Annex B***, and were considered in the preparation of this PIR/EIS.

APPENDIX F

PLAN FORMULATION

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LIST OF FIGURES

F.0 PLAN FORMULATION

This appendix provides additional information that was considered during the plan formulation process.

F.1 PRIOR FORMULATION

In 1999, USACE completed the C&SF Project Comprehensive Review Study (Restudy). The purpose of the Restudy was to reexamine the C&SF Project to "determine the feasibility of structural or operational modifications to the project essential to the restoration of the Everglades and the south Florida ecosystem, while providing for other water-related needs such as urban and agricultural water supply and flood protection in those areas served by the project" (WRDA 1996). The intent of the study was to evaluate conditions within the south Florida ecosystem and make recommendations to modify the C&SF project to restore important functions and values of the Everglades and south Florida ecosystem and plan for the water resources needs of the people of south Florida for the next 50 years. The selected plan (Alternative D13-R) was published as the "Final Integrated Feasibility Report and PEIS for the C&SF Project" in April 1999 and was authorized by WRDA 2000 Section 601.

The BBCW project was included in the Recommended Comprehensive Plan in Section 9.1.8.23 in the Restudy. The recommended plan included two components (FFF and OPE). OPEs were identified during the iterative plan formulation process as elements that could not be evaluated using the South Florida Management Model because either they were outside the boundary of the model or they were too small to be simulated at the scale of the model. These components underwent a separate benefit evaluation including: (1) ecological values based on hydrology, spatial extent, habitat quality, and improvement to native flora and fauna; (2) urban and agricultural water supply, (3) flood damage reduction; and (4) water quality.

The Restudy included a conceptual description of the project, with both a map (***Figure F-1***) and a narrative, reproduced below.

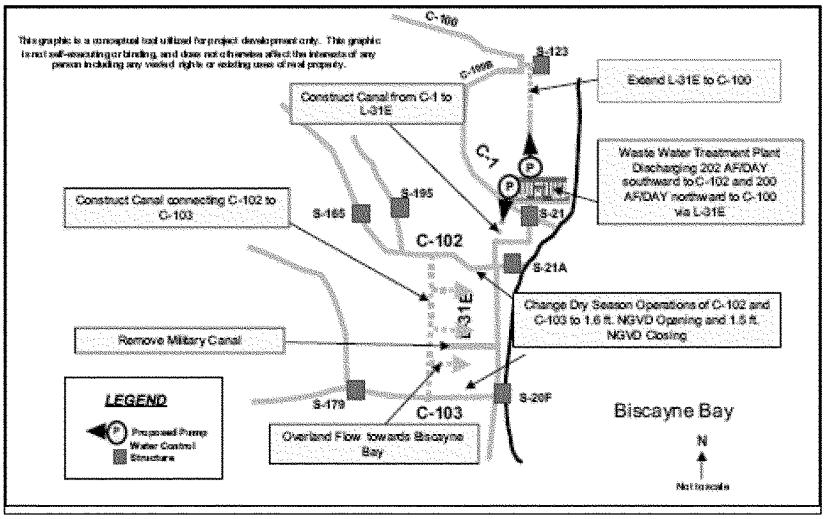

FIGURE F-1: ALTERNATIVE D13R–SOUTH BISCAYNE BAY AND COASTAL WETLANDS ENHANCEMENT COMPONENT

F.1.1 From Restudy Appendix A4 – Description of Alternative D-13R (Page A4-47)

Component FFF5-Biscayne Bay Coastal Canals

Study Region: Lower East Coast and Biscayne Bay

Map: Refer to Component Map 14

Purpose: Maintain higher stages in C-102 and C-103 for urban and environmental water supply.

Operation: Maintain canal stages in C-102 and C-103 with water provided from local sources. Wet season operation for C-102 between S-21A and S-195 (open at 2.2 feet NGVD, close at 2.0 feet NGVD) and for C-103 between S-20F and S-179 (open at 2.2 feet NGVD, close at 2.0 feet NGVD) will remain unchanged. Dry season operation of C-102, between S-21A and S-195, and C-103 between S-20F and S-179, will both change from opening at 1.4 feet NGVD and closing at 1.2 feet NGVD to opening at 1.6 feet NGVD and closing at 1.5 feet NGVD. A borrow canal will be constructed west of L-31E which directly connects the downstream reach of C-102 with C-103 to maintain levels in the lower reaches of C- 103.

Design: 3.5 mile connection canal
Location: Biscayne Bay Coastal Canals in Miami-Dade County.

Assumption and Related Considerations:

1) Local water source tied to Component BBB5, water reuse.

2) Component simulates overland flow to Biscayne Bay. South Biscayne Bay Coastal Wetlands Components will be included as part of Other Project Elements, since their effect is not measurable with current modeling techniques. The intent of these components is to restore overland flow and groundwater seepage to Biscayne Bay while reducing the frequency of point-source discharges.

F.1.2 From Restudy Appendix A6 – Other Project Elements (Page A6-24)

A 6.3.3.15 Biscayne Bay Coastal Wetlands

This project incorporates the L-31 East Flow Redistribution Critical Project list. The ability of the Comprehensive Plan to provide hydrologic benefits to the southern Everglades is supported in large part by the Biscayne Bay Coastal Wetlands Component FFF5, which replaces freshwater inputs to the Biscayne Bay Estuary that are reduced by some D-13R components (i.e., seepage control components along the protective levee and the capture of other discharges to tide). The project is necessary to properly distribute these additional flows to the estuary. The project has four sub-components located in southeast Miami-Dade County, covering the southwest shoreline of Biscayne Bay from the Deering Estate at C-100C south to Florida Power and Light Company's Turkey Point Power Plant, generally along the L-31 East levee.

- ***Sub-component 1–Deering Estate Flowway**–Operation of this subcomponent involves pumping water from the SW 160th Street ditch (a tributary to C-100C) through property adjacent to the Deering Estate and ultimately into Cutler Drain which runs through the Deering Estate. The design involves: 1) adding a 50-cfs pump station at end of SW 160th Street Canal, 2) filling in mosquito ditches in coastal mangroves, and 3) constructing weirs to delay water passage in Old Cutler Drain.*

- ***Sub-component 2–Cutler Wetlands**–Operation of this sub-component involves: 1) routing water south from C-100A to the Cutler Wetlands Proposal Area via a shallow distribution swale on the surface of the marl to C-100B, 2) pumping water from C-100B to a spreader swale, and 3) pumping water from C-100A south into a spreader swale to allow sheetflow to Biscayne Bay. Depending on water quality, flows may need to be routed through Stormwater Treatment Areas (STAs). Design involves constructing: 1) a spreader swale from C-100A south to C-100B, 2) a levee west of the spreader swale, and 3) a 200-cfs pump along the north end of the spreader swale at C-100A. If water quality dictates, the design may also involve construction of: 4) an STA adjacent to C-100B, 5) a 200-cfs*

pump adjacent to the STA and C100B, and 6) a levee seepage canal along the north and south ends of the STA.

- ***Sub-component 3–L-31 East Flowway**–The purposes of this subcomponent are: 1) to reestablish conditions for living oyster bars along the shoreline of the bay and 2) to hydrologically isolate the Miami-Dade County landfill. A flow redistribution system will be created west of L-31 East and existing wetlands will be restored in the area between L-31 East and the western boundary of the redistribution system. A distribution swale with a western levee will be constructed along this boundary. The wetland area west of L-31 East should be used for short-term, shallow ponding of water to maintain wetlands and help drive freshwater flow to the nearshore Bay out of the east bank of L-31 East. Depending on water quality, flows may need to be routed through an STA. Design involves: 1) installation of culverts and risers under L-31 East, 2) construction of a spreader swale east of L-31 East, 3) backfilling Military Canal, 4) construction of a plug in C-100B, 5) construction of a canal west of the landfill to intersect with L-31 East borrow canal, and 6) filling in mosquito ditches. If water quality dictates, the design may also involve construction of: 7) a STA from C-102 to C-103 and east of Homestead Air Force Base, 8) a seepage collection ditch on the west side of the STA, 9) a 200-cfs pump at C-102 to the STA, and 10) a 200-cfs pump at C-103 to the STA.*

- ***Sub-component 4–North Canal Flowway**–The operation of this subcomponent involves pumping available water from C-103 and Florida City Canal to re-establish sheetflow across freshwater and coastal wetlands to Biscayne Bay. Depending on water quality, flows may need to be routed through an STA. Design involves: 1) construction of a 200-cfs pump on C-103, 2) construction of a 200-cfs pump on Florida City Canal, 3) installation of culverts and risers under the L-31 East levee, 4) construction of a delivery canal from C-103 south to North Canal, 5) construction of a spreader swale east of the L-31 East levee, 6) backfilling North Canal east of SW 112th Avenue and 7) construction of a flowway south from Florida City Canal from SW 127th Avenue to SW 107th Avenue. If water quality dictates, the design may also involve construction of: 8) an STA on the western edge of the coastal wetlands in between C-103 and Florida City Canal, 9) an STA associated with the flowway south of Florida City Canal, and 10) seepage management facilities around the STAs.*

- ***Sub-component 5–Barnes Sound Wetlands**–Operation of this subcomponent involves pumping available water from Florida City Canal to a shallow east-west spreader canal. Depending on water quality, flows may need to be routed through an STA. Design involves construction of: 1)*

a 50-cfs pump at Florida City Canal, and 2) a new canal south from Florida City Canal to a shallow spreader swale along the edge of the coastal wetlands. If water quality dictates, the design may also involve construction of an STA and seepage management facility.

There are some general problems or considerations that apply to the entire area. These include existing ditches, which are extensive, the presence of exotic plants and animals, potential water quality problems, and land ownership constraints. The areas under review for restored sheet flow were extensively ditched early in the twentieth century. This cross ditching interferes with providing restored historic flow patterns. For these reasons, the ditches may need to be filled. In addition, the area would require an extensive and possibly ongoing invasive exotic plant removal program. Most of the 13,600 acres of land to be acquired are under current acquisition efforts by the state and county.

F.1.3 Deering Glade Rehydration Feasibility Study Report

Many of the Component 1 measures for the various alternatives are derived from the Deering Glade Rehydration Feasibility Study Report developed by the Miami-Dade County Park and Recreation Department and the South Florida Water Management District (SFWMD). Under this feasibility study, three conceptual alternatives were developed as potential basin modifications to rehydrate a portion of the newly purchased 10-acre parcel west of Old Cutler Road and the Deering Glade. These alternatives are discussed in detail below.

Alternative 1a

Under Alternative 1a, a weir is proposed near the existing ridge on the Deering Property. This "plug" would create a freshwater head in the slough that could result in Glade rehydration and improved (reduced) salinity conditions by precluding saltwater intrusion. Emphasis would be placed on designing a weir that would blend with the natural landscape, to the extent possible, and constructing the structure in such a way as to minimize disturbance to the surrounding area.

The proposed structure would be designed as a broad-crested weir, with a crest elevation set equal to the mean high-tide elevation. The weir would be adjustable to allow operation at varying water depths (i.e., raise to maximize rehydration or lower under potential flood conditions). Rehydration would be accomplished solely by rainfall, as diversion from Spur Canal would not occur under this alternative. In summary, Alternative 1a entails:

- An adjustable weir near the bridge on Old Cutler Trail that enables Park and Recreation staff to protect historic, cultural, and/or environmental resources within the Glade
- Rainfall-driven rehydration
- No diversion from the Spur Canal
- Preclusion of saltwater intrusion
  - Minimum: 2.0 feet NGVD
  - Maximum: 3.5 feet NGVD

Alternative 2b

Alternative 2b includes all the components of Alternative 1a, with the following additional features as shown in Figure 4:

Spur Canal Extension: The Spur Canal would extend through the 10-acre rehydration parcel to Old Cutler Road.

Weir Construction: A weir would be constructed at the end of the Spur Canal extension to allow water to flow by gravity into the Glade. The conceptual design includes a sharp-crested weir with three rectangular openings of variable height that uses vertical sheet piles with sharpened edges. The weir boards would be approximately 4 feet in length to facilitate manual removal and replacement. The design would be based on estimated elevations of the Spur Canal using available hydrological data within the basin.

Jack and Bore: Alternative 2b includes a 50- foot jack and bore under the Old Cutler Road, using two 42-inch ductile iron pipes enclosed within the steel casings. Water flow would pass through the wetland area, over the weir, and then be delivered to the Glade through these two pipelines.

Creation of Wetland Habitat: An option under Alternative 2b is to grade the northern back of the Spur Canal extension to allow for the rehydration of the southern half of the 10-acre Power's rehydration parcel. A wetland educational trail may be constructed on the northern portion of the parcel, with extending boardwalks through the created wetland area.

Alternative 3c

Alternative 3c incorporates all of the components of Alternative 1a and 2b, with the addition of a submersible pump station. The pump station will contain irrigation type pumps and be sized to deliver approximately 15 cfs of supplemental flows. Other potential benefits include increased operational flexibility and additional local flood protection. Alternative 3c is used in most of the Alternatives that were developed by the sub-team.

F.2 ALTERNATIVE PLANS

F.2.1 No Action Alternative

The future without-project condition does not include construction of any alternative considered in this study and also does not include any other Comprehensive Everglades Restoration Plan (CERP) projects not already authorized for construction. Local environmental restoration projects under construction were identified and included in the future without-project conditions. The study area is most influenced by the land use projections for 2050, which project a decrease in agricultural and natural land uses and an increase in urban land uses. Potential effects of the change in land use include: decreasing groundwater recharge, increasing stormwater runoff flows, decreasing dry season canal flows and decreasing agricultural nutrient outflows. Intermediate impacts on the environment that may be effected include: increasing invasive exotic vegetation, decreasing native vegetation, decreasing freshwater wetland habitat, and decreasing fish and wildlife.

F.2.2 Alternative C

This plan is similar to the Yellow Book (YB) plan but it uses some gravity flow water conveyance methods instead of pumps. This plan contains four stormwater treatment areas (STAs), removes the L-31E levee, and backfills all major drainage canals. This alternative attempts to recreate historic slough patterns.

Component 1 (Deering Estate)

Management measures and features for this sub-region are virtually the same as what were proposed in the Restudy. Operation of this sub-component involves pumping water from the SW 160th Street Canal through the Powers Property and ultimately into Cutler Drain, which runs through the Deering Estate. The design involves adding a 50 cfs pump station at the end of SW 160th Street Canal, filling in mosquito ditches in coastal mangroves, and constructing weirs to delay passage in Old Cutler Drain. Features may include use of a spreader canal, use of historic creek beds, use of gravity flow instead of a pump, creation of a mini STA, and exotic species removal.

Component 2 (Cutler Wetlands)

A levee and spreader canal would be constructed along the western project boundary (eastern margin of developed area), roughly from C-100 to land just northeast of the wastewater treatment plant. Water would be passively (weir) or actively (pump) diverted into the spreader canal from C-100. A canal from 4-armed-shaped lake (Saga Bay) would be constructed to the spreader canal and

water passively (weir) or actively (pump) diverted into the spreader canal. Outlets from spreader system would be located at or near areas where historic creeks are located. The slough located between Lennar Property and the wastewater treatment plant would be reestablished. The slough should extend well into wetlands to the east of L-31E (may involve removing soil to obtain appropriate topography). Water would be passively (weir) or actively (pump) diverted from C-1 near the Turnpike into the recreated slough. Any available property between Lennar Property and the wastewater treatment plant that is not utilized as part of the recreated slough would be converted into an STA. A system of culverts and weirs along L-31E between school and C-1 would be constructed to allow flow from slough and STA to the wetlands east of L-31E. East-west drainage ditches would be backfilled.

Component 3 (L-31E Wetlands between C-1 and Florida City Canal)

A levee would be constructed along the western project boundary from just north of C-102, along the eastern side of developed areas (including the northern, eastern and southern borders of Homestead Air Reserve Base), south to Florida City Canal. The current agricultural land located between the new western levee and the freshwater wetlands would be converted, as needed into an STA to appropriately rid redirected canal water of nitrogen and phosphorus. A new canal west of the landfill would be constructed to connect C-1 with the northern end of the STA in Sub-region 3. A spreader ditch would be constructed at the southern end of this connector canal to distribute water into the northern end of the STA. A new canal would be constructed parallel to the Florida Turnpike that connects C-102 with C-103 (allows flexibility to move freshwater between sub-regions). The C-102, Military, C-103, North, and Florida City canals would be backfilled from their mouths west to the project boundary. Water would be passively (weir) or actively (pump) diverted from the new termini of C-102, Military, and C-103 into the STA. Water would be diverted passively (weir) or actively (pump) from C-103, just downstream of the confluence of C-103 and C-103S, into the STA. L-31E Canal would be backfilled and L-31E Levee degraded. The FPL power line service road will be degraded. Four sloughs would be reestablished with one just south of C-102, one just north of Military Canal, one near C-102, and one near Florida City Canal (slough locations should be at or near the footprint of the historic sloughs). All ditches and roads in the sub-region west of L-31E would be removed.

Component 4 (Model Lands)

Long Slough (located near intersection of Card Sound Road and U.S. Highway 1) would be restored / enhanced. A spreader ditch would be constructed just south and east of Keys Gate (from western end of Keys Gate to Tallahassee Road). A canal would be constructed from the new terminus of Florida City

Canal (at Tallahassee Road)) to the eastern end of the new spreader ditch. A canal would be constructed from Florida City Canal (near eastern end of Keys Gate) to western end of the new spreader ditch. Water would be passively (weir) or actively (pump) diverted from Florida City Canal into the new canals, which would feed into the new spreader ditch. Agricultural land located from new spreader ditch south to 368th Street will be converted into an STA and would feed water from the spreader ditch into the STA. L-31E would be backfilled from Florida City Canal to Card Sound Road. Culverts would be installed through Card Sound Road to render the road hydrologically transparent.

The following management measures apply to most, if not all, project sub-regions under this alternative: (1) ensure adequate storage (if STAs are deemed insufficient for storage); may involve creation of reservoirs or an ASR; (2) stage manipulation (i.e. increase in stage and modification of hydroperiod) to enhance habitat to be determined; (3) appropriate pump sizes, where needed, to be determined; (4) backfill all east-west drainage ditches in Sub-regions 2 and 3; (5) removal of non-native vegetation; and (6) provide fish and wildlife habitat enhancement in STAs where appropriate.

F.2.3 Alternative D

Alternative D is similar to Alternative C except for a few added features: all north-south mosquito ditches in all component areas would be backfilled (if it can be achieved without destroying desirable vegetation); Tallahassee Road would be removed in the Component 4; and SW 360th Street and adjacent ditch would be removed in the Component 4 area.

F.2.4 Alternative E

This alternative attempts to recreate some of the historic sloughs that were located in the area and which fed Biscayne Bay, and includes reservoirs to provide water to the project area during the dry season (only one of two alternatives to have this feature).

Alternative E has the same management measures/features as Alternative D with the following exceptions: 1) the northern end of the spreader canal in Component 2 begins at the southern end of the Burger King property, 2) water from C-100 is passively (weir) or actively (pump) diverted from C-100 to the spreader canal through a pipe of an appropriate size, 3) east-west drainage ditches are plugged at their eastern end instead of being backfilled, 4) no new canal is constructed from Saga Bay to the spreader system, 5) north-south mosquito ditches are not backfilled, 6) major conveyance canals (C-1, C-100, C-102, Military, C-103, Florida City Canal) are not backfilled; as much water as possible is redirected from the canals into the STAs and freshwater wetlands, 7) the recreated slough just south of C-102 is rerouted around the rock mine,

8) the rock mine is lined and used as a reservoir, and (9) all SFWMD structures (S123, S21, S21A, S21G, and S20F) are replaced with manatee friendly gates.

In addition, priority would be given to rehydrating/restoring the wetlands and embayments associated with Black Point and Fender Point; the rationale is that if there is a lack of freshwater for the project, the morphology of the coastline that results in the formation of the embayments in these areas would provide the most likely areas for restoring estuarine conditions year round. Flexibility for interbasin transfer of freshwater across the project is also included.

F.2.5 Alternative F

Alternative F is based on the Yellow Book (YB) alternative, with modifications as needed to make it feasible. The original YB alternative was unacceptable because the engineering lacked refinement and some concepts were not feasible once scrutinized.

Component 1 (Deering Estate)

The entire Powers property (40 acres) would be used for an STA or a polishing area, and storage. Only east/west oriented mosquito ditches would be filled, leaving north/south ditches as "distribution" swales/ditches.

Component 2 (Cutler Wetlands)

A box-culvert flowway would be used under properties from C-100 to south of the Burger King property (already developed and disturbed) to reduce the visibility of the component. A pump facility would be at the southern terminus of the culvert to minimize noise impacts. Due to existing developmental pressures, an STA used in Alternative YB adjacent to the C-1 would only have about half the land depicted to be presently available.

Consideration of a reservoir instead of an STA would require seepage controls both for loss of water and salt intrusion. The latter may be minimized with used of shallowly dug, bermed reservoirs (i.e., 10 foot reservoir dug 8 feet, with 2 additional feet of storage capacity above ground, contained by a berm).

A mitigation area would exist within the footprint of the flow-way in this area.

Use of residential lakes (east of Galloway, Saga Bay area) as water sources for spreader canal (box culvert & remove pumping station) would be considered.

Only east/west oriented mosquito ditches would be backfilled, leaving north/south ditches as "distribution" swales/ditches.

Component 3 (L-31 E Flowway)

A reservoir on the west side of C-1, on property anticipated for the South Miami-Dade Water and Sewer Department (WASD) Plant purchase (existing lakes) would connect with an STA on the east side of C-1 or connect to a distribution canal that runs to the southern part of region. A reservoir incorporating rock pits/borrow lakes on Princeton canal would minimize the need for land for an STA; balance of land "freed" would go to a restored wetland. The use of borrow lakes would require additional evaluation related to existing salt intrusion and the potential need for additional seepage and barrier controls.

The wiered distribution ditch to the restored wetlands would be moved one half mile west, along the area from the borrow lakes reservoir (to the north) to Mowry Canal (to the south). A reservoir would be constructed as a band along the northeastern to southeastern boundary of the military Air base (a reservoir may be more compatible with the air base than an STA) to provide water supply and storage for the geographic region's water needs.

This alternative optimizes the restored wetland areas within the area designated as STAs in Alternative YB.

Component 4 (Model Lands/Barnes Sound)

An STA would be added on the northwest side of Florida City Canal, north of SBLGS; the flow-way to south side of canal would be maintained. Connectivity would be provided via a distribution canal, to any C-111SC eastern water distribution system. This connection could provide a water source for distribution through the Florida City Canal to the SBLGS, as well as to Model Lands (via culverts on east end of Florida City Canal. Elevations in Model Lands would be raised via controls at the S-20 structures. A distribution ditch with culverts/weirs would be incorporated east of S-20 (utilizing/incorporating the existing getaway canal from S-20, along the south side of the FPL Property) to provide available freshwater to the northeastern panhandle of Model Lands and Barnes Sound (to mangroves southeast of the Turkey Point cooling canals that were cut off from flows by cooling canal construction. Canals would be plugged or filled (e.g. north Model Lands Canal, Tallahassee Road borrow canal, Card Sound borrow canal, other borrow canals for the northern Model lands farm road network) to restore natural flowways in Model Lands. Roads would be removed or have culverts installed (e.g. Tallahassee Road, other access roads) to restore natural flowways in Model Lands. Card Sound Road would be replaced with elevated roadway or a series of bridges to improve hydrological and ecological connectivity between Triangle and Model Lands. L-31E would be moved landward in Model Lands to reconnect coastal wetlands.

F.2.6 Alternative G

This alternative provides a less costly approach to achieve project benefits by: (1) limiting construction of measures (smaller pumps and spreader canals), (2) minimizing construction of STAs and (3) relying more heavily on water management operational changes. This alternative slightly modifies the boundaries of the component areas.

Component 1 (Deering Estate)

The measures from the three alternatives in the Deering Glade Rehydration Feasibility Study were accepted for this component area.

Components 2 and 3 (Gould's Canal to Florida City Canal)

This area includes an STA with a western boundary at SW 112 Avenue, an eastern boundary at SW 107th Avenue, a northern boundary at SW 168th Street, and a southern boundary at SW 284 Street.

Another STA is proposed with a northern boundary at C-103 Canal, a southern boundary at the Florida City Canal, an eastern boundary at SW 117th Avenue, and a western boundary at SW 127th Avenue that runs south to SW 328th Street, west to SW 137th Avenue, and south to the Florida City Canal.

The northern and eastern boundary of a wetland area will start at Gould's Canal located at SW 248th Street and run south to the Florida City Canal located at Palm Drive; L-31E being the eastern boundary. A levee will be constructed along the western side of L-31E.

The western boundary of the wetland will run along the eastern side of SW 107th Avenue, continue south and west of SW 107th Avenue and SW 112th Avenue, and continue south and west of SW 112th Avenue and 117th Avenue to Florida City Canal (Palm Drive). A spreader canal will be constructed along the eastern side of SW107th Avenue, SW 112th Avenue and SW 117 Avenue. The roadway will act as a levee system.

Pump stations would be located at the following locations:

- SW 248th Street pumping from a pump basin next to Gould's canal south;
- C-102 and SW 107th Avenue pump from C-102 both north and south (2 each);
- Military Canal and SW 107th Avenue pumping from the canal both north and south (2 each);
- C-103 and SW 112th Avenue pumping both north and south (2 each);

- North Canal and SW 117th Avenue pumping both north and south (2 each);
- Florida City Canal and SW 117th Avenue pumping both north (1 each).

Subregion 3 (Model Lands/Barnes Sound)

This area would include a third STA constructed south of Florida City Canal (Palm Drive) located between SW 167th Avenue and SW 137th Avenue, running east and west along SW 360 Street. It will have a pump station located at SW 167th Avenue, pumping south into the western end of the detention area. The wetlands area would include all the Model Lands area down to Card Sound Road.

F.2.7 Alternative H

Alternative H contained a minimal approach that resembled Alternative G, but used natural soils in lateral ditches and smaller polishing ponds instead of STAs to clean water. This alternative slightly modifies the boundaries of the component areas.

Component 1 (Deering Estate)

The measures from the three alternatives in the Deering Glade Rehydration Feasibility Study were accepted for this component area.

Components 2 and 3 (Gould's Canal to Florida City Canal)

The northern and eastern boundary of the wetland area would start at Gould's Canal located at SW 248th Street and run south to the Florida City Canal located at Palm Drive; L-31E being the eastern boundary. A levee would be constructed along the western side of L-31E.

The western boundary of the wetland area would run along the eastern side of SW 107th Avenue, and continue south and west of SW 107th Avenue and SW 112th Avenue, continue south and west of SW 112th Avenue and 117th Avenue to Florida City Canal (Palm Drive). A spreader canal would be constructed along the eastern side of SW107th Avenue, SW 112th Avenue and SW 117 Avenue. The roadway would act as a levee system.

Pump stations would be located at the following locations:

- SW 248th Street pumping from a pump basin next to Gould's canal south;
- C-102 and SW 107th Avenue pump from C-102 both north and south (2 each);

- Military Canal and SW 107th Avenue pumping from the canal both north and south (2 each);
- C-103 and SW 112th Avenue pumping both north and south (2 each);
- North Canal and SW 117th Avenue pumping both north and south (2 each);
- Florida City Canal and SW 117th Avenue pumping both north (1 each).

All pump stations would pump ground water from a pump basin 100 to 150 feet from the canal for water quality. No STAs would be constructed.

Component 3 (Model Lands and Barnes Sound)

An STA area would be constructed south of the Florida City Canal (Palm Drive) located between SW 167th Avenue and SW 137th, running east and west along SW 360 Avenue. It would have a pump station located at SW 167th Avenue pumping south into the western end of the detention area. The wetlands area would include all the Model Lands area down to Card Sound Road.

F.2.8 Alternative I

This plan is similar to Alternative YB, but it extends the connector canal northward and proposes a desalinization plant for water supply. This alternative slightly modifies the boundaries of the component areas.

Component 1 (Deering Estates)

The measures from the three alternatives in the Deering Glade Rehydration Feasibility Study were accepted for this component area.

Component 2 (C-100 / Black Creek)

A spreader/weir/plug would be installed at the end of C-100 to control water entering into the Bay. A canal would be dug from C-100 south along Cutler Ridge. The canal along Cutler Ridge would have spreaders along it to rehydrate wetlands east of Cutler Ridge. The canal would go along the west side of the Saga Bay community into an STA; levees would be built around it to control flooding, and pumps would be used to pump the water out through a spreader into the wetlands to the south of Saga Bay.

A second alternative for this area would include an STA in the agricultural lands just to the west of Saga Bay, and water would be pumped out into the wetlands to the south and east of Saga Bay. Water from C-1 would be pumped into an STA northwest of the water treatment plant, and pumped into the wetlands to a spreader canal that would disperse the water through the wetlands to the east of

the treatment plant. A canal would be plugged on the SW and SE corners of the landfill, water pumped from C-1 into both STAs (one STA is in component 3) and then to wetlands to the east and southeast (component 3) into a canal that would send water to the south and away from the landfill. A plug/spreader would be placed at the end of the canal to control flow into the Bay.

Water would be sent from C-1 into an STA to the west of the landfill, with a seepage barrier on the eastside of the landfill. The treated water would be sent into a reservoir to the southwest of the landfill and then sent to rehydrate the wetlands to the east of the rectangular lake north of the Sand Mine; or sent into L-31 E, which would send the treated water to the wetlands east of L-31E. STAs and reservoirs would be constructed to the east of Homestead Air Force Base. Control devices and spreaders would be installed on all the canals and mosquito ditches filled.

Component 4 (C-103 south to the Model Lands)

This area would include an STA to the south of C-103, west of Turkey Point (Florida City Canal) which would pump clean water into a spreader canal (to the east between the STA and Turkey Point), which in turn would pump water to the south, to rehydrate wetlands to the south (Model Lands).

F.2.9 Alternative J

This alternative uses a combination of reservoirs and STAs attempting to capture flows of varying amounts per canal (C-1, C-102 and C-103). Primary measures in Component 2 (Cutler Wetlands) include one reservoir and two STAs, with a spreader canal; and in Component 3 (L-31 E Flowway), two reservoirs and four STAs. The scientific focus for establishing reservoir size was based on attempting to achieve certain durations of consecutive days of zero flow to the coastal wetlands via canal structures. This alternative does not attempt to recreate any historic sloughs and in brief uses less water than Alterative E. Alternative J maximizes redirection of flows to natural flow ways. Existing canals would not be backfilled with the exception of a portion of Military Canal in Component 3 and portions of L-31 E Canal in Component 4. Mosquito and drainage ditches are plugged or backfilled in all component areas. The existing L-31E Levee would be degraded and a new one built further west. Operational changes are proposed in Components 2, 3 and 4.

F.2.10 Alternative K

This plan is similar to Alternative YB but uses package treatment plants instead of the STAs to significantly reduce land acquisition costs. Anticipated high operational costs and environmental degradation due to the creation of undesirable effluent by-product rendered this alternative minimal consideration.

F.2.11 Alternative L

Alternative L was designed to duplicate Alternative YB performance with the construction of reservoirs. The reservoirs would be located adjacent to primary canals (C-1, C-102 and C-103) upstream of the STAs and be fed by pumps. Water would be conveyed out of the reservoirs in a controlled manner into the STAs.

F.2.12 Alternative M

Alternative M was ultimately derived from common components of Alternatives E, J, P, Q and YB, and was intended to make use of mutual water management features to attain the objectives of the Biscayne Bay Coastal Wetlands project. Alternative M is the minimal alternative that attempts to reduce costs by eliminating some features (with concomitant reduction to benefits expected) and uses trenches and detention areas instead of reservoirs and STAs, with the exception of an STA in Component 3 (L-31E Flowway). The sizing of the detention areas was based on capturing 80 percent of the current flows in the canals. As detention areas cannot pond water as high as reservoirs, a greater amount of land would be required for the detention areas. Spreader canals also are primary measures in Components 2 through 4. Alternative M attempts to use the smallest number of constructed features and the smallest footprint practicable. Revisions to Alternative M further reduced the scope to limit restoration to only those wetlands east of L-31E and use the L-31E Canal to convey water and act as a spreader canal.

F.2.13 Alternative N

Alternative N was designed for ecological lift with little concern for costs. Alternative N utilizes an extensive array of features operational measures: culverts, weirs, plugs, STAs, pumps, reservoirs, canals and seepage management, stormwater detention areas, constructed wetlands, backfilled canals, water quality treatment plants, spreader ditches or flow ways, modified stage criteria and supplemental water deliveries. Alternative N includes an upstream impoundment and a full array of construction features wherever needed. L-31E would be completely removed south of the Florida City Canal.

F.2.14 Alternative O

Alternative O was ultimately derived from components of Alternatives M and Q and is intended to make use of common water management features to attain the objectives of the Biscayne Bay Coastal Wetlands project. Alternative O includes the use of flow ways, spreader canals, culverts, piping, weirs, canal plugs, 102 mosquito control ditch plugs, and pumps to achieve the overall project goals of restoring and enhancing wetlands and nearshore bay habitat by

minimizing point source discharges and improving the quantity, quality, timing, and distribution of water to freshwater and tidal wetlands and Biscayne Bay. Reservoirs and STAs are not included in this alternative. Alternative O reduces cost by removing a southern spreader canal included in many other alternatives, which has high real estate costs.

F.2.15 Alternative O, Phase 1

Alternative O Phase 1 constitutes a subset of Alternative O measures and includes all of the State's Expedited Construction program (formerly Acceler8) features. This option generally incorporates the more northerly and easterly elements of Alternative O, and defers the riskier elements for a subsequent study.

F.2.16 Alternative P

Like Alternative N, this alternative was designed to maximize ecological lift compared to previous alternatives. This plan specifically targeted salinity levels in Biscayne Bay and was based on modeling conducted by the National Park Service.

F.2.17 Alternative Q

Alternative Q was crafted to provide an alternative that was more aligned with the possible location of the proposed C-111 Spreader Canal. The team attempted to design this alternative to avoid the more costly real estate and to utilize more passive water flow to reduce costs rather than using pumps. Alternative Q does not include reservoirs. This alternative is intended to reduce proposed infrastructure to the minimum needed for the redistribution of canal discharges and water volumes associated with anticipated (Yellow Book) reuse water, while maintaining existing levels of flood protection in developed areas. It leaves in place existing infrastructure to the extent possible to reduce construction costs, including the L-31E Levee, but allows eastward surface water flow through this levee. Alternative Q relies on canal plugs in specific locations where canals are no longer needed (such as the eastern portion of Goulds Canal) instead of canal filling to reduce costs. Alternative Q assumes wastewater reuse is available at a volume of approximately 135 million gallons per day (mgd) from a location near the South Miami-Dade Water and Sewer Department (WASD) Plant. Forested wetlands are used (including created or restored forested wetlands in presently abandoned or underutilized farming areas) as polishing wetlands, to the extent possible, instead of building engineered STAs. An STA is included Alternative Q includes pumps to capture water available from the C-1, C-102, and C-103 canals.

The intent of this alternative is to provide maximum passive storage of water particularly in the Model Lands area and the areas just west of the L-31E Levee. As a side benefit, this alternative would provide ample recreational opportunities via the use of levees for bicycling/greenways, the use of deep water areas for fishing, and the use of existing farm roads for nature trails/wildlife observation opportunities.

F.2.18 Alternative S

Alternative S is a non-structural alternative that proposes operational changes to hold water higher in the existing canals. Benefits would be achieved by increasing groundwater flow to Biscayne Bay. Alternative S did not warrant extensive consideration as it would also cause groundwater levels to rise within the municipalities west of the proposed project areas. This would cause a violation of the Savings Clause as flood protection would be decreased. Additionally, there would likely be flooding at Homestead Air Reserve Base that would adversely affect Homeland Security.

APPENDIX G

ECONOMIC AND SOCIAL CONSIDERATIONS

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G.0 ECONOMIC AND SOCIAL CONSIDERATIONS

G.1 INTRODUCTION

The Biscayne Bay Coastal Wetlands (BBCW) project Selected Plan is an integral component of the south Florida ecosystem improvement efforts that together make up the overall Comprehensive Everglades Restoration Plan (CERP). This appendix presents the socio-economic issues related to the implementation of the Biscayne Bay Coastal Wetlands project.

The primary effects of the project include the costs of implementation as well as the ecosystem restoration and improvement benefits. Project implementation costs are monetarily expressed in terms of the net national project cost (National Economic Development [NED] costs). Project costs have regional impacts as expenditures on the project within the regional economy can cause changes in local and regional earnings, sales, and employment. While the costs of implementation are expressed in traditional monetary terms, ecosystem improvement, the most significant beneficial effect of the project is not expressed in monetary terms. Ecosystem improvement is expressed in terms of National Ecosystem Restoration benefits in accordance with U.S. Army Corps of Engineers (USACE) policy. For ecosystem restoration projects, a plan that reasonably maximizes ecosystem restoration benefits compared to costs, consistent with the Federal objective shall be selected.

The potential economic impacts of the alternative restoration plans are secondary consequences of the environmental improvements and hydrologic changes that are expected to result from the proposed structural and operational modifications to the Biscayne Bay Coastal Wetlands project study area. These projected impacts are contingent upon the successful implementation and operation of restoration plans and subsequent outputs and therefore, subject to the uncertainties inherent in those ecosystem restoration activities. Due to the challenges inherent in quantifying National Ecosystem Restoration (NER) effects or benefits, quantifying the resulting NED impact is also a challenge. Nonetheless, there are methods for evaluating the economic efficiencies of alternative restoration plans.

In order to evaluate the economic efficiencies of the span of project alternatives, an analysis of the NED costs and NER benefits of each alternative is undertaken. Specifically, a Cost Effectiveness/Incremental Cost Analysis is utilized to determine the alternative that provides least unit cost per unit of benefits.

G.1.1 Elements of the Economic Appendix

This appendix provides the framework used to determine the socio-economic effects of the alternative ecosystem restoration plans formulated in the feasibility phase of the Biscayne Bay Coastal Wetlands project. In order to fully understand the potential scope and effects of each alternative, the economic evaluation of the alternative restoration plans includes five principal elements:

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.

Anticipated Effects of Alternative Projects on the National Economic Development 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 water supply
- Flooding potential
- Recreation
- Commercial and recreational fishing

Evaluation of Project Costs versus Benefits: A benefit/cost analysis is conducted utilizing a cost effective/incremental cost approach. Project costs include all expenditures required to implement each alternative plan. The Federal government and the State of Florida would share these costs according to the cost-sharing agreement governing CERP. Project costs include those costs for initial construction; purchase of lands; relocations; rights of way; rehabilitation, replacement, and repair; and operations and maintenance (including the costs of post-construction monitoring and adaptive management). Project benefits used in plan selection are habitat units.

Regional Economic Development Effects: The potential Regional Economic Development effects of the Selected Plan include changes in income, employment, or economic output of the region.

Other Social Effects: The potential social effects of the Selected Plan include effects on minority, elderly, and disadvantaged groups; population displacement; and effects on community cohesion.

The sections that follow evaluate the economic impacts of the alternative restoration plans. ***Section G.2*** develops a socio-economic profile for the region, and ***Sections G.3*** and ***G.4*** contain an evaluation of the project on various economic activities in the study area. The costs and the incremental analysis of the alternative plans are presented in ***Sections G.6, G.7,*** and ***G.8***. The regional

economic effects and other social effects of the alternative plans are explored in ***Section G.9*** respectively.

The economic analysis for the Biscayne Bay Coastal Wetlands project was conducted in a manner consistent with Federal statutes and USACE policy. Procedures for estimating NED and Regional Economic Development effects are specified in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies,* and Engineering Regulation (ER) 1105-2-100.

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: the available analytical tools, economic theory, Federal policy, obtainable data, as well as time and budgetary constraints. These factors are discussed below.

G.1.2.1 Without-Plan and With-Plan Conditions

Proper definition of the without-project and with-project conditions is critical to the planning process. The without-plan condition is the condition expected to exist in the future in the absence of a proposed project while the with-project condition is the expected future outcome in light of all proposed project impacts. The future with-project is evaluated against the future without-project over the period of analysis. In this analysis, national and regional socioeconomic parameters are considered including income, employment, population, and other aggregate projections such as land use trends, water supply and water demand. Conditions under the without-project and under each with-plan alternative are compared in order to identify the beneficial and adverse effects of each proposed plan alternative. Through comparison, the relative desirability of each with-plan alternative as compared to the without-plan can be assessed. For example, an alternative that included modifications to the current ecosystem which would provide additional water storage areas may result in fewer economic losses associated with agriculture (irrigation) water shortages than the without-plan and those alternatives not including these modifications. This would be a desirable ancillary benefit of restoration for this particular alternative.

G.1.2.2 Methodology for Conducting Economic Analysis

For this analysis, the alternative restoration plans were compared using information in both monetary and non-monetary units. The economic analysis of the Biscayne Bay Coastal Wetlands alternative restoration plans include: (1) the NED costs (in monetary terms), (2) the anticipated environmental benefits resulting from restoration measures (in non-monetary terms), (3) the

NED benefits and impacts attributable to the following: 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 resulting from project implementation.

The economic basis for making policy decisions about whether to invest public funds in ecosystem restoration for this project is comparing monetary costs and non-monetary benefits in order to determine whether the expenditure is justified and to select the plan which minimizes the cost of obtaining ecosystem benefits. The costs of ecosystem restoration projects include: initial construction costs; major rehabilitation and repair costs; operations and maintenance 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 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, 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 both difficult and controversial.

Although, ecosystem restoration projects are not subject to traditional benefit-cost analyses, ecosystem restoration projects must still be justified by comparing the monetary costs and non-monetary benefits of restoring the degraded ecosystem. USACE ecosystem restoration evaluation procedures focus on the non-monetary benefits of restoration, comparing these benefits to monetary costs using cost estimate/incremental cost analysis procedures.

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 remainder of the 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, residents of the study area represent the socio-economic environment for the other impact topics of flooding, water use shortages, fishing, recreation, and navigation.

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 Economic and Social Well–Being Problems and Opportunities

As a result of the Central and Southern Florida (C&SF) Flood Control Project which provided flood protection and readily available drinking water, the population of south Florida has grown from approximately 900,000 as reported in 1950 to a population of over 5.5 million in 2005. By the year 2025, the population of south Florida is projected to grow to over 7.3 million (SFWMD, 2006). Thus, the coastal areas of south Florida have become highly urbanized.

A rapidly expanding human population demanding more developable lands and advancing agricultural development now threatens the relatively pristine natural areas. The tourism industry is also dependent upon the region's ability to sustain its economy and its quality of life through management of its resources. Both agriculture and tourism depend on a system that can provide vital water supply needs and flood protection.

Competition for regional water resources has intensified with the increase in population and agriculture industry growth. This places a strain on existing resources, which will eventually surpass the readily available sources. When the needs of the natural system are then factored in, demands become greater and conflicts among competing water users would become even more severe. While most people recognize the need for a healthy ecosystem to support the region's economy and jobs, many people are concerned that restoration projects would displace farms and other businesses, limit development, reduce available water supply and reduce job opportunities. By contrast, continued degradation of the south Florida ecosystem would adversely affect the tourism and recreational industry that are important to the regional economy.

G.2.3 Land Use

The existing use of land within the study boundaries varies widely from agriculture to high-density multi-family and industrial urban uses. A large portion of south Florida remains natural, although much of it is disturbed land. The dominant natural features are the federally protected Everglades National Park (ENP) and Biscayne National Park (BNP), along with Biscayne Bay and remnant freshwater and coastal wetland and upland systems within and adjacent to the developed areas along the coast. Generally, urban development is concentrated along the lower east coast of Miami-Dade County.

Although there remains substantial agricultural acreage in southwestern Miami-Dade County (90,000 acres), rapid population growth and land development practices have resulted in notable western urban sprawl; the predominant land use is single-family residential (USDA, 2002). Rural areas in western Miami-Dade County are rapidly becoming largely urban in makeup.

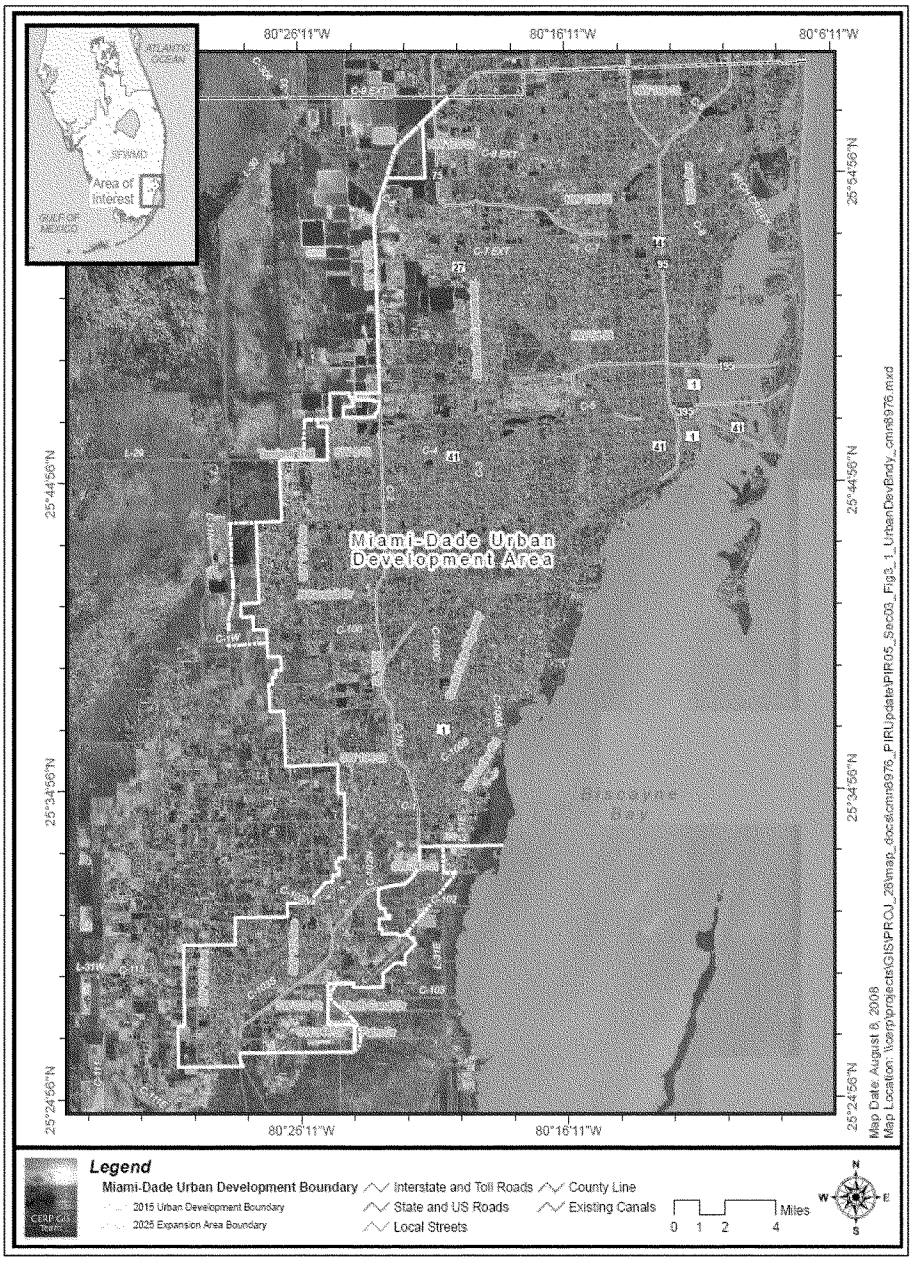
The existing use of the land that is being purchased primarily consists of mixed open land with agriculture, degraded wetlands and fallow fields. Homestead Air Reserve Base borders a portion of the study area on the west, and BNP borders the study area on the east. Inside the study area boundary there is a landfill towards the northern end of the study area as well as a water treatment facility. The majority of the agricultural land use is ornamental trees, with a mix of row crops and nursery crops.

The Turkey Point Nuclear Power Plant is located on the shoreline near the project area. Some water used in the reactor is piped in from the Miami-Dade municipal water supply. A separate supply of water that cools the turbine steam supply for reuse comes from a unique, closed system of 36 interconnected canals totaling over 168 miles on length. This power plant is an integral part of the power supplied to Miami-Dade County, providing energy to over 450,000 homes (FP&L, 2008).

A review of various local governments (county and municipality) comprehensive plan future land use maps indicate that the portion of the study area lying within the urban development boundary is designated as "Estate" and "Low Density Residential" land uses, which ranges in density from two and a half to six dwellings per acre. Much of the future development within the study area will occur on lands that are currently in agricultural use. Additionally, a majority of land currently designated for agricultural use and lying outside of the urban development boundary but within the urban expansion area is projected to be developed with similar uses once the urban development boundary is expanded. Based on increasing residential demand in this area, it is highly probable that this section of the urban development boundary will be expanded within the next ten years.

In areas east and south of the urban development boundary but landward of the coastal areas, at least some continued conversion of undeveloped lands designated in the county land use map as "Open Lands" to rock mines and some undeveloped lands designated as "Agriculture" to construction/demolition debris landfills is possible. In addition, pressure to remove conservation easements on wetland mitigation areas within the urban development boundary to allow development is already occurring. In cases where existing (and/or future) wetland mitigation areas are developed, additional mitigation areas would be needed to offset the loss of wetland functional values. However, based on development pressures, land costs, and the proximity of the Florida Power and Light (FPL) mitigation bank, it is likely that the additional mitigation would be in the form of wetland enhancement, resulting in a further net loss of the spatial extent of wetlands and other open lands within the study area.

Portions of the coastal areas adjacent to BNP that are currently designated in the county land use map as "Environmental Protection" and "Environmentally Protected Parks" within the Biscayne Bay Coastal Wetlands study area are anticipated to remain in this use. However, the remaining undeveloped coastal areas landward of the "Environmental Protection" designation within the urban development boundary are expected to be developed in the near future. With a few exceptions such as the expansion of Turkey Point Power Plant, the remaining coastal wetland areas adjacent to BNP and outside the urban development boundary are likely to remain largely unfilled and undeveloped.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ATLANTIC OCEAN
SFWMD
Area of Interest
GULF OF MEXICO
Miami-Dade Urban Development Area
Biscayne Bay
Legend
Miami-Dade Urban Development Boundary
2015 Urban Development Boundary
2025 Expansion Area Boundary
Interstate and Toll Roads
State and US Roads
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FIGURE G-1: MIAMI-DADE COUNTY URBAN DEVELOPMENT BOUNDARY

G.2.4 General

Socioeconomic and demographic data for the Lower East Coast of Florida 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 (WRDA, 2000). Additional characteristics of the Lower East Coast 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. 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 Lower East Coast. However, high technology manufacturing has begun to emerge as a significant sector in the State over the last decade (WRDA, 2000).

G.2.5 Population

This section 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 document.

G.2.5.1 Population: Historic Trends and Existing Condition

Describing the demographic characteristics for the project site's census tract, Miami-Dade County, and the State of Florida, helps to provide a basis for understanding the existing socio-economic context in which plan implementation will take place. Some of these characteristics are outlined below.

The Biscayne Bay Coastal Wetlands project site does not coincide exactly with the census tracts. The census tract provides a convenient area for which data is available, and is closer to the relatively small sub-county component site footprint. This census tract data provides a blueprint for the surrounding area, not exact characteristics of the project site. The Biscayne Bay Coastal Wetlands site has few permanent residents or existing businesses, and most of the owners of the land do not occupy the property and in many instances reside outside of the region, and therefore may not mirror the demographics of the local area residents. The most current information regarding the detailed demographics of the Biscayne Bay Coastal Wetlands census tracts was published in the 2000 Census.

Florida:	
Population 2000	15,982,378
Population 2006	18,089,888
Change in population, 1990-2000	23.5%
Change in population, 2000-2006	13.2%
Below poverty level, 2004 estimate	11.9%
White, 2006	80.2%
Black, 2006	15.8%
Hispanic origin, 2006	20.2%
Other, 2006	2.7%
Miami Dade County:	
Population 2000	2,253,362
Population 2006	2,402,208
Change in population, 1990-2000	16.3%
Change in population, 2000-2006	6.6%
Below poverty level, 2004 estimate	17.1%
White, 2006	77.0%
Black, 2006	20.2%
Hispanic origin, 2006	61.3%
Other, 2006	1.9%

(U.S. Census Bureau, 2008)

TABLE G-1: BISCAYNE BAY COASTAL WETLANDS 2000 CENSUS TRACT

Census Tract	106.02	107.04	114.01	Total
Population	2,915	7,914	4,330	15,159
Percent below poverty level	43%	24%	9%	23%
White	16%	53%	77%	53%
Black	79%	32%	11.8%	35%
Hispanic origin	20.1%	48.8%	31%	38%
Other Races	5%	15%	11.2%	12%

(U.S. Census Bureau, 2000)

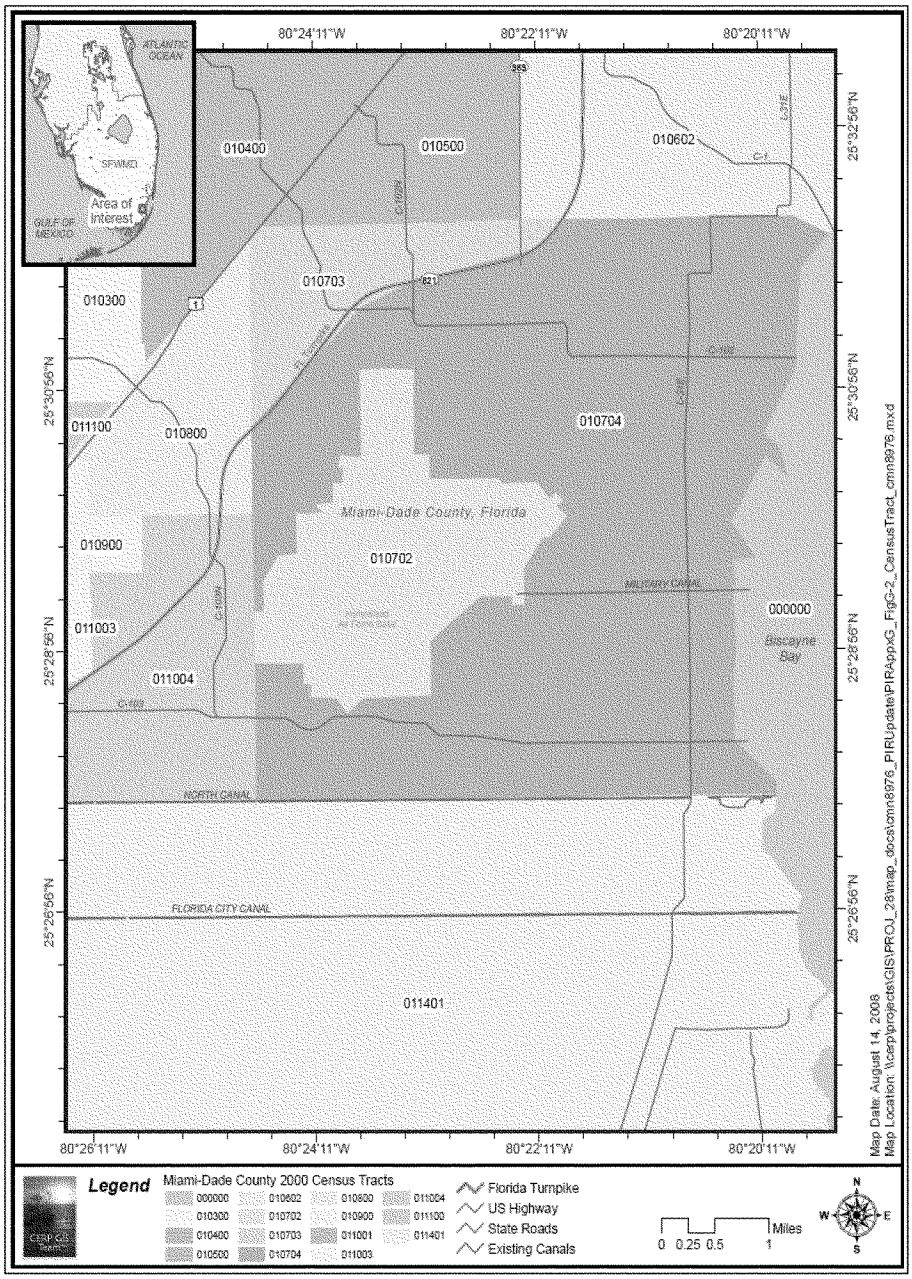

FIGURE G-2: CENSUS TRACT MAP OF BISCAYNE BAY STUDY AREA

Population in Miami-Dade County increased 6.6 percent from just over 2.2 million people to more than 2.4 million people during the period from 2000 to 2006. The population of Florida and the United States increased 13.2 and 6.4 percent respectively over the same short period. Thus, current statistics demonstrate that countywide, Miami-Dade is characterized by a slower population growth rate than the rest of the State, but a larger population growth than the Nation as a whole.

Miami-Dade County has a large percentage of people that claim Hispanic origin. Of the 2.25 million residents in the county during the year 2000, over one half are of Hispanic origin. Miami-Dade County also comprises nearly half of the state's Hispanic population. Of the 15,159 population in the study area, 38 percent claim Hispanic roots. Florida's African-American population is 2,333,427, which is 14.5 percent of the State's total population. In Miami-Dade County the African-American population is 457,432; which makes up 20.3 percent of the county's population. The study area has a population that is 35 percent African-American (5,327). The Native-American population of the study area represents less than one percent of the aggregate population of the study area (40 persons).

G.2.5.2 Population: Projections

Population in Miami-Dade County is expected to increase nearly 70 percent with a nearly 1.5 million person increase from 2000 to 2050. Due to this anticipated population growth, the county is expected to remain the most populated county in Florida. However, the south Florida nine-county area is expected to grow even more, for an increase of 78 percent between 2000 and 2050.

Table G-2 summarizes existing and projected population in Miami-Dade County: the 2000 figures are from the U.S. Census. The future estimates out to the year 2030 were based on the University of Florida Bureau of Economic and Business Research (BEBR) projections in *Projections of Florida Population by County, 2001-2030*, dated February 2002. The Miami-Dade County Department of Planning and Zoning developed the long-term projections from 2030-2050. These population projections were calculated for, and accepted by, the Initial CERP Update. ***Table G-3*** displays the population rates of growth for each decade from 2000 to 2050. ***Table G-4*** indicates the population growth rate of the study area is expected to be lower than that of the State from 2000-2050.

TABLE G-2: POPULATION ESTIMATES, 2000-2050

Population (1,000's)						
	Year					
	2000	2010	2020	2030	2040	2050
Miami-Dade	2,253	2,554	2,862	3,148	3,499	3,811
Share of Florida Total	14.10%	13.54%	13.13%	12.83%	12.90%	12.83%
Florida Total	15,982.40	18,866.70	21,792.60	24,528.60	27,118.70	29,714.50

TABLE G-3: STUDY AREA POPULATION RATES OF GROWTH 2000-2050

	Average (% Per year) Population Growth				
	2000-2010	2010-2020	2020-2030	2030-2040	2040-2050
Miami-Dade	1.3%	1.2%	1%	1.1%	0.9%
Florida Total	1.8%	1.55%	1.26%	1.06%	0.96%

TABLE G-4: STUDY AREA POPULATION GROWTH 2000-2050

	% Change 2000-2050*
Miami-Dade	70%
Florida	85.9%

* Note: Florida population projections are only published until 2050

G.2.6 Economy

Generally, a strong wholesale and retail trade, government and service sectors characterize Florida's economy. Florida's warm weather and extensive coastline attracts vacationers and other visitors and helps 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 since early to mid 1990s.

As of 2007, the most significant employment sectors in the Miami-Dade economy included trade, transportation and utilities; government; education and health

services; professional and business services; as well as leisure and hospitality. In 2007, the trade, transportation and utilities sector employed 24.9 percent of the workforce; while government employed 14.7 percent and education and health services employed 13.4 percent of the workforce. Professional and business services employed 13.3 percent of the workforce; leisure and hospitality services employed 10.1 percent. These industries paid an average annual wage of $39,933 for trade, transportation, and utilities; $51,991 for government; and $42,428 for education and health services. Those persons in the professional and business services sector received an average annual wage of $52,779 while those in leisure and hospitality services received an average annual wage of $24,716.

Homestead Air Reserve Base is a major economic presence in the southeast Miami-Dade Region. Since 1994 the Department of Defense has expended approximately $100 million in new construction infrastructure improvements on the base. The military provides an economic boost of $120 million a year for Homestead and Florida City. In 2003 there were 1,776 total personnel at the base with an annual payroll of $84,000,000. The base is a 2,200-acre stand-alone, Air Force Reserve Command-owned and operated installation.

The unemployment rate for Florida is four percent (Florida Legislature, 2007), while the unemployment rate for Miami-Dade County is 3.8 percent.

In 1999, per capita income in Florida was $21,557 (U.S. Census Bureau, 2000), but is somewhat lower in Miami-Dade County, at $18,497. The per capita income in census tract 106.02 was $7,832 while census tracts 107.04 and 114.01 had higher per capita incomes at $11,990 and $20,366 respectively.

Despite a considerably lower than average per capita income, the study area's median household income in 1999 was comparable to that of both the county and the state. At $33,120, it fell short of both the state average ($38,819) and that of Miami-Dade County ($35,966). These numbers suggest greater household size within the study area which would account for the increased household income over per capita income.

In 1999 it was reported that 12.2 percent of Florida's population lived below the poverty level, while 17.6 percent of Miami-Dade County were below the poverty level. The percentage of individuals in the study area living below the poverty level is considerably higher, at 23 percent. Within the study area 3,550 individuals live below the poverty level while the state reports 1,952,629 and the county reports 369,995 (U.S. Census Bureau, 2000).

G.2.7 Agriculture Economy

Despite its continued population growth and urban expansion, agriculture in Miami-Dade County remains a valuable industry and employer. In the latest

census of agriculture, it is reported that the market value of agricultural products from Florida exceeded six billion dollars per year. Florida ranks number one nationally in the quantity of acres devoted to grapefruits and oranges; the state ranks number two in the amount of acreage devoted to sugar cane production. Additionally, Florida ranks number two in fruit, nursery/greenhouse crop and vegetable production. There are 2,244 farms in Miami-Dade County with total cropland of over 66,000 acres. The market value of agricultural products sold in Miami-Dade County was 578 million in 2002 (USDA, 2002).

Because of the temperate climate, Miami-Dade County and south Florida are a major source of traditional vegetables for the rest of the nation during the colder months. Traditional vegetables include pole beans, tomatoes, squash, potatoes, corn, bell peppers and other more common vegetables. According to the 2002 Census of Agriculture, the vegetable, melon, potato and sweet potato crop in Miami-Dade County had an estimated value of over 102 million dollars. Additionally, Miami–Dade County is the number one producer of nursery/greenhouse crops and the number one producer of sweet potatoes in the state.

Aside from the extended growing season of traditional crops, the climate of south Florida is also favorable for the growth of many different tropical fruits. These fruits include lychee, avocado, mango, Persian limes, carambola, mamey sapote, guava, papaya and bananas. Additional smaller yield tropical fruits are harvested as well.

G.3 MUNICIPAL AND INDUSTRIAL WATER DEMAND

In the study area, surficial aquifers supply the majority of water for urban use. Rainfall is the primary supporter of the agriculture water demand in south Florida and surficial waters (canals, shallow groundwater, and ponds) provides the majority of the irrigation demands in the watershed. Currently, water shortages and restrictions are implemented during low rainfall periods or droughts.

Salinity intrusion is becoming a predominant problem for water supply. In the Lower East Coast area, salinity intrusion is thought to be the result of three issues. First, the ground water table has been lowered due to reduced recharge as well as increased drainage and withdrawal through pumping. Secondly, numerous drainage and navigation canals have been constructed linking inland areas to coastal waters. The third issue contributing to the lowering of the groundwater table is sea level rise.

G.3.1 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 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-5*** 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 municipal and industrial water use is estimated at 1,176.79 mgd. The addition of the 1,901.14 mgd of agricultural water use increases total water demand for the region to 3,077.93 mgd. Agricultural water use accounts for 62 percent of the total use, and all municipal and industrial uses accounts for 38 percent (***Figure G-3***). Total water demands are presented in the following table.

TABLE G-5: U.S. GEOLOGICAL SURVEY ESTIMATED TOTAL WATER USE, FOR SELECTED COUNTIES, 2000, EXCLUDING MINING AND POWER GENERATION

	Municipal and Industrial							
	Public	Self-Supply				Sub		Grand
County	Supply	Domestic	Commercial	Industrial	Recreation	Total	Agriculture	Total
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**

(In Millions of Gallons per Day)
NOTE: Recreation self-supply water use includes golf course irrigation.
Source: USGS unpublished data, 2002.

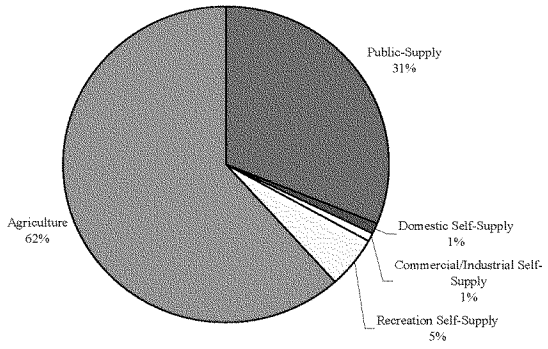

FIGURE G-3: DISTRIBUTION OF U.S. GEOLOGICAL SURVEY ESTIMATED 2000 WATER USE FOR THE NINE-COUNTY AREA

Figure G-3 presents the distribution of USGS estimated 2000 total and municipal and industrial water use, by county in the Lower East Coast. Combined, total water use in the four counties of the Lower East Coast (Broward, Miami-Dade, Monroe, and Palm Beach counties) was 2,104.7 mgd, which accounted for 68 percent of the nine-county region. The Lower East Coast municipal and industrial water use was estimated at 1,044.06 mgd, or 89 percent of the region's total municipal and industrial water use.

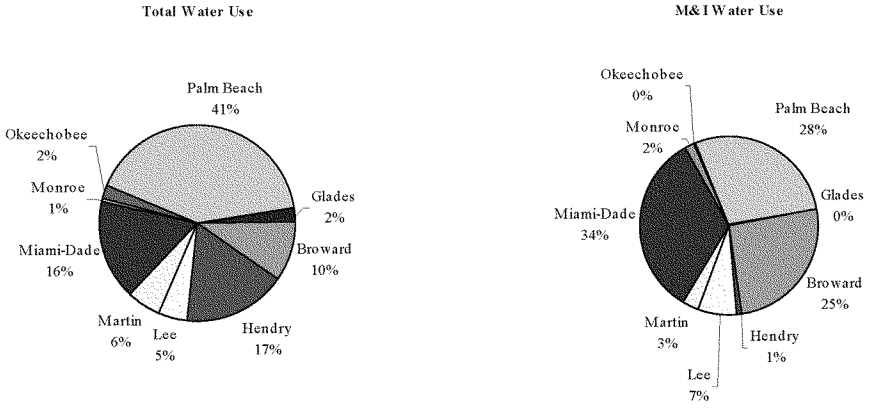

FIGURE G-4: DISTRIBUTION OF U.S. GEOLOGICAL SURVEY ESTIMATED 2000 TOTAL AND MUNICIPAL AND INDUSTRIAL WATER USE, BY COUNTY

A municipal and industrial forecast is required as input to modeling that will be the basis for planning and optimally designing the Biscayne Bay Coastal Wetlands project. The planning horizon is the year 2050. Water use estimates from the present to 2050 for natural area environmental purposes, agricultural irrigation purposes, municipal and industrial use, and other purposes are needed. The results of the IWR-MAIN effort are a set of projections through the year 2050 for municipal and industrial use only.

The municipal and industrial water use forecasts were developed using the IWR-MAIN Water Demand Management Suite, a computerized water resource planning tool that allows the development of water use forecasts and the evaluation of water conservation programs. The IWR-MAIN software allows water use forecasts to be developed based on existing water use patterns and existing or forecast socioeconomic parameters and then allows the impact of water conservation measures on those water uses to be evaluated. In the Initial CERP Update, residential water use was forecast using a multiplicative forecast model and nonresidential water use was forecast using a constant use rate model.

The Lower East Coast region municipal and industrial water demand forecast is shown in the following table. Figures are derived from the University of Florida BEBR population and employment projections, and were collected for the 2000 Initial CERP Update. The section of the Initial CERP Update that applies to the

Biscayne Bay study area is Service Area 3, which encompasses Miami-Dade and Monroe counties. Water demand projections estimate the Service Area 3 most likely population scenario, conservation–adjusted water use in 2050 at 505.6 mgd. Service Area 3 is expected to be using one third of the total water demanded in the nine-county Initial CERP Update Region.

The South Florida Water Management District (SFWMD) requires the 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 would increase and the shortages and restrictions would become more prominent, leading to both economic and environmental damages. 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. The 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, migration of the underlying salt wedge leading to increased saltwater intrusion and shortages to wells and well fields would become more prevalent.

TABLE G-6: ESTIMATED 2050 CONSERVATION ADJUSTED WATER DEMAND FOR SERVICE AREA 3 IN MILLION GALLONS PER DAY UNDER MOST LIKELY POPULATION SCENARIO

End Use	2000 Demand	2050 Demand
Service Area 3	373.2 mgd	586.6 mgd

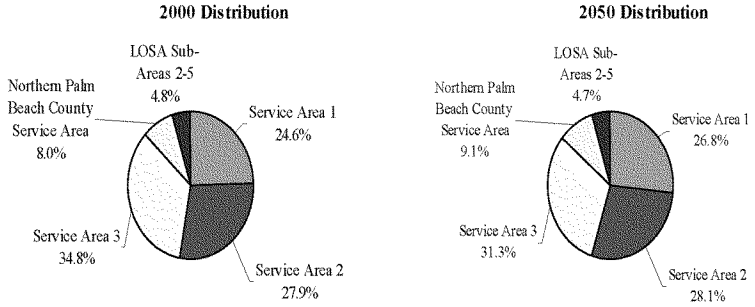

FIGURE G-5: DISTRIBUTION OF TOTAL CONSERVATION-ADJUSTED MUNICIPAL AND INDUSTRIAL WATER USE, BY SERVICE AREA, 2000 AND 2050, MOST-LIKELY POPULATION SCENARIO

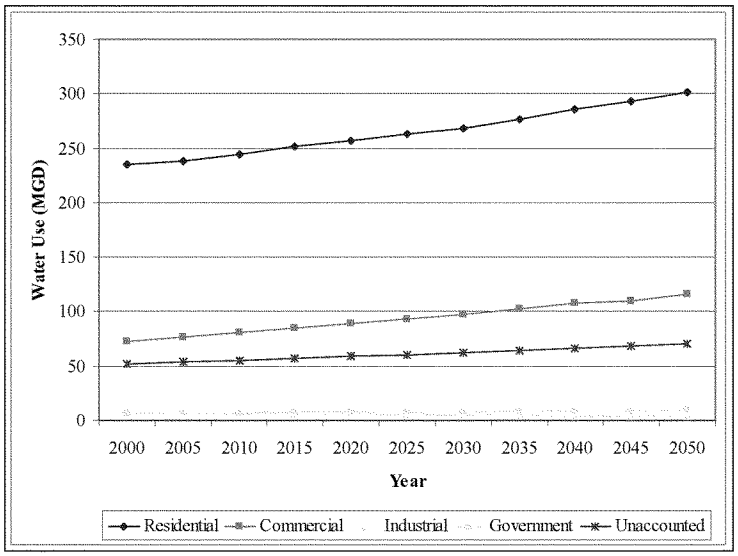

FIGURE G-6: SERVICE AREA 3, MOST-LIKELY POPULATION SCENARIO MUNICIPAL AND INDUSTRIAL CONSERVATION ADJUSTED FORECAST BY WATER USE SECTOR

G.3.2 Agricultural Water Demands

Agriculture is a significant irrigated land use of the Lower East Coast region. According to CERP, agricultural land use represents less than one-quarter of the land use in the service area, and in many areas will be virtually non-existent in the future.

Rainfall is the primary supporter of the agriculture water demand in south Florida-approximately 59 inches per year along the Lower East Coast. Surficial waters (canals, shallow groundwater, and ponds) are the major source of water for the irrigation demands within the watershed. Unfortunately, surficial supplies are inadequate at some time nearly every year. During droughts, agricultural water users have higher than usual irrigation water demands; however, water supplies are usually at their lowest levels during droughts. Consequently, water shortage management policies are implemented which restricts the 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 damages.

The Lower East Coast receives significant groundwater recharge via easterly seepage from the water conservation areas under the north-south levee system; however, during prolonged droughts, significant volumes of water from Lake Okeechobee can be required by the Lower East Coast to supplement local water supplies and prevent saltwater intrusion into well fields.

G.4 FLOOD DAMAGE REDUCTION IMPACTS OF SELECTED ALTERNATIVES

A key design criterion and goal throughout the development of the project components has been that flooding of developed areas will remain the same or improved with the plan implemented as compared to without the plan. No flooding of residential or commercial properties will be caused by implementation of the plan. See ***Annex C*** for a detailed analysis of flooding impacts.

G.5 RECREATION

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

users' 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.

Biscayne Bay provides 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 the 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 the 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 the study area related recreation and/or the number of people who participate 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 the 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. 84.5 million people visited Florida in 2007 as tourists (Visit Florida, 2008). Yet the 2000 Florida Statewide Comprehensive Outdoor Recreation Plan (SCORP) notes that tourism within the state is sensitive to both national economic and energy conditions.

The SCORP is the best source of information on recreation demand and supply at the state and regional scales. The most recent SCORP (2000) used a ten-year forecast horizon (to the year 2010). It divides the state into 11 planning regions, each with clusters of counties. Region 11 is comprised of Broward, Miami-Dade and Monroe counties.

TABLE G-7: COUNTIES WITHIN STATEWIDE COMPREHENSIVE OUTDOOR RECREATION PLAN PLANNING REGIONS POTENTIALLY AFFECTED BY ALTERNATIVE RESTORATION PLANS

Region	Counties
Region 11	Broward
	Miami-Dade
	Monroe

(Florida Department of Environmental Protection, 2000)

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-8*** presents descriptive information on the recreation facilities in SCORP Regions 11 for study area specific recreation categories. These resource-based categories were selected as those that could potentially be affected by the hydrologic changes or ecological changes associated with the alternative restoration plans. This table also includes percentages of the statewide totals for the recreation categories.

TABLE G-8: REGIONAL OUTDOOR RECREATION FACILITIES REGION 11, 1998

Resource/Facility	Region 11	% of State Total	State Total
Outdoor Recreation Areas	2,080	16%	13,097
Outdoor Recreation Acres	3,038,475	28%	10,850,904
Land Acres	1,831,363	20%	9,077,004
Water Acres	1,207,112	68%	1,773,900
Hunting Acres	871,151	14%	6,168,716
Land Acres	869,573	14%	6,046,955
Water Acres	1,578	1%	121,761
Camping			
RV / Trailer Camp Sites	10,603	8%	138,576
Tent Camp Sites	1,081	11%	10,214
Trails			
Hiking Trails (miles)	277	7%	3,904
Horseback Riding Trails (miles)	91	6%	1,443
Nature Trails (miles)	107	10%	1,043
Freshwater Catwalks	40	5%	748
Boating			
Canoe Trails (miles)	296	11%	2,587
Freshwater Boat Ramp Lanes	235	12%	1,973
Freshwater Marinas	6	1%	511
Freshwater Slips / Moorings	303	3%	11,758
Saltwater Marinas	366	33%	1123
Saltwater Marina Slips	14,470	32%	45,839

(Florida Department of Environmental Protection, 2000)

G.5.1 Recreation Demand

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. 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.5.1.1 Regional Recreation Demand

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 recreation participation information was derived from the 2000 surveys conducted by the University of Florida, Department of Recreation, Parks, and Tourism. Participation in outdoor recreation activities is expressed in terms of user-occasions, which occur each time an individual participates 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 the per capita participation rates to population projections.

Table G-9 presents 1997 and projected 2010 demands for the selected recreation activities in SCORP Planning Region 11. 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 regions' recreation resources and facilities.

TABLE G-9: DEMAND AND FACILITY NEEDS (1997 AND 2010)
SELECTED RECREATION ACTIVITIES
(STATEWIDE COMPREHENSIVE OUTDOOR RECREATION PLAN REGION 11)

Activity	Units	Demand (user-occasions)		Resources/Facility Needs	
		1997	2010	1997	2010
Hunting	Acres	663,841	772,849	79,348	235,427
RV / Trailer Camping	Camp Sites	2,203,445	2,779,565	0	0
Tent Camping	Camp Sites	888,761	1,136,981	10	317
Hiking	Miles	1,282,041	1,672,767	252	413
Horseback Riding	Miles	1,780,575	2,189,849	0	0
Bicycle Riding	Miles	19,654,556	24,089,784	1,241.32	1,607.60
Nature Study	Miles	1,456,739	1,988,143	0	0
Canoeing	N/A.	108,405	142,253	N/A.	N/A.

(Florida Department of Environmental Protection, 2000)

In sum, the Biscayne Bay ecosystems support a significant amount of outdoor recreation in the Lower East Coast of Florida. A significant portion of the expenditures comes from tourists. It is not possible at this time to anticipate precisely how expenditures and consumer surplus associated with Biscayne Bay-related recreation would change if restoration occurred. However, based on the adverse effects related to environmentally damaging releases of waters into the Bay's ecosystem, it can be concluded that improving the environmental quality of the Biscayne Bay ecosystem would substantially support and sustain local recreation-based businesses. Given the potential levels of expenditures and consumer surplus in the future, a small percentage increase in the quantity or quality of Biscayne Bay-related recreation could represent an increase in recreation value.

G.5.1.2 Local Recreation Demand

Miami-Dade County owns or operates several parks within the study area. They include the Deering Estate, Black Point Park and Marina, and Homestead Bayfront Park that provide direct access to the Biscayne Bay both visually and by water. In addition, Lakes by the Bay Park is under development and will provide both active recreation areas and nature trails and preserves. Homestead Air Force Base Park, also under development, is a SFWMD park that would provide active recreation.

As development continues in the southern tier of the county, and in particular in the area just inside the eastern boundary of the urban development boundary, there would be continuing pressure to acquire additional park land in order to meet the county's level of service for local park and recreation acres.

G.5.2 National Recreation Trends

National trends in recreation may help to identify potential or expected changes in the demand for Florida recreation as the result of ecosystem restoration. Two national surveys of outdoor recreation have particular relevance for this investigation.

G.5.2.1 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. Approximately 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 Selected Plan. 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 approximately 134 million participating (66.7 percent of the population). Approximately 124 million recreationists (62.1 percent) enjoy visiting a beach or other waterside and gathering outdoors with family. Sightseeing also had a high level of participation (56.6 percent). Other very popular activities include hiking and backpacking, fishing, boating and camping.

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 due to differences in the surveys.

TABLE G-10: PARTICIPATION RATES FOR SELECTED RECREATIONAL ACTIVITIES BY U.S. POPULATION 16 YEARS OR OLDER, 1994-1995

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%
Warm water	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%

(Outdoor Recreation Coalition of America, 1997)

TABLE G-11: TRENDS IN UNITED STATES RECREATION PARTICIPATION 1982-1994

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%

(Outdoor Recreation Coalition of America, 1997)

Table G-11 contains numbers 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 United States population during this period explains some of the change in the number 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 climbing, rock climbing, caving, and special types of wildlife viewing.

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.

G.5.2.2 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

The U.S. Fish and Wildlife Service (FWS) 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-12***. 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 participated 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.

TABLE G-12: TOTAL UNITED STATES WILDLIFE WATCHING PARTICIPATION, 1996

Category	Participants	Expenditures
Residential	60.8 million	
Nonresidential	23.7 million	
Total*	62.9 million	$29 billion

(U.S. Fish and Wildlife Service, 1996)

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 one 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 both their state of residence as well as in other states. 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-13: UNITED STATES WILDLIFE WATCHING ACTIVITY, 1996

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

(U.S. Fish and Wildlife Service, 1996)

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, 1996

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%

(U.S. Fish and Wildlife Service, 1996)

The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation contains state-level information on recreation participation and expenditures. In 1996, approximately 3,642,000 of Florida's 11,239,000 residents (32 percent) participated 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.

As indicated in

Table G-15, there were an estimated 1,846,000 participants in wildlife-watching activities in Florida in 1996. Approximately 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, the in-state and out-of-state participants spent a total of 14,658,000 days watching wildlife in Florida.

TABLE G-15: PARTICIPANTS IN WILDLIFE-RELATED RECREATION IN FLORIDA, 1996

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

(U.S. Fish and Wildlife Service, 1996)

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 over $1.6 billion in 1996 on wildlife watching. This includes trip-related expenditures 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, and plantings.

TABLE G-16: FLORIDA WILDLIFE WATCHING EXPENDITURES, 1996

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%

(U.S. Fish and Wildlife Service, 1996)

G.5.2.3 State Recreation Trends

The 2000 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 of Recreation and Parks did not have funds to conduct a new participation survey for the latest SCORP so the recreation participation information was derived from the 1992-1993 surveys conducted by the University of Florida, Department of Recreation, Parks, and Tourism. Participation in outdoor recreation activities is expressed in terms of user-occasions, which occur each time an individual participates 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 the 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, over 45 million residents and tourists participated in these activities in 1992. Hiking, recreational vehicle (RV) camping, and nature study were popular with residents and tourists. With the exception of recreational vehicle camping, participation by residents outnumbered tourist participation.

TABLE G-17: DEMAND FOR SELECTED RECREATION ACTIVITIES IN FLORIDA USER-OCCASIONS (THOUSANDS), 1992

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%

(Florida Department of Environmental Protection, 1994)

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-18: PARTICIPATION RATES FOR SELECTED RECREATIONAL ACTIVITIES (1985, 1992)

	% of Residents Participating		% of Tourists Participating	
Activity	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%

(Florida Department of Environmental Protection, 1994)

G.5.2.4 Contribution of Tourism to State Recreational Trends

As described in the 2000 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 project-related recreation in the study area. The Comprehensive Review Study detailed the importance of tourism on the recreation in Florida.

G.5.2.5 Potential Changes in Value of Recreation

The Biscayne Bay Coastal Wetlands project can support a significant amount of outdoor recreation in the Lower East Coast region, with a significant portion of expenditures coming from tourists. Based on the recent adverse effects related to environmental damage of the ecosystem, it may be concluded that improving the environmental quality of the estuary ecosystem would substantially support and sustain local recreation-based businesses. Given the potential levels of expenditures and consumer surplus in the future, a small percentage increase in the quantity or quality of project-related recreation could represent an increase in recreation value.

There are potential recreation resources that would be associated directly with the construction of the impoundment. The uses presently considered compatible with resource protection and passive recreation include: freshwater fishing, horseback riding, hiking, off-road bicycling, wildlife viewing and nature study.

G.6 COSTS

Data for initial construction/implementation, land acquisition, monitoring, and periodically recurring costs for operation, maintenance, repair, replacement, and rehabilitation, have been developed through engineering design and cost estimation, and real estate appraisal efforts. Details of that data development are explained and discussed in ***Appendix B***. The main issues requiring economic evaluation attention include equivalent time basis calculations, price levels, and timing of project spending.

Costs represent the difference between conditions without any plan (the "base condition" or "without-plan condition") and with-plan alternatives. Costs of a plan represent the value of goods and services required to implement and operate/maintain the plan. The costs presented in ***Table*** G-19 are the total initial costs of construction and real estate. The operations and maintenance costs are annual estimates for fully implemented components.

TABLE G-19: INITIAL COST OF CONSTRUCTION, REAL ESTATE AND OPERATIONS AND MAINTENANCE

BISCAYNE BAY COASTAL WETLANDS COSTS					
	Alternative YB	**Alternative O**	**Alternative M**	**Alternative Q**	**Alternative O Phase 1***
Construction	**$277,660,000**	**$146,900,000**	**$130,600,000**	**$272,470,000**	**$45,100,000**
S/A	$27,250,001	$14,690,000	$13,060,000	$27,250,000	$4,510,000
PED	$22,210,000	$11,710,000	$10,450,000	$21,780,000	$3,690,000
Total Construction	$327,120,001	$173,300,000	$154,110,000	$321,500,000	$53,300,000
Real Estate	$559,854,000	$360,210,000	$360,210,000	$483,800,000	$76,660,000
Total First Cost	**$886,970,000**	**$533,510,000**	**$393,600,000**	**$805,300,000**	**$129,960,000**
Annual OMRR&R	**$5,900,000**	**$3,700,000**	**$3,700,000**	**$5,990,000**	**$1,400,000**

*Costs are planning level costs based on a rough order of magnitude and do not coincide exactly with the detailed costs of the SAP presented in other sections of the report.

The cost estimate for the alternatives includes construction, lands, easements, right-of-ways, relocation, and disposal, pre-construction, engineering and design costs, and construction management. Data for initial construction/implementation,

land acquisition, monitoring, and periodically recurring costs for operation, maintenance, repair, replacement, and rehabilitation, have been developed through engineering design and cost estimation, and real estate appraisal efforts (refer to ***Appendix B - Cost Estimates*** for details of data development for cost estimates).

For purposes of this report and analysis, NED costs (NED costs, as defined by Federal and USACE policy), are expressed in 2010 price levels and are based generally on costs estimated to incur over a 40-year period of economic analysis, depending on the length of construction. The local sponsor's expedited construction program began construction of the project in 2010. These costs are included in ***Table G-20*** and were used in the cost effectiveness analysis of the alternatives.

The timing of a plan's costs is important. Construction and other initial implementation for component costs cannot simply be added to periodically recurring costs for project operation, maintenance and monitoring. Construction costs incurred in a given year of the project cannot simply be added to construction costs incurred in other years if meaningful and direct comparisons of the costs of the different components are to be made. A common practice of equating sums of money across time with their equivalent at an earlier single point in time is the process 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 (4.375 percent per year), the cost time stream for the alternative plans were mathematically translated into an equivalent time basis value.

There is some uncertainty as to how any of the plans, if approved and adopted, would be implemented. It is recognized that any of the plans would likely be implemented over a considerable length of time. For purposes of this evaluation, construction costs are assumed to incur on an equal monthly basis during the implementation of the alternative plans as defined.

ER 1105-2-100 requires that interest during construction be computed, which represents the opportunity cost of capital incurred during the construction period. Interest was computed for pre-construction, engineering and design 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 both real estate and construction costs. Interest during construction was computed for the total real estate cost starting from the month prior to construction commencing. The cost of a project is the investment incurred up to the beginning of the period of analysis. The investment cost at that time is the sum of construction and other initial cost such as real estate and pre-construction, engineering and design cost plus interest during construction. ***Table G-20*** summarizes the total investment cost and total annual equivalent costs of each alternative plan.

TABLE G-20: PLANNING LEVEL CONSTRUCTION AND INVESTMENT COST OF ALTERNATIVE PLANS

BBCW INVESTMENT COST					
	Alternative M	**Alternative O**	**Alternative Q**	**Alternative P-1**	**Alternative YB**
Construction	**$130,600,000**	**$146,900,000**	**$272,470,000**	**$45,100,000**	**$277,660,000**
S/A	$10,450,000	$11,710,000	$21,780,000	$3,690,000	$22,210,000
PED	$13,060,000	$14,690,000	$27,250,000	$4,510,000	$27,250,001
Total Construction	**$154,110,000**	**$173,300,000**	**$321,500,000**	**$53,300,000**	**$327,120,001**
Construction Schedule (Months)	33	34	38	33	40
Real Estate	**$239,492,000**	**$360,211,000**	**$483,801,000**	**$76,662,000**	**$559,854,000**
Certification for IDC (Months)	36	37	41	36	43
Total First Cost	**$393,600,000**	**$533,510,000**	**$805,300,000**	**$129,960,000**	**$886,970,000**
IDC Construction	$9,440,000	$10,950,000	$25,340,000	$3,265,000	$24,500,000
IDC Real Estate	$21,120,000	$50,840,000	$76,220,000	$10,500,000	$92,840,000
TOTAL INVESTMENT	**$424,160,000**	**$595,300,000**	**$906,860,000**	**$143,730,000**	**$1,004,310,000**
O&M	$3,700,000	$3,700,000	$5,990,000	$1,400,000	$5,900,000
First Year for Benefits	2010	2010	2010	2010	2010
Amortized Cost (40 Years)	$22,640,000	$31,780,000	$48,410,000	$7,670,000	$54,130,000
Average Annual Cost	**$26,340,000**	**$35,480,000**	**$54,400,000**	**$9,070,000**	**$60,030,000**

*Note – Final Costs of Selected Plan will be revised based on additional engineering and design. NER costs do not include Recreation Cost for Plan Formulation

G.7 ECOLOGICAL EVALUATION OF BENEFITS USED IN COST EFFECTIVENESS/INCREMENTAL COST ANALYSES

In practice, USACE ecosystem restoration studies typically measure the ecosystem benefits of alternative plans in terms of physical dimensions (number of acres of wetlands, for example), or population counts (number of wading birds, for example), or various habitat-based scores ("habitat units" based on the FWS's Habitat Evaluation Procedures, or "HEP", for example). More than 20 performance measures were originally developed by the Biscayne Bay Coastal Wetlands Project Delivery Team (PDT) to evaluate how well each of the alternative plans performed on various criteria indicative of ecosystem restoration. To reduce the complexity of the evaluation, the PDT selected a subset of these performance measures that best integrate information regarding the quality and quantity of improved hydrologic and ecologic function within the study area.

Ecological benefits for the project were determined using a hybrid approach to quantify habitat unit change. The alternative approach is referred to as the Criterion Based Ecological Evaluation Method (CBEEM). This methodology utilizes modeling results, project component sizes and operation, and best professional judgment of a multi-agency team of ecologists to derive a habitat unit score that represents the ecological lift achieved by each alternative. This method evaluated benefits for each of the three project sub-regions and within each of the three major ecological zones present within the project area (nearshore bay, saltwater wetlands, freshwater wetlands). Each alternative plan was evaluated against the CBEEM performance metrics defined in the Biscayne Bay Coastal Wetlands Project Management Plan (PMP) which are as follows:

1. Restore nearshore salinity regime
2. Restore tidal wetland salinity regime
3. Reduce direct canal drainage
4. Potential freshwater wetland rehydration
5. Reduce nitrogen concentrations
6. Reduce total phosphorous loading to Biscayne Bay
7. Reduce non-native vegetation
8. Restore connections between basins and wetlands

A complete description of the CBEEM evaluation tool including normalized scores of each ecological zone against the criteria and methodology is provided in ***Appendix C.***

G.8 COST EFFECTIVE/INCREMENTAL COST ANALYSIS

G.8.1 Cost Effectiveness/Incremental Cost Analyses for Final Array of Alternatives

Cost effectiveness and incremental cost analyses (CE/ICA) reveal information about good financial investments given the dollar costs and non-dollar outputs ("benefits") of alternative investment choices for an ecosystem restoration project. This analysis is useful in lending support to identifying the National Ecosystem Restoration (NER) plan. The analyses are conducted in a series of steps that progressively identify alternatives that meet specified criteria and screen-out those that do not. Corps Engineer Regulation 1105-2-100 requires cost effectiveness and incremental cost analyses to support recommendations for ecosystem restoration.

A cost effectiveness analysis is conducted to ensure that least cost alternatives are identified for various levels of environmental output. Cost effectiveness analysis begins with a comparison of the annual costs and annual outputs of alternatives 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 equal or lower costs than other alternatives. Next, through incremental cost analysis (ICA), the cost effective alternative plans are compared to successively identify the alternative plans with the least additional cost per additional output that is, the plans that are the most efficient in production of output. 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?" i.e., are the additional outputs worth the costs incurred to achieve them?

This analysis is based on and follows guidance from the USACE Institute for Water Resources publication, Evaluation of Environmental Investment Procedures Manual, Interim: Cost Effectiveness and Incremental Analyses, May 1995, IWR Report #95-R-1. As per this guidance, CE/ICA analysis compares the alternative plans' average annual costs against the appropriate average annual habitat unit estimates. The average annual outputs are calculated as the difference between with-plan and without-plan conditions over the period of analysis (through year 2050). The following sections present the average annual costs, average annual benefits and the results of cost effectiveness and incremental cost analysis for the alternative plans.

G.8.2 Average Annual Benefits

Cost effective/incremental cost analysis requires a comparison of average annual costs and average annual benefits. 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 and output used for the cost

effective/incremental cost analyses are displayed in ***Table G-22***. The period of analysis for benefit annualization that was utilized is 40 years. The base year, or the first year benefits begin to accrue, is in 2010. The average annual habitat unit lift is calculated as subtracting the future without project habitat units from the future with project habitat units for each year and averaging over the life of the project. 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).

The analysis of ecological response times for large, diverse ecosystems is extremely difficult to calculate. For example, when analyzing an estuarine system, certain attributes would have to be examined when predicting the response to changes in salinity. Oysters may provide responses within a year of salinity change towards normal conditions. Seagrasses would normally respond quickly, but these responses are difficult to measure since there would be relocation of certain populations in response to specific currents and salinity concentrations. Small invertebrate and fish species should respond quickly; however, large vertebrate species would take longer to increase as they take longer to mature and reach reproductive ages.

The same difficulty occurs in the examination of freshwater systems. Different attributes, such as sawgrass marshes, periphyton mats, and bayheads respond differently in time to changes in hydroperiods and hydropatterns. Sawgrass marshes are in intense competition with other grasses, sedges and freshwater marsh species. Changes in the content of certain species could occur fairly rapidly in certain areas; however, the competition of populations and/or communities along ecozones could take a much greater amount of time for species, populations and communities to become established. Periphytons have been shown to respond rapidly to changes in hydroperiod and hydropattern. Forested wetlands, including bayheads, would take a much longer time to respond to hydrologic changes in terms of tree species transitions. As such, the team took a linear approach to predict ecological response time in each of the three ecozones that were defined.

Summary results from CBEEM which are used in the cost effective/incremental cost analyses are provided in ***Table G-21*** and a graphic representation of the nearshore response time can be seen in ***Figure G-7***.

TABLE G-21: CBEEM RESULTS: TOTAL HABITAT UNIT CALCULATIONS FOR EACH ECOLOGICAL ZONE

TOTAL HABITAT UNIT SUMMARY (NET FWO CONDITION)							
	Existing Condition	**Future Without**	**Alternative O**	**Alternative M**	**Alternative Q**	**Alternative YB**	**Alternative O, P1**
NEARSHORE HABITAT LIFT							
Functional Habitat (acres)	**732**	**1,673**	**5,565**	**3,696**	**5,154**	**4,147**	**4,624**
2050 HU Lift		**941**	**3,892**	**2,023**	**3,481**	**2,474**	**2,950**
Avg. Ann. HU			**3,974**	**2,251**	**3,595**	**2,666**	**3,106**
SALTWATER WETLAND HABITAT LIFT							
Functional Habitat (acres)	**973**	**1,002**	**7,176**	**7,236**	**5,292**	**4,136**	**7,398**
2050 HU Lift		**29**	**6,174**	**6,234**	**4,290**	**3,134**	**6,396**
Avg. Ann. HU			**5,704**	**5,759**	**3,967**	**2,901**	**5,909**
FRESHWATER WETLAND HABITAT LIFT							
Functional Habitat (acres)	3,997	**3,997**	**7,108**	**4,181**	**9,311**	**8,465**	**4,280**
2050 HU Lift			**3,111**	**185**	**5,315**	**4,468**	**283**
Avg. Ann. HU			**2,868**	**171**	**4,900**	**4,119**	**261**

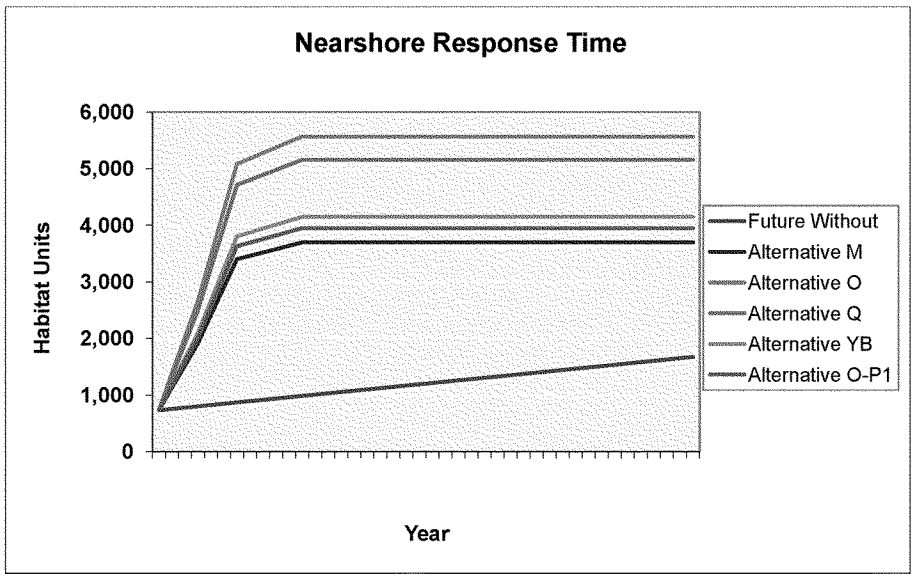

FIGURE G-7: NEARSHORE RESPONSE TIME

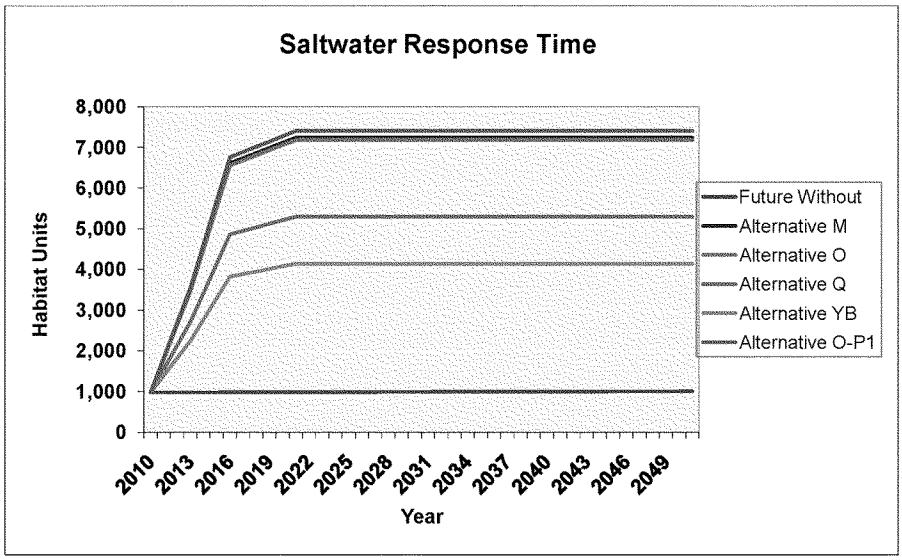

FIGURE G-8: SALTWATER RESPONSE TIME

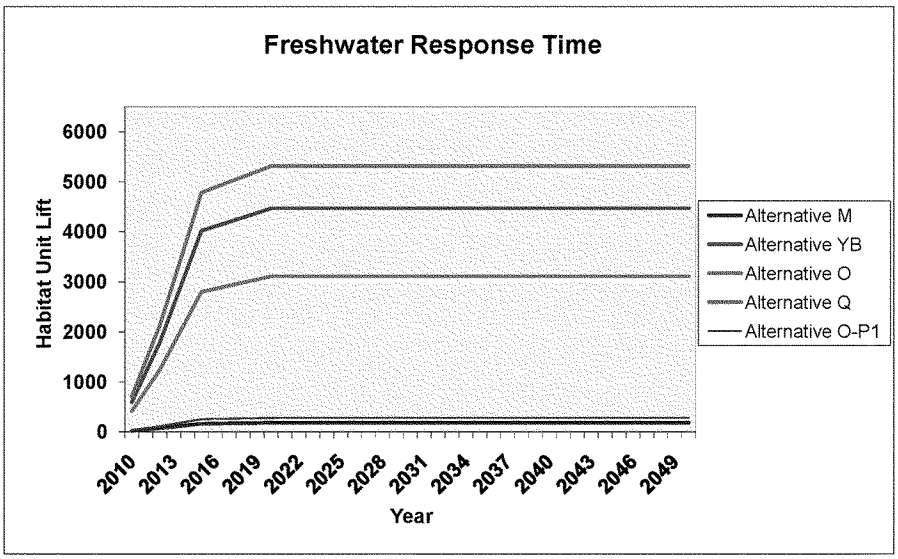

FIGURE G-9: FRESHWATER RESPONSE TIME

G.8.3 Cost Effective Analysis

Cost effectiveness analysis begins with a comparison of the annual costs and annual outputs of alternatives 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 equal or lower costs than other alternative plans. The three criteria for cost effectiveness screening:

1. The same output level could be produced by another plan at less cost;
2. A larger output level could be produced at the same cost; or
3. A larger output level could be produced at less cost.

Sometimes it is difficult to summarize the results of cost effective/incremental cost analyses when the analyses are performed separately on habitat units for distinct species or communities. 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 the case for the Biscayne Bay Coastal Wetlands features and alternatives, in which certain features or alternatives provide greater benefits to the freshwater wetlands in the watershed, while other alternatives provide greater benefits for the nearshore habitats. It was determined that the

separate ecological zones were all considered to be of equal importance. It was also believed that a combined habitat unit score summing all three zones, while not appropriately representing the significance of each ecological zone, would provide a valuable cumulative impact analysis for determining the plan which best meets the needs of the watershed. The results of the cost effective/incremental cost analyses on each ecological zone were examined both independently and combined and plan selection was based upon utilizing an aggregate of these results.

The results will be demonstrated in the various following charts and graphs. In summary, cost effective/incremental cost analysis was performed using the following four metrics to represent various ecosystem outputs of the Biscayne Bay Coastal Wetlands alternatives:

1. Combined habitat unit score
2. Freshwater ecological zone
3. Saltwater ecological zone
4. Nearshore ecological zone

Cost effective/incremental cost analysis was conducted for each of the Biscayne Bay Coastal Wetlands alternative plans. 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). A summary of the average annual lift calculations and average annual costs used in the cost effective/incremental cost analyses analysis are provided in ***Table G-23***.

The total cost of CERP is not included in this cost effective/incremental cost analyses. The cost of the balance of the CERP features, those not included in the Biscayne Bay Coastal Wetlands alternatives, is the same for all the Biscayne Bay Coastal Wetlands alternatives. As such, including it in this analysis does not bring any additional insight or differentiation between alternatives. For this analysis, the difference between the alternatives can be shown through a display of the outputs and costs of each Biscayne Bay Coastal Wetlands alternative without the cost of the "other CERP" features.

TABLE G-22: COSTS AND OUTPUTS USED IN BBCW COST EFFECTIVENESS AND INCREMENTAL COST ANALYSIS

Alternative	Annual Cost	Freshwater HU's	Saltwater HU's	Nearshore HU's	Total System-Wide HU's
Alternative O	$35,480,000	2,868	5,704	3,974	12,546
Alternative M	$26,340,000	171	5,759	2,251	8,181
Alternative Q	$54,400,000	4,900	3,967	3,595	12,462
Alternative YB	$60,030,000	4,119	2,901	2,666	9,687
Alternative O, P1	$9,070,000	261	5,909	3,106	9,276

Notes: Values for alternatives are differences between "Without" plan and "With" plan on an average annual basis. Values assume system benefits (ecosystem outputs that would accrue to the Biscayne Bay Coastal Wetlands study area if rest of CERP were constructed).

Key: HU habitat unit

G.8.3.1 Cost Effectiveness Analysis–Combined Wetland Outputs

Table G-23 and ***Figure G-10*** show that Alternatives O and Alternative O Phase 1 are cost effective in the overall production of habitat units. Alternatives M has a higher average annual cost than that of Alternative O-P1, and Alternative Q and YB have a much greater annual cost than Alternative O, while providing less total benefits, rendering them non cost-effective. Alternative O has more than thirty-five hundred more habitat units than does Alternative O Phase 1. Alternative O Phase 1 produces habitat units at the lowest average cost per unit of output at $978 per habitat unit, which is about one third of the cost per habitat unit of Alternative O.

TABLE G-23: RESULTS OF COST EFFECTIVENESS ANALYSIS: ALL PLANS ARRAYED BY INCREASING OUTPUT FOR EACH OUTPUT CATEGORY–COMBINED HABITAT UNITS

Name	Annual Cost	Combined	Cost Per HU	Cost Effective
No Action Plan	0	0		
Alternative M	$26,340,000	8,181	$3,220	No
Alternative O-P1	$9,070,000	9,276	$978	Best Buy
Alternative YB	$60,030,000	9,687	$6,197	No
Alternative Q	$54,400,000	12,462	$4,365	No
Alternative O	$35,480,000	12,546	$2,828	Best Buy

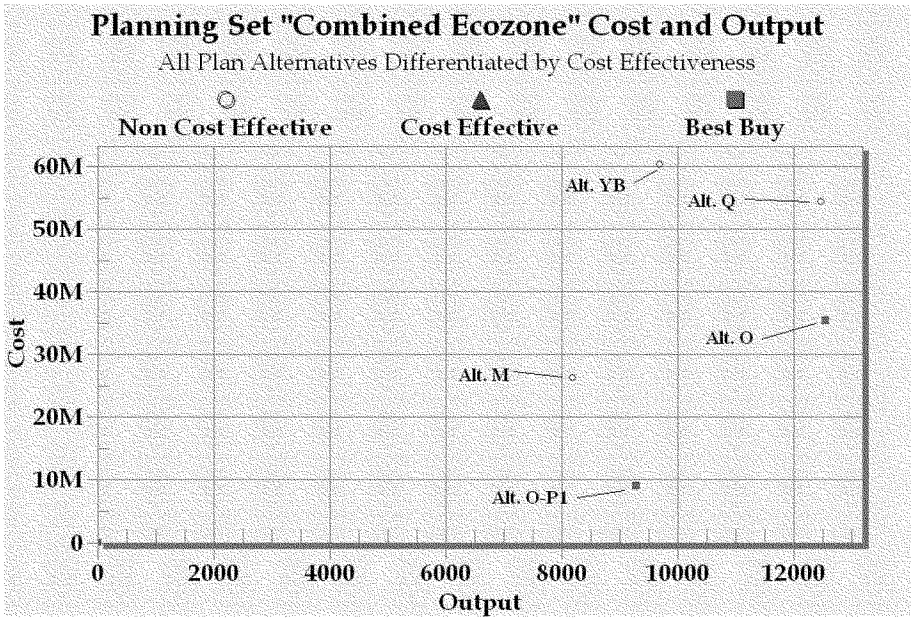

FIGURE G-10: COST EFFECTIVE/INCREMENTAL COST ANALYSIS ON TOTAL SYSTEM-WIDE HABITAT UNITS

G.8.3.2 Cost Effectiveness Analysis–Freshwater Zone Outputs

Table G-24 and ***Figure G-11*** show that Alternative O, Alternative Q and Alternative O Phase 1 are all cost effective in the production of freshwater habitat. Alternative M provides the least average annual habitat unit lift, and this alternative also has a higher average annual cost than Alternative O Phase 1 making it non cost-effective in the production of freshwater habitat. Alternative O has more than fifteen times the total output as Alternative M, and Alternative Q has more than twenty times the total output. Alternative Q produces the greatest amount of benefits and also is the least cost per benefit, identifying it as the only best buy plan.

TABLE G-24: RESULTS OF COST EFFECTIVENESS ANALYSIS: ALL PLANS ARRAYED BY INCREASING OUTPUT FOR EACH OUTPUT CATEGORY– FRESHWATER HABITAT UNITS

Name	Annual Cost	Freshwater	Cost Per HU	Cost Effective
No Action Plan	**$0**	**0**		
Alternative M	$26,340,000	171	$154,432	No
Alternative O-P1	$9,070,000	261	$34,763	Yes
Alternative O	$35,480,000	2,868	$12,370	Yes
Alternative YB	$60,030,000	4,119	$14,573	No
Alternative Q	$54,400,000	4,900	$11,102	Best Buy

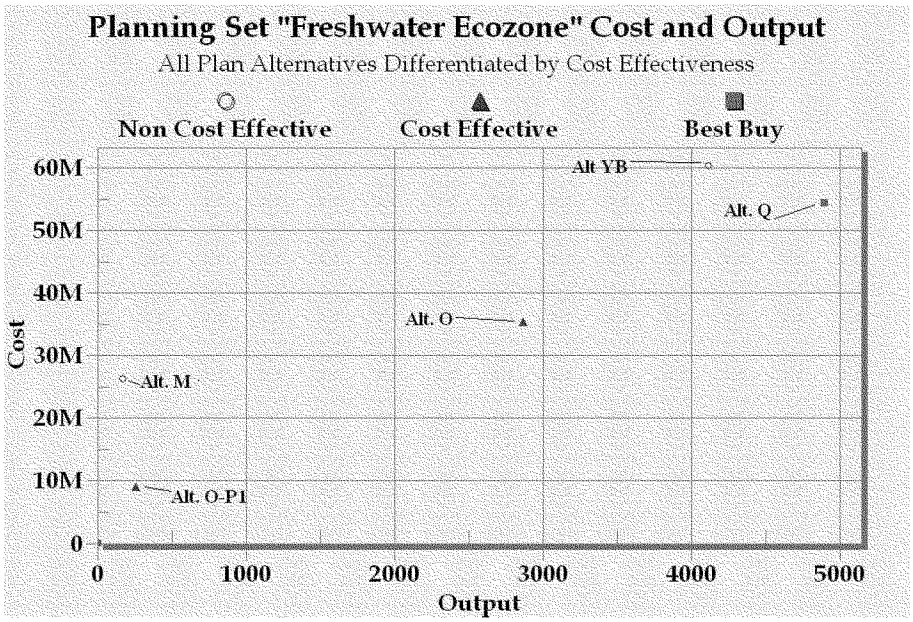

FIGURE G-11: BISCAYNE BAY COASTAL WETLANDS ALTERNATIVE PLANS–COST EFFECTIVE/INCREMENTAL COST ANALYSES RUNS ON FRESHWATER WETLAND HABITAT

G.8.3.3 Cost Effectiveness Analysis–Saltwater Wetlands Habitat Units

Table G-25 and ***Figure G-12*** show that only Alternative O Phase 1 is cost effective in the production of saltwater wetlands habitat. Alternative O produced just slightly less saltwater lift than Alternative M; the overlying reason for the cost difference between Alternatives O and Alternative M is related to freshwater and nearshore features. Alternative O Phase 1 provides approximately three percent greater average annual habitat units than Alternatives O and M, yet costs almost one-third less per unit of output than Alternative M.

TABLE G-25: RESULTS OF COST EFFECTIVENESS ANALYSIS: ALL PLANS AND COST EFFECTIVE PLANS ARRAYED BY INCREASING OUTPUT FOR EACH OUTPUT CATEGORY–SALTWATER HABITAT UNITS

Name	Annual Cost	Saltwater	Cost Per HU	Cost Effective
No Action Plan	$0	0		
Alternative YB	$60,030,000	2,901	$20,691	No
Alternative Q	$54,400,000	3,967	$13,713	No
Alternative O	$35,480,000	5,704	$6,220	No
Alternative M	$26,340,000	5,759	$4,573	No
Alternative O-P1	$9,070,000	5,909	$1,535	Best Buy

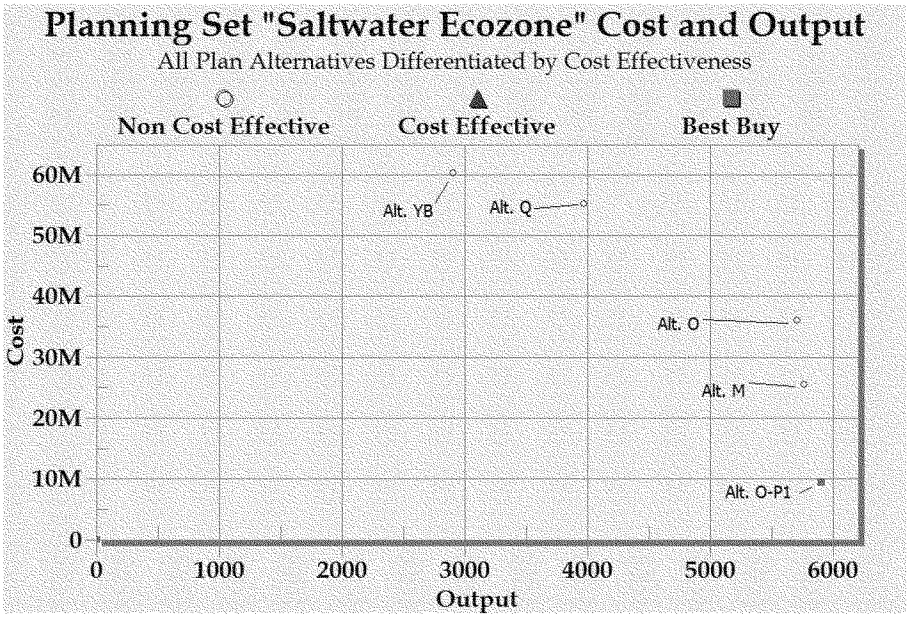

FIGURE G-12: BISCAYNE BAY COASTAL WETLANDS ALTERNATIVE PLANS–COST EFFECTIVE/INCREMENTAL COST ANALYSES RUN ON SALTWATER HABITAT

G.8.3.4 Cost Effectiveness Analysis–Nearshore Habitat Units

Table G-26 and ***Figure G-13*** show that Alternative O Phase 1 and Alternative O are the only alternatives that are cost effective in the production of nearshore habitat. Alternative O Phase 1 has a much lower average annual cost per unit of output than does either Alternative O or Alternative M. Alternative O Phase 1 has almost 800 more habitat units than Alternative M while the average annual cost per habitat unit is less than one quarter of the average annual cost per habitat unit for Alternative M. Alternative O Phase 1 has about 25 percent fewer benefits than Alternative O while costing approximately 70 percent less.

TABLE G-26: RESULTS OF COST EFFECTIVENESS ANALYSIS: ALL PLANS & COST EFFECTIVE PLANS ARRAYED BY INCREASING OUTPUT FOR EACH OUTPUT CATEGORY–NEARSHORE HABITAT UNITS

Name	Annual Cost	Nearshore	Cost Per HU	Cost Effective
No Action Plan	$0	0		
Alternative M	$26,340,000	2,251	$11,703	No
Alternative YB	$60,030,000	2,666	$22,513	No
Alternative O-P1	$9,070,000	3,106	$2,920	Best Buy
Alternative Q	$54,400,000	3,595	$15,133	No
Alternative O	$35,480,000	3,974	$8,928	Best Buy

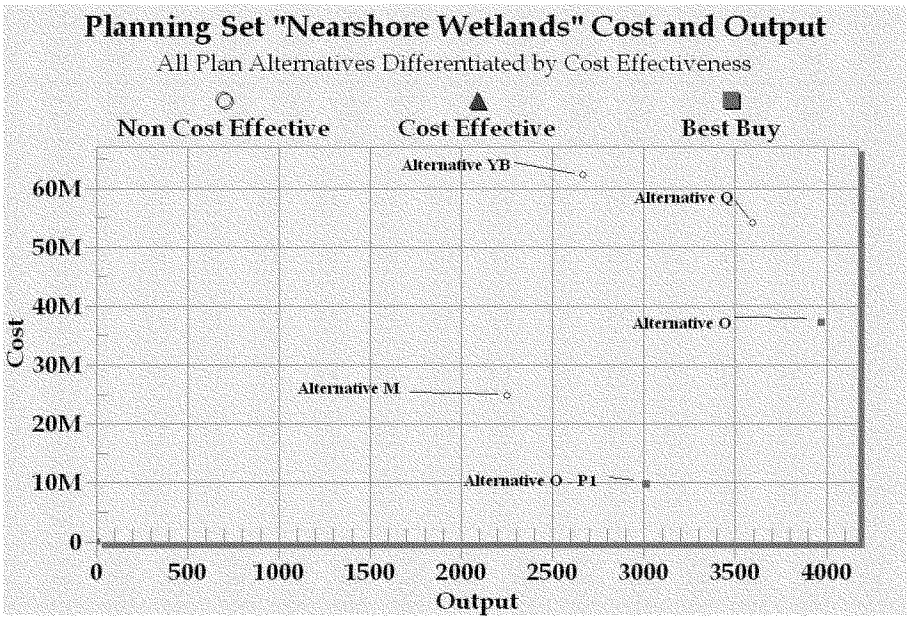

FIGURE G-13: BISCAYNE BAY COASTAL WETLANDS ALTERNATIVE PLANS–COST EFFECTIVE/INCREMENTAL COST ANALYSIS RUN ON NEARSHORE HABITAT

G.8.4 Incremental Cost Analysis

Tables G-27 through ***G-30*** and ***Figures G-14*** through ***G-17*** present the results of the incremental cost analysis for the Biscayne Bay Coastal Wetlands alternative plans for respective ecological zones and the combined results. Only the 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 the first best buy 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. There are no more than two best buy plans for any ecological zone for the Biscayne Bay Coastal Wetlands alternatives.

G.8.4.1 Incremental Cost Analysis–Combined Habitat Units

Figure G-14 and ***Table G-27*** show that there are two best buy plans for the combined ecological zone HU production, Alternative O Phase 1 and Alternative O. Upon examination of the graph, there is an obvious jump in cost per unit of output when comparing Alternative O Phase 1 to Alternative O. Alternative O Phase 1 has the lowest incremental costs per unit of saltwater habitat output of any of the alternatives ($978 per combined habitat unit). The next best alternative in terms of average cost per combined habitat unit is Alternative O. It provides an increment of 3,270 (~35% increase) additional habitat units over Alternative O Phase 1 at an incremental cost of over $26,400,000 ($8,076 per habitat unit). Alternative O also has a higher average cost ($2,828 per habitat unit), and the incremental cost per unit of output is about eight times greater than for Alternative O Phase 1.

TABLE G-27: RESULTS OF INCREMENTAL COST ANALYSIS: COST EFFECTIVE AND BEST BUY PLANS ARRAYED BY INCREASING OUTPUT FOR COMBINED ECOLOGICAL ZONE HABITAT UNITS

	Average Annual Cost	Output	Average Cost Per Unit of Output	Incremental Average Annual Cost	Incremental Output	Incremental Cost Per unit of Output
Combined Habitat Units						
Without Plan	$0	0	N/A	N/A	N/A	N/A
Alternative O-P1	$9,070,000	9,276	$978	$9,070,000	9,276	$978
Alternative O	$35,480,000	12,546	$2,828	$26,410,000	3,270	$8,076

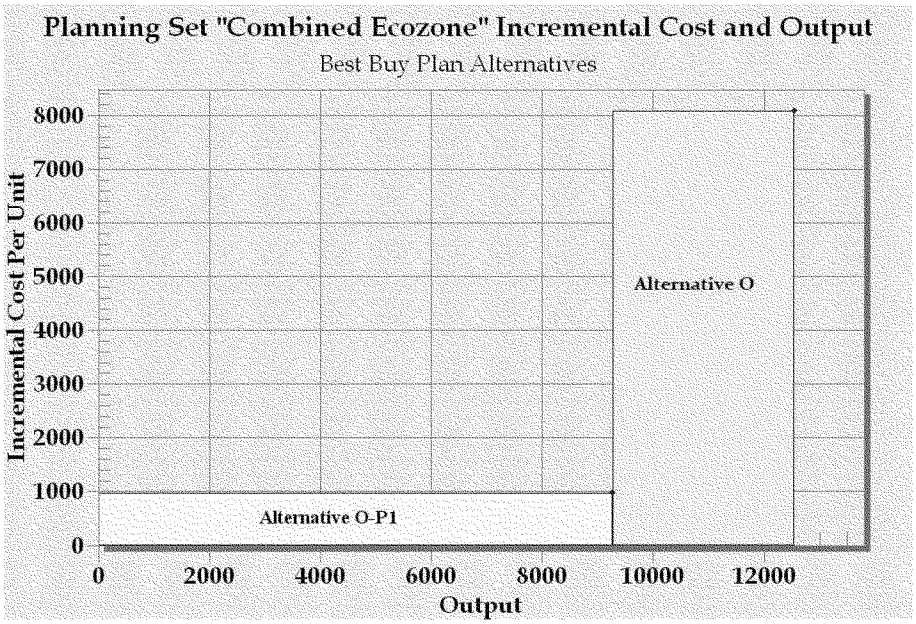

FIGURE G-14: BEST BUY PLANS FOR COMBINED ECOLOGICAL ZONE HABITAT UNIT PRODUCTION

G.8.4.2 Incremental Cost Analysis–Freshwater Ecological Zone

Table G-28 and ***Figure G-15*** show that there is only one best buy plan for freshwater wetlands habitat: Alternative Q.

TABLE G-28: RESULTS OF INCREMENTAL COST ANALYSIS: COST EFFECTIVE & BEST BUY PLANS ARRAYED BY INCREASING OUTPUT FOR FRESHWATER HABITAT

	Average Annual Cost	Output	Average Cost Per Unit of Output	Incremental Average Annual Cost	Incremental Output	Incremental Cost Per unit of Output
Freshwater Habitat Units						
Without Plan	$0	0	N/A	N/A	N/A	N/A
Alternative Q	$54,400,000	4,900	$11,102	$54,400,000	4,900	$11,102

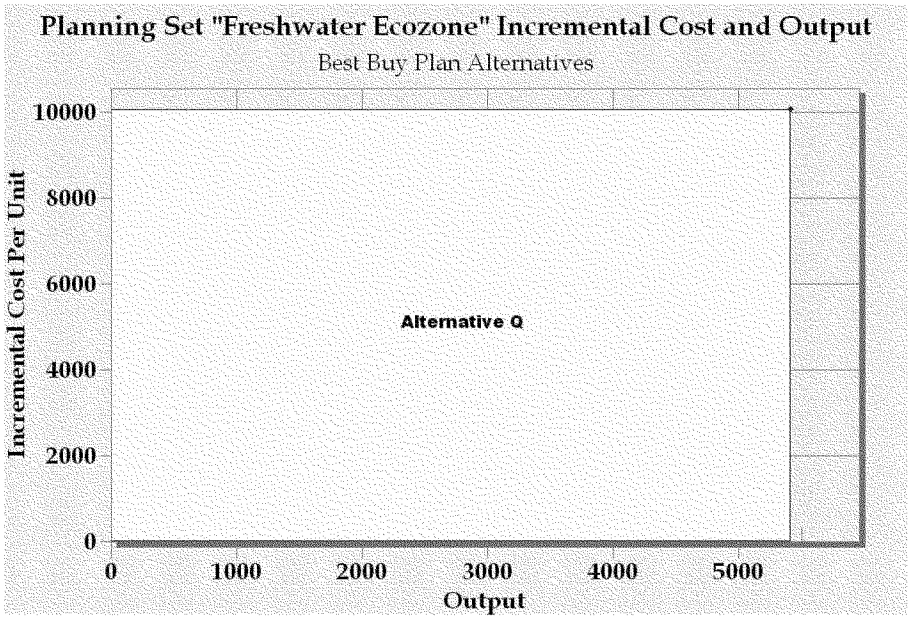

FIGURE G-15: BEST BUY PLANS FOR FRESHWATER ECOLOGICAL ZONE HABITAT UNIT PRODUCTION

G.8.4.3 Incremental Cost Analysis–Saltwater Ecological Zone

Table G-29 and ***Figure G-16*** show that there is only one best buy plans for saltwater wetland habitat, Alternative O Phase 1. None of the other alternatives are cost effective in the production of saltwater habitat units.

TABLE G-29: RESULTS OF INCREMENTAL COST ANALYSIS: COST EFFECTIVE & BEST BUY PLANS ARRAYED BY INCREASING OUTPUT FOR SALTWATER HABITAT

	Average Annual Cost	Output	Average Cost Per Unit of Output	Incremental Average Annual Cost	Incremental Output	Incremental Cost Per unit of Output
Freshwater Habitat Units						
Without Plan	$0	0	N/A	N/A	N/A	N/A
Alternative O-P1	$9,070,000	5,905	$1,536	$9,070,000	5,905	$1,536

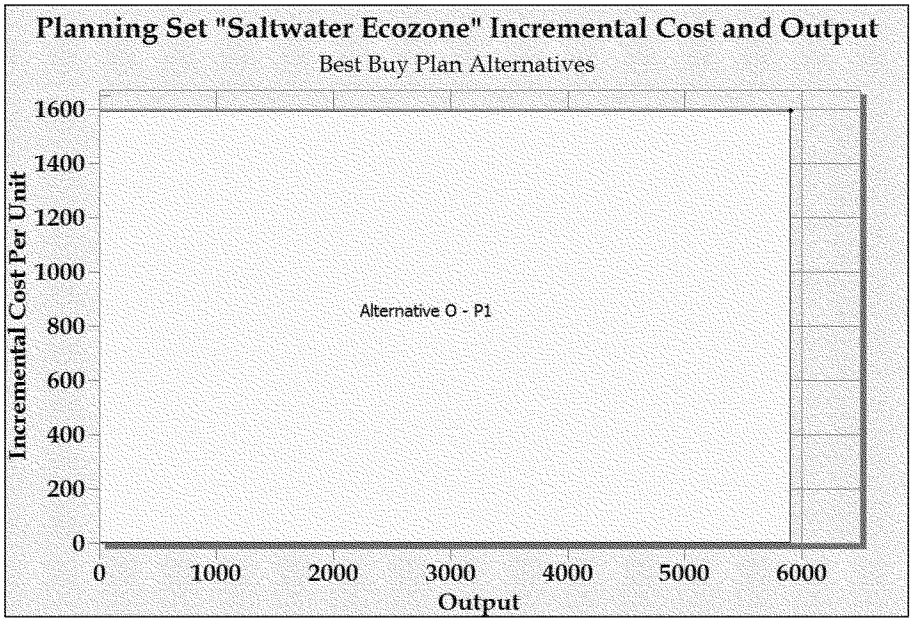

FIGURE G-16: BEST BUY PLANS FOR SALTWATER HABITAT UNITS

G.8.4.4 Incremental Cost Analysis–Nearshore Ecological Zone

Table G-30 and ***Figure G-17*** show that there are two best buy plans for the production of nearshore wetland habitat, Alternative O and Alternative O Phase 1. Alternative O Phase 1 has the lowest incremental costs per unit of

nearshore output than all of the other alternatives ($2,920/habitat unit). Alternative O provides approximately thirty percent more output than does Alternative O Phase 1, but comes at an incremental cost per unit of output that is almost ten times greater than the incremental cost per unit of output that Alternative O Phase 1 produces.

TABLE G-30: RESULTS OF INCREMENTAL COST ANALYSIS: COST EFFECTIVE AND BEST BUY PLANS ARRAYED BY INCREASING OUTPUT FOR NEARSHORE HABITAT

	Average Annual Cost	Output	Average Cost Per Unit of Output	Incremental Average Annual Cost	Incremental Output	Incremental Cost Per unit of Output
Combined Habitat Units						
Without Plan	$0	0	N/A	N/A	N/A	N/A
Alternative O-P1	$9,070,000	3,106	$2,920	$9,070,000	3,106	$2,920
Alternative O	$35,480,000	3,974	$8,928	$26,410,000	868	$30,426

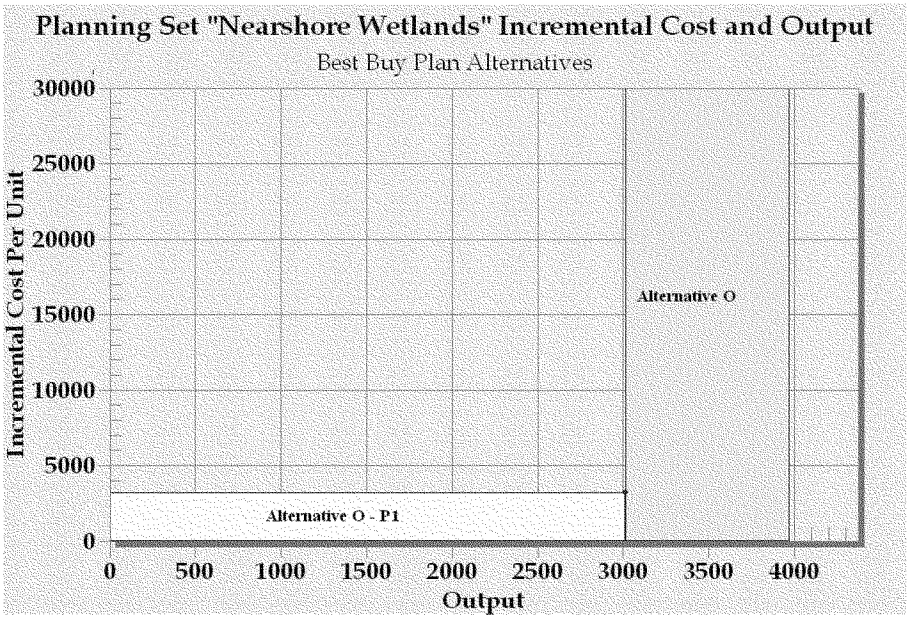

FIGURE G-17: BEST BUY PLANS FOR NEARSHORE HABITAT UNITS

G.8.5 Summary of Cost Estimate/Incremental Cost Analysis

As can be seen in the following summary table, Alternative O Phase 1 is the only plan that is cost effective for the combined ecological zone and all of the ecological zones separately while examining the system-wide impacts of the Biscayne Bay Coastal Wetlands alternatives implementation. Alternative O Phase 1 is also the most efficient at producing Nearshore, Saltwater and Combined Wetland Habitat Units. None of the other alternatives are cost effective in all three ecological zones, and only Alternative O is also effective and best buy plans in the production of combined eco-zone output. Alternative Q is the most efficient plan at producing habitat for the freshwater zone. Alternatives M and YB are not cost effective for any of the ecological zones. Alternative O Phase 1 will provide substantial ecological restoration benefits. Alternative O is not considered a cost effective plan in saltwater restoration since it produces approximately the same saltwater habitat units as Alternative M, but at a much higher cost. It should be noted that the cost increase between Alternative O Phase 1 and Alternative O is attributed to substantially greater freshwater wetland improvements.

TABLE G-31: RESULTS OF COST EFFECTIVE/INCREMENTAL COST ANALYSES

	Alternative O Phase 1	Alternative M	Alternative O	Alternative Q	Alternative YB
Combined Habitat Units	Cost Effective and Best Buy		Cost Effective and Best Buy		
Freshwater Ecological Zone	Cost Effective		Cost Effective	Cost Effective and Best Buy	
Saltwater Ecological Zone	Cost Effective and Best Buy				
Nearshore Ecological Zone	Cost Effective and Best Buy		Cost Effective and Best Buy		

As a result of the cost effective/incremental cost analysis, Alternative O Phase 1 was identified as the National Ecosystem Restoration plan. It is the plan that reasonably maximizes the production efficiency for each of the ecological zones, in that it contains the lowest average cost per unit of output, is cost effective for all ecological zones, and is a logical first step towards achieving restoration of the Biscayne Bay Coastal Wetlands study area. This alternative provides a substantial improvement in the much needed restoration of the Biscayne Bay nearshore and saltwater wetlands.

It is recognized that Alternative O would provide a more comprehensive watershed restoration plan than Alternative O Phase 1 (due to the large increases in freshwater benefits), and therefore has been identified as the environmentally preferred plan and the Conceptual Watershed Alternative. Alternative O Phase 1 is a compatible subset of Alternative O and as such, the remaining components of Alternative O could be further studied and constructed in the future, with no conflicts to the current Alternative O Phase 1 configuration.

G.9 REGIONAL ECONOMIC IMPACTS

G.9.1 Overview

The purpose of this appendix is to evaluate and quantify the economic consequences of the Biscayne Bay Coastal Wetlands implementation. This is achieved through analyzing each of the five alternatives' impacts on the region through three perspectives: employment, output and gross regional product. From these outputs, the regional economic impact can be determined and compared among alternatives.

The economic impact of the Biscayne Bay Coastal Wetlands project is most significant on the Regional Economic Development account. The regional economic development account registers economic effects to the region that are expected to result from the alternative plans. Economic effects include the impacts of economic stimuli in terms of changes in regional industrial output, earnings, or employment. The impacts include resultant economic changes in the industries that support and rely upon the industries directly affected by the stimuli; and those impacts experienced by all local industries as direct and indirect effects alter household income and ultimately change local household spending patterns.

The magnitude of the economic impacts on the local region may be evaluated in relation to its causes. The primary impacts are due to the actual construction costs of all the components of each alternative. Additionally the costs of the land purchases required by the components of each alternative could cause some regional impacts. Both of these categories are discussed later.

G.9.2 Methodology

A regional input-output model, REMI, was used to estimate the Regional Economic Development effects of the Biscayne Bay Coastal Wetlands Selected Plan. Regional input-output analysis provides the classic tool for tracing economic impacts throughout the regional economy. Based on the region's industrial structure, input-output analysis tracks the expected inter-industry flow of goods and services. For the Regional Economic Development analysis, the regional economy was defined as Miami-Dade County, the rest of Florida without Miami-Dade County and the entire state of Florida. Using county-level economic data, which was procured from the software vendor, the model was used to estimate the economic effects of the five alternative plans on employment, gross sales, and gross regional product. Specifically, *REMI* was employed in a four-part methodology to: (1) describe the study area economy, (2) create economic scenarios, (3) introduce economic changes, and (4) estimate resulting economic effects.

G.9.2.1 The REMI Model

The REMI model is an econometric or input-output model used in policy analysis. The REMI model has also been referred to as a computable general equilibrium model. REMI models contain in-depth data on industries and inventories. REMI models also incorporate the productivity and competitiveness benefits due to concentrations of economic activity in cities and metropolitan areas, and to the clustering of industries. The model uses advanced statistical and econometric methods to demonstrate economic changes over time, thus informing policy. The REMI model utilizes portions of four major modeling approaches: Input-Output, General Equilibrium, Econometric, and Economic Geography.

Input-Output: The REMI model incorporates inter-industry relationships found in traditional Input-Output models. Consequently, both the industry structure as well as the interactions between industries is captured for a particular region.

General Equilibrium: General equilibrium occurs when supply is balanced with demand. General equilibrium usually occurs over the long run, as prices, production, consumption, imports, exports, adapt to stabilize the economic system. By including general equilibrium properties, it is possible to evaluate the wide-reaching impacts of policies such as tax policies.

Econometrics: REMI is often referred to as an "Econometric model," which means the underlying equations and responses are estimated using advanced statistical techniques. These estimates are used to quantify the

structural relationships of the model. Econometrics are also used to estimate the timing of economic responses as different periods of response time will result in different economic outcomes thereby changing the policy recommendations as well.

New Economic Geography: This portion of the model represents the spatial dimension of the economy. The productivity and competitiveness benefits of labor and industry concentrations due to geography are called agglomeration economies, and are modeled in the economic geography equations.

Environment and Economy: Environmental policies are designed to clean up the environment, conserve natural resources or protect human health. Although these policies are not inherently economic in nature, they often have a significant influence on economic activity. REMI models are often used to better understand the economic impact of environmental policies, and to design rules which improve the environment in a cost-effective manner.

G.9.2.1.1 The Multiplier Effect

After taking into consideration the parameters, choosing the appropriate final demand multipliers, and entering project costs, the REMI model presents the outputs or regional economic impact estimations. These outputs provide an estimate of how the dollars spent by each alternative to build, operate, and maintain the Biscayne Bay Coastal Wetlands would economically impact all industries in Miami-Dade. For example, one dollar spent in one industry will generate financial activity for another industry within a community; that is, to purchase food, clothing, housing or other goods, to hire employees or to pay taxes.

A new project has a direct, indirect, and induced economic impact on output (sales), earnings, and employment in the South Region. The first round of expenditures for a project causes direct impacts. In terms of this project, this could be an awarded construction contract. The indirect impacts count the purchased inputs as a result of the first round expenditures. The 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 workers' earnings being spent.

G.9.2.2 Model Inputs

The primary inputs to the REMI model were the construction expenditures and the definition of the study area.

G.9.2.2.1 Construction Expenditures

The total construction costs were derived by summing up the costs of all the plan features for each alternative. These costs include, but are not limited to, costs associated with pre-construction engineering and design, hazardous, toxic and radioactive waste, supervisory and administrative costs, and actual construction for each alternative.

A summary of the construction expenditures in included on ***Table G-32*** below.

TABLE G-32: SUMMARY OF TOTAL EXPENDITURES IN MILLIONS OF 2008 DOLLARS

Alternative	YB	O	M	Q	O P-1
Construction Expenditures	$247.0	$137.7	$122.9	$256.8	$42.0

It is important to remember that the construction is not a one-year injection into the regional economy, but will be broken up over a number of years. Most of these alternatives will take three to four year to construct beginning in 2010. The impacts are likely to occur in varying magnitude over time. In reality, the direct impacts of the construction last only as long as those activities are carried out.

G.9.2.2.2 Definition of the Study Area

The Biscayne Bay Coastal Wetlands study area is contained within Miami-Dade County. The large portion of southern Biscayne Bay lies within the boundary of BNP. The national and state statistical systems providing the data for the regional economic analysis make it impractical to isolate the economic activities of parts of counties. A site specific multiplier is not readily accessible, easily calculated, or practical. Moreover, a site specific multiplier is not realistic, because it would isolate the economic impacts. The economic multipliers available for our use are limited to county-level data. Therefore, based on model applicability and the general geographical area, the regional impact analysis focused on Miami-Dade County as a whole. A broader level of analysis focused on the rest of Florida, excluding Miami-Dade, and all of Florida, inclusive of Miami-Dade.

G.9.2.2.3 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, there is foreign or corporate land ownership, then the expansionary effects of large transfers of funds may not occur in the study area. A similar result would occur if funds were held in a foreign bank. Additionally, if the land is owned by a governmental agency, then it may just be a land transfer resulting in very little regional economic effect.

Due to the ambiguity of the ultimate use of real estate funds, the expenditures on land were not input into the REMI model. Therefore, the regional impacts of real estate purchases were assumed to be minimal and not calculated. If it were possible to know more about the future use of these funds, expenditures for land, commissions, leases, appraisal fees, title fees, and other administrative activities involved with real estate, those values could be used in the REMI analysis or another model. However, even with a higher degree of certainty regarding the future of this knowledge, it is anticipated that the financial inputs would be marginal, and any regional impact model would have significant reliability concerns.

When running the model, there were five alternatives considered. For each alternative, this analysis estimated the regional impacts of construction costs of the Biscayne Bay Coastal Wetlands project. Therefore, each alternative's regional impact analysis provided employment, outputs and total gross regional product estimates for the construction expenditures. Real estate costs were not calculated in the model due to the complexity and uncertainty in predicting if there are benefits, and if so, how many.

G.9.2.2.4 Employment

Employment is quantified in terms of years of employment. It is important to note that these are not indefinitely recurring years of employment, but rather single, non-recurring years of employment. While the project will undoubtedly generate some permanent recurring jobs the vast majority of labor will be hired during the actual construction phase only. This can be observed on the tables below by comparing the employment figures for the first four years with those for the following seven years.

G.9.2.2.5 Output

Output is quantified as total gross sales. This includes all sales that are a direct or indirect result of the project expenditures. Gross sales include the total sales of producers, intermediaries, wholesalers and retailers. While this is a classic indicator of economic activity it is important to remember that this indicator includes 'double counting' of economic activity. That is, the production, distribution and consumption of any given product are counted every time it is sold throughout the chain of production and consumption, even if there is very little actual value added. This is contrasted with total gross regional product.

G.9.2.2.6 Total Gross Regional Product

Total gross regional product is an economic measure of the total returns to the factors of production: land, labor and capital. Gross regional product measures only the total value of end-user products and services. By doing so gross regional product measures only value-added and avoids 'double counting' products and they move through the production and consumption process.

The regional economic effects for the selected alternative plans are presented on the following tables. Regional Economic Development effects have only been calculated for construction expenditures and not for changes resulting from impacts to navigation, water usage, flood control or real estate expenditures. Economic impacts to total industry output and employee compensation are expected to persist through each year of construction.

***Table* G-33** shows the 11-year total impacts for the five alternative plans, in millions of 2007 dollars. This is perhaps the best overall summary of the regional economic impact of the five alternative plans.

Table G-34,

Table G-35, and

Table G-36 show the economic impacts disaggregated into the first four years, the next seven years, and the eleven year totals. They are presented for Miami-Dade County only, the Florida not including Miami-Dade County and the entire state of Florida, respectively.

TABLE G-33: 11 YEAR TOTAL IMPACTS FOR THE FIVE ALTERNATIVE PLANS, IN MILLIONS OF 2007 DOLLARS

11-Year Total Impacts for the Five Alterantive Plans, In Millions of 2007 Dollars					
Alternative	YB	O	M	Q	O P-1
Construction Expenditures	$247.0	$137.7	$122.9	$256.8	$42.0
Miami-Dade County					
Total Employment Years	3,546	1,994	1,775	3,687	607
Output	$454.6	$253.7	$225.7	$472.4	$77.1
Total GRP	$260.6	$145.7	$129.5	$270.8	$44.2
Rest of Florida					
Total Employment Years	1,043	593	522	1,072	206
Output	$163.9	$92.8	$81.4	$169.1	$30.8
Total GRP	$99.7	$56.4	$49.6	$102.7	$19.2
Total Florida					
Total Employment Years	4,588	2,587	2,298	4,759	813
Output	$618.5	$346.5	$307.1	$641.5	$107.9
Total GRP	$360.3	$202.1	$179.1	$373.5	$63.5

TABLE G-34: TOTAL IMPACTS ON MIAMI DADE COUNTY FOR THE FIVE ALTERNATIVE PLANS, IN MILLIONS OF 2007 DOLLARS

MIAMI-DADE IMPACTS	Construction Expenditures	First 4 Years	Next 7 Years	11 Year Total	% in First 4Years
Alternative YB	$247.0				
Total Emp (Employment Years)		3,449	97	3,546	97%
Output (Millions of 2007$)		$440.7	$13.9	$454.6	97%
Total GRP (Millions of 2007$)		$243.7	$16.9	$260.6	94%
Alternative O	$137.7				
Total Emp (Employment Years)		1,949	45	1,994	98%
Output (Millions of 2007$)		$246.8	$6.9	$253.7	97%
Total GRP (Millions of 2007$)		$136.9	$8.8	$145.7	94%
Alternative M	$122.9				
Total Emp (Employment Years)		1,739	36	1,775	98%
Output (Millions of 2007$)		$220.2	$5.6	$225.7	98%
Total GRP (Millions of 2007$)		$122.1	$7.4	$129.5	94%
Alternative Q	$256.8				
Total Emp (Employment Years)		3,585	101	3,687	97%
Output (Millions of 2007$)		$458.0	$14.3	$472.4	97%
Total GRP (Millions of 2007$)		$253.3	$17.5	$270.8	94%
Alternative O P-1	$42.0				
Total Emp (Employment Years)		594	13	607	98%
Output (Millions of 2007$)		$75.2	$1.9	$77.1	98%
Total GRP (Millions of 2007$)		$41.6	$2.6	$44.2	94%

TABLE G-35: TOTAL IMPACTS ON THE REST OF FLORIDA FOR THE FIVE ALTERNATIVE PLANS, IN MILLIONS OF 2007 DOLLARS

REST OF FLORIDA IMPACTS	Construction Expenditures	First 4 Years	Next 7 Years	11 Year Total	% in First 4Years
Alternative YB					
Total Emp (Employment Years)	$247.0	827	216	1,043	79%
Output (Millions of 2007$)		$129.3	$34.6	$163.9	79%
Total GRP (Millions of 2007$)		$74.0	$25.7	$99.7	74%
Alternative O					
Total Emp (Employment Years)	$137.7	477	116	593	80%
Output (Millions of 2007$)		$74.5	$18.4	$92.8	80%
Total GRP (Millions of 2007$)		$42.7	$13.7	$56.4	76%
Alternative M					
Total Emp (Employment Years)	$122.9	429	94	522	82%
Output (Millions of 2007$)		$66.6	$14.8	$81.4	82%
Total GRP (Millions of 2007$)		$38.2	$11.3	$49.6	77%
Alternative Q					
Total Emp (Employment Years)	$256.8	857	215	1,072	80%
Output (Millions of 2007$)		$134.2	$34.9	$169.1	79%
Total GRP (Millions of 2007$)		$76.9	$25.8	$102.7	75%
Alternative O P-1					
Total Emp (Employment Years)	$42.0	149	57	206	73%
Output (Millions of 2007$)		$23.0	$7.8	$30.8	75%
Total GRP (Millions of 2007$)		$13.3	$6.0	$19.2	69%

TABLE G-36: TOTAL IMPACTS ON FLORIDA FOR THE FIVE ALTERNATIVE PLANS, IN MILLIONS OF 2007 DOLLARS

TOTAL FLORIDA IMPACTS	Construction Expenditures	First 4 Years	Next 7 Years	11 Year Total	% in First 4Years
Alternative YB					
Total Emp (Employment Years)	$247.0	4,276	313	4,588	93%
Output (Millions of 2007$)		$570.0	$48.5	$618.5	92%
Total GRP (Millions of 2007$)		$317.7	$42.6	$360.3	88%
Alternative O					
Total Emp (Employment Years)	$137.7	2,425	162	2,587	94%
Output (Millions of 2007$)		$321.3	$25.2	$346.5	93%
Total GRP (Millions of 2007$)		$179.6	$22.4	$202.1	89%
Alternative M					
Total Emp (Employment Years)	$122.9	2,168	130	2,298	94%
Output (Millions of 2007$)		$286.8	$20.3	$307.1	93%
Total GRP (Millions of 2007$)		$160.3	$18.7	$179.1	90%
Alternative Q					
Total Emp (Employment Years)	$256.8	4,443	316	4,759	93%
Output (Millions of 2007$)		$592.2	$49.2	$641.5	92%
Total GRP (Millions of 2007$)		$330.2	$43.3	$373.5	88%
Alternative O P-1					
Total Emp (Employment Years)	$42.0	743	69	813	91%
Output (Millions of 2007$)		$98.2	$9.7	$107.9	91%
Total GRP (Millions of 2007$)		$54.9	$8.6	$63.5	87%

G.9.2.3 Comparison of Plans' Economic Impact to Overall Economic Activity

These outputs are meaningless, unless there is a relative comparison of what this means for the regional economy. To demonstrate the importance of these effects, the estimations were compared to the county employment and gross regional product. Data were not available for county-level gross sales output.

TABLE G-37: COMPARISON OF PLANS' EONOMIC IMPACT TO OVERALL ECONOMIC ACTIVITY

	Current	Plan	Project Impact	%
Employment Years	1,158,801	YB	3,546	0.31%
(11 Year Totals)		O	1,994	0.17%
		M	1,775	0.15%
		Q	3,687	0.32%
		O P-1	607	0.05%
Gross Regional Product	$97,200.0	YB	$260.6	0.27%
(11 Year Totals)		O	$145.7	0.15%
(In Millions)		M	$129.5	0.13%
		Q	$270.8	0.28%
		O P-1	$44.2	0.05%

From the percentage column it can be seen that the magnitude of the impact of the proposed plans on the overall economy of Miami-Dade County is very small. None of the selected alternative plans' impact would be more than one-third of one percent of the overall Miami-Dade economy. The percentage effect on the overall economy of Florida is so small that it is negligible.

Furthermore, it should be noted that the regional economic development impact of the Selected Plan, Alternative O Phase 1 is far less than all of the other plans; almost by an order of magnitude.

G.9.2.4 Other Social Effects

The other social effects account considers the effects of alternative plans in areas that are not already contained in the NED and regional economic development accounts. The Biscayne Bay Coastal Wetlands alternative plans could result in either beneficial or adverse other social effects within the study area. The categories of effects contained within the other social effects account include:

- Urban and community impacts including effects on income, employment and population distribution
- Life, health, and safety factors
- Displacement, Long-term productivity
- Energy requirements and energy conservation

Project alternatives have the potential to raise property values in the surrounding area, increase attractiveness to the community, increase recreational opportunities, and improve environmental health such as water and air quality among other impacts. All of these factors could influence the demographics of the surrounding community which may or may not have implications for environmental justice issues.

Another major social impact is the change in land available for development. Land used for the project may have been slated for use in residential or commercial development. Without this land, housing opportunities could become rare, thus raising housing prices. Alternatively, the absence of development could increase regional energy demand and improve environmental quality. The extent of the footprints of the alternatives will determine to what extent these impacts could occur.

The alternatives of this project all require a considerably large footprint. Despite the large area needed, there is currently very little development and population in the immediate project area; this will help to avoid any adverse social effects.

G.9.3 Overall Regional Economic Impact Conclusions

All of the selected alternative plans would have some positive effect on employment, gross output and the gross regional product of Miami-Dade County; and to a lesser extent, the State of Florida. The Selected Plan is the most desirable plan from the regional economic perspective. Moreover any social effects, negligible as they may be, would be entirely positive, improving the quality of life for any affected individuals.

The magnitude of regional economic impact, however, is not very large. Based on the analysis and results, it appears that no alternative for the Biscayne Bay Coastal Wetlands would have more than a one third of one percent impact on the total regional economy. Furthermore, the Selected Plan (Alternative O Phase 1) has even less of an impact on the regional economy (less than $1/20^{th}$ of one percent).

G.10 FINDINGS ON 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. The intent of Executive Order 12898 is to make Federal agencies conduct their programs, policies and activities in such a manner that prevents disproportionately adverse human health or environmental effects towards minority or low-income populations. The activity shall not (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color, or national origin. It requires the analysis of information such as the race, national origin, and income level in areas expected to be impacted by proposed environmental actions. It also requires Federal agencies to collect, maintain, and analyze information on consumptive patterns of populations relying principally on consumption of native fish and wildlife; agencies have a responsibility to communicate the risks of these consumptive patterns to the public.

The Biscayne Bay Coastal Wetlands project would provide benefits to the surrounding communities by improving the natural environment. The project features of wetland restoration and improved water discharge are by design in locations remote from urban populations such that negative impacts are eliminated for all communities. In the public outreach efforts conducted to date, no environmental justice issues have been identified.

The project features are located based upon hydrologic characteristics, land availability and interconnection to existing canals and structures in order 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 for the use of land resulting in improvements to the human quality of life and the intended environmental benefits intended by the impoundment.

Furthermore, the operating procedure will maintain if not improve flood damage reduction. This would improve the 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 the increased benefits in enjoyment, aesthetics, and economics for recreational activities.

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APPENDIX H

RECREATION

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H.0 AUTHORIZATION

The Comprehensive Everglades Restoration Plan (CERP), authorized by the Water Resources Development Act (WRDA) of 2000, included modifying the Central and Southern Florida (C&SF) Flood Control Project, which was constructed with extensive Congressional authorizations from the 1944 Flood Control Act through the WRDA of 1996. The Federal Water Project Recreation Act (Public Law 89-72) and the WRDA of 1986 (Public Law 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 (SFWMD) 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 the CERP Biscayne Bay Coastal Wetlands (proposed project) complies with the philosophy and inclusion of the CESAD-PD-J 15 SEP 2004 Memorandum, are economically justified, and fall within the ten percent rule. The recreation proposal was developed by the U.S. Army Corps of Engineers (USACE) and local sponsor, the SFWMD. The proposed recreation is recommended for construction based on Congressional approval and sponsor willingness to pay.

H.1 INTRODUCTION TO RECREATION FOR THE BISCAYNE BAY COASTAL WETLANDS–TIDAL WETLANDS RESTORATION PROJECT

H.1.1 Proposed Recreation Overview

The Biscayne Bay Coastal Wetlands proposed project recreation appendix contains a description of the conceptual recreation elements and a concept plan. The proposed recreation concept map identifying these elements is shown in ***Figure H-1***. The recreation features being planned in the proposed project are incidental to the project benefits and compatible with the restoration purpose. The recreation features are not used in the justification of the selected plan. The Rough Order of Magnitude cost estimates for implementation of the recreation plan have been generated by USACE and SFWMD. Adjustments may be made to the dollars spent depending on project design. The costs for the proposed recreation features would be $2,316,000. These costs include a 28% contingency per the total project cost summary as shown in Appendix B. Once the recreation

features are completed, the SFWMD will assume responsibility for operation and maintenance of the proposed facilities.

The proposed project objectives would support the development of restoration compatible recreation that would provide for public access and education. The recreation facilities and activities proposed for the project include: environmental interpretation, trailheads with vehicular parking and handicapped accessible facilities, multi-use trails atop levees adjacent to canals and flow ways, primitive camping, access for bike riding, bank fishing, wildlife watching. Trailhead restroom facilities are envisioned to be waterless but potable water may be available in the near future.

The proposed project recreation facilities would help to fill six Statewide Comprehensive Outdoor Recreation Plan (SCORP) regional deficits, link with other regional recreation facilities and develop synergy between facilities by bundling recreation facilities. Proposed recreation facilities and activities would be ancillary to the proposed project and work harmoniously with the project purposes within two project components. The proposed project component areas are: 1) Cutler Flow way (C-100)/C-1 Wetlands, 2) L-31-E (Goulds Canal south to Florida City Canal), 3) Canal 102 (C-102). The proposed recreation would be developed within these components and their structures to provide restoration compatible recreation facilities and activities.

No additional real estate would be required for the proposed recreation features since all would be located on project fee title lands to be verified in the Project Implementation Report (PIR), ***Appendix–Real Estate***. All features would be compatible with the environmental goals and objectives of the proposed project, and would not detract from the environmental or socioeconomic benefits generated by the proposed project.

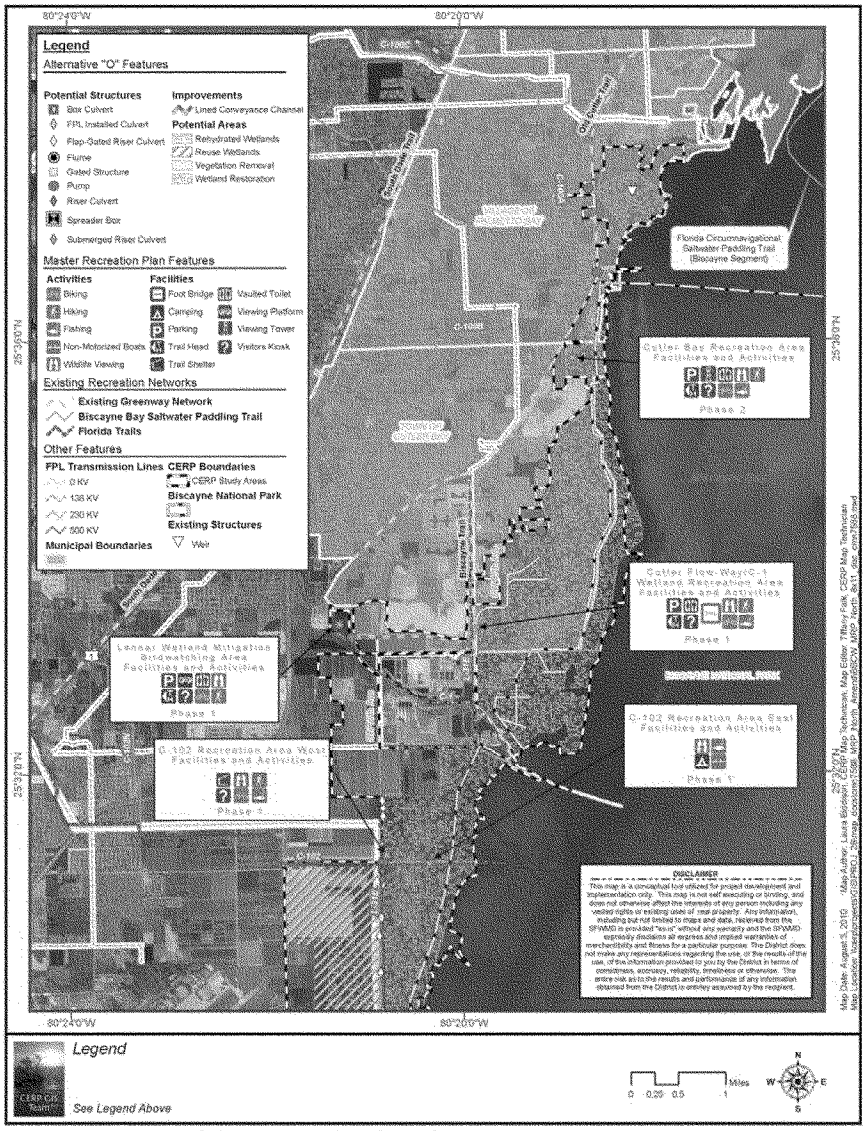


FIGURE H-1: BISCAYNE BAY COASTAL WETLAND–TIDAL WETLAND RESTORATION PROJECT CONCEPTUAL RECREATION PLAN

H.1.2 Recreation Facilities Management Overview

As project local sponsor, the SFWMD is responsible for 100 percent of the recreation operations, maintenance, repair, rehabilitation and replacement as outlined in the USACE *Planning Guidance Notebook* (ER 1105-2-100, Apr 2000, page E-286), the USACE/SFWMD *Design Agreement,* May 2000 and the September 29, 2005 Operations and Maintenance, Repair, Replacement and Rehabilitation USACE's Memorandum.

Public access for passive recreation and non-motorized boats is planned for the proposed restoration project recreation component. Concerns have been expressed regarding the potential unlawful or ecologically harmful affects of passive use within this and other CERP projects. Responding to such concerns, the SFWMD, through its rulemaking authority has instituted Rule 40E-7 Florida Administrative Code with enforcement provisions by wildlife officers or other law enforcement officials to ensure that unlawful or ecologically harmful actions do not occur. Rule 40E-7 includes general language applicable to all SFWMD owned lands and several special provisions for different types of land use, including recreation. The rule addresses hours of public access, the SFWMD's ability to allow or prohibit activities in different areas or at different times, and the SFWMD's overall ability to close public access (e.g. during emergencies, pending storms, routine operations and management, and protection of the land).

H.2 BENEFIT CATEGORIES

H.2.1 Study Area Recreation Background

The proposed project recreation benefit analysis study area includes Miami-Dade, Broward and Monroe counties as outlined in the SCORP 2000 Region 11. The SCORP is the baseline for CERP recreation planning.

Recreation deficits identified by the SCORP for this region include: bicycle riding, tent camping, hiking, hunting, freshwater beach activities, freshwater fishing and saltwater beach activities. A SCORP needs assessment through 2010 identifies these deficits and the unit need for each recreation element (e.g. miles of trail, number of camp sites). The SCORP deficits for bicycle riding, tent camping, hiking, freshwater beach activities, freshwater fishing (non-boat) and saltwater beach activities are considerations for the proposed project recreation proposal.

The population projections for south Florida, presented in ***Table H-1***, indicate population growth which will increase the region's existing recreation deficits. The proposed recreation study area will traditionally consider outside study influences from surveys and other documented and respected sources.

Table H-1 is a comparison of study area county growth rates that occur within the SCORP Region 11. The growth rates are also compared to the State and national growth rates.

TABLE H-1: STUDY AREA POPULATION PROJECTIONS THROUGH 2050 (1,000)

	2005	2010	2020	2025	2030	2040	2050
Broward	1,755	1,919	2,215	2,357	2,488	2,776	3,065
% Change		0.91%	0.86%	0.94%	0.95%	0.90%	0.90%
Miami-Dade	2,412	2,576	2,874	3,017	3,150	3,448	3,747
% Change		0.94%	0.89%	0.95%	0.95%	0.91%	0.92%
Monroe	81	82	84	85	85.9	88	90
% Change		0.98%	0.97%	0.98%	0.99%	0.97%	0.97%
Florida	4,248	4,577	5,173	5,459	5,724	6,312	6,902
Study Area % of Florida Population	1.43%	1.48%	1.54%	1.56%	1.57%	1.61%	1.64%
United States	295,531	308,936	335,805	349,695	363,584	391,946	419,854
Study Area % of United States Population	0.36%	0.39%	0.44%	0.47%	0.48%	0.48%	0.48%

Florida growth rate	1.99%	2.08%	2.14%	2.14%	0.78%	0.71%
US growth rate	0.91%	0.83%	0.83%	0.79%	0.78%	0.71%

There are five habitat types within the project area that provide excellent environmental interpretation opportunities for prospective visitors. The habitat types support 268 fish species, 16 amphibian species, 57 reptilian species, 294 avian species and 35 mammalian species in or near the project area. Of these, 13 vertebrate and invertebrate species are either threatened or endangered.

Land use varies widely from large natural and unspoiled areas to agriculture, high-density multi-family residential and industrial urban uses. Western urban single-family residential sprawl is noted as a problem.

H.2.2 Existing Recreation Resources

Park recreation opportunities and facilities have been renowned for improving the quality of life for residents and visitors. They provide and or expand access to recreations resources, services and experiences in the community. Parks may also manage and protect the community's natural resources. Some parks create and expand partnerships to promote, and continue community opportunities for park visitor's physical and mental well-being.

Existing recreational facilities within the SCORP Region 11 provide ideal recreation resources for linkages and bundling of proposed recreational elements. Recreation facilities within the proposed project study area and the three-county area (Miami-Dade, Broward and Monroe) include:

- Biscayne National Park
- Everglades National Park
- Florida Keys National Marine Sanctuary
- Crocodile Lake National Wildlife Refuge
- Loxahatchee National Wildlife Refuge
- 5 Fish management areas
- 5 Wildlife management areas
- 12 State of Florida greenways and trails projects
- 15 State of Florida parks
- 32 Florida communities trust sites
- Many State of Florida Artificial Reef Program 2000 local projects (Statewide Comprehensive Outdoor Recreation Plan, 2000)
- 189 Miami-Dade County parks

Recreation facilities within the proposed project study area include:

- Biscayne National Park
- Everglades National Park
- Crocodile Lake National Wildlife Refuge
- Oleta River State Park

- Bill Baggs State Park
- Barnacle Historic State Park
- Canals L-30 and L-31 fish management areas
- Southern Glades Wildlife Management Area
- A.D. Barnes Park
- Tropical Park
- Fairchild Tropical Botanical Garden
- Matheson Hammock Park
- Hardy Matheson Preserve
- Deering Estate
- West Kendall District Park
- Miami Metro Zoo
- Larry and Penny Thompson Park
- Black Point Park and Marina
- Approximately 50 Miami-Dade County parks and greenways

Some of these facilities charge a park entrance fee, but most are open to the public free of charge. Additionally, the Florida Fish and Wildlife Conservation Commission (FWC) provide five freshwater boat ramps in Miami-Dade County and four ramps in Broward County. All of the area's recreation sites are regularly utilized, particularly on weekends, and would provide suitable recreational linkage and bundling opportunities for proposed project recreation.

H.3 PROPOSED RECREATION

H.3.1 Proposed Cutler Flow Way/C-1 Canal Wetlands Recreation Area

The Cutler Wetland component of the proposed project is south of the Deering Estate area located on project fee title lands. This component would restore a more natural flow of freshwater to the Biscayne Bay via a system of flow ways and spreader swales between the C-100 Canal and the C-1 Canal upstream and north of control structure S-21. The project levees and dike systems would be used for hiking and biking access. The construction staging areas for this site would be used after project completion to provide parking and handicapped accessible facilities. Pedestrian and bicycle access to the levee trail would be provided by a pedestrian bridge. The trailhead features would include benches, refuse receptacles, bicycle rack and waterless toilet facilities. The trailhead would provide access to a three-mile multiuse trail on the canal levee for wildlife viewing and bank fishing opportunities. Linkage to the south Dade Greenway Network of Trails is possible at this site. The proposed access point would include perimeter fencing and gates to limit vehicular traffic and provide security to the facilities after nightfall. Implementation of the proposed Cutler Flow Way/C-1 Canal Wetlands Recreation Area would help to fill SCORP

projected recreation deficits within the proposed project area. The preliminary cost estimate for this site is $933,500 as shown in ***Table H-2***.

Miami-Dade Parks & Recreation Department has recommended flexibility in the final siting of the recreation features associated with the proposed Cutler Flow Way/C-1 wetlands feature, and the team has agreed to consider possibly siting them at the Lakes by the Bay Park site if it is determined to be mutually beneficial to all parties, and subject to Miami- Dade County Parks and the Non-Federal Sponsor's mutual willingness to enter into a partnership agreement describing mutual responsibilities with respect to ownership and maintenance responsibilities.

TABLE H-2: PROPOSED CUTLER FLOW WAY C-1 WETLANDS RECREATION AREA FEATURES

Feature	Quantity	Unit Cost	Total Cost
Parking Area Handicap Accessible	15 spaces	$120,000	$120,000
Waterless Vault Toilets	1 unit	$75,000	$75,000
Pedestrian Bridge	1 unit	$500,000	$500,000
Bridge Pilings	Lump Sum	$100,000	$100,000
Benches	10 units	$700	$7,000
Trash Receptacles	10 units	$500	$5,000
Bicycle Rack (8 bikes)	1 unit	$2,000	$2,000
Shade Shelter/Information Kiosk 10' x 20'	1 unit	$40,000	$40,000
Park Security Gate	1	$30,000	$30,000
Area Fencing	Lump Sum	$50,000	$50,000
Trail Signage	5 units	$500	$2,500
Potable Water Source/Hose-bib	2	$1,000	$2,000
Cutler Flow Way/C-1 Wetlands Site Total:			**$933,500**

H.3.2 Proposed C-102 Canal (C-102) Recreation Area West and East

The proposed C-102 Canal recreation area component of the proposed project would enhance the use of the existing greenway and blue trails and work harmoniously with the existing C-102 Canal right-of-way, structures and proposed improvements. The recreation component is proposed for the north side of the C-102 Canal, just west of the Biscayne National Park (BNP)

boundary on SFWMD fee title lands. The proposed recreation facilities for the C-102 Canal site include a shade shelter, educational kiosk and primitive campsites for kayakers. The facilities would be co-located among other trail related resources, including: Miami-Dade Greenway Network Trails, SFWMD trails, Florida Circumnavigation Saltwater Paddling Trail (Biscayne Segment). Proposed facilities are envisioned to assist with Trust for Public Land, *Get Your Feet Wet: The Public Access Plan for Biscayne Bay* public access goals. Approximately four additional miles of levee trails would now be accessible.

West: A planned shade shelter serving hiking and biking trails, will be located at the west end of the parcel (Folio No: 30-6033-000-0020) near the C-102 Canal and L-31 intersection. The platform campsites would be located farther east on the northeastern side of the parcel away from BNP.

East: Primitive camping facilities accessible to local, regional or statewide kayakers via the Biscayne Bay are also planned. The campsites will be easy for paddlers from the Biscayne Bay to access and will be located on quiet lands adjacent to mangrove wetlands. The proposal includes six elevated tent platforms approximately 10-foot by 12-foot made of substantial timbers and filled with shell rock or other sustainable materials so campers can drive tent stakes for support. The minimal provisions are intended to provide a site, not currently available in the area, for kayakers without competition from other potential users. The preliminary cost estimate for this site is $67,900 as detailed in ***Table H-3*** .

TABLE H-3: PROPOSED C-102 RECREATION WEST AND EAST FEATURES

Feature	Quantity	Unit Cost	Total Cost
Benches	2 units	$700	$1,400
Trash Receptacles	1 unit	$500	$500
Bicycle Rack (8 bikes)	1 unit	$2,500	$2,500
Trail Signage	5 units	$500	$2,500
Shade Shelter / Information Kiosk 10' x 20'	1	$40,000	$40,000
Primitive Tent Platforms	6	$3,500	$21,000
C-102 Site Total:			**$46,000**

H.3.3 Proposed Lennar Wetland Recreation Area

The proposed Lennar Homes Wetland Recreation Area site is renowned for migratory and shore birds, and frequently draws birdwatchers. The Lennar Homes Wetland Mitigation Permit (200103245) deed with conservation easement restrictions and soils remediation information has been reviewed. Coordination with Tropical Audubon and the U.S. Fish and Wildlife Service (FWS) has been positive and wildlife-friendly recreation recommendations have been added.

The site will be developed in an environmentally sensitive manner, with an accessible bird observation platform (similar to a short fishing pier) with blinders, benches, bike rack, shade shelter/kiosk and a vault toilet. A parking area created from crushed shell, screened from wildlife habitat and two paved accessible parking spots, are included. The proposed recreation area would not be within the permit or conservation easement lands per mitigation permit. Public access and structures are being considered where SW 97th Avenue and SW 224th Street would be closed. The preliminary cost estimate for this site is $488,900 as detailed in ***Table H-34***.

TABLE H-4: LENNAR WETLAND RECREATION FEATURES

Feature	Quantity	Unit Cost	Total Cost
Benches	2 units	$750	$1,500
Trash Receptacles	1 unit	$400	$400
Bicycle Rack (8 bikes)	1 unit	$2,500	$2,500
Trail Signage	5 units	$500	$2,500
Shade Shelter/Information Kiosk 10' x 20'	1 unit	$60,000	$60,000
Vault Toilet	1 unit	$77,000	$77,000
Birdwatching (Pier) Platform	Lump Sum	$225,000	$225,000
2 Paved Accessible Parking with Shellrock Overflow Parking	Lump Sum	$750	$1,500
Lennar Wetland Site Total:			**$488,900**

H.3.4 Proposed Deering Estate Educational Wetland

The team is also recommending construction of a 2.07 acre educational wetland adjacent to S-700 pump station at the Deering Estates (Powers Addition)

wetlands site. The educational wetland, which will be operated and maintained by Dade County Parks and Recreation, will be consist of 0.92 acres of deep marsh (el. -1.0 to 0.0), 0.5 acres of mid marsh (el. 0.0 to 1.0), 0.35 acres of high marsh (el. 1.0 – 2.0), 0.12 acres of forested wetland (el. 0.0 to 2.0), and 0.18 acres of upland buffer (el > 2.0).

The facility will be excavated from disturbed areas and each zone will be planted with native vegetation indigenous to these types of conditions. The created wetland is intended to educate the public about native flora and fauna, historic conditions, and the importance of freshwater in coastal ecosystems. When not being used for educational purposes the site can also serve as a place to commune with nature. The preliminary cost estimate for this site is $773,700 as detailed in ***Table H-35***.

TABLE H-5: DEERING ESTATES RECREATION FEATURES

Feature	Quantity	Unit Cost	Total Cost
Earthwork	All	$620,000	$620,000
Plants	10,829	$11	$113,700
Plant Maintenance & Replacement		$20,000	$20,000
Spillway	1	$20,000	$20,000
Deering Estates Site Total:			**$773,700**

H.3.5 Biscayne-Everglades Greenway

The project came about after the inception of the BBCW DEIS planning process, is known as the Biscayne-Everglades Greenway, and several public agencies are partnering in the project, including the National Park Service, Miami-Dade County, SFWMD, the city of Homestead, and others. The eastern terminus of this greenway is proposed for alignment along SW 328 Street and SW87 Avenue near the entrances to Homestead Bayfront Park and Biscayne National Park. Connectivity to CERP features north of the North Canal should be considered during detailed design.

H.4 RECREATION BENEFITS

H.4.1 National Perspective

The national economic development benefit evaluation procedures contained in Engineering Regulation 1105-2-100 (Apr, 2000), Appendix E, Section VII, describes three methods of evaluating the beneficial and adverse national

economic development effects of project recreation: travel cost method, contingent valuation method and unit day value method.

The unit day value method was utilized for estimating recreation benefits associated with the proposed project recreation components. When the unit day value method is used for economic evaluations, planners select a specific value from the range of values provided annually. Application of the selected value to estimate annual use over the project life, in the context of the with-project and without-project framework of analysis, provides the estimate of recreation benefits.

The without project condition analysis has no recreation value since without the proposed project there would be no opportunity for public access or facilities. It is presumed that the proposed project lands must be opened to the public in order to realize the recreation benefits being claimed. The with-project condition would be the expected value of the recreational activity based on the unit day value method. ***Table H-5*** illustrates the method of assigning point ratings to particular activities. Point values are assigned based on measurement standards described for five criteria:

1. Activities
2. Facilities
3. Relative scarcity
4. Ease of access
5. Aesthetic factors

TABLE H-5: GENERAL RECREATION GUIDELINES FOR POINT ASSIGNMENTS

Criteria	Judgment Factors				
Recreation experience[1] Total Points: 30	Two general activities2	Several general activities	Several general activities: one high quality value activity[3]	Several general activities; more than one high quality high activity	Numerous high quality value activities; some general activities
Point Value: 13	**0-4**	**5-10**	**11-16**	**17-23**	**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: 6	**0-3**	**4-6**	**7-10**	**11-14**	**15-18**
Carrying capacity[5] 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: 8	**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: 10	**0-3**	**4-6**	**7-10**	**11-14**	**15-18**
Environmental Total Points: 20	Low esthetic factors[6] that significantly lower quality[7]	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: 8	**0-2**	**3-6**	**7-10**	**11-15**	**16-20**

Point value assignments for ***Table H-5*** are based on USACE Economic Guidance Memorandum 11-03. 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 reviewed after several site visits and coordination with local agencies. The following selection factors were used for the criteria outlined in ***Table H-5***.

- The proposed project recreation proposal would provide an area specific, unique recreation opportunity afforded by the proposed project setting and the proposed project levees. The site offers solitude and panoramic views outside a growing metropolitan region, and would provide specific recreation amenities for expanding regional populations that would increase demands. Levee crown walking, biking and nature study use could also experience a panoramic view-shed. The point value rating is estimated in the middle end of the judgment factor scale because of the general activities that would sustain a regional use in the project area.

- The availability of opportunity rating is based upon current local recreation facilities near the project area within the proposed recreation resource location. At the high end of the scale are those recreational facilities which are a geographical rarity; these are sites for which there is no close substitute within two hours. For example, two hours of drive time is sufficient for an east-west transit across the lower part of Florida. For this study let us assume that two hours is sufficient to travel about 80 miles (non-interstate travel). With exception of jogging and walking activity and equestrian trails, alternative facilities exist for all other classifications. Scores for this judgment factor are therefore expected to be mid-to-low scale. One note; with the exception of equestrian activity the proposed recreation resources would help provide facilities necessary to alleviate some current and projected SCORP Region 11 deficits in those activities.

- The proposed project recreation resources carrying capacity point values are estimated to improve with the proposed recreation component construction. The general recreation values are based on the optimum use of the site potential, without overuse of the proposed recreation resources. Good water resources and access to them for kayaking, bank fishing, multi-use trail, environmental education and observation, and primitive tent camping comprise a large part of the projected recreation resources use. Peak use is conservatively projected to occur during half of the calendar year.

- 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. Direct routes from the north and west on paved roads provide sufficient access.

- The environmental quality rating is based upon the existing aesthetic values of the proposed project planned recreation facilities and the ease of correcting any limiting aesthetic factors. The proposed site possesses adequate aesthetic resources given that the area borders the Biscayne Bay with panoramic views.

The value of a day of general recreation at the proposed project site was determined for each project activity using the guidelines for assigning points for the general recreation in ***Table H-6***. The points were then converted to dollar values using conversion factors included in USACE Economic Guidance Memorandum 11-03, UDV for Recreation, Fiscal Year 2011, which is based on Engineering Regulation 1105-2-100. ***Table H-6*** includes point values with their corresponding general recreation value equivalent expressed in fiscal year 2011 dollars. The 45 points resulted in a unit day value of $7.17. The next step is to estimate the annual use over the proposed project life.

TABLE H-6: CONVERSION OF POINTS TO DOLLAR VALUES FISCAL YEAR 20111

Point Values	General Recreation Values
0	$3.58
10	4.26
20	4.70
30	5.38
40	6.72
50	7.62
60	8.29
70	8.74
80	9.63
90	10.31
100	10.75

H.4.2 State of Florida Perspective

The Florida Department of Environmental Protection (FDEP) Division of Recreation and Parks developed the SCORP for 2000. The SCORP was used to derive and project total recreation participation and allocate this participation

from state to regional levels. The SCORP includes guidelines for resource-based outdoor recreation activities as listed in ***Table H-7***. 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.
The SCORP user rate guidelines and demands were used to develop reasonable user rate projections. Due to the restoration project's location, visibility, user base and rustic/minimal recreation features proposed, a conservative usage rate would be projected. Generally, the projected usage rates follow the resource needs and guidelines published by the SCORP. However, for activities where a supply-demand gap exists, estimates used were substantially lower than the SCORP published rates. It is anticipated that the recreation opportunities within the study area would suffer from two factors that may diminish use and benefits: reduction of use during dry periods and the lack of public knowledge regarding the proposed facilities.

H.4.3 Regional Perspective

Due to projected population growth in the area, the current SCORP indicates demands not met for the year 2010 for six activities proposed for the project proposed recreation facilities. In the current or existing without project condition, miles of biking and hiking trails, tent camping facilities, freshwater and saltwater beach activities, freshwater fishing and hunting facilities are needed to meet demand. ***Table H-7*** contains a numerical description of these results. ***Table H-7*** shows that demands not met for hiking, biking and nature trails would increase 126 percent, 95 percent and 420 percent respectively.

In many areas, even where water bodies are accessible, they are unusable due to the lack of facilities. As previously noted, the regional level needs assessments (SCORP) are not capable of identifying local needs. Nonetheless, it is well known that there is a need to fund development of access facilities such as boat ramps, canoe launches, docks, catwalks and piers, as well as support facilities such as showers, restrooms, and parking areas. Federal, state and local governments should work together to fund construction of these facilities in all areas where there is sufficient access to water bodies suitable for recreation (SCORP, 2000).

TABLE H-7: PROJECT RECREATION USE PROJECTIONS BY YEAR

	2005	2010	2015	2020	2025	2030	2040	2050
Bike	11,171	12,680	14,371	16,279	18,449	20,852	22,789	24,696
Salt Water Beach	(1,187)	(1,148)	(1,105)	(1,057)	(1,002)	(940)	(891)	(843)
Fresh Water Boat Ramp	(3,135)	(3,125)	(3,114)	(3,102)	(3,088)	(3,073)	(3,060)	(3,048)
Salt Water Fish	(1,436)	(1,365)	(1,286)	(1,197)	(1,096)	(983)	(893)	(804)
Hike	972	1,154	1,358	1,588	1,849	2,139	2,373	2,603
Horse	*(29)*	*(10)*	*11*	*34*	*61*	*90*	*114*	*137*
Hunt	*(3,552)*	*(3,540)*	*(3,526)*	*(3,510)*	*(3,492)*	*(3,472)*	*(3,455)*	*(3,439)*
Nature	250	528	839	1,191	1,591	2,034	2,391	2,743

Italicized font represents recreation activities not proposed within the Biscayne Bay Coastal Wetland - Tidal Wetlands Restoration Project study area.

Table H-8 presents an analysis of recreational demand and supply for some of the major categories of recreation within the proposed project study area. Numbers presented are the differences between existing and future without project conditions and current supply within SCORP Region 11 of south Florida. Negative numbers represent situations where there exists more supply than what is needed to fill demand, while a positive number represents an unmet demand.

The use guidelines for designated bicycle, hiking and nature study trails were based on carrying capacity guidelines adopted by the SCORP, and used by the state park system. The bicycle trail use guideline of forty to eighty users per mile per day assumes ten to twenty riders per mile per day with a daily turnover rate of four. The use guideline for hiking trails, four to twenty hikers per mile per day, assumes one to five groups of two hikers per mile per day with a daily turnover rate of two. The guideline for nature trails, forty to one hundred sixty persons per mile per day, assumes five to twenty groups of two hikers per mile per day with a daily turnover rate of four (these data are presented in ***Table H-8***).

The proposed project consists of approximately seven miles of trails with linkages to many more miles of South Dade Greenway Network Trails and C&SF Flood Control Project canals available for use. A conservative approach was used for the purpose of usage projections. Only four miles of trails and

canals were used to determine daily usage rates, because it is expected that while all available trails would be utilized, the trails and canals two miles to either side of the access points and parking facilities would be utilized most frequently. This essentially underestimates the potential daily usage rates, but was determined to be the most likely scenario.
A balanced mix of ecosystem compatible recreation use and facilities are planned for the proposed project. The proposed recreation would help to fulfill some of the SCORP 2000 existing and projected recreation deficits for Region 11.

Recreation trends show increased usage of existing facilities and a need to develop new facilities:

- The Outdoor Recreation Coalition of America notes the trend in walking and bird watching increased 42 percent and 155 percent from the 1984 survey to the 1995 survey.
- The FWS, National Survey of Fishing, Hunting and Wildlife-Associated Recreation shows a 98 percent and 38 percent increase in residential and non-residential wildlife watching in the State of Florida (Yellow Book, 1999).

With ensuing development in the immediate area to accommodate population growth projections for the State of Florida, the study team anticipates ample use of the proposed recreation facilities in the years ahead, and projects a shortage of recreation resources in the area by 2050.

TABLE H-8: MOST LIKELY RECREATION PARTICIPATION USER DAY PROJECTIONS

Activity	Units Provided	Maximum Area Requirements	Turn over Rates	SCORP Guidelines	SCORP Region IX Resource Needs (2010)		Proposed Project Projected Daily Use
					Annual User Occasions	Units	
Biking Walking	7 miles (4 mi used for UDV)	10-20 users Per Mile	4/day	40-80 users per mile per day	24,089,784 1,672,767	Miles/Day	15 15
Canoeing/ kayaking	Biscayne Bay/ Florida Blue-way Trail, area canals (20 mi)	1-2 users per canoe	2/day	2 0-4 canoes, kayaks/acre or mile/day	N/A	Miles/Day	15
Nature Study	7 miles (4 mi used for UDV)	5-20 groups per mile	4/day	40-160 users per mile of trail/day	1,988,143	Miles/Day	20
Bank Fishing	Spreader Canal 250 Linear Foot	NA	2/day	fisherman/5 LF	924,095	Linear Feet/Day	10
Tent Camping	6 Sites	3–10 campsites/ acre	4campers/ day	users/campsite/ day	1,136,981	Campsite	5
General Recreation Total							**80 users per day**

Key: SCORP Statewide Comprehensive Outdoor Recreation Plan

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-9***.

USACE 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 the Engineering Regulation 1105-2-100 dated April 22, 2000 were observed in preparing this cost analysis. The federally mandated project evaluation interest rate of 4.125 percent, a 40-year economic period of analysis, and FY 2011 cost estimates were used to evaluate economic feasibility.

TABLE H-9: SUMMARY OF COSTS AND BENEFITS

Annual Costs	
Total Recreation Costs	$2,316,000
Interest During Construction	$134,000
Total Investment Cost (rounded)	$2,450,000
Amortized Investment Cost	$127,000
OMRR&R	$25,000
Total Annual Cost	$152,000
Annual Benefits	
Unit Day Value	$7.17
Daily Use	80
Annual Use	29,200
Average Annual Benefit	$210,000
Benefit to Cost	1.4
Net Annual Benefits	$58,000

Key: OMRR&R Operations and Maintenance, Repair, Replacement and Rehabilitation

The benefit-to-cost ratio for the recreation features is approximately 1.4 with net annual benefits equaling approximately $58,000.

TABLE H-10: SENSITIVITY ANALYSIS USING MULTIPLE SCENARIOS

Scenario	Annual Users	Daily Users	Annual Benefit
Most Likely	29,200	75	$210,000
Worst Case	12,045	33	$87,000
SCORP Guidelines	401,500	1,100	$2,879,620

Key: SCORP Statewide Comprehensive Outdoor Recreation Plan

A sensitivity analysis was done to further confirm expected benefits and provide additional justification for proposed recreation features. Minimum and SCORP expected benefits have been provided for comparison with the proposed project recreation benefits. This economic analysis suggests there would be ample benefits to conservatively justify the proposed recreation facility construction for the proposed project. The proposed recreation project is recommended for construction based on Congressional approval and local sponsor willingness to provide funding.

H.6 PHASE II RECREATION CONCEPTS

The Biscayne Bay Coastal Wetland study has been divided into two phases. The following proposed recreation information would be developed in Phase II. The Cutler Wetland component of the proposed Biscayne Bay Coastal Wetland is south of the Deering Estate area on project fee title lands. Proposed project levees and dikes would provide public access for environmental interpretation areas, and a multi-use trail. The construction staging area would provide an ideal trailhead with minimum facilities (handicapped accessible parking, paved parking, overflow permeable parking with bus access, restrooms, interpretive kiosk and shade shelter) and an overlook platform. A pedestrian bridge may be needed for the multi-use trail. The Town of Cutler Bay has agreed to partner with the SFWMD operation and maintenance of the proposed facility.

Costs and economic justification would be completed in the Phase II Project Implementation Report. Discussions of a region-wide network of environmental interpretation, multi-use trails and public access to the Biscayne Bay have taken place. The concept of opening up access to the Biscayne Bay is supported by the Trust for Public Land (*Get Your Feet Wet…The Plan to Discover Biscayne Bay*), Miami-Dade County, the Town of Cutler Bay, SFWMD and USACE.

H.7 REFERENCES

Design Agreement Between The Department of the Army and South Florida Water Management District for the Design of Elements of the Comprehensive Plan for the Everglades and South Florida Ecosystem Restoration Project (12 May 2000).

PL 89-72. The Federal Water Project Recreation Act of 1965.

PL 99-662. Water Resources Development Act (WRDA) of 1986.

PL 106-541. Water Resources Development Act of 2000.

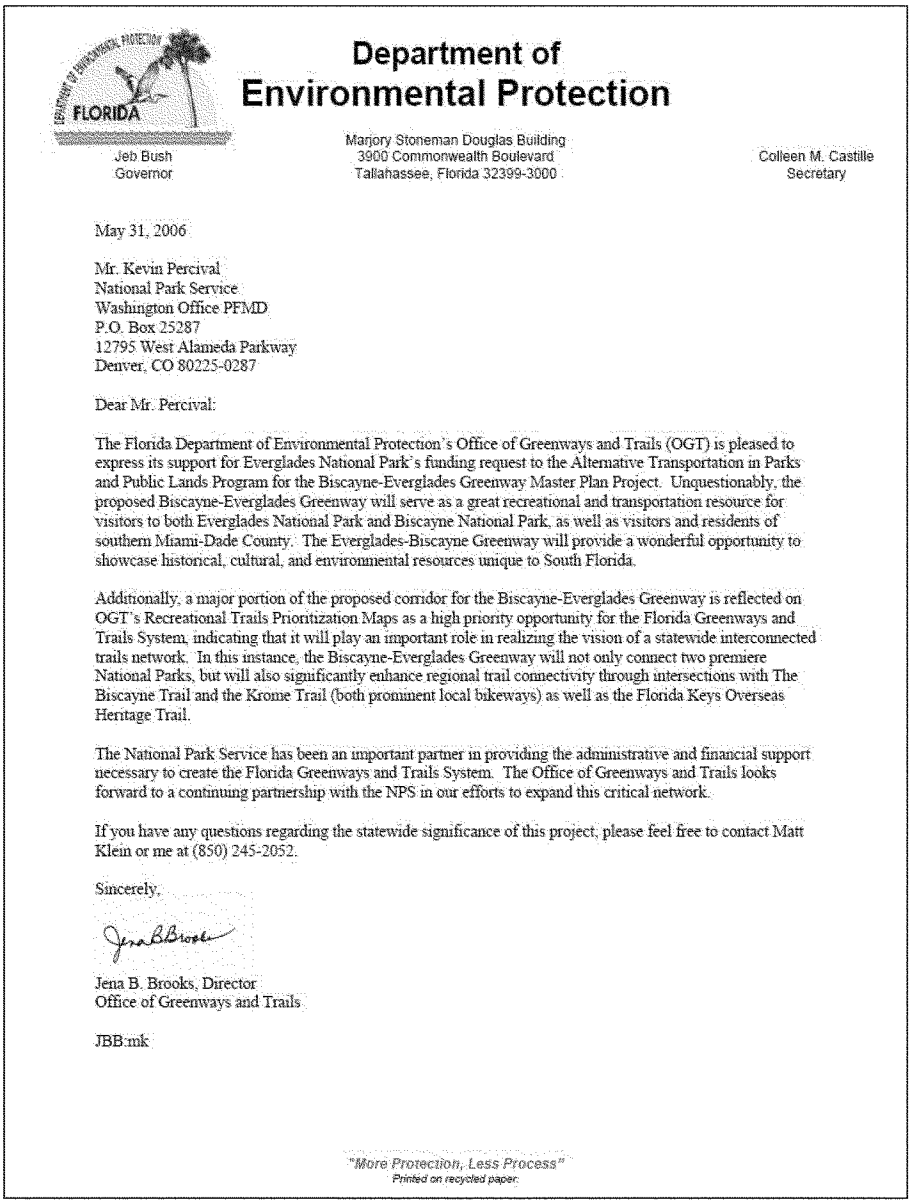
State of Florida, Department of Environmental Protection, Division of Recreation and Parks. Outdoor Recreation in Florida-2000: Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP), Tallahassee, FL.

U.S. Army Corps of Engineers, Economic Guidance Memorandum, 11-03, Unit Day Values for Recreation, Fiscal Year 2011.

U.S. Army Corps of Engineers, Central and Southern Florida Study (Yellow Book), Jacksonville District, (1999).

U.S. Army Corps of Engineers, South Atlantic Division (CESAD-PDD-J), OMRR&R Memorandum, Atlanta, GA (29 Sep 2005).

U.S. Army Corps of Engineers, Planning Guidance Notebook, ER 1105-2-100 (APR 2000), Washington, D.C.



Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Colleen M. Castille
Secretary

May 31, 2006

Mr. Kevin Percival
National Park Service
Washington Office PFMD
P.O. Box 25287
12795 West Alameda Parkway
Denver, CO 80225-0287

Dear Mr. Percival:

The Florida Department of Environmental Protection's Office of Greenways and Trails (OGT) is pleased to express its support for Everglades National Park's funding request to the Alternative Transportation in Parks and Public Lands Program for the Biscayne-Everglades Greenway Master Plan Project. Unquestionably, the proposed Biscayne-Everglades Greenway will serve as a great recreational and transportation resource for visitors to both Everglades National Park and Biscayne National Park, as well as visitors and residents of southern Miami-Dade County. The Everglades-Biscayne Greenway will provide a wonderful opportunity to showcase historical, cultural, and environmental resources unique to South Florida.

Additionally, a major portion of the proposed corridor for the Biscayne-Everglades Greenway is reflected on OGT's Recreational Trails Prioritization Maps as a high priority opportunity for the Florida Greenways and Trails System, indicating that it will play an important role in realizing the vision of a statewide interconnected trails network. In this instance, the Biscayne-Everglades Greenway will not only connect two premiere National Parks, but will also significantly enhance regional trail connectivity through intersections with The Biscayne Trail and the Krome Trail (both prominent local bikeways) as well as the Florida Keys Overseas Heritage Trail.

The National Park Service has been an important partner in providing the administrative and financial support necessary to create the Florida Greenways and Trails System. The Office of Greenways and Trails looks forward to a continuing partnership with the NPS in our efforts to expand this critical network.

If you have any questions regarding the statewide significance of this project, please feel free to contact Matt Klein or me at (850) 245-2052.

Sincerely,

Jena B. Brooks, Director
Office of Greenways and Trails

JBB:mk

"More Protection, Less Process"
Printed on recycled paper.

Board of County Commissioners
MIAMI-DADE COUNTY – FLORIDA
DISTRICT 9

DENNIS C. MOSS
COMMISSIONER

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1634 N.W. 6TH AVENUE
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FAX (305) 245-5008

April 27, 2006

Mr. Kevin Percival
ATP Planning Group Manager
National Park Service
12795 West Alameda Parkway
Denver, CO 80225

Re: Grant Proposal for the Biscayne Everglades Greenway Master Plan

Dear Mr. Percival:

I offer this letter in support of the proposal for the Biscayne Everglades Greenway Master Plan that has been submitted by Everglades National Park.

This project will help maintain and enhance the quality of life of both visitors and residents from the community by providing alternative accesses to two strategically located national parks. Your funding support is needed in order to help achieve these objectives.

I eagerly endorse the project and strongly urge your support.

Sincerely,

Dennis C. Moss
Vice Chairman, District 9
Board of County Commissioners

METROPOLITAN PLANNING ORGANIZATION
(MPO) SECRETARIAT
111 N.W. 1 STREET, SUITE 910
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May 2, 2006

Mr. Kevin Percival
National Park Service
Washington Office PFMD
P.O. Box 25287
12795 West Alameda Parkway
Denver, CO 80225-0287

Dear Mr. Percival:

On behalf of the Miami-Dade Metropolitan Planning Organization's Bicycle/Pedestrian Program, I wish to express my strong support for the Everglades National Park funding request to the Alternative Transportation in Parks and Public Lands Program for the Biscayne-Everglades Greenway Master Plan Project.

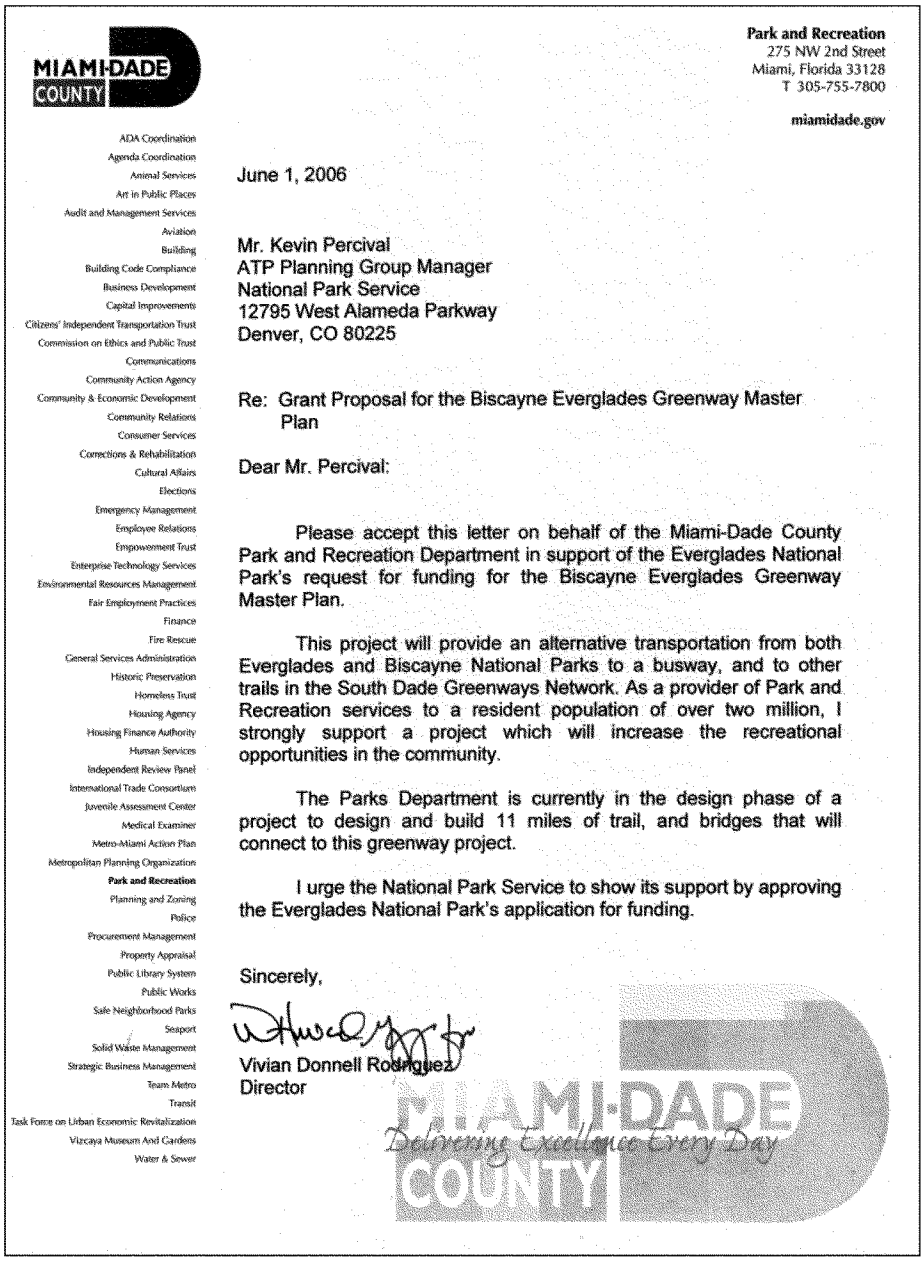
The Biscayne-Everglades Greenway is a 30-mile-long multi-use trail connecting Everglades and Biscayne National Parks and running through Florida City, the City of Homestead and portions of unincorporated Miami-Dade County. The Biscayne-Everglades Greenway will help create a non-motorized hub in Homestead where it will connect to several other projects that are planned or under construction including the South Dade Trail (under construction by Miami-Dade Transit), the Southern Glades Trail (open), Biscayne Trail phase 1 (under design by Miami-Dade Parks Dept), Krome Trail (being planned by FDOT) and the US-1 connection to the Florida Keys Overseas Heritage Trail (under construction by FDOT).

This Greenway will become a world class destination for visitors to access the two National Parks and experience the local flavor of the communities to which it links.

Sincerely,

David Henderson, AICP
Bicycle/Pedestrian Coordinator

Metropolitan Planning Organization for the Miami Urbanized Area



MIAMI-DADE COUNTY

ADA Coordination
Agenda Coordination
Animal Services
Art in Public Places
Audit and Management Services
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Building
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Task Force on Urban Economic Revitalization
Vizcaya Museum And Gardens
Water & Sewer

Park and Recreation
275 NW 2nd Street
Miami, Florida 33128
T 305-755-7800

miamidade.gov

June 1, 2006

Mr. Kevin Percival
ATP Planning Group Manager
National Park Service
12795 West Alameda Parkway
Denver, CO 80225

Re: Grant Proposal for the Biscayne Everglades Greenway Master Plan

Dear Mr. Percival:

Please accept this letter on behalf of the Miami-Dade County Park and Recreation Department in support of the Everglades National Park's request for funding for the Biscayne Everglades Greenway Master Plan.

This project will provide an alternative transportation from both Everglades and Biscayne National Parks to a busway, and to other trails in the South Dade Greenways Network. As a provider of Park and Recreation services to a resident population of over two million, I strongly support a project which will increase the recreational opportunities in the community.

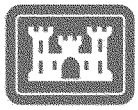
The Parks Department is currently in the design phase of a project to design and build 11 miles of trail, and bridges that will connect to this greenway project.

I urge the National Park Service to show its support by approving the Everglades National Park's application for funding.

Sincerely,

Vivian Donnell Rodriguez
Director

MIAMI-DADE COUNTY
Delivering Excellence Every Day



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