FINAL SUPPLEMENT to the FINAL ENVIRONMENTAL IMPACT STATEMENT

July 2000

CENTRAL AND SOUTHERN FLORIDA PROJECT FOR FLOOD CONTROL AND OTHER PURPOSES MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK 8.5 SQUARE MILE AREA MIAMI-DADE COUNTY, FLORIDA

LEAD AGENCY: Jacksonville District, U.S. Army Corps of Engineers

COOPERATING AGENCIES: U. S. Fish & Wildlife Service and The National Park Service

This Supplement considers alternatives to mitigate potential flooding within the 8.5 SMA resulting from increased stages associated with the Modified Water Deliveries to Everglades National Park Project (MWD Project). The current authorized MWD Project consists of structural modifications and additions to the existing Central and Southern Florida (CS&F) Project to enable water deliveries for the restoration of more natural hydrologic conditions in Everglades National Park. This supplement considered several structural and non-structural plans to achieve the same purpose. Alternative 6D, with conditions, has been identified as the Recommended Plan.

For more information, contact Elmar Kurzbach, U.S. Army Corps of Engineers, Planning Division, P.O. Box 4970, Jacksonville, Florida 32232-0019, phone (904) 232-2325 or facsimile 904-232-3442. Comments are due within 30 days of the date of publication of the Notice of Availability of this Final SEIS in the Federal Register, expected on August 4, 2000.

U.S. Army Corps of Engineers
Jacksonville District

FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

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SECTION 1.0

PURPOSE AND NEED FOR THE CONSIDERED ACTION

1.1 PROJECT NEED

In June 1992, a General Design Memorandum (GDM) for Modified Water Deliveries to Everglades National Park (MWD project) was approved by the Chief of the Engineering Division, Directorate of Civil Works, United States Army Corps of Engineers (USACE). This approval fulfilled the requirements of Section 104 of the 1989 Everglades National Park (ENP) Protection and Expansion Act (PL 101-229), which directed the Secretary of the Army to select the plan that accomplished the goals of the MWD Project to the extent practicable. A Record of Decision was executed by the USACE on May 13, 1993. The general goal of the MWD project was to increase the quantity and improve the timing of water delivered from the Central and Southern Florida Flood Control System to ENP. The specific directive relative to the 8.5 Square Mile Area (8.5 SMA) was to build a flood protection (mitigation) project for the residential areas in the East Everglades that were going to be adversely affected by the increasing water deliveries resulting from implementing the MWD project.

Following project authorization in 1992, there have been several studies of the 8.5 SMA flood mitigation component. Significant improvements to hydrologic modeling capabilities have enhanced our understanding of the restoration requirements of the Everglades ecosystem. The need to integrate the MWD project with the C-111 Project, which has been designed and partially implemented, became evident. The South Florida Water Management District (SFWMD), ENP, and others suggested additional potential options that would meet the legislated mitigation requirements and other interests in the 8.5 SMA while ensuring environmental restoration of Northeast Shark River Slough (NESRS). Consequently, the SFWMD, ENP, and others have suggested the flood mitigation system approved by the Corps in 1992 may no longer represent the best alternative for attaining full restoration of NESRS while simultaneously meeting the need for a flood mitigation system in the 8.5 SMA.

The SFWMD, as the local sponsor, has reviewed the subsequent analyses of the cost of construction, operation, and maintenance of the authorized flood mitigation components, along with new information and technologies. This evaluation prompted the SFWMD Governing Board to request that the USACE evaluate additional alternatives with respect to the 8.5 SMA. Various alternatives were developed for consideration, with a goal of ensuring the natural hydrology of the NESRS would be restored while meeting the needs of the landowners of the 8.5 SMA.

In light of improved technical data and changed conditions, the USACE has recognized the need to reevaluate the conclusions of the 1992 GDM for best achieving the goal of restoration to the NESRS while meeting the need for flood mitigation in the 8.5 SMA. This GRR/FSEIS presents hydrologic modeling simulations, social impact assessments (SIA), policy analysis, real estate information, engineering design and cost analysis, an environmental impact assessment, economic data, and a review of public concerns. Two Department of Interior (DOI) agencies, the United States Fish & Wildlife Service (USFWS) and the National Park Service (NPS), are cooperating agencies. Both agencies assisted in the development of project requirements and objectives and contributed to the technical analyses of the affected environment and environmental effects. The USACE and the DOI will use this as a decision document for potential future Federal action on this project. In addition, the SFWMD Governing Board used the Draft GRR/SEIS in its motion for a Recommended Plan (see Appendix B).

1.2 AUTHORIZING DOCUMENTS

1.2.1 Initial Authorization

PL 101-229, 13 December 1989 (Section 104). Section 104(a) of the Everglades National Park Protection and Expansion Act authorized the Secretary of the Army to modify the Central and Southern Florida (C&SF) Project to improve water deliveries to ENP and to take steps to restore its natural hydrological conditions.

Section 104(b) – (h) also authorized and directed the Secretary to construct a "flood protection system" for the residential area in the East Everglades and adjacent agricultural areas, if the Secretary determines those areas will be adversely affected by operations of the project. To protect agricultural areas, the Secretary must find that there is a substantial reduction in the area's present economic utility that is attributable solely to the project modification or the residential flood mitigation system. The Secretary was directed to review the operation of the modified project within 18 months, and periodically thereafter, to determine whether agricultural areas are being adversely affected and to protect these areas if necessary. However, any preventive measure shall be implemented in a manner that presents the least prospect of harm to the natural resources of ENP. The Secretary was also directed to coordinate the construction program with the Secretary of the Interior to permit the Park's expansion (land acquisition) program to proceed concurrently.

1.2.2 Supplemental Authorizations and Agreements

Interagency Agreement Between the Department of the Interior, National Park Service, and the Department of the Army (Interagency Agreement No. IA-5000-1-9501, June 1991). This agreement was entered into for the purpose of implementing the provisions of the Everglades National Park Protection and Expansion Act of 1989, with specific reference to modifications of the C&SF Project to improve water deliveries to ENP. The agreement is the current mechanism used by the DOI to transfer funds to the USACE for implementation of the project features associated with the MWD project.

Everglades National Park Protection and Expansion Act of 1989, Amendment (PL 103-219, 9 March 1994). This act amended the original act (PL 101-229) by adding a section pertaining to land acquisition. The amendment allows for the Secretary of the Interior to provide up to 25% of the funding for land acquisition in the Frog Pond, Rocky Glades Agricultural Area, and 8.5 Square Mile Area.

1.3 PROJECT LOCATION

The 8.5 SMA, also known as the East Everglades Agricultural and Residential Area, is located about 20 miles southwest of Miami and about 10 miles north of Homestead, in the East Everglades area (Figure 1). The 8.5 SMA is bounded on the east by the L-31N flood protection levee, on the west by the ENP expansion area, on the north by SW 104th Street, and on the south by SW 168th Street (Richmond Drive). US 41 (Tamiami Trail) is located about 6.6 miles to the north. The 8.5 SMA is situated immediately east and south of NESRS and north of the Taylor Slough headwaters.

The 8.5 SMA, for present purposes, encompasses approximately 10 square miles (approximately 6,413 acres). The area in excess of 8.5 square miles results from the inclusion of lands along the north and west periphery of the 8.5 SMA which were acquired by the USACE in anticipation of constructing the proposed levee and canal system authorized in the 1992 MWD GDM plan (USACE 1992).

Because the potential effects of this project extend beyond the 8.5 SMA, a larger study area was considered in this GRR/FSEIS. This area includes parts of the Everglades Expansion Area in the NESRS, depending on individual environmental effects or resources being evaluated. Human effects evaluations were limited to the bounds of the 8.5 SMA and lands immediately adjacent to the east, while hydrological effects were studied in those parts within, and immediately adjacent to, the 8.5 SMA.

The 8.5 SMA is prone to frequent flooding due to its elevation and location along the eastern periphery of the historical Everglades. Because this area is west of

the protective levee system of the C&SF Project, it is not provided structural flood protection. Although the 8.5 SMA was initially settled during the 1940s, much of the residential and agricultural development occurred during the 1970s, made possible by reduced groundwater levels resulting from the southward extension of the L-31N Canal and a protracted dry spell. Since that decade, floods from heavy rains and periodic high ground water have caused damage to property and crop loss.

1.4 PROJECT BACKGROUND

ENP is located in South Florida in the southernmost portion of the historic Everglades. The historic Everglades was originally a broad, shallow wetland that flowed imperceptibly from Lake Okeechobee to the mangrove zone at the southern tip of Florida. In an effort to control flooding and better manage water in South Florida, a complex system of canals, levees, structures, pumps, and impoundments known as the Central and Southern Florida Flood Control Project (C&SF) was constructed. Congress authorized this project in 1948 and modifications in subsequent years.

Following construction of Water Conservation Areas (WCA) 3A and 3B and the southward extension of Levee 67 (L-67 Ext.) in the early 1960's, the natural flows to ENP, located in the southern portion of the project, became subject to control by regulation schedule. Discharges were sporadic and based on competing needs to retain water for urban and agricultural use during the dry season, and to maintain flood control capacity during the wet season. As a result of severe impacts to ENP from droughts in the mid-1960's, Congress established a minimum water delivery schedule to protect ENP resources (PL 91-282, June 1970). This minimum delivery schedule remained intact throughout much of the 1970's.

The Flood Control Act of 1968 (PL 90-483) authorized the Everglades National Park-South Dade Conveyance System (ENP-SDCS). The act provided for modifications to the existing C&SF Project for the purposes of improving the supply and distribution of water supplies to ENP while meeting agricultural and urban water needs in south Dade County. The ENP-SDCS, which was completed in 1983, included modifications to the original levee and borrow canal L-31 (currently comprised of L-31N and L-31W) and construction of control structure S-331.

In March 1983, the ENP Superintendent issued a request, referred to as the Seven Point Plan, for actions to protect the Park. The Seven Point Plan was prompted primarily by ENP concerns for the ecological deterioration that occurred in the wake of heavy rainfall in 1982 and 1983 and subsequent regulatory releases triggered by the minimum deliveries schedule. The plan included the following components:

1. Fill in L-28 canal and remove substantial portions of the L-28 levee

2. Fill in L-67 extension canal and remove the L-67 extension levee

3. Restore WCA 3B to the Everglades system

4. Distribute WCA 3A water deliveries along the full length of Tamiami Trail between L-28 and L-30

5. Establish a water quality monitoring program

6. Defer implementation of any new drainage districts

7. Field test a new schedule for delivery of water to the park

The SFWMD and USACE subsequently made structural modifications to the L-28 and L-67 Extension canals and levees, and began a rainfall-based water delivery plan for the park. This Experimental Program of Water Deliveries to Everglades National Park (*PL 98-181, Section 1302: Supplemental Appropriations Act of 1984, 30 November 1984*) authorized the modification of PL 91-282 (Minimum Delivery Schedule) and allowed for a two-year experimental program of water deliveries to the park for the purpose of developing an improved schedule. The law also authorized the Secretary of the Army to acquire agricultural lands and construct necessary flood protection measures for the protection of homes affected by the modification of the delivery schedule.

In response to PL 98-181, the USACE completed the *General Plan for Implementation of an Improved Water Delivery Schedule to Everglades National Park, Florida* in January 1985, which was approved by the Secretary on February 28, 1985. This plan recommended (1) the preparation of a General Design Memorandum (GDM) and an Environmental Impact Statement (EIS) addressing modifications to improve water deliveries to ENP, and (2) extension of the two-year time limit specified in PL 98-181 based on a written agreement between USACE, ENP, and SFWMD. The experimental program was eventually extended to January 1, 1989, and later to January 1, 1992 under PL 99-190 and PL 100-676, respectively.

The Everglades National Park Protection and Expansion Act of 1989 (PL 101-229 Section 104) authorized the USACE to construct modifications to the C&SF Project. Alternatives to restore natural hydrologic conditions in the Park were evaluated in a GDM and Environmental Impact Statement (EIS) on MWD to Everglades National Park, which was published in 1992. Specifically, the GDM addressed the NESRS portion of water deliveries of the C&SF Project.

The proposed action presented in the GDM included a flood mitigation system for the 8.5 SMA. Implementation of the recommendations for the water deliveries in the GDM would result in an increase in water flows through NESRS. These flows were expected to raise ground water levels and increase the areal extent and frequency of flooding in the 8.5 SMA. The flood mitigation system would prevent this area from being subjected to increased flood risk from higher stages in NESRS as a result of the MWD project. As originally designed, the flood mitigation component of the MWD project consisted of a levee and berm system with a seepage canal to one side. The canal would convey seepage water north and east to a proposed pump station (S-357) at Canal L-31N at the northeast corner of the 8.5 SMA. S-357 would pump the water north to another proposed structure (S-356, not a part of this project) at the junction of Canal L-31N with Canal L-29 adjacent to US 41. S-356 would then pump the water west for eventual discharge back into NESRS. During the process of obtaining Water Quality Certification, the Florida Department of Environmental Protection (FDEP) requested that the seepage canal be placed between the outer (larger) levee and the inner (smaller) levee. The inner levee could then function to prevent stormwater runoff from the 8.5 SMA from entering the seepage canal and adversely affecting water quality.

1.5 PROJECT GOAL, REQUIREMENTS, AND OBJECTIVES

1.5.1 Project Goal

The 1992 GDM sought to develop a plan for an improved water delivery system for ENP. The two main objectives of the MWD project were related to the ENP's hydrology and flood protection and/or mitigation to the East Everglades residential and agricultural area. Hydrology is crucial to the Everglades ecosystem and thus is an integral aspect of restoration to the ENP. The hydrology has a direct effect on the plants and animals and has an influence on the overall water quality within the Everglades. Historical flooding and impacts resulting from elevated water levels from the ENP project required flood mitigation for the 8.5 SMA to be a main objective of the MWD project.

On June of 1999 the Governing Board of the SFWMD approved a motion requesting the USACE to develop and evaluate a full array of alternatives to the plan authorized in the 1992 GDM (July 22, 1999, letter from SFWMD to USACE, reproduced in Appendix B). The overall goal of this particular planning and study effort was stated as follows:

Project Goal *- Facilitate selection of a Recommended Plan for the 8.5 SMA. An acceptable plan is one that provides a technical solution for the hydrological and ecological restoration of the Everglades National Park and mitigation for additional flooding impacts in the 8.5 SMA that would result from implementing*

the MWD project, both as specified in the 1989 Act, while maintaining compatibility with Comprehensive Everglades Restoration Plan Objectives.

In achieving this goal, each of the alternatives were evaluated. The evaluation discusses each alternative in relationship to the project need, project goals and objectives, and the impacts to the environment.

1.5.2 Project Requirements

Project requirements are conditions required of any alternative to be considered viable. Five requirements are fully described in Section 4.0 of the GRR. These requirements are briefly restated below:

RQ1. Do not negatively impact higher stages in ENP as specified in the MWD Project.

RQ2. Mitigate for increased stages within the 8.5 SMA resulting from implementation of the MWD Project.

RQ3. Develop a solution that can be permitted by regulatory interests under current and reasonably foreseeable regulations (i.e., water quality, wetlands).

RQ4. Ensure no significant impact to existing habitat of endangered or threatened species.

RQ5. Maintain current levels of flood protection for agricultural areas east of L-31N.

1.5.3 Project Objectives

Project objectives have been developed based on these project requirements. These objectives set the basis for determining whether an alternative can meet the project goal. These objectives are fully described in Section 4.0 of the GRR, and are briefly restated below:

OB1. Evaluate effects on hydropatterns in the NESRS.

OB2. Evaluate impacts to the landowners and residents of the 8.5 SMA resulting from implementation of the Modified Water Deliveries Project.

OB3. Analyze cost effectiveness.

OB4. Analyze effects to ecological functions.

OB5. Evaluate effects on conditions favorable to Federal and State listed endangered species survival.

OB6. Measure compatibility with Comprehensive Everglades Restoration Plan and C-111 Projects without adversely impacting the current level of flood protection east of L-31N.

OB7. Analyze impacts and costs associated with time delays in implementation of alternatives.

1.6 RELATED ENVIRONMENTAL DOCUMENTS

The following NEPA, design, and planning documents are of immediate relevance to the present SEIS study effort:

1. Draft restoration plan for Northeast Shark Slough (ENP 1994)

2. GDM and EIS for the Modified Water Deliveries to Everglades National Park (USACE 1992a)

3. Water control plan for the Water Conservation Areas and the ENP-South Dade Conveyance System (USACE 1992b)

4. Environmental Assessment and Finding of No Significant Impact (FONSI) for Test 7 of the Experimental Program of Water Deliveries to ENP (USACE 1997)

5. Final Environmental Assessment, 1998 Emergency Deviation from Test 7 of the Experimental Program (USACE 1999)

6. Environmental Assessment (FONSI) of the 1999 Emergency Actions to Protect the Cape Sable Seaside Sparrow (USACE 1999)

7. Central and Southern Florida Project Comprehensive Review Study - Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (USACE/SFWMD 1999)

8. Interim Structural and Operational Plan (ISOP), Emergency Deviation from Test 7 of the Experimental Program – Final Environmental Assessment (USACE 2000)

1.7 DECISIONS TO BE MADE

This Final Supplemental Environmental Impact Statement (FSEIS) provides information to the USACE and DOI to use in their public decision making process. Each agency will issue a Record of Decision (ROD). The USACE and DOI have identified Alternative 6D with conditions as the Recommended Plan.

1.8 SCOPING AND ISSUES

Scoping for the SEIS was initiated in April of 1999 during a pre-scoping meeting with various agencies and stakeholder groups. On June 3, 1999, a scoping letter was distributed by the Jacksonville District Corps of Engineers, which summarized the purpose and history of the project, and outlined seven primary issues raised during the pre-scoping process. The seven issues presented in the June 3, 1999, letter were:

- Effects on natural systems and the ENP
- Social, economic and environmental effects on the residential community within the 8.5 SMA
- Water management as necessary to assure the continued existence and recovery of the Cape Sable Seaside Sparrow
- Effects on Native American Interests
- Effects on farmlands within the 8.5 SMA and adjacent agricultural areas
- Potential for contamination transport by surface and groundwater to the adjacent environment
- Secondary and cumulative impacts associated with providing a level of flood protection (incidental or by design) beyond the level provided by flood mitigation.

The SFWMD had requested that the USACE evaluate other options that would be consistent with the authorized project objectives of restoring the hydrology of ENP and mitigating the potential flooding effects on the 8.5 SMA. The scoping meeting was held at 6:30 PM, June 21, 1999, at the Miami-Dade Agricultural Extension Office in Homestead, Florida, as previously advertised.

Numerous specific comments and issues were raised during the formal scoping meeting and during subsequent coordination with affected stakeholders. Table 18 (Summary of Public Coordination) lists the meetings held. The following issues were identified as a result of the scoping process:

1. Thorough evaluation of all alternatives
2. Long-term effects of the alternatives
3. Evaluate cumulative impacts
4. Need a complete economic analysis of all alternatives and their impacts
5. Compatibility with the Restudy
6. Historic and cumulative loss of additional areas adjacent to the 8.5 SMA
7. Water quality impairment
8. Recreational amenities
9. Land use changes required
10. Effect of schedule delay for completion of the project
11. Validity of data and methodology used in evaluating the alternatives
12. Geographic extent of the study

On June 23, 1999, the SFWMD Governing Board requested that the Corps evaluate in the SEIS a full array of alternative local options in addition to the full acquisition plan and the authorized flood mitigation plan. The SFWMD would then use the SEIS process to decide which plan(s) they would support as the local sponsor. Accordingly, a letter dated July 9, 1999, that discussed this change in approach was sent by the USACE to all individuals who received the original scoping letter. The deadline for comments on the June 21, 1999 scoping meeting was extended to July 23, 1999, to allow additional time for all interested parties to consider the new information. As a result of the scoping process, the seven issues presented encompass the significant issues and concerns expressed by cooperating agencies and interested parties.

On April 14, 2000, the availability of the Draft GRR/SEIS was published in the Federal Register. This document was widely circulated to agencies and interested stakeholders. The comment period closed on May 30, 2000. Numerous issues were raised regarding conclusions and findings of the analysis detailed in the Draft GRR/SEIS. Responses to all comments have been formulated and are included, along with a copy of the comments, in Appendix H.

On June 15, 2000, the SFWMD Governing Board, as local sponsor of this project, passed a motion that identified Alternative 6D as “the optimal plan for the

Modified Water Deliveries Project to Everglades National Park" subject to the following conditions:

(a) The Perimeter Levee's location and footprint should maximize the amount of wetlands included in the buffer area, following the approximate boundary in Alternative 6D.

(b) The Internal Levee and seepage canal system should be optimized to minimize impacts to the residents of 8.5 SMA. For example, the levee's location should avoid residences where practicable. Upon exhaustion of reasonable efforts to avoid landowner impacts, residents should receive fair market value or be provided equivalent property at no expense to themselves.

(c) Water quality treatment should be provided for the runoff to meet state water quality standards and not cause degradation of ambient conditions.

(d) Alternative 6D, including all required lands, should become a project feature of the MWD Project. Therefore, construction and land acquisition shall be implemented through full federal funding, programs and/or procedures, consistent with the 1994 Project Cooperation Agreement (PCA).

(e) The potential for flooding of landowners who are east of the proposed levee, before and after project implementation, is unchanged consistent with the federal SEIS. Flood mitigation, not flood protection, should be provided by the design, construction and operation of Alternative 6D as enhanced herein.

(f) Miami-Dade County is strongly encouraged to enforce existing land use ordinances in order to preserve existing uses and densities, and sustain a willing seller program for all lands within the entire 8.5 square mile area.

(g) For those lands within the 8.5 SMA which fall east of the proposed levee, a willing seller program, free from fear of condemnation, for all lands should be continued utilizing appropriate and available programs and funds. SFWMD shall utilize its regulatory authority to protect the water resources of the area and undertake rulemaking where necessary to address secondary and cumulative impacts. SFWMD shall also exercise its authority to review any comprehensive plan amendments proposed by Miami-Dade County.

(h) Implementation of Alternative 6D, as enhanced above, should not adversely harm the restoration levels of ENP's hydrology greater than that simulated through modeling of Alternative 6D.

The Governing Board's formal recommendation for Alternative 6D was detailed in a letter from the Executive Director of the SFWMD to the Jacksonville District Commander, dated June 21, 2000 (see Appendix B, Pertinent Correspondence).

SECTION 2.0
ALTERNATIVES EVALUATED

2. 1 DESCRIPTION OF THE ALTERNATIVES

The "without project" alternative for the FSEIS is the current approved agency action, or the Authorized GDM Plan. The Authorized Plan for the entire MWD Project is shown in Figure 2. The without project alternative for the flood mitigation component for the 8.5 SMA is Alternative 1 with the 1995 base operations plan (Figure 3A). All alternatives were compared to the 1995 base operations plan (95 base). Comparisons to the 1995 base condition allowed an assessment of each alternative to meet the larger goal of restoring the hydrology and ecology in the NESRS while mitigating adverse hydrologic affects to the 8.5 SMA. The following nine alternatives, as well as two variations of Alternative 6B (6C and 6D), have been developed for evaluation:

Alternative 1	Authorized GDM Plan
Alternative 2B	Modified GDM Plan
Alternative 3	Deep Seepage Barrier Plan
Alternative 4	Landowner's Choice Land Acquisition Plan
Alternative 5	Total Buy-Out Plan
Alternative 6B	Western Portion of 8.5 SMA as Buffer Plan
Alternative 6C	Modified Western Portion of 8.5 SMA as Buffer Plan (SOR Boundary)
Alternative 6D	Modified Western Portion of 8.5 SMA as Buffer Plan
Alternative 7	Raise All Roads Plan
Alternative 8A	Western Portion of 8.5 SMA as Flow-way Plan
Alternative 9	Adaptive Refinement of GDM Plan

A brief description of each alternative is provided in this section. Detailed descriptions can be found in the General Reevaluation Report (Section 3.4).

(1) Alternative 1 – Authorized GDM Plan. This alternative includes a major levee along the 8.5 SMA perimeter, a seepage canal, a minor levee, and a seepage pump station located at the northeast corner of the 8.5 SMA. The pump discharges seepage water into the L-31N canal where it travels north and is discharged west to the L-29 canal, and ultimately back into the NESRS.

(2) Alternative 2B – Modified GDM Plan. This alternative has the same basic layout as Alternative 1, except that the seepage pump station will be installed at the southwest corner of the 8.5 SMA, and will discharge seepage water into a treatment area in or adjacent to the C-111 Project Area.

(3) Alternative 3 – Deep Seepage Barrier Plan. This alternative includes a perimeter levee that follows the same alignment (along the 8.5 SMA) as Alternative 1. A seepage barrier, located within the levee, extends down approximately 50-70 feet. No pump station is included in this plan.

(4) Alternative 4 – Landowner's Choice Land Acquisition. This alternative provides for acquisition of land in the 8.5 SMA through three different means. Current owners have a choice of a) Buy-Out, b) Flowage Easement, or c) Life Estate with Flowage Easement.

(5) Alternative 5 – Total Buy-Out Plan. This alternative involves the acquisition of all land in the 8.5 SMA from either willing sellers or by condemnation.

(6) Alternative 6B – Western Portion of 8.5 SMA as Buffer Plan. This alternative would convert the western portion of the 8.5 SMA to a buffer area between the developed area and ENP. The perimeter levee, a seepage canal, and an interior levee generally follow 202nd Avenue. The seepage pump station, located at the southern terminus of the seepage canal, will discharge seepage water to the south into a treatment area in or adjacent to the C-111 Project area.

(7) Alternative 6C – Modified Western Portion of 8.5 SMA as Buffer Plan (Save Our Rivers Boundary). This alternative, a variation of Alternative 6B, would also convert the western portion of the 8.5 SMA to a buffer area between the developed area and ENP. The perimeter levee, a seepage canal, and an interior levee generally follow the eastern boundary of the Phase 1 – Save Our Rivers (SOR) boundary. The seepage pump station, located at the southern terminus of the seepage canal, will discharge seepage water to the south into a treatment area in or adjacent to the C-111 Project area.

(8) Alternative 6D – Modified Western Portion of 8.5 SMA as Buffer Plan. This alternative, also a variation of Alternative 6B, would convert the western portion of the 8.5 SMA to a buffer area between the developed area and ENP. The perimeter levee is generally inside (i.e., east and south) of the Phase 1 – SOR boundary line that the outer levee for Alternative 6C follows. The seepage canal and two adjacent interior levees are located along 205th Avenue north from 168th Street to 132nd Street, then east along 132nd Street to the L-31N canal. The seepage pump station, located at the southern terminus of the seepage canal, will discharge seepage water to the south into a treatment area in or adjacent to the C-111 Project area.

(9) Alternative 7 – Raise All Roads Plan. This alternative includes raising all existing roads and restoring them in-kind. All areas within the roads will remain unimproved. However, a flowage easement would be obtained for any areas impacted by increased water levels associated with the implementation of the MWD Project.

(10) Alternative 8A – Western Portion of 8.5 SMA as Flow-way. This alternative uses a concept similar to Alternative 6B to protect the eastern most inhabited portion of the area, and keep the western area as a more natural, undeveloped area. This western area will serve as a buffer zone to ENP west of the mitigation levee and as a natural flow-way for diverting flow from ENP to the C-111 Project area. An exterior diversion levee will run approximately parallel to the interior levee and serve as a containment barrier for a natural swale flow-way. The containment levee will be small enough to allow surface water flow from ENP into the flow-way, but big enough to direct flow contained within the flow-way. A seepage pumping station located at 168th Street will discharge seepage water to the south into a treatment area in or adjacent to the C-111 Project area.

(11) Alternative 9 – Adaptive Refinement of GDM Plan. This alternative evolved as a plan that is capable of integrating immediately with the system operation for implementation of the MWD Project, but constructed in a manner that can be modified to comply with the future anticipated features in the Comprehensive Everglades Restoration Plan (CERP). This alternative has the same layout of levees and seepage canals as Alternative 1. It includes an initial pumping structure at the northeastern corner of the 8.5 SMA as proposed in Alternative 1. It also includes a future pumping structure located at the southern terminus of the seepage canal at the southwestern corner of the 8.5 SMA for construction after the CERP is implemented.

2.2 ISSUES AND BASIS FOR CHOICE

The alternative plans were evaluated based on analyses of hydrologic modeling, WRAP evaluations, extent of hydrologic enhancement of the NESRS, effects on protected species, impacts to the residents of the 8.5 SMA, and cost. The Recommended Plan effectively balances cost and impacts to the residents of the 8.5 SMA while enhancing the hydrology of the NESRS and fish and wildlife resources. The alternatives evaluated are shown in Figures 3A through 3K.

2.3 RECOMMENDED PLAN

Based on analyses and public input on the Draft GRR and SEIS, Alternative 6D with conditions (identified in Section 4.0 of the FSEIS and Section 6.0 of the GRR) has been adopted as the Recommended Plan.

Recommended Plan 6D consists of one perimeter and two interior levees as well as a seepage canal and pump station. The location of the perimeter levee is generally between Alternative 6C (Save Our Rivers boundary line) and Alternative 6B. The seepage canal system runs along 205th Avenue north from 168th Street to 132nd Street, then east along 132nd Street to the L-31N canal.

The seepage collection canal is designed to keep the groundwater levels within the area interior of the outer levee at the same levels as existed prior to the implementation of the MWD project. Two interior levees, one on either side of the seepage canal, are positioned to prevent surface water from directly entering the seepage canal. A proposed pumping structure (S-357) located at the southern terminus of the levee/canal system will discharge seepage through a 96-inch diameter pipe to be released south into a treatment area in or adjacent to the C-111 project area. There will be no major changes to operations of existing structures in the C&SF system resulting from implementation of this alternative.

The exterior levee on the western boundary of this alternative ranges from approximately 530 to 5545 feet east of the westernmost boundary of the 8.5 SMA, depending on the location along the boundary. This alternative includes approximately 4.5 square miles within its boundaries.

2.4 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

The Recommended Plan is evaluated in detail in Section 4.11. Sections 4.4 through 4.10 and 4.12 through 4.14 discuss the environmental consequences of all other alternatives developed and considered for this project. The consequences of all alternatives were evaluated in detail for their capability to meet performance requirements and performance measures. None of the alternatives or variations were eliminated from detailed evaluation.

2.5 COMPARISON OF ALTERNATIVES

Alternatives 1, 2B, and 9 generally consist of an approximately 4-foot high perimeter levee that bounds the 8.5 SMA along its north and west periphery. Inside of this perimeter levee is a canal that is designed to collect seepage that passes through the perimeter levee. Interior to the seepage canal is a small levee that has the primary purpose of eliminating overland flow from the residential area into the canal. The length of the levee and canal system is estimated at over 41,000 linear feet. The primary difference between these three alternatives is the location of the proposed pump station to convey seepage water from the area. Alternative 1 has the pump station located at the intersection of the seepage canal and L-31N. Alternative 2 conveys seepage water to the C-111 buffer area to the south and thus its pump station is located at the southern terminus of the seepage canal at Richmond Drive. Alternative 9 initially is to be configured as Alternative 1, with discharge to L-31N. Once the C-111 project is completed, seepage water can then be conveyed either north to L-31N or south to the C-111 buffer system. Alternatives 1, 2B, and 9 provide a similar level of flood mitigation for the 8.5 SMA. The area within the 8.5 SMA can be anticipated to develop as provided for by the Miami-Dade County Comprehensive Plan.

Alternative 3 utilizes an exterior levee at the same location as that for Alternatives 1, 2B, and 9. However, instead of the installation of a seepage canal and interior levee, this alternative uses a deep seepage barrier to control seepage. The seepage barrier is contemplated to be placed within the levee to a depth of about 75 feet. Flowage easements were required on 4,693 acres to meet the overall flood mitigation requirement. Alternative 3 does not include a pump station.

Alternatives 4 and 5 are non-structural alternatives. These alternatives call for the purchase and ecological restoration of the entire 8.5 SMA, either through fee simple acquisition or through the purchase of flowage easements. Under Alternative 4, owners of properties within the 8.5 SMA would be given a choice of either selling the property or remaining on the property and accepting a flowage easement. With the exception of the 306 acre FAA parcel, alternative 5 calls for the fee simple purchase of the entire 8.5 SMA. Therefore, a flowage easement would be purchased on the FAA parcel. The fee simple acquisition under Alternative 5 will eliminate all development within the 8.5 SMA.

Alternative 6B and its two variations, Alternatives 6C and 6D, utilize a structural alternative similar in nature to Alternatives 1, 2, and 9. That is, each of these alternatives includes a perimeter levee, seepage canal, and an interior levee(s). The primary difference between the three alternatives is the location of the levee and canal system. For Alternative 6B, the 20,600-foot long levee and seepage canal generally is located along SW 202nd Avenue. In Alternative 6C, the levee and canal system follows the Phase 1 – Save Our Rivers (SOR) boundary. For Alternative 6C, the levee and canal length is estimated at 35,410 feet. Alternatives 6B and 6C utilize a seepage canal that is located adjacent to the perimeter levee. Conversely, the Recommended Plan proposes a 34,500-foot long perimeter levee situated between the footprints of the Alternative 6B and 6C levees. The seepage canal and two interior levees are approximately 21,000 feet in length and are located approximately 4,000 feet interior of the perimeter levee. Water from these seepage canals is anticipated to be conveyed to a treatment area within the C-111 buffer area south of Richmond Drive. Alternative 6B, for the most part, provides flood protection for the area between L-31N and the interior levee. The remaining area of Alternative 6B, as well as the non-acquisition portions of Alternatives 6C and 6D, is provided flood mitigation through either structural means or through flowage easements. Alternatives 6B, 6C, and 6D contemplate the removal of development west and north of the perimeter levee, ecological restoration and the reversion of this area back to natural conditions.

Alternative 7 is also considered a structural alternative. This alternative calls for all of the public roads within the 8.5 SMA to be raised above flood levels in-kind. That is, existing asphalt roads will be replaced and raised using asphalt and existing dirt roads will be replaced and raised using dirt fill. This alternative

provides flood mitigation using flowage easements. Development within the 8.5 SMA would continue to be governed by the County's Comprehensive Land Use Plan.

Alternative 8A considers the use of a large flow-way bounded by a perimeter and an interior levee. The perimeter levee is approximately 24,860 feet in length. The interior levee is approximately 21,700 feet in length. A large swale would be created between the two levees to provide a collection and conveyance channel for seepage water from the area. Areas to the east of the interior levee would continue to be developed in accordance with County requirements. Areas to the west of the perimeter levee would experience elevated flood stages consistent with the implementation of the MWD project.

2.6 MITIGATION

2.6.1 Wetlands and Fish and Wildlife Resources.

Mitigation of impacts is appropriately discussed in terms of avoidance, minimization, and compensatory actions that reduce or offset the negative environmental impacts resulting from an action. The overall MWD is designed to be a restorative action, to improve or offset environmental impacts resulting from past and current water management practices (C&SF Project structures and operations). The specific focus of MWD is in the Water Conservation Areas, Northeast Shark River Slough and Shark River Slough Basin of ENP. When fully operational, the overall MWD project will benefit the ecosystem function and habitat value of approximately 100,000 acres of wetlands in NESRS, 600,000 acres of wetlands in WCA-3, and 200,000 acres of wetlands within the Shark River Slough Basin of ENP. This would occur as a result of restoration of more natural hydrologic conditions, both in terms of timing and flood stages. It is current Corps policy that in cases where the purpose of a project is to restore an ecosystem, especially fish and wildlife habitat, the project should not be required to develop or implement specific and separate fish and wildlife mitigation.

In implementing the Recommended Plan for 8.5 SMA, construction of specific features would result in some direct wetlands impacts. The plan includes a perimeter levee, seepage canals, interior levees, a pumping structure, discharge pipe and a treatment area. Construction of these would result in a direct impact to 130 acres of wetlands. Offsetting these specific and relatively minimal impacts is the reversion to more natural hydrologic conditions and historic wetlands regime throughout the area. This results in a net increase in wetlands function and fish and wildlife habitat. In addition, since the overall MWD project is expected to result in environmental restoration with far greater positive than negative impacts, separate mitigation features to offset these losses are not considered necessary. The appropriate sections of this document disclose the

project specific impacts as well as the offsetting benefits. A 404(b)(1) evaluation is provided as Attachment C.

Wetlands and fish and wildlife mitigation in terms of this FSEIS are defined as measures that could be employed to avoid and/or reduce potential impacts and the impacts that remain (residual impacts) after implementation of such measures. It does not include actions that are part of the plan for implementation of the proposed action, or environmental commitments for the project (see Section 5.0 of this document). The Final Fish and Wildlife Coordination Act Report (FCAR) has identified and recommended certain enhancement features, which will be incorporated in the final design to the extent practicable (USFWS/NPS 2000). These enhancement features would be included to provide habitat or conditions intended to improve upon the positive effects of the Recommended Plan.

Based on the recommendations in the FCAR, the Recommended Plan "will not require compensatory mitigation for wetlands and fish and wildlife resource losses."

2.6.2 Socio-Economic Resources

Mitigation of flood-related effects on socio-economic resources will be accomplished through one of four different methods: (1) structural and operational modifications to the C&SF Project; (2) fee simple acquisition; (3) acquisition of flowage easements; and (4) acquisition of life estates in conjunction with flowage easements. Mitigation accomplished through structural and operational modifications involves the construction and operation of water control features (e.g., canals, levees, and pump stations) to prevent the 8.5 SMA from experiencing any increase in flooding as a result of the MWD Project. Fee simple acquisition involves the purchase of property. Acquisition of flowage easements involves compensating property owners for periodic flooding where full structural-operational flood mitigation is not reasonably attainable. This is a less than fee simple approach that allows the owner to retain ownership rights to the property. Life estates is an instrument that allows the owner to retain ownership and use of property (with certain constraints on development) for the duration of the current owner's life, after which time the title reverts to the Federal government. While the life estate is in effect, the Federal government will hold a flowage easement on the property. The particular methods used for each alternative are detailed in Section 4.

SECTION 3.0
AFFECTED ENVIRONMENT

3.1 THE STUDY AREA

The study area (project area) encompasses the 8.5 SMA and the ENP Expansion area. The project area (the 8.5 SMA) presently encompasses approximately ten square miles. The 8.5 SMA, also known as the East Everglades Agricultural and Residential Area, is located in the East Everglades (i.e., that portion of the Everglades between levee L-31N and the ENP), about 20 miles southwest of Miami and about 10 miles north of Homestead (Figure 1). It is bounded on the east by levee L-31N, on the west by the eastern ENP expansion boundary, on the north by SW 104th Street, and on the south by SW 168th Street (Richmond Drive). U.S. Highway 41 lies approximately 6.6 miles to the north. The project area is situated immediately east of NESRS and north of the Taylor Slough Headwaters. In addition to the 8.5 SMA, project effects on the ENP Expansion Area (including NESRS), Northwest Shark River Slough (west of L-67 Extension), Taylor Slough, and the C-111 Basin were assessed. A hydrologic evaluation was conducted which found no adverse impacts to Florida Bay (See Figure 185 and 186 of Appendix A).

3.2 TOPOGRAPHY

The 8.5 SMA is located in the Rocky Glades physiographic zone, which occupies the western slope of the Atlantic Coastal Ridge (Figure 4). The Rocky Glades forms a narrow transitional area between the Shark River Slough and Taylor Slough Headwaters physiographic zones (DERM, 1980; Schomer and Drew, 1982). It also comprises a significant topographical, geological, hydrological, and ecological transition between the Atlantic Coastal Ridge proper and the Everglades trough. The name “Rocky Glades” reflects the fact that limestone is exposed at the surface throughout this area. Due to solution processes the ground surface is riddled with potholes (micro-karst topography). Topographic elevations range from 5.0 to 8.5 feet National Geodetic Vertical Datum (NGVD) (Figure 5). The higher elevations (above 7.0 feet) are generally in the east and southeast portions of the project area. Elevations become progressively lower towards the northwest and west.

3.3 GEOLOGY

The limestone bedrock underlying the 8.5 SMA comprises the upper portion of the Miami Limestone geologic unit (Hoffmeister, 1974; Hoffmeister et al., 1967; Scott, 1992). The Miami Limestone was laid down during the Pleistocene age and occurs at or near the surface in southeast Florida from Palm Beach to

Miami-Dade and Monroe counties. This formation includes an eastern (oolitic) and a western (bryozoan) facies (Figure 6). The oolitic facies, which underlies the 8.5 SMA and overlies the bryozoan facies where both are present, consists of white to orangish gray, poorly to moderately indurated, sandy, oolitic limestone (grainstone) with scattered concentrations of fossils. The Miami Limestone is highly porous and permeable (due to the dissolution of carbonate by ground water) and features solution holes and pinnacle rock. It forms much of the Biscayne Aquifer of the surficial aquifer system. The Miami Limestone is thickest along the Atlantic coast (maximum of 40 feet) and thins to the west (Schroeder et al. 1958). The thickness of the Miami Limestone where it underlies the 8.5 SMA is less than ten feet. Subadjacent to the Miami Limestone are limestone, sand, and shell deposits of the Fort Thompson Formation, which in turn is underlain by sand, silt, clay, and carbonate deposits of the Tamiami Formation and Hawthorn Group.

3.4 HYDRIC SOILS

The soils in and surrounding the 8.5 SMA were originally identified as *Rockland* soil, with a narrow finger of *Perrine marl – very shallow phase* extending north along SW 197th Avenue (Jones, 1948; USDA-Soil Conservation Service, 1958). Both soils historically supported wet rockland prairies and, by today's standards, would be classified as hydric. Subsequent agricultural activities in the 8.5 SMA, particularly rock plowing, have altered soil composition and drainage characteristics. Current soil mapping (Noble et al., 1996) reflects the soil conversion effects as of 1985 (when the contemporary soils were mapped).

Currently there are two hydric soil types mapped within the 8.5 SMA - *Biscayne-Rock Outcrop complex* and *Dania muck, depressional* (Noble et al., 1996). These soils cover approximately 1160 acres (~20%) and 10 acres (< 0.2%), respectively, of the project area (Figure 7). Biscayne-Rock Outcrop complex represents the co-mingling of two hydric soil types - *Biscayne marl* and *Rock outcrop*. Biscayne marl component is a poorly drained, shallow soil with about four inches of grayish-brown calcareous marl overlying limestone bedrock (Miami Limestone) and including scattered small solution holes filled with very dark gray, non-calcareous mucky silt loam. The Rock outcrop component consists of surface exposures of Miami Limestone, a hard and porous limestone with solution holes containing silty clay or clay. The water table remains below the surface (within 10 inches) during normal years but can become ponded during extremely wet periods. Permeability is moderate. Biscayne and Rock outcrop comprise about 60 and 40 percent, respectively, of this soil complex. Dania muck, depressional, the other hydric soil, is a shallow, very poorly drained soil, with black organic muck typically up to 15 inches in depth overlying a soft, porous limestone bedrock. This soil is ponded for nine to twelve months in most years. Permeability is rapid throughout.

3.5 NON-HYDRIC SOILS

The only non-hydric soil mapped in the project area is *Chekika very gravelly loam*, which covers just over 4800 acres (~80%) of the 8.5 SMA (Noble et al., 1996). Chekika is a very shallow, somewhat poorly drained soil with typically a five-inch thick surface layer of dark grayish-brown very gravelly loam overlying hard, porous limestone bedrock. Solution holes within the limestone, filled with silt loam or silty clay loam, extend up to nine inches below surface. The water table remains within the limestone and during most years is between 12 and 36 inches below surface. Permeability is moderate. Chekika soils resulted from rock plowing of the underlying limestone to render the land useful for vegetable farming. Small pockets that escaped rock plowing are likely comprised of Biscayne-Rock Outcrop complex or Dania muck, depressional soils. Rock-plowing subsequent to 1985 (the year the soils were mapped) has probably enlarged the extent of Chekika soils.

3.6 GENERAL HYDROLOGY

The effects of local rainfall are a key component of the local hydrology in the 8.5 SMA. The average rainfall over the 8.5 SMA is about 58 inches per year. This water is removed from the surface through evapotranspiration, seepage into the underlying Biscayne Aquifer, inter-flow within the shallow aquifer, and discharge to the L-31N canal. Prior to the construction of the C&SF Flood Control Project and placement of canal L-31N east of the 8.5 SMA, freshwater sheet flow traversed portions of this area on its way towards the Everglades and its eventual discharge to Florida Bay. The canals and levees that make up the C&SF Project serve to increase the drainage rate for the area. (Figure 8).

Upon its completion in the early 1950s, it was anticipated canal L-31N would form the western limits of urban and agricultural development in the region. Therefore, plans were not made for developing areas west of the canal. Water levels within canal L-31N are operated to maintain specific water levels in the areas east and west of the canal. During periods of high rainfall, the canal serves to drain the area to the east, thereby providing flood protection for the nearby residential and agricultural areas. Because the associated levee lies to the west of canal L-31N, the potential for flood relief in the 8.5 SMA is limited. Thus, rainfall in excess of the storage capacity of the local aquifer and soils results in significant standing water (flooding) within the study area. Although along the southern boundary of the 8.5 SMA a series of surface water flow channels have been constructed within the upper few feet of the limestone bedrock, these channels do not appear to augment drainage of the area to any significant degree. Information provided by Miami-Dade County Department of Environmental Resources Management (DERM) indicates that these channels are not part of a system that drains the water downgradient to a positive outfall.

Because the 8.5 SMA was historically considered to be west of the developable area, formal flood protection levels of service within the area were never established. That is, peak water elevations resulting from a rainfall event of a certain volume and duration event have not been established. Rather, excess rainfall is allowed to pond on the surface within the study area. At times, when flooding in the 8.5 SMA was at its worst, canal L-31N and its associated pumping stations have been operated in opposition to the normal operating procedures in an effort to reduce this flooding.

Canal L-31N is a component of the Everglades National Park-South Dade Conveyance System (ENP-SDCS). The ENP-SDCS, originally authorized in 1968 (PL 90-483), was intended to improve the supply and distribution of water to ENP and expand agricultural and urban water needs in Miami-Dade County. Since completion of the system in 1983, water levels in canal L-31N (and L-31W) have been a source of controversy between the ENP and development interests along its eastern perimeter (Light and Dineen, 1994).

3.7 SURFICIAL AQUIFER SYSTEM-BISCAYNE AQUIFER

The Biscayne aquifer underlies an area of about 4,000 square miles in Broward, Miami-Dade, Monroe, and Palm Beach Counties, including the 8.5 SMA. The aquifer is the only source of drinking water that supplies about three million people who live primarily in urban areas from Homestead in Miami-Dade County, northward to Boca Raton, in Palm Beach County. The aquifer is also a source of water that is transported by pipeline to the Florida Keys.

The Biscayne is at shallow depths and in some areas is in direct hydraulic connection with streams, canals, and other natural and manmade surface water bodies. Because of this connection, the aquifer, Lake Okeechobee, the three water conservation areas, and the extensive network of canals, control structures, and pumping stations are continually monitored and managed as an integrated hydrologic system. Water conservation areas 3A and 3B encompass nearly all of western Broward and northwestern Miami-Dade Counties. Water is added to the conservation area by rainfall, by gravity drainage from Hendry County, and by several large pumping stations in Broward and Palm Beach Counties. These pumping stations lift excess wet season water from drainage canals to the conservation areas, thus providing flood control. During dry periods, stored water is released through structures and by seepage under levees to maintain flow to the ENP, to provide recharge to municipal wellfields, and to maintain groundwater levels near the coast for the prevention or retardation of saltwater intrusion (Fish and Stewart, 1991).

The Biscayne aquifer is the only formally named aquifer within the surficial aquifer system in Miami-Dade County. Because it is the principal aquifer in

Miami-Dade County, it has been declared a sole-source aquifer. The formations composing the aquifer include (in descending order) all or part of the Pamlico sand, Miami Limestone (Miami Oolite), Anastasia Formation, Key Largo Limestone, and the Fort Thompson Formation (all of Pleistocene age), and contiguous, highly permeable beds of the Tamiami Formation of Pliocene and late Miocene age (hydraulic conductivity of 100 ft/day or more). Some geologic formations that compose the Biscayne aquifer extend beyond the area generally ascribed to the aquifer. Thus, to delineate the boundaries of the aquifer, changes in hydraulic properties within the geologic formation must be determined. The key criterion in defining the Biscayne aquifer is the presence of highly permeable limestone or calcareous sandstone in the Fort Thompson Formation, Anastasia Formation, or the Key Largo Limestone (Fish and Stewart, 1991).

3.7.1 Site Hydrostratigraphy and Hydraulic Properties

The Miami limestone includes an oolitic facies to the east (underlying the Atlantic Coastal Ridge), and a bryozoan facies to the west. The 8.5 SMA is directly underlain by the oolitic facies of the Miami limestone (Hoffmeister, 1974). The oolitic facies consists of variably sandy limestone composed of oolites with scattered concentrations of fossils. In the 8.5 SMA, the thickness of the Miami Oolite facies is approximately 16 to 20 feet. Pumping of wells completed in the Miami Oolite indicates that large yields can be obtained in some areas; however, test drilling indicates that the Miami Oolite does not have as well developed a network of cavities as the underlying Fort Thompson Formation. The Miami Oolite is underlain by the Ft. Thompson Formation throughout Miami-Dade County, including the 8.5 SMA. Thickness of the Fort Thompson in the 8.5 SMA is approximately 35 to 40 feet, thinning to the west. Aquifer testing of the Fort Thompson Limestone indicates that the average hydraulic conductivity exceeds 40,000 ft/day. Below the Fort Thompson Limestone are less conductive units of the Tamiami Formation, which reach a total of thickness of approximately 70 feet in the 8.5 SMA. Limestone units with a hydraulic conductivity of 100 to 1,000 ft/day are present within the Tamiami beneath the 8.5 SMA, becoming less conductive to the north, and more conductive to the south. A hydrogeologic cross section is included as Figure 9.

The transmissivity of the surficial aquifer system in Miami-Dade County increases from less than 75,000 ft^2/day in westernmost portion of the county to greater than 1,000,000 ft^2/day in a large area centered around Krome Avenue. The 8.5 SMA is included in this high transmissivity area, which coincides with the greatest thickness of the Fort Thompson Formation in the 8.5 SMA. The decrease in transmissivity to the west corresponds to the thinning of the highly permeable Fort Thompson Formation.

3.7.2 Flow Conditions

The sources of recharge to the surficial aquifer system in Miami-Dade County are: (1) Infiltrating rainfall or irrigation water through surface materials to the water table; (2) infiltration of surface water imported by overland flow from the north in the water conservation areas or by canal; (3) infiltration of urban runoff by way of drains, wells, or ponds; and (4) groundwater inflow from southwestern Broward County. Soil types have significant control on the rate of recharge. Seasonal variations occur, with recharge by rainfall greatest during the wet season, and recharge by canal seepage being greatest during the dry season. Most of the water that circulates within the surficial aquifer system is discharged by canals. Pumpage constitutes only a small part of the total discharge from the aquifer, although this effect is amplified because it is greatest during the dry season when recharge and aquifer storage is smallest.

Groundwater contour maps for the surficial aquifer system in Miami-Dade County at the end of the wet and dry seasons are included as Figures 10 and 11. The maps represent the average of water levels for September (wet season) and April (dry season) during the period 1974 to 1982. As shown on the figures, groundwater flows from the highest water levels which are maintained in water conservation areas 3A and 3B, toward the east-southeast and southwest. In the 8.5 SMA, groundwater flow is predominantly toward the east-southeast. Groundwater flows into the 8.5 SMA from the east Everglades. Canals, control structures, or well fields cause local variations in the flow pattern. Canals that quickly remove groundwater during periods of high water levels greatly shorten groundwater flow paths compared to predevelopment conditions. However, it is often unclear whether canals act as fully penetrating boundaries or as partly penetrating boundaries of the flow system.

3.8 REGIONAL WATER SUPPLY/DEMAND

Major wellfields are located to the north of the 8.5 SMA near Miami and Ft. Lauderdale. Intensive pumping has lowered the water table near the wellfields and has reversed the natural seaward flow direction in some places. The nearest major wellfield is the Miami Springs-Hialeah wellfield located in Miami.

During 1985, about 786 million gallons per day (mgd) of water was withdrawn from the Biscayne aquifer. More than 72% of this water was used for public supply, 23% for agriculture, and the remainder for domestic and industrial purposes (Randazzo and Jones, 1997). The U.S. Geological Survey (USGS, 1992) reported that in 1990, Miami-Dade County used about 576 mgd of water, with 92% of that water supplied by groundwater, and 98% of that groundwater supply was from the Biscayne aquifer. In the 8.5 SMA, no municipal water service is provided to the residents, therefore drinking water is provided by

private supply wells. Due to the absence of issues associated with water supply, this resource was eliminated from further evaluation.

3.9 WATER QUALITY

Although water is the lifeblood of the Everglades system, it is also potentially a medium of pollutant transport. The south Florida region, including the 8.5 SMA, presents a unique situation with the coexistence of extensive agricultural and urban areas in close proximity to ecologically sensitive wetlands and marine resources. All are dependent upon the regional water supply. Present delivery of waters to ENP originates from or passes through agricultural areas having the potential to alter or degrade water quality (Sheidt, 1989). The Everglades evolved in a relatively nutrient-poor environment and as a result, the release of nutrients has changed the sawgrass and wet prairie habitat. Cattail monocultures have been found to develop around disturbances such as drainage, canal construction and other human activity. These monocultures have specifically been found in the 8.5 SMA.

The natural quality of water in the Biscayne aquifer typically complies with State Drinking Water Standards and is typically suitable for all urban demands. Poor water quality exists in some coastal areas that are impacted by chemical contamination or saltwater intrusion. Areas that are affected by saltwater intrusion tend to be localized in linear extent due to the constant recharge (high water levels) maintained at the various water control structures. Because the Biscayne aquifer is close to the surface and highly permeable, groundwater is vulnerable to contamination. Rapid urbanization combined with growth of agriculture continues to threaten shallow groundwater from a variety of manmade sources.

3.9.1 Pesticides

Pesticides are a concern to the ENP due to the presence of agricultural lands within the flow path of waters flowing to the ENP. An ENP study, however, found it difficult to document pesticide use because agricultural use is not reported to any agency and information is not often volunteered (Sheidt, 1989). Based on the sub-tropical climate and the variety of crops grown, it was conservatively estimated that as many as 88 different compounds were being applied, including 41 insecticides, 29 herbicides, 15 fungicides, and 3 fumigants, with sporadic use of some additional compounds. Assuming the manufacturer's recommended application periodicity and rate per acre, a total annual estimate of 8 million pounds of active ingredient was obtained. Approximately 2,642 acres within the 8.5 SMA are used as farmland. Crops include temperate and tropical fruits and vegetables, trees, and ornamental plants. U.S. Environmental Protection Agency (USEPA) identified five insecticides and 18 herbicides used in south Florida as

probable groundwater contaminants (USEPA lists only those compounds with nationwide use exceeding 1 million pounds annually). Many of the listed compounds are highly toxic to birds, mammals, and fish. Overall, the insecticides were found to pose a greater threat in terms of acute toxicity. All of the fungicides for which data were available were toxic to fishes. Most of the herbicides were moderately to slightly toxic.

Water control structures G-211 and S-331 are included in SFWMD's pesticide monitoring program. The latest available monitoring events (December 1998, April 1999, and August 1999) found detectable levels of atrazine ranging from 0.012 parts per billion (ug/l) to 0.059 ug/l (Pfeuffer 1998, 1999a, 1999b). Atrazine is easily lost from the soil by leaching, but is relatively non-toxic to mammals and fish. Compounds detected at low levels at G-211 in April 1999 included DDD, DDE, DDT, endosulfan sulfate, and heptachlor epoxide. The DDT concentration of 0.0027 ug/l exceeds the 62-302 FAC surface water quality standard of 0.001 ug/l. Hexazinone was detected in S-331 at 0.032 ug/l in August 1999 (Table 1).

Sediment samples from S-331 had detectable DDE in December 1998 and April 1999, at concentrations of 2.3 ug/kg and 1.5 ug/kg, respectively. DDE was detected in sediment from G-211 in April 1999 at a concentration of 4.1 ug/kg. DDT and related compounds were banned from use in 1973. The large volume used, and the high sorption capacity of these compounds explains the persistence of detections in the sediment samples. The hydrophobicity of the DDT compounds results in a significant bioaccumulation factor. In sufficient quantities, these compounds can have reproductive effects on wildlife and carcinogenic effects in many mammals.

A USGS study of surface water quality impacts due to land use in the East Everglades (Waller, 1982) included one residential area within the 8.5 SMA (168th Street), the Chekika Hammock State Park just west of the 8.5 SMA, and a rock-plowed tomato field in the Frog Pond area south of the 8.5 SMA. The residential site yielded insecticide and herbicide residues, while the Chekika site yielded malathion. The rock plowed tomato field had high concentrations of chlordane (220 parts per million (mg/kg)) in the soil. The residential area soils had both chlordane (3 mg/kg) and detectable compounds in the DDT family. The soil cleanup target level for chlordane, per 62-777 FAC, is 3.1 mg/kg.

There have been no studies of pesticides in the 8.5 SMA that focused on water quality in agricultural drainage canals or L-31N during pesticide application periods. The possibility exists that elevated levels of pesticides occur but have escaped documentation (PEER, 1998).

Groundwater quality characteristics of the Biscayne aquifer were evaluated by USGS in 1978/1979 for seven land use areas within the East Everglades (Waller, 1983). Areas within the 8.5 SMA included Howard Drive agricultural area and

the Richmond Drive residential area. Seven monitoring wells were installed at the agricultural area, and two wells in the center of the residential area. The wells were nested, with one well completed to depths of approximately 10 to 15 feet below ground surface (bgs), and one to depths between 35 to 50 feet bgs. Soil samples were also collected from each land use area. The wells and soil samples were analyzed for insecticides, herbicides, and polychlorinated biphenyls once during the sampling program. The results showed that in the Howard Drive agricultural area, no pesticide or herbicides were detected in the groundwater. Soil contained only low concentrations of insecticide residues. In the Richmond Drive area, no pesticide or herbicides were detected in the groundwater. The soil in the Richmond Drive area contained chlordane and compounds in the DDT family.

3.9.2 Nutrients

A water quality analysis of the 8.5 SMA was conducted by PEER Consultants in 1998. Total phosphorus (TP) data for wells and surface water sampling sites in and around the 8.5 SMA were evaluated. A measure of compliance for phosphorus discharges for the C-111 basin were established as less than 10 parts per billion (ug/l) to Shark River Slough and to Taylor Slough. The data were predominantly from the mid 1980's, with the exception of station S-311 which was sampled in 1997 and 1998. No phosphorus was detected at S-311 for the PEER evaluation period. Due to the lack of TP data for groundwater in the 8.5 SMA, water quality data for the L-31N canal were utilized by PEER to determine if land use practices had impacted water quality. The rational behind this evaluation was the fact that modeling indicated groundwater flow in the 8.5 SMA is primarily to the east, and is intercepted by the L-31N canal. The data from L-31N indicated low levels of TP in the surface water, decreasing downstream. The study hypothesized that phosphorus is retained by soils in the 8.5 SMA and does not move outside the project area, although this could not be proved. This conclusion assumes that all groundwater flow from the 8.5 SMA is intercepted by the L-31N canal.

To evaluate TP near septic systems, previous studies in the vicinity of the 8.5 SMA were evaluated by PEER. Water quality in the vicinity of septic systems located just north of Homestead, in Coral Gables, in Hialeah near the Miami airport, and in north Miami-Dade County was monitored and evaluated by Pitt et al. (1975). The average TP concentration was 20 ug/l, with one well above 200 ug/l (in Hialeah). Ayres Associates (1989) monitored groundwater quality for a residential subdivision in Miami-Dade County east of the 8.5 SMA. Seven wells had average TP concentrations ranging from 18 to 67 ug/l. The maximum TP concentration observed was 1,200 ug/l.

Anderson and Shaw (1991) evaluated groundwater quality data from the East Everglades to determine impacts from agricultural activities. Wells were installed

in old and new agricultural areas east and west of L-31N and C-111, and sampled six times over a two-year period. Monitoring included two wells in the vicinity of the 8.5 SMA. The average TP concentrations for wells located directly in agricultural areas was 9.0 ug/l.

The USGS evaluation (Waller, 1982) of the effects of land use on surface water quality, mentioned in previous sections of this report, indicated that the rock-plowed tomato field (south of the 8.5 SMA) showed increased concentrations of organic nitrogen, total organic carbon, and orthophosphate from water at background sites in Taylor Slough, reflecting agricultural impacts. In a similar USGS study of the effects of land use on groundwater quality (Waller, 1983), areas within the 8.5 SMA were sampled, including the Howard Drive agricultural area and the Richmond Drive residential area. Potassium, organic carbon, and total Kjeldahl Nitrogen concentrations were higher than background. At Richmond Drive, Kjeldahl nitrogen was also above background in the groundwater samples. The elevated nutrient levels were attributed to the proximity to organic, peaty soils.

3.9.3 Metals and Toxic Organic Compounds

An evaluation of water quality data for wells in the 8.5 SMA and DERM surface water quality stations LN01 and LN04 was performed by PEER (1998). Wells G-3189, G-3273, G-3201, G-596, were monitored. The samples were analyzed for volatile organics and semi-volatile organics, and all samples were below detection limits. There were detections of arsenic, barium, chromium, copper, lead, manganese, mercury, nickel, selenium, and zinc, which were below USEPA action levels.

Analytical data received from DERM was also reviewed by HDR, and included wells GW-24A, GW-24B, and GW-24C located on the north side of the 8.5 SMA near SW 202nd Avenue, and well G-696 located near the corner of SW 197th Avenue and SW 136th Street. The sample data were suspect due to inadequate quality control and lack of chain of custody forms, and are therefore not discussed here.

3.9.4 Indicator Bacteria

Coliform bacteria are most commonly used as indicators of domestic sewage and agricultural runoff entering a water body. The coliform group also contains a variety of species occurring naturally in soils. Determination of fecal coliform bacteria concentrations is made to distinguish between enteric and soil coliforms. The bacteria counts indicate the relative amounts of waste matter, both naturally occurring or as sewage discharge, entering a body of water. The USGS study of surface water quality impacts due to land use in the East Everglades (Waller, 1982) included one residential area within the 8.5 SMA (168th street), the

Chekika Hammock State Park just west of the 8.5 SMA, and a rock-plowed tomato field about 6 miles to the south of the 8.5 SMA. In addition to fecal coliforms, the USGS study also measured the number of fecal streptococci bacteria to further distinguish between animal and human bacteria. The streptococci bacteria are more common in animal intestines, therefore the ratio of fecal coliform to fecal streptococci bacteria (FC/FS ratio) gives an indication of the source. A ratio of greater than 4.0 indicates contributions from human sources. In the residential area, the FC/FS ratio (>8) indicates the likelihood that the source of the bacteria is from human sources.

The USGS study by Waller (1983) indicated that groundwater in a shallow monitoring well at the Richmond Drive residential area had FC/FS ratios indicating that humans were not the source of the bacteria.

3.9.5 Hurricane Irene Storm Event Sampling

Sampling of standing surface water from ten locations within the 8.5 SMA was performed following Hurricane Irene in October 1999. Sample locations are shown on Figure 12. The samples were analyzed for purgeable halocarbons (EPA method 601), semi-volatile organics (EPA Method 8260), metals, total phosphorus, and total cyanide. In addition, two locations were sampled for fecal coliforms. The coliform locations included SW 168th Street at 197th Avenue, and SW 168th street at 209th Avenue. Detected concentrations from the sampling event are summarized in Tables 2 and 3. The results show detectable metals, nutrients, and a few organic compounds. Total phosphorus exceeds the established criteria of 10 ug/l, ranging from 140 to 930 ug/l. Coliform bacteria was above the State surface water standard (>1000 cfu/100 ml) during most of the sample events.

3.9.6 Water Quality Summary

Conclusions regarding the water quality of the 8.5 SMA can be made based on the data and literature review of studies within the vicinity of the 8.5 SMA. Constituents of concern appear to be pesticides, nutrients, and bacteria. Toxic organics and metals do not appear to be a concern, although unidentified problems could exist (see Section 3.27 below).

Although surface water at the L-31N shows detections of pesticide residues to be typically at low levels, it is possible as mentioned in the PEER report, that there have been no studies of pesticides in the 8.5 SMA that focused on water quality in agricultural drainage canals or L-31N during pesticide application periods. The possibility exists that elevated levels of pesticides occur but have not been documented. Also, it is possible that some of the 65 compounds used in Florida are not on the EPA list and could be leachers or potential groundwater

contaminants. This would apply to agricultural areas outside of the 8.5 SMA as well.

Nutrient levels appear to be elevated in some agricultural and residential areas. The PEER study hypothesized that phosphorus is retained by soils in the 8.5 SMA and does not move outside the project area, although this could not be proved. This conclusion assumes that all groundwater flow from the 8.5 SMA is intercepted by the L-31N canal. Related studies of total phosphorus associated with septic systems in Miami-Dade County showed elevated levels in groundwater (PEER, 1998).

Data concerning indicator bacteria were limited, but show some evidence that humans may have impacted water quality due to septic systems in the 8.5 SMA. In the Richmond Drive residential area, the FC/FS ratio (>8) in surface water samples indicated the likelihood that the source of the bacteria is from human sources. Hurricane Irene sampling event data show elevated coliforms in standing surface water, although the source (human or animal) was not identified.

3.10 VEGETATION

Historic Conditions. The native plant communities of the 8.5 SMA and the adjoining east Everglades predominantly consisted of freshwater marsh and wet prairie. Tree islands dominated by various tropical hardwood tree species or by one or more species of bay trees dotted the marsh-prairie expanse. These communities generally rested on a substrate of limestone (Miami Limestone) or marl. Marl consists of calcitic mud formed by precipitation of calcite by blue-green algae in submerged algal mats ("periphyton") (Gleason and Stone, 1994). The tropical hardwood islands (hammocks) developed on rock substrates elevated slightly above the surrounding terrain, whereas the bay tree islands formed over peat deposits often in association with subdued bedrock highs (Gunderson 1994). The marshes, prairies, and bay tree islands are wetland community types, while the hammock tree islands are an upland community type. These communities formed a natural hydro-ecological buffer between the deeper Everglades marshes and the higher and drier areas along the Atlantic Coastal Ridge (ENP, 1994). These non-forested wetlands were chiefly dominated by short hydroperiod graminoid species. Sawgrass (*Cladium jamaicense*) dominated the long hydroperiod wetlands while muhly grass (*Muhlenbergia capillaris*) and black sedge (*Schoenus nigricans*) dominated the short hydroperiod wetlands. Their hydrology was driven mostly by inflows from Northeast Shark River Slough (NESRS) and local precipitation.

Davis (1943) compiled a vegetation map of southern Florida which characterized the early 1940's landscape in and around the 8.5 SMA as an expanse of "marsh-prairies" dotted by hammock and bay tree islands. Muhly grass was

conspicuously absent and apparently did not establish its codominance with sawgrass until perhaps the 1950s (Atwater, 1954). More recently, Hilsenbeck and Hoffstetter (1980) studied the plant communities of the East Everglades area. The 8.5 SMA portion of their study area consisted of muhly grass and muhly/narrow beardgrass marl prairies dotted by numerous small- to moderate-size (1-10 acres) bay tree islands and tropical hardwood hammock tree islands. These tree islands represented various successional stages. Several tree islands were recovering from recent fires thought to have swept the area in the early 1970s. Immediately west of the 8.5 SMA a muhly grass prairie prevailed and the number of tree islands present increased many-fold.

Historically, native upland plant communities were probably sparse in the 8.5 SMA due to low elevations, high water tables, and periodic flooding. However, the eastern limits of the 8.5 SMA extend to within a half-mile of the Miami Rockland upland pine forest community (Davis, 1943). Although no evidence exists that this pine forest type occurred within the 8.5 SMA, the presence of species more typical of pine uplands such as pineland snowberry (*Chiococca pinetorum*), trema (*Trema* spp.), and probably some lichen species probably relates to the altered ecology of the region and recent dispersal rather than a seed bank from historical presence. These species will likely be eliminated with prolonged increase in hydroperiod.

Current Conditions. The plant communities of the 8.5 SMA were classified and mapped by the Wetland Rapid Assessment Procedure (WRAP) Assessment Team exclusively for the present study. The classification included one upland cover type, eight wetland types, one open water type, and a catch-all cover type for lands converted to agricultural or residential uses (Figure 13). Based on the WRAP mapping, 42% (2699 ac.) of the 8.5 SMA is classified as wetlands, 1% (65 ac.) as uplands, and 57% (3646 ac.) as residential and/or agricultural lands.

3.11 UPLANDS

Almost all of the upland plant communities have been converted to agricultural or residential land uses. Where vegetation exists, the WRAP Assessment Team classified the land cover as upland forest/shrub complex. Twelve areas of uplands collectively encompassing about 65 acres occur in the east-central and southeast portion of the 8.5 SMA. All were classified as upland forest/shrub complex, dominated by Australian pine (*Casuarina* spp.) and a sparse ground cover of sawgrass. Since upland plant communities are dominated by non-native or nuisance species, this resource was determined not to be an issue of concern and was eliminated from further consideration or analysis.

3.12 WETLANDS

Gunderson (1994) describes four herbaceous wetland communities in the Everglades: sawgrass marshes, wet prairies (peat), wet prairies (marl), and sloughs. Wet Prairies (marl) are found in several areas including areas east of the Shark River and Taylor Sloughs. In these areas elevations are slightly higher and correspondingly, hydroperiods are shorter. Wetland hydroperiods gradually increase westward to NESRS and decrease with higher elevations associated with the Atlantic Coastal Ridge to the east. In ENP the graminoid communities remain intact, although negatively impacted by regional water management facilities to the north (C–4, L–29, WCA 3) and east (L–31N). Within the 8.5 SMA, limestone and marl are located at or near the surface and can be expected to support, in a natural condition, short stature sawgrass communities and marl wet prairies (Table 4).

The vast majority of wetland features within the 8.5 SMA have undergone varying degrees of disturbance related to land clearing for agricultural or residential improvements and invasion by exotic species. Generally, wetlands with the least amount of disturbance are located in the western areas of the 8.5 SMA. The developed (eastern) portion of the 8.5 SMA, excepting the FAA radar facility, is virtually devoid of wetlands, whereas a zone extending down the central portion is dotted by wetlands intermixed within agricultural and residential land uses. Field reconnaissance by HDR biologists found many of the wetland communities to include varying densities of Brazilian pepper (*Schinus terebinthifolius*), Australian pine, and melaleuca (*Melaleuca quinquenervia*). Australian pine forest is very dense, supporting a sparsely vegetated understory and ground cover. A common ground cover species is sawgrass, growing within a thick layer of duff comprised entirely of pine needles. Australian pine can be found in monotypic stands, along marsh and prairie edges, and in abandoned fields. Brazilian pepper is common along roadsides as well as forming dense wooded plots throughout the 8.5 SMA. Its thick shrubby growth form can quickly out-compete native flora and provides minimal habitat for wildlife. Primrose willow (*Ludwigia* spp.) and saltbush (*Baccharis* spp.) are occasionally found along the edges of Brazilian pepper woodlands. Brazilian pepper is a quick invader of abandoned farm fields, due in part to seed dispersal by birds.

Hilsenbeck and associates (Hilsenbeck et al., 1979) discussed the degree to which the native marsh and prairie communities have recovered from rock plowing. Rock plowing involves the mechanical scarification of the upper six to twelve inches of marly surface soil and underlying oolitic limestone for the purposes of preparing a gravelly loam suitable for farming. Rock plowing aerates the soil, elevates the land surface, alters local soil hydrology, levels most topographic irregularities, and creates more available root space (Noble, et al., 1996; Gunderson and Loftus, 1993). Muhly grass appears to be more resilient compared to sawgrass in areas that have been rock plowed but not farmed. In these instances, a shift from sawgrass to muhly grass dominated wetlands can

occur. Abandoned fields which undergo repeated rock plowing followed by farming, are more likely to be colonized by cattail (*Typha* spp.), Brazilian pepper, napier grass (*Pennisetum purpureum*), primrose willow and other undesirable species. Reestablishment of muhly grass in these intensely farmed areas does not occur.

3.12.1 Wetland Community Types

In order to evaluate the function of wetlands the DOI mapped and characterized wetlands within the study area. Wetland cover types were systematically developed by overlaying four basic wetland habitat types (graminoid, herbaceous, shrubby, and forested) over three elevational divisions (<6.5 ft., 6.5 to 7.0 ft., and >7.0 ft.NGVD) within the 8.5 SMA (USFWS/NPS 2000) . For the evaluation of wetlands that would be potentially impacted by project operations, wetlands in the adjoining portion of ENP were included (marl prairie short hydroperiod wetlands, peat-forming long hydroperiod wetlands, forested wetland systems, and forested exotic wetlands). For purposes of analysis, there are separate categories of wetlands occurring in ENP and in the 8.5 SMA. Wetlands evaluated for this study were delineated according to the following definitions. The distribution of these wetlands is shown on Figure 13.

- **Forested Wetland — ENP**: Predominantly native woody and herbaceous species typical to the fringe vegetative community of hardwood hammocks and willow heads.

- **Long Hydroperiod Wetland — ENP**: Marl prairie dominated by sawgrass, typically peat-forming and characterized by inundation periods greater than 180 days (6 months) per average year.

- **Short Hydroperiod Wetland — ENP**: Marl prairie dominated predominantly by muhly grass and other graminoid species, characterized by inundation periods ranging from 30 to 180 days (1 to 6 months) per average year.

- **Graminoid Wetland:** Prairie vegetative community dominated by grasses, sedges and rushes typical to short hydroperiod wetlands such as muhly grass, sparse sawgrass, black sedge, arrowfeather (*Aristida purpurascens*), Florida bluestem (*Schizchyrium rhizomatum*), Elliot's lovegrass (*Eragrostis elliottii*), white-topped sedge (*Dichromena* spp.), umbrella sedge (*Fuirena* spp.), bighead rush (*Juncus megacephalus*), arrowhead (*Saggittaria* spp.) and a variety of beakrushes including *Rhynchospora polystachus*, *Rhycospora microcarpa*, and *Rhynchospora divergens*.

- **Herbaceous Wetland - Low to Moderate Soil Disturbance:** Short hydroperiod wetland community dominated by non-woody, non-invasive, relatively desirable species, which demonstrates a soil substrate

characterized by previous disturbance, such as farming, recreation, building construction, livestock, and other activities that were relatively short-lived and/or minor in size and scope.

- **Herbaceous Wetland — High Soil Disturbance:** Short hydroperiod wetland community dominated by non-woody but undesirable herbaceous species, which demonstrate a soil substrate characterized by previous disturbance, such as farming, recreation, building construction, livestock, and other activities that were intensive and continuous throughout a relatively long period of time, leaving distinctive surface scars and obvious landscape alteration.

- **Shrubby Wetland:** Wetland dominated by native woody shrub species, such as salt bush and wax myrtle (*Myrica cerifera*), frequently co-dominated by exotics, such as Brazilian pepper, bottlebrush (*Callistemon ridigus*), and other invasive ornamentals. Herbaceous species could include muhly grass, sawgrass, napier grass, cattail, beard grass (*Andropogon* spp.), sedges, and rushes.

- **Forested Exotic Wetland:** Forested wetland (>50 percent canopy cover) dominated by exotic species such as melaleuca, Australian pine, and Brazilian pepper.

- **Forested Native Wetland:** Forested wetland (>50 percent canopy cover) within the 8.5 SMA, dominated by native species, such as figs (*Ficus* spp.), red bay (*Persea borbonia*), sweet bay (*Magnolia virginiana*), swamp bay (*P. palustris*), red maple (*Acer rubrum*), coco plum (*Chrysobalanus icaco*), pond apple (*Annona glabra*), and Dahoon holly (*Ilex cassine*).

- **Upland Forest Shrub Complex:** Found throughout the 8.5 SMA associated with parcels of land previously cleared but which are currently abandoned. Characteristic species include primrose willow, Brazilian pepper, Australian pine, melaleuca, saltbush, willow (*Salix caroliniana*), pond apple, Burma reed (*Neyraudia reynaudiana*.), napier grass, cattail, sawgrass, and wide variety of sedges and grasses.

- **Agricultural/Residential:** Area cleared for farming or residential development mostly devoid of wetland vegetation with the possible exception of ruderal native or exotic species.

3.12.2 WRAP Analysis

To compare relative differences (both losses and gains) in wetland function between the “existing condition” the nine project alternatives, and two variations, the WRAP method was employed (Miller and Gunsalus, 1997) by USFWS.

WRAP is a matrix developed to assist in the functional evaluation of wetland sites. The WRAP matrix establishes a numerical ranking for individual ecological and anthropogenic factors (variables) that can strongly influence wetland function. The numerical output for the variables is then used to evaluate current wetland condition. Each wetland type is rated according to its attributes and characteristics. WRAP variables include the following: (1) wildlife utilization, (2) wetland overstory/shrub canopy of desirable species, (3) wetland vegetative ground cover of desirable species, (4) adjacent upland/wetland buffer, (5) field indicators of wetland hydrology, and (6) water quality input and treatment systems. The acreage of each wetland habitat type (polygon) is then multiplied by the acreage of that habitat type to derive “functional units (FU)” for comparison purposes (Table 5).

From December 1999 through February 2000, the WRAP Team conducted a series of on-site field investigations, consisting of 37 survey sites representative of 17 wetland habitat types (polygons) inside and adjacent to the 8.5 SMA to establish the “existing condition” wetland functional conditions. The WRAP Team was composed of representatives from USFWS, SFWMD, USACE, ENP, FDEP, the Miccosukee Tribe, and DERM. The Miccosukee Tribe and SFWMD representatives participated only in the "existing conditions" phase of the WRAP analysis.

3.13 FISH AND WILDLIFE RESOURCES

The following discussion of fish and wildlife resources was distilled from the FCAR (USFWS/NPS 2000) prepared specifically for this project and from biological reconnaissance by Miami-Dade County (DERM, 1999). A description of the type and distribution of habitats within the 8.5 SMA and ENP are presented in Sections 3.11 and 3.12. A comprehensive listing of fauna known or expected to occur in the 8.5 SMA and environs is compiled in Table 4.

Conditions within the 8.5 SMA likely provide important resources for opportunistic small animals including raccoons, rabbits, squirrels, songbirds, hawks, kestrels, crows, turkey vultures, frogs, and various reptiles. White-tailed deer were observed in the study area, specifically within ENP, but only limited resources for these large ungulates were apparent within the project area. On-site surveys found the greatest degree of species richness within the forested wetland systems within the ENP lands to the west of the 8.5 SMA, whereas species richness was lowest in wetlands on higher elevations (7.0-8.0 feet NGVD) in the eastern regions of the 8.5 SMA, in close proximity to L–31N.
This eastern region of the 8.5 SMA is dedicated to agricultural and residential land uses, providing only marginal benefits to resident wildlife. High water conditions within the study area have prompted land owners/managers to alter (i.e., ditching) natural landscape features to provide flood relief and optimize agricultural production. It appears that many years of continuous anthropogenic

activity in this area is correlated with invasion of exotic species and roadside (including vacant lots) accumulation of human refuse (*i.e.* household garbage, derelict appliances, and vehicles etc.). As a result, reductions in wetland function are more dramatic in the eastern portions of the 8.5 SMA as compared to the west and ENP, and opportunistic flora and fauna with strict resource requirements likely do not thrive.

The change in fish and wildlife diversity and wetland function between the western and eastern portions of the 8.5 SMA correlates with an elevational gradient (increasing elevations from west to east) and land use. Both elevation and land use are inter-dependent co-variables as lower elevations correlate with frequent flooding that limits the extent and type of land use. Higher elevations are more compatible with agricultural, commercial, and residential land uses.

The following provides a brief overview of wildlife observed within the 8.5 SMA as presented in the FCAR. Table 4 provides a list of expected wildlife within the study area.

Avifauna. Avian diversity in this region of south Florida is high. Waterfowl, wading birds, and other bird species that depend upon wetlands for critical resources dominate avian communities here. DERM identified 142 species of birds in the study area (DERM, 1999).

Mammals. According to DERM (1999), 21 species of mammals have been recorded in the 8.5 SMA. Of these, 11 were observed by DERM staff in 1997 and 1999.

Fish, Amphibians, and Other Aquatic Animals. Surveys conducted during December 1999 and January 2000 by the WRAP team recorded five species of small fish, two species of frog, and a variety of aquatic invertebrates.

3.14 LISTED SPECIES

A variety of species listed as threatened, endangered, or special concern occur or potentially occur in the project. Federally listed species that could occur in the project area or be affected by construction and operation of the proposed action include the snail kite, wood stork, Cape Sable seaside sparrow (CSSS), Florida panther, and eastern indigo snake. Species listed by the State of Florida as threatened, endangered, or species of special concern are found in Table 6. Due in part to their dependence on specific hydrologic conditions for nesting or foraging, impacts to the snail kite, wood stork, and CSSS were assessed through hydrologic modeling.

The CSSS is the most critically endangered. Unlike the wood stork, which ranges well outside of Florida and the snail kite, which has nest sites within and

outside of the C&SF project area (including the upper St. Johns marshes), the sparrow's current range is limited to south Florida. Due to this narrow range and specific habitat requirements, existing populations are vulnerable.

Snail Kite (*Rostrhamnus sociabilis plumbeus*). Snail kites, listed as endangered in 1967, require long hydroperiod wetlands that remain inundated throughout the year. This preference is associated with the apple snail, its primary food source, which requires nearly continuous flooding of wetlands for greater than one year (USFWS, 1999b). Suitable habitat for the kite includes freshwater marsh, and shallow vegetated lake margins where apple snails can be found. Critical habitat for the snail kite was designated in 1977 and includes WCA 1, 2, and 3A, and portions of ENP as well as Lake Okeechobee shorelines and portions of the St. Johns marsh.

Preferred nesting habitat includes small trees and shrubs such as willow, bald cypress, pond cypress, sweet bay, dahoon holly, southern bayberry, and elderberry. During dry periods when suitable shrubs and trees experience dry conditions, herbaceous vegetation is utilized for nesting (Sykes et al., 1995). During these dry conditions, herbaceous species such as sawgrass, cattail, bulrush, and common reed are used for nest sites. The snail kite's breeding season can vary from year to year depending on rainfall and water levels. Ninety-eight percent of nesting attempts occur between December through July while 89% are initiated between January and June.

Wood Stork (*Mycteria americana*). The Wood stork was listed as endangered in 1984 due to loss of foraging habitat and colony nesting failures (USFWS, 1999b). Preferring freshwater wetlands for nesting, roosting, and foraging, wood storks can be found throughout central and southern Florida. Nests are typically constructed in tree stands within swamps or stands surrounded by large areas of open water. Due to its tactile feeding methods, storks feed most effectively in shallow water settings where prey items are concentrated. During the winter and spring dry seasons when water levels naturally recede, prey items are often further concentrated providing foraging areas with abundant food supplies. Drainage in southern Florida may be responsible for delayed nesting by the stork, moving from an early nesting start in November, to February or March. Initiation of nesting this late is believed to contribute to nest failures and colony abandonment due to the dispersal of prey items associated with the onset of the wet season (May-June). There is no designated critical habitat for the wood stork (USFWS, 1999b).

Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis)*. The CSSS is an endemic bird species, listed as endangered in March of 1967 and restricted to the fringe uplands of southern Everglades and Big Cypress. Adults are so sedentary that they rarely move more then a few hundred meters unless forced to do so by fires or flooding (USFWS, 1999b). The preferred habitat of CSSS appears to be short hydroperiod, mixed marl prairies, usually

characterized by muhly grass (*Muhlenbergia capillaris*). These short hydroperiod prairies contain moderately dense, clumped grasses with open space permitting ground movement by the sparrows. Foraging preferences include a variety of soft-bodied insects, grass, and sedge seeds, depending on what is available.

Critical habitat for CSSS, designated August 1977, does not account for the distribution of the present day core sub-populations or areas necessary for the bird to maintain stable populations. Since the 1900s, CSSS has been episodically extirpated from portions of its total range. Bass and Kushlan (1982) recorded two core populations for CSSS and four peripheral populations totaling 6,656 birds (Figure 14). Peripheral population F, the population closest to the 8.5 SMA on the west edge of the Atlantic Coastal Ridge, was the smallest population estimated in 1982 at 112 birds and again in 1992 with similar results. However, field surveys recorded no sparrows in population F for 1993, and estimated 16 birds in the population from 1996-1998 (Curnett et al., 1998).

Nesting occurs from approximately mid-March until the onset of the rainy season (mid-June) (Nott et al., 1998). In dry years, nesting can begin as early as mid-February and continue through early August, with the majority of nesting occurring in the spring when the marl prairies are dry. CSSS raise two to three broods per season, needing at least 80 days to complete an average reproductive cycle of two clutches. The nest cups, constructed of grass, are placed approximately 14 centimeters above the ground level (Werner 1975, Lockwood et al. 1997). Nesting will not be initiated if water levels are greater than 10 cm during the breeding season (Pimm 1996, personal communication *in* USFWS 1999b). When water levels rise above the mean level of nests from ground (~14 cm), sparrows cease breeding (USFWS, 1999b). Areas that sustain the short hydroperiod prairies are considered essential for the sparrow to successfully breed and to ensure the survival of the species.

The 1992 GDM/EIS for the MWD project determined that impacts to fish and wildlife resources, including the sparrow, were within acceptable ranges. However, in a letter dated February 19, 1999, from Sam D. Hamilton of the USFWS, a final biological opinion for the MWD to the ENP project, Experimental Water Deliveries Program, and the C-111 Project, was rendered. The opinion of the USFWS was a jeopardy decision regarding impacts related to changes in hydrology. Reasonable and prudent alternatives to the Experimental Program were proposed which would avoid jeopardizing the CSSS including water level management, fire management, and monitoring (USFWS, 1999a).

Eastern Indigo Snake (*Drymarchon corais couperi).* It is likely that eastern indigo snakes occur within the 8.5 SMA. Eastern Indigo snakes could find necessary resources in and around the higher elevations in the eastern portion of the area. Susceptible to desiccation, the indigo is often found utilizing gopher tortoise burrows as a refuge. There are no reported occurrences of the indigo snake within the 8.5 SMA.

Florida Panther (*Felis concolor coryi*). It is likely that Florida panthers occasionally utilize the 8.5 SMA. A deceased panther was found in the ENP just south of 168th St. in January 2000 (USFWS, 2000). Records for a 15-month old male panther and a 4 year old female panther indicate that they have been sited near, but not within the 8.5 SMA (see Biological Assessment, Attachment A).

3.15 AIR QUALITY AND NOISE

Primary sources of air pollution originate from transportation, stationary source fuel combustion, industrial processes, and solid waste disposal. Since there are only two paved roads in the 8.5 SMA and no industry, air quality poses little if any environmental threats. The project is located in an air quality attainment area. Due to the absence of issues associated with air quality, this resource was eliminated from further evaluation.

Noise levels are associated with surrounding land use. There are no significant noise generating land users within the project area.

3.16 AESTHETIC RESOURCES

The western portion of the study area overlooks the adjoining ENP parkland. The Everglades have long been renowned for its expansive and picturesque marshes, wet prairies, and tree islands. The 8.5 SMA is visually flat; therefore there are few wide-ranging panoramic vistas to be appreciated, except from the vantage point of man-made structures such as highway overpasses, multi-story buildings, towers, and levees. From street or house-level inside the area the views are limited by trees, fence rows and man-made barriers.

3.17 RECREATIONAL RESOURCES

Several opportunities for passive recreation, such as hiking, birding, wildlife viewing, and nature photography are currently available in the publicly owned lands in western portions of the 8.5 SMA and adjoining portions of the ENP, including the Chekika Hammock facility. In addition, hunting is temporarily allowed within the ENP Expansion Area.

3.18 EXISTING LAND USE

The existing land use for the 8.5 SMA is based on an adaptation of an unpublished land use survey completed by DERM in December 1999 and modified based on land acquisitions by SFWMD through February 2000. DERM

field surveyed the existing land uses on a parcel-by-parcel basis, assigning each parcel to a basic land use category. This unpublished information was used to further refine and, in some instances, re-classify the existing land uses more in consonance with the Florida Land Use/Cover Classification System. The existing land use classifies those lands purchased by the SFWMD Management District for the mitigation project and the East Coast Buffer Project as "public." It should be noted that land acquisitions by the South Florida Water Management District are continuing for both of these projects.

In general, the residential and agricultural uses are located on the east half of the project area and vacant land and wetlands are on the west half (Figure 15). A Florida Power & Light (FPL) powerline corridor runs north and south through the study area but remains undeveloped, although the southern portion of this corridor is leased for agriculture production. The area between canal L-31N and SW 194th Avenue from SW 120th Street to 136th Street is a Federal Aviation Administration (FAA) radar facility. Table 7 provides a summary of current land use by number of parcels and amount of acreage for the 8.5 SMA. In the Social Impact Analysis (Appendix E), several land use classifications were grouped together to simplify the land use impact analysis for the various alternatives. Table 8 represents the existing land use information that was utilized for analysis.

About 46.9 percent of land or 3,005 acres within the 8.5 SMA are classified as vacant lands. About 43.9 percent of the vacant land is in public ownership with the remaining 56.1 percent in private ownership. About 41.2 percent (2,642 acres) of the land use is agricultural including row crops, tree crops, specialty farms, mixed agricultural land, and nurseries. In addition, approximately 260 parcels of the agricultural lands are classified as residential with agricultural land (15.0%, 959 ac.). A small percentage (33%) of the area is residential, covering approximately 342 acres. According to the Miami-Dade County Property Appraiser data and DERM data, the residential land uses and the residential with agricultural lands include a total of 321 houses and 193 mobile homes. For houses alone, this results in a residential density of 3.65 acres per house. If trailers are considered, the residential density is reduced to 2.28 acres per residential unit. These densities are considerably below the 1:40 acre density required for the area. Commercial properties are minimal in the 8.5 SMA and include only 4 properties consisting of 16 acres. However, it should be noted that the DERM identified four residential units that appear to be involved with some commercial activity.

3.19 FUTURE LAND USE

As required by Florida law, the future use of land is regulated by the adopted comprehensive plan for the governing local jurisdiction. The Comprehensive Development Master Plan (CDMP) for Miami-Dade County (adopted in May 1997 and amended in April 1999) establishes controls for future development in the

8.5 SMA. The Land Use Element and the Land Use Plan Map for 2005 of the CDMP designate the 8.5 SMA as "Open Land." The Open Land classification is intended for uses other than urban development, such as resource-based activities, recreation, and conservation. The 8.5 SMA is specifically identified in the CDMP as Open Land (Subarea 4, East Everglades Residential Area on Figure 4 of the CDMP's Land Use Element). This subarea is limited to seasonal agriculture and conditional rural residences. Such residences will be permitted subject to the special regulations prescribed in the East Everglades Zoning Overlay District, further described below. Generally, these residences will be considered at a density of one unit per 40 acres. Consideration of one unit per 20 acres is possible if the dwelling is ancillary to agricultural uses. This ordinance is based on the premise of restricting development within the 10-year floodplain. The 10-year flood elevation within the area has been determined to be 7.7 feet elevation. Consideration of one unit per five acres is possible only after such time as drainage facilities become available to protect the area from a one-in-10-year flood event or for those areas that are currently above the 7.7-foot elevation. Currently, there are approximately 574 acres that are provided flood-protection. Therefore, on these properties, property owners can request a variance to develop their property at a density of 1 unit per 5 acres. Although compatible utilities are allowable, no uses that would affect water quality are permitted.

Considering the East Everglades Zoning Overlay and the limited amount of land receiving flood protection, the future land use of the 8.5 SMA should be very similar to the existing land use. However, within this area, there are numerous examples of parcels where zoning restrictions have not been enforced. If enforcement of zoning ordinance continues at its current level, then the future land use of the 8.5 SMA may see a slightly greater increase in the amount of potential development in the area.

3.20 ZONING

The County adopted the East Everglades Overlay Zoning Ordinance in 1981 to address the unique problems and implement the special studies of the East Everglades area, of which the 8.5 SMA is a part. The ordinance's provisions are incorporated in Chapter 33B, Article II of the Miami-Dade County Code of Ordinances. The code outlines environmental performance standards for all uses, such as limitations on fill and excavation, landscaping requirements, solid waste, and agriculture management.

The East Everglades is divided into six management areas, each with specific uses and conditions. The 8.5 SMA is outlined as Management Area 1, and is characterized as agriculture with existing residential uses. Management Area 1 is limited to agriculture and one unit per 40 acres as outlined in the Land Use Element. One unit per 20 acres is only allowed if ancillary to an agricultural use

less than 40 acres, is occupied by owner or employee, and is not contiguous to property under the same ownership (as deeded on January 14, 1981). Units at a density of one per five acres are allowed only in portions of the Management Area with flood protection and an established residential character as of January 14, 1981.

The East Everglades Overlay Zoning Ordinance also includes incentives to limit future development within the area by offering transferable development rights. These are called Severable Use Rights and may be applied to urban properties elsewhere in the unincorporated County. For the 8.5 SMA or Management Area 1, the code offers one severable "right" per five acres which is usable as a bonus to other development sites.

3.21 INFRASTRUCTURE

The "Open Land" designation is intended to encourage uses other than urban development, such as resource-based activities, recreation, and conservation. The CDMP discourages the provision of urban services to "Open Land" areas except for improvements necessary to protect public health, safety, and welfare. Therefore, urban services and infrastructure provided to the 8.5 SMA through Miami-Dade County are limited.

EMS and Fire Rescue. Miami-Dade County currently provides fire and emergency services for the 8.5 SMA. Fire rescue services are provided to this area by the following stations: Redlands Station (located at 13150 SW 238th Street), Hammocks Station (located at 10001 Hammocks Boulevard), and Richmonds Station (located at 13390 SW 152nd Street).

The emergency medical services (EMS) division of the Miami-Dade County Fire Rescue Department also is responsible for planning and coordinating all emergency medical rescue activities in the County, including the 8.5 SMA.

Police Services. Miami-Dade County currently provides police services for the 8.5 SMA. Police services are provided to this area by the following stations: Hammocks Police Station (located at 10000 SW 142nd Avenue) and Cutler Ridge Station (located at 10800 SW 211th Street).

Electricity. Electricity is provided to the 8.5 SMA by FPL. The County is currently in the process of accessing specific information regarding the number of residential and commercial hook-ups in the study area.

Telecommunications. BellSouth currently provides telephone services to the 8.5 SMA.

Water and Sewer Services. Miami-Dade County currently does not provide water and sewer services to the 8.5 SMA.

Solid Waste Services. Miami-Dade County currently does not provide garbage and trash removal service for the 8.5 SMA.

Roads and Transportation. Miami-Dade County currently maintains approximately 6.5 miles of roadway in the 8.5 SMA. These roadways include SW 136th Street and SW 168th Street. The County does not provide mass transit services in the study area.

3.22 EXISTING SOCIAL PROFILE

Accurate demographic data specific to the 8.5 SMA are non-existent. Therefore, 1990 Census Block data disaggregated or collected by county census block, block group or zip code cannot be extracted to accurately reflect the demographics of the area. Complicating this effort is the presence of uncounted migrant farm labor. Therefore, both published and unpublished data sources have been drawn upon to develop a reasonable "snapshot" of the demographics of the 8.5 SMA. The Social Impact Assessment (SIA), Appendix E, provides a more detailed description of this information.

Population. The 1990 Census Block data that includes the 8.5 SMA shows a 1990 population of 828 persons living in 202 households or about 4.1 persons per household. Of this number, 246 American Indians were identified who live outside of the 8.5 SMA. From this, it is estimated that about 582 persons in about 142 households lived in the 8.5 SMA in 1990. The current population of the 8.5 SMA has been estimated by several independent surveys. The "PEER Report" estimated the population of the area at 640 persons living in 375 residences. An independent count by an area resident indicates a minimum of 432 residences with an estimated population of 1728 persons. This latter estimate is reported to include migrant farm workers. However, this estimate is most likely high because of the large amount of second homes and weekend homes characteristic of this area.

As shown in the SIA, the estimated current population used for this analysis was determined to be 208 residential owner-occupied households. The household size was determined to be 4.1 persons per household. This estimate of household size was taken from the 1990 Census and appears to be accurate. Family size for the white population is generally over 2.7 and minority and Hispanic family sizes are typically larger than that of the white population. Therefore because this area is largely Hispanic, a household size of 4.1 appears to be accurate for this area. Therefore, the current population of the 8.5 SMA was determined to be 853 (208 households x 4.1 persons per household).

According to the SIA (Appendix E), the population in the 8.5 SMA is expected to increase by about 84 percent or 717 persons by the year 2015. Between the year 2015 and 2050, the future population is expected to remain constant at 1,570 persons due to the limited area available for future development. County projections indicate that the Minor Statistical Area (MSA 7.6) will reach its development capacity by the year 2015. This is simply based on the availability and desirability of land adjacent to the ENP and the County's desire to restrict growth in the environmentally sensitive areas bordering ENP. Enforcing the 1:40 density and limiting development to flood protected areas would constrain future population growth in the 8.5 SMA further.

Demographic Data. The SIA (Appendix E) estimated the following demographic data for the 8.5 SMA:

Age

- 34.0 percent of the population are under 17 years of age, including 24.8 percent school age children between 5 years old and 17 years old.
- 63.6 percent of the population are between the ages of 18 years old and 64 years old.
- An estimated 2.4 percent of the population are above the age of 65 years old.

Sex

- 51.1 percent of the population are male
- 48.9 percent of the population are female

Ancestry

- The 1990 Census Data indicates that almost 64.0 percent of the population in the 8.5 SMA are white, non-hispanic while 36.0 percent of the population are Hispanic. The 1990 Census Data identified no black persons within the 8.5 SMA.
- An independent survey, completed by a resident, indicates that the Hispanic population represents 75 percent of the 8.5 SMA population. The Hispanic population consists primarily of people of Cuban and Mexican ancestry. There are few residents that trace their ancestry to Central America.

Education. 1990 Census data for census tract 250115, which includes the 8.5 SMA, indicates that 37.2 percent of the population has less than a high school education, while 27.4 percent are high school graduates. About 13.4 percent have an Associate's Degree or higher. However because data in this census

tract includes the area of Homestead, Florida, it is probable that it is not representative of the 8.5 SMA, which is basically rural in nature. The 8.5 SMA contains no schools and students are bussed to other areas of the county. The presence of migrant farm workers would tend to increase the percentage of residents with less than a high school education and reduce the percentage of those with an Associate's Degree or higher.

The distribution of future population characteristics, as identified above, is assumed to remain the same as the existing population characteristics. Specific data sets for the 8.5 SMA are not available that would allow for the accurate projection of changes in these population characteristics.

3.23 EXISTING ECONOMIC PROFILE

As with the demographic data in the previous section, data specific to income and employment in the 8.5 SMA is non-existent. Data from a variety of sources was reviewed and the best estimates of these investigations are presented in the SIA (Appendix E) and summarized here.

Income. Income per capita within the 8.5 SMA was based on the 1990 Census Data for Census Tract 250115. For this census tract, per capita income data are estimated to range from $14,371 to $20,782. However because this census tract includes Homestead, Florida, the lower estimate is probably more reflective of the Per-Capita Income in the 8.5 SMA. Similarly, the census data for total income for this census tract ranged from $12.3 million to $17.7 million based on the estimated resident population and Per-Capita Income data. However, again because of the inclusion of Homestead, Florida in the census tract, the lower estimate is more reflective of the wages and salaries or earnings to residents in the 8.5 SMA. The two largest sectors of the area economy include farming and wholesale/retail trade, with farming by far the largest.

Poverty data was also obtained from Census Tract 250115. This census tract, in 1990, had an 8 percent poverty level. However, the County as a whole had a 14.2 percent poverty level. Given the reported information that migrant farm workers reside in the 8.5 SMA, it may be safe to assume that the percentage of families with incomes below the poverty level is higher than the 8 percent identified for the census tract.

Employment. There are no major employers in the 8.5 SMA. The largest employers include a vegetable processing plant and a few small retail stores. The small retail stores employ no more than 20 people and the processing plant approximately 50 people; however, it is uncertain that these employees reside in the 8.5 SMA. There are also an unknown number of residents who participate in full-time farming activities. Based on 1990 Census Data for this census tract, about 51 percent or about 435 permanent residents are employed. Other than

the above identified employment opportunities within the 8.5 SMA, it is assumed that the remainder of the employed population work outside of this area.

The present estimate of employed permanent residents of the 8.5 SMA of 435 persons is expected to increase to about 800 by the year 2015 and remain constant thereafter. This increase is based on the assumption that the present relationship between resident population and employed population will remain constant over the projection period.

Based on 1996 unemployment data for the State of Florida and Miami-Dade County, and the 1990 Census Data for the 8.5 SMA, unemployment for the 8.5 SMA is estimated to be between 7.0 and 7.5 percent.

3.24 EXISTING WELL BEING

The Socioeconomic Impact Analysis (Appendix E), prepared for this project, assessed the existing well being in the 8.5 SMA based on "Community Cohesion" and "Sense of Place."
Community cohesion measures those elements that draw a community together. A majority of the residents in the area share a strong Hispanic heritage. However, the area does not have any schools or churches that would tend to draw these families together. A large number of property owners do not reside in the 8.5 SMA. Many of these absentee property owners spend only weekends in the area. In addition, it has been reported that there are riding or "Social Clubs" that meet in the 8.5 SMA on weekends. The balance of residents versus non-residents who are involved with these clubs is uncertain.

A common sentiment is mistrust in governments at all levels. Previous purchases or government efforts to purchase properties within the area have left some residents afraid that they will not be offered a fair price for their properties, and galvanized other landowners into a cohesive group resisting the government buyout efforts. There exists within the area a strong vocal group of residents who are actively resisting any government efforts to interfere with their lives. Whether this resistance is representative of all residents has not been determined. If it were, the sense of community cohesion among property owners in the area would be strong. At the very least, community cohesion may be characterized as moderate.

The "sense of place" factor measures those elements that provide residents a sense of well being, such as home ownership, working the land, rural atmosphere, and sense of security. It also includes an active concern and active participation in the decisions that may affect these elements. Within the 8.5 SMA, there are strong feelings associated with property ownership. Many property owners look upon property ownership as "owning a piece of America." The sense of property ownership is particularly strong among those families that

have immigrated from more restrictive political environments. There are, however, conflicting data. A number of informal surveys were made of homeowners and land owners within the 8.5 SMA to determine their willingness to sell their properties for the implementation of the alternatives, particularly the buy-out alternative. Informal surveys were conducted by the SFWMD, a local resident, and via letters presented at various public meetings and workshops. These unscientific surveys have produced widely diverse results and are considered unreliable because of the uncontrolled nature of the survey instruments that would have eliminated or minimized any bias. It is not sufficient to ask an individual about his willingness to sell property without determining the threshold that would trigger their willingness to sell. This is to say that individuals may not be willing to sell their property at, for example, $1000 per acre, but would be more than willing to sell their property at $5,000 per acre. A properly developed survey instrument would have helped identify these types of bias-free data. Time constraints in the collection of data limited the amount of information that could be gathered. Further, only a relatively small percentage of property owners have attended public meetings held to discuss the various alternatives that could affect their properties. Several residents in the 8.5 SMA claim they were not notified of these public meetings in a timely manner. This may explain the low level of participation. Overall, the sense of ownership and place within the 8.5 SMA appears to be strong.

3.25 PRIME AND UNIQUE FARMLANDS

The protection of farmland falls under the purview of the Natural Resources Conservation Service (NRCS). Prime farmland is any land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, without intolerable soil erosion. (7 U.S.C. 4201(c)(1)(A)). There is no prime farmland within the 8.5 SMA.

Unique farmland is any land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as, citrus, tree nuts, olives, cranberries, fruits, and vegetables (7 U.S.C. 4201(c)(1)(B)). According to the NRCS district conservationist, most of the 8.5 SMA qualifies as unique farmland, in particular those areas under cultivation or in improved pasture, including horse farms (Christine Kaufman, NRCS, pers. comm., August 1999). There are about 2,642 acres of agricultural land within the 8.5 SMA. A variety of row and field crops are grown both within and immediately adjacent to the 8.5 SMA, including okra, sweet potatoes, malanga (tanier/tania), malanga isleña (taro), beans, squash, sugar cane, and corn. Tree groves of lime, mango, and mameys are also present, as are several nurseries that raise a variety of ornamental plants. Also present are some areas of improved pasture and fallow (or abandoned) cropland. Coordination with NRCS regarding conversion of

unique farmland has been initiated (see Appendix B for NRCS correspondence and Form AD-1006).

3.26 STATEWIDE AND LOCALLY IMPORTANT FARMLANDS

According to the NRCS, there is no Statewide or Locally Important Farmland within the 8.5 SMA (see Appendix B).

3.27 HAZARDOUS MATERIALS

A computerized search was undertaken of available regulatory information to be used for evaluating the potential hazardous materials impacts to the 8.5 SMA. Agency databases were searched through VISTA Information Solutions, Inc. (VISTA). VISTA completed a search of the entire 8.5 SMA project area. The completeness or accuracy of this information cannot be guaranteed by HDR.

USEPA Lists. The following lists, which are maintained by USEPA, were searched and reviewed:

(1) **National Priorities List (NPL), Florida, July 1999.** The NPL is a listing by state/county providing information on uncontrolled or abandoned hazardous waste sites identified for priority remedial actions. There were no sites within the 8.5 SMA identified in the NPL.

(2) **Resource Conservation and Recovery Act (RCRA) Corrective Actions and associated TSD (CORRACTS).** This is a list of RCRA facilities undergoing a corrective action after a release of hazardous waste or constituents into the environment. No CORRACT facilities were identified within the 8.5 SMA.

(3) **Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS).** This is a computerized listing provided by the EPA on its World Wide Web site (http:\\www.epa.gov\superfund.htm) identifying facility type (i.e. large, small or limited quantity generator; treatment, storage or disposal facility; transporter; burner/blender; and recycler), site inspections, preliminary assessments and remedial status. The CERCLIS List contains sites which are either proposed on the NPL or sites which are in the screening and assessment phase for possible inclusion. No CERCLIS sites were identified within the 8.5 SMA.

(4) **Emergency Response Notification System of Spills (ERNS).** The ERNS database is a national database used to collect information on reported releases of oil and hazardous substances. No releases were reported within the 8.5 SMA.

(5) **Treatment, Storage and Disposal Facilities (RCRA-TSD).** The EPA's Resource Conservation and Recovery Act (RCRA) program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation of TSD facilities. No TSD facilities were identified within the 8.5 SMA.

(6) **RCRA Large Generators of Hazardous Wastes (GNRTR).** The RCRA program identifies facilities that generate at least 1000 kg/month of non-acutely hazardous waste (or 1 kg/month of acutely hazardous waste). No RCRA large quantity generators were identified within the 8.5 SMA.

(7) **RCRA Small Generators of Hazardous Wastes (GNRTR).** The RCRA program identifies facilities that generate less than 1000 kg/month of non-acutely hazardous waste. No RCRA small quantity generators were identified within the 8.5 SMA.

State Lists. The Solid Waste, Groundwater, and UST/AST Site Lists of the FDEP were scrutinized for any potential contamination sites in the 8.5 SMA project area. The following computerized listings were reviewed:

(1) **Solid Waste Facilities List- GMS-80 (SWLF).** This is a list of active and inactive solid waste facilities, incinerators, and transfer stations. No solid waste facilities were identified within the 8.5 SMA.

(2) **Petroleum Contamination Tracking System/ Miami-Dade County Fuel Spills (LUST).** The LUST list is a computer printout that identifies petroleum sites by county with the FDEP tracking number, facility name and identification number. The list provides information concerning cleanup responsibility, Early Detection Incentive Program (EDI) application date, date of field inspection by FDEP or county-contracted compliance inspector, EDI eligibility determination and date. It also indicates the assessment and remediation tasks that have been undertaken for the facility. No leaking underground tanks were identified within the 8.5 SMA.

(3) **Stationary Tank Inventory System/ Miami-Dade County Underground Tank Report (UST's).** The UST list is a computer printout that identifies registered underground petroleum storage tanks. Two registered UST sites were identified within the 8.5 SMA, including Heinl's Nursery, Inc., and EL Backhoe Station. Three 8000-gallon fuel oil tanks were registered at Heinl's Nursery. Apparently, the tanks were removed from the site but a removal date was not reported. The EL Backhoe Station contains one active 1000-gallon fuel oil tank.

(4) **Stationary Tank Inventory System-Aboveground (AST's).** The AST list is a computer printout that identifies aboveground storage tanks registered

with the FDEP. The VISTA search indicated four AST sites within the 8.5 mile SMA project area, including Oruga Corp., the South Florida Water Management District, Thorpe Aviation, and Valdes Farms. One 550-gallon unleaded gasoline and one 550-gallon diesel tank were reported at Oruga Corp. Two 10,000-gallon aboveground diesel tanks were reported at the South Florida Water Management District. Thorpe Aviation reports one 1000-gallon aviation fuel tank that has been removed, and Valdes Farms reports a 1000-gallon diesel AST and a 1000 gallon unleaded gasoline AST.

A reconnaissance of the 8.5 SMA was undertaken by DERM in 1999 to identify land use activities within the 8.5 SMA on a parcel by parcel basis (unpublished data). The DERM site reconnaissance indicates numerous parcels where unregulated activity is taking place. The activities of concern included several properties with abandoned automobiles, abandoned boats, unidentified waste piles, pump stations, outhouses, garage and storage sheds, and numerous animal pens. These land use activities could potentially impact soil, groundwater, or surface water quality in the 8.5 SMA.

Based on the review of available Federal and State lists, it does not appear that the 8.5 SMA has been directly impacted by hazardous or petroleum wastes or products. The presence of underground fuel tanks within the 8.5 SMA constitutes a potential source for petroleum contamination of the Biscayne aquifer due to its close proximity to ground surface, and the shallow water table. Unregulated activities outlined above are generally confined to small, localized areas, and are not considered a significant issue of concern.

3.28 CULTURAL RESOURCES

The 8.5 SMA is located along the eastern periphery of the historic Everglades. There are no known prehistoric or historic period archaeological resources located within the 8.5 SMA. However, according to the Florida Division of Historical Resources (FDHR), there are two known sites positioned on tree islands in the ENP expansion area immediately to the north and west. Site DA85 is a black dirt midden site occupied during the Glades II Period (A.D. 750-1200). Site DA1085 is also a black midden site but was occupied during portions of the Glades I (500 B.C.-A.D. 750), Glades II, and Glades III (A.D. 1200-1500) periods. Both sites are located on the north ends of tree islands.

Prehistoric settlement in the NESRS area occurred on tree islands (usually at the more-elevated northern ends) and consist of black dirt middens. Site size is limited by the areal extent of an island's higher northern tips. Archaeological deposits may be buried as much as six feet below surface. Human burials are occasionally found within the middens or within isolated solution holes in the oolitic limestone (Carr and Beriault, 1984). There are (or recently were) approximately 36 tree islands within the 8.5 SMA, according to a detailed East

Everglades vegetation map (Hofstetter et al., 1979: Maps 1 and 2). Most of the tree islands are quite small (less than 100 feet in length); however, six of the tree islands are large, ranging between 600 and 1200 feet in length. Most of the tree islands were classified as mixed bayhead-tropical hardwood tree islands, which are generally less elevated than tropical hardwood tree islands. There are a few small-sized tropical hardwood type tree islands are present within the 8.5 SMA.

A cultural resource assessment survey of the 8.5 SMA project was performed during Spring 2000. Extant tree islands were subjected to surface inspection and subsurface shovel testing. No cultural resources were encountered.

SECTION 4.0
ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

4.1 SUMMARY

Section 4.1 presents the results and conclusions of the environmental consequences evaluation. Sections 4.4 through 4.14 discuss the environmental consequences of each alternative. The following lists the nine alternatives and two variations of Alternative 6B (6C and 6D) that were evaluated:

- Alternative 1: Authorized GDM Plan
- Alternative 2B: Modified GDM Plan
- Alternative 3: Deep Seepage Barrier Plan
- Alternative 4: Landowner's Choice Land Acquisition Plan
- Alternative 5: Total Buy-out Plan
- Alternative 6B: Western Portion of 8.5 SMA as Buffer Plan
- Alternative 6C: Modified Western Portion of 8.5 SMA as Buffer Plan (SOR Boundary)
- Alternative 6D: Modified Western Portion of 8.5 SMA as Buffer Plan
- Alternative 7: Raise all Roads Plan
- Alternative 8A: Western Portion of 8.5 SMA as Flow-way Plan
- Alternative 9: Adaptive Refinement of GDM Plan

4.1.1 Results

Table 9 provides a Summary Impact Matrix of Environmental Consequences. Each of these environmental and socio-economic features are discussed below.

Construction Impacts. Construction of any structural alternative will involve clearing, grubbing, vegetation removal, blasting, excavation, and grading. These activities will temporarily disturb or displace wildlife, create noise, generate additional car and truck traffic, potentially raise some fugitive dust, and generally be annoying to residents closest to levee and canal alignments. All of these transitory impacts would occur during the period of construction and would end when construction is complete. All applicable Federal, State, and local laws and regulations will be complied with and strictly enforced regarding protection of resources, avoidance of air, water and land pollution. These minor and short-term disruptions in the quality the human environment would be offset, or mitigated, by the long-term additional flood mitigation provided the residents and the greatly improved ecosystem functioning when construction is complete and project operations commence.

Water Quality. Alternatives 1 and 9 include the collection of seepage in a canal adjacent to the perimeter levee. Flow from this canal is anticipated to be discharged into the L-31N canal for conveyance northward and eventually into the ENP near S-332. It is anticipated that the phosphorus levels in the seepage water from the 8.5 SMA will be comprised primarily of seepage water from the ENP (Walker, 1997). Therefore, the seepage water quality will likely have phosphorus levels very close to the expected 6-ppb in the ENP. Thus, the discharge of seepage water into the L-31N will likely reduce the phosphorus concentrations in the canal. For Alternative 9 water will eventually be conveyed south into a treatment area prior to its conveyance. The construction of this treatment area is a part of another Everglades Restoration project and thus is not added to the cost of the projects in this report. It is postulated that the discharge of 8.5 SMA seepage water will reduce the levels of phosphorus in L-31N and thus may have a positive impact on the water quality conveyed to the treatment area and then into the park.

Alternatives 2B, 6B, 6C, 6D, 8A, and 9 all consider the conveyance of water from the 8.5 SMA to the south into the C-111 buffer area. All of these alternatives, except 8A, envision the construction of a seepage canal to collect water within the 8.5 SMA and manage water levels. Alternatives 2B, 6B, 6C and 9 have seepage canals that are immediately adjacent to the perimeter levee. This location means that the primary head differential across the levee to the canal is much greater than the gradient from east to west. Thus, as stated earlier, the normal west to east groundwater flow will continue and a preponderance of the water which enters the seepage canal will be from the ENP. Alternative 6D has a seepage canal which is some distance inside the perimeter levee and thus can be expected to be influenced by the canal L-31N.

As noted, these alternatives discharge to the south and into the C-111 buffer area. The range in phosphorus levels for this discharge will be between 7 ppb and 12 ppb. Since the 12-ppb exceeds the 10-ppb discharge standard, it is assumed that treatment must occur. Best Management Practices or BMP's can be of significant value in the reduction of pollutant loadings. One of the primary ways that BMP's can be implemented in the South Florida area is to allow for the capture and treatment both by infiltration and biological uptake. The BMP envisioned for this effort includes the construction of a treatment area within the C-111 buffer area. This treatment area will provide water quality treatment by both biological uptake and infiltration. Additionally, dilution due to sheet flow in the C-111 buffer area should aid in the enhancement of water quality.

Alternatives 2B, 3, 4, 5, 6B, 7, and 8A are expected to have minimal impacts on water quality. With Alternative 2B, water would be discharged south to a proposed treatment area within the C-111 system prior to discharge into the ENP. Under Alternative 3, the proposed seepage barrier would slightly impede groundwater movement toward the east during both wet and dry years, although some buildup of water on the west side of the barrier is expected. Under

Alternatives 4, 5, and 7, groundwater elevations are expected to rise but have little impact on water quality, largely due to the eventual removal of septic fields and agriculturally related contaminants following acquisition. With Alternative 6B, because surface runoff will be passed south to a proposed treatment area within the C-111 system prior to discharge to ENP, and the extent of developed lands reduced in size, water quality impacts are expected to be low. Water quality impacts under Alternative 8A are also anticipated to be minimal because of reduced contaminant loads resulting from treatment within the flow-way.

Alternative 9 is anticipated to have moderate impacts during the initial phase (when waters are being passed north along the L-31N Canal) and low impacts during the subsequent phase (when waters are being directed to the new treatment area).

Wetland Area Changes and WRAP. Compared to Base 95 conditions, total wetland area will be increased for all alternatives. The increase will vary from about 3,500 to 8,000 acres (Table 9). However, short hydroperiod wetland area decreased for all alternatives, ranging from – 5,063 acres (Alternative 6C) to – 3,954 acres (Alternatives 4, 5, and 7). Conversely, long hydroperiod wetland area increased for all alternatives, ranging from 12,274 acres for Alternative 9 to 10,839 acres for Alternative 3. These changes appear to result from increased hydroperiods within the modeled area and shifts from short hydroperiod wetlands to long hydroperiod wetlands. For those alternatives with structural requirements, short hydroperiod wetlands are lost due to drawdown effects associated with seepage canals.

The WRAP prepared by the DOI identified five alternatives that resulted in a net reduction in functional units compared to Base 95 conditions. These alternatives, (1, 2B, 3, 6C, and 9) ranged from a loss of 2,765 FU (Alternatives 1, 2B, and 9) to a loss of 1,775 FU (Alternative 3). Alternatives 4, 5, 6B, and 6D resulted in net gains in functional units and ranged from 2,448 FU (Alternatives 4 and 5) to 1,290 FU (Alternative 7). The Recommended Plan resulted in a net gain of 1,322 FU. The Recommended Plan would provide 4,807 wetland FU more than Alternative 1.

Listed Species. A Biological Assessment (BA), under the provisions of Section 7 of the Endangered Species Act (50 CFR 402), has been prepared by the USACE for five listed species that are known to, or might occur in the project area, including the wood stork, snail kite, eastern indigo snake, Florida panther, and Cape Sable seaside sparrow (Attachment A). Based on the information presented in the BA, the USACE has concluded that the Recommended Plan would not be likely to adversely affect any of the listed species. Coordination with the USFWS has been initiated and concurrence with this determination requested.

Farmlands. Unique farmland is any land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits, and vegetables (7 U.S.C. 4201(c)(1)(B)). According to the NRCS (State Soil Scientist), Alternatives 4, 5, 6B, 6C, 6D and 8A would result in the direct conversion of between 45 and 2,106 acres of unique farmland; Alternatives Alternatives 1, 2B, 3, 7, and 9 would not result in the conversion of any farmlands. None of the alternatives would result in the indirect conversion of farmlands. Specific conversion acreages for each alternative are provided in Table 9. The NRCS farmland conversion impact rating form is reproduced in Appendix B.

Cultural Resources. A cultural resource assessment survey of the project's project area associated with all evaluated alternatives found no cultural resources. Therefore, the proposed action will have no effect on cultural resources listed on, or eligible for listing on, the National Register of Historic Places. A letter from the State Historic Preservation Office (Florida Division of Historical Resources) dated June 22, 2000, concurs with this "finding of no historic properties." See Appendix B.

Cost. Structural alternatives (1, 2B, and 9) are the least costly alternatives ranging between approximately $40 million (Alternative 9) and $30 million (Alternative 1). Alternative 3 requires a seepage barrier and is estimated to cost in excess of $235 million. All other alternatives require either total or partial land acquisition, or purchase of flowage easements, and range in cost between $179 million (Alternative 5) and $63 million dollars (Alternative 6C). The Recommended Plan is estimated to cost $88 million.

Relocations. Estimated residential relocations are greatest for Alternatives 5 and 6B (208 and 129, respectively). Alternatives 1, 2, and 9 (structural alternatives) each require zero (0) residential and zero (0) commercial relocations (note: one residential parcel was acquired by USACE under the Authorized Plan). Alternatives 4 and 5 require approximately four commercial relocations. Actual numbers will vary somewhat and are dependent on landowner's choice particularly alternative 4, as to selling out or selling flowage easements. The Recommended Plan requires approximately 35 residential relocations.

Environmental Justice. The purpose of Executive Order 12898 relating to Environmental Justice is to prevent discrimination against low income or minority populations in the siting of public works projects. This is to say that where project-siting options exist between communities/neighborhoods of different income or ethnic make-up, efforts must be made to site a project without regard to income or ethnic make-up of the community or neighborhood. This Executive Order directs Federal agencies and departments to make achieving environmental justice a part of their mission to the greatest extent practicable.

In the case of the 8.5 SMA, the community consists of a minority population that is about 75% Hispanic. In addition, as indicated in section 3.23 a substantial number of low-income households may also reside in the 8.5 SMA. Within the 8.5 SMA, the community appears homogenous with no known portions of the area that have extreme differences in income or ethnic make-up that could create the possibility of conflicting siting options. Therefore, each of the alternatives that have been evaluated as part of this study affect the same homogenous community within the 8.5 SMA. No matter which alternative is selected there are no alternate siting options that could affect a substantially different income group or ethnic community. However, each of the alternatives potentially affect the 8.5 SMA community to a different degree. Therefore, the impacts discussed in this section relate more to the degree of the effect of each alternative on the 8.5 SMA community.

As discussed above, each of the alternatives evaluated had some potential impact to the 8.5 SMA community. The SIA provides a table (Table 14) summarizing the magnitude of differences between the impacts of each alternative.

- Alternatives 1, 2, and 9 have the lowest potential to impact the 8.5 SMA community because of the minimal relocation of one household involved and the minimal land required to complete the project.

- Alternatives 3, 6C, 6D, and 7 minimize impacts on the 8.5 SMA community because of either the requirement for flowage easements on many parcels or a small number of relocations (6C – required the relocation of 17 households and 6D – required the relocation of 35 households).

- Alternatives 4, 6B, and 8A have a higher impact to the 8.5 SMA community because of the large number of both relocations and flowage easements. (Alternative 6B required the relocation of 129 households and Alternative 8A required the relocation of 104 households).

- Alternative 5 had the highest potential to impact the 8.5 SMA community, because it requires the acquisition of all of the land within the area, which would essentially eliminate the geographical nexus for the community altogether.

For the anticipated 35 owner occupied residentail households, the 52 non-owner occupied residents and the one business requiring relocation as a result of alternative 6D, the relocation process will be completed pursuant to the Unifrom Relocaton assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, as amended). This legislation provides for the uniform and equitable treatment of all persons displaced from their homes, farms and businesses as a result of land acquisitions for federal projects.

To help mitigate these relocations, the USACE will work with these residents to minimize the disruption to their households and the overall community. For Alternative 6D, sufficient undeveloped land within the 8.5 SMA is available located above the 10-year flood elevation for the households being relocated as a result of this alternative. Therefore, dislocated households may be able to relocate to comparable housing within the 8.5 SMA, in order to mitigate any adverse impacts and to preserve a sense of place and community for those households affected.

To ensure that the 8.5 SMA community has been informed about the project, additional efforts have been made throughout the process to provide the members of the community with information, as well as provide an opportunity for the public to comment on the various alternatives. Efforts include providing public meeting notices in both English and Spanish; providing interpreters at formal public meetings to translate English to Spanish; providing court reporters to record public comment in both languages; and providing English and Spanish advertising on the radio and television. In addition, the Executive Summary portion of the Draft Supplement Environmental Impact Statement (DSEIA) was printed in both English and Spanish.

4.1.2 Conclusions

A thorough assessment of the environmental consequences associated with each alternative was completed. The following presents a summary of the alternatives and their relative effects in terms of cost, impacts to wetlands, and impacts on the residents of the 8.5 SMA.

Alternative 3 (Deep Seepage Barrier Plan), Alternative 4 (Land Owners Choice Plan), Alternative 6B (Western Portion of the 8.5 SMA as Buffer Plan, and Alternative 7 (Raise all Roads Plan) were eliminated in part due to high cost (all at or above $134 million). Additionally, Alternative 3 performed low in terms of wetland benefit as indicated by the loss of WRAP functional units. Alternative 3 did not provide sufficient seepage control, and therefore did not provide adequate mitigation for increased flooding. This alternaitve created an abrupt change in water levels, on opposite sides of the permiteter levee, a consequence that DOI considered less than optimal for wading birds. Alternative 6B requires the relocation of approximately 143 residences.

Alternative 1 (Authorized GDM Plan), Alternative 2B (Modified GDM Plan), Alternative 6C (Modified Western Portion of 8.5 SMA as Buffer Plan (SOR Boundary)), and Alternative 9 (Adaptive Refinement of GDM Plan) resulted in the lowest costs ranging from approximately $30 million to $61 million. However, each performed poorly and result in a decrease in wetland function. Alternatives 1, 2B, and 9 result in a loss of 2,765 FU while 6C is reduced by 1,805 FU.

Alternative 5 (Total Buyout Plan) resulted in the maximum wetland benefit based on increased wetland acres (7,943) and lift in WRAP functional units (2,448 FU). However, this was one of the more costly alternatives at $179 million, and required 100% buyout of the 8.5 SMA. The buyout would necessitate the off-site relocation of 208 residences and approximately four businesses. Given the unique ethic and economic blend of the 8.5 SMA community, a total buyout presented adverse socio-economic impacts.

Alternative 6D with conditions (The Recommended Plan) resulted in an increase in WRAP functional units (1,322 FU), due in large part to the minimization of drawdown effects within ENP and preservation of wetlands in the western portions of the 8.5 SMA. Construction costs are moderate in comparison to the other alternatives at approximately $96 million. Approximately 35 owner occupied residential households, the 52 non-owner occupied residents and the one business will require relocation, however, it is anticipated that most residences can relocate within the 8.5 SMA, if desired by the owner. Given the moderate costs, improvements to wetland functions, and minimization of relocations, Alternative 6D appropriately balances impacts to the residents of the 8.5 SMA, the environment, and cost.

Public and agency comments received during the Comment/Response period revealed two clear and opposing preferences as to which alternative should be selected: (1) those in favor of Alternative 1 (Authorized GDM Plan), and (2) those in favor of Alternative 5 (Total Buyout Plan). Among those preferring Alternative 1 are the 8.5 SMA residents, South Dade agricultural interests, and the Miccosukee Tribe. Among those preferring Alternative 5 (Total Buyout Plan) are ENP, USFWS, and environmental organizations. Alternative 6D, the Recommended Plan, strikes a meaningful balance between these differing viewpoints. This balance is evident in the WRAP scores, increased overall extent of wetlands, comprehensiveness of flood mitigation, residential displacement, and other factors. For all these environmental and socio-economic variables, Alternative 6D results in benefits that fall more-or-less midway between those of Alternatives 1 and 5. Alternative 6D is, therefore, an effective balance between the total buyout and the authorized plan.

4.2 SPECIFIC SOURCES OF INFORMATION

There are three major sources of information used in the analyses presented in this section: (1) hydrological and hydrogeological simulations from the MODBRANCH Model as generated by the USACE-Jacksonville District's Geotechnical Branch; (2) the FCAR report jointly prepared by USFWS and NPS (USFWS/NPS 2000); and (3) a socio-economic assessment performed by HDR. The modeling output provided the basis for the analysis. The FCAR and the socio-economic report were based on the modeling results. Details on the three primary information sources are provided below.

MODBRANCH Simulations. Potential environmental consequences of the alternative plans were primarily based on the simulations generated by the MODBRANCH model. MODBRANCH was first developed to evaluate flow and seepage within the canal systems of south Florida. Details on model assumptions, boundary conditions, climatic conditions, and project conditions are presented in Section 4.4 below.

Socio-Economic Assessment Report. This report examined potential effects of the alternative plans on land use patterns, residential and business relocations, and environmental justice. In addition to the modeling output, this report utilized data from the U.S. Census Bureau, unpublished information from a late-1999 land use survey conducted by Miami-Dade County's DERM, and information provided by 8.5 SMA residents.

Coordination Act Report. The DOI has prepared a Final Fish and Wildlife Coordination Act Report (Appendix G). The basis of the DOI analysis in this document is different from the USACE's analysis. The reason is that the USACE's recognizes Alternative 1 with Base 95 operations as the basis of evaluation, and the DOI base is a "fully restored condition" or Alternative 5 with Base 83 condition. The absolute outputs of the model runs are the same. The performance evaluation of alternatives was different, because each alternative is compared against a different base in the two analyses. The DOI's views and recommendations contained in the FCAR report are reproduced below (USFWS/NPS 2000: 99-109):

> *Results from the analysis of the performance measures for each of the 8.5 SMA project objectives are detailed in Chapters 5 through 7. A brief narrative of the relative performance of each of the alternatives is provided below. Figures for the structural alternatives in this chapter show differences in water depth between each alternative and the predicted restored water levels. The data used in the figures were produced by subtracting the water depth at each model cell for an alternative from the restored water depth.*
>
> ***Alternative 1***
>
> *Alternative 1 performed poorly for all of the legislative requirement hydrologic performance measures. This alternative lowers water levels in both the 8.5 SMA and in NESRS (Figure 33) [reproduced in Appendix G] that negate some of the benefits that could be derived from the MWD Project. It also does not provide full structural flood mitigation. In terms of the other objectives, the plan does not provide flood protection and is least compatible with future restoration. The plan performed poorly for wood storks and snail kites and had a WRAP score that reflected a loss of 2,765 functional units from existing conditions.*
>
> ***Alternative 2 [Alternative 2B]***

Alternative 2 [Alternative 2B] performed poorly in the legislative requirements performance measures related to restoration of NESRS, decreasing water depths in more than 35,000 acres in NESRS. The plan provided full structural mitigation. In essence, the plan mitigates for increased water levels by reducing water levels in both the 8.5 SMA and NESRS (Figure 34) [reproduced in Appendix G]. In terms of the other hydrologic performance measures, Alternative 2[B] does not provide flood protection, but does increase the spatial distribution of short-hydroperiod wetlands by draining long period hydroperiod wetlands in ENP. It does not provide flood protection to the 8.5 SMA. It is more compatible with future restoration than Alternative 1 because it would move water to the south, but is still less compatible than other alternatives. Because residents of the 8.5 SMA would be allowed to remain, this alternative would provide the perception of flood protection. However, neither adequate flood mitigation nor protection would be provided. The alternative performed poorly for wood storks and snail kites. The WRAP score reflected a loss of 2,765 functional units from existing conditions. Thus, as with Alternative 1 Alternative 2[B] would result in a loss of functional wetlands if implemented.

Alternative 3

Alternative 3 performed poorly in the legislative requirement hydrologic performance measures pertaining to flood mitigation. It does not provide full structural flood mitigation to more than 4,000 acres within the 8.5 SMA. Alternative 3 performed well in the re-establishment of hydropatterns in NESRS, increasing water depth over 12,000 acres in NESRS (Figure 35) [reproduced in Appendix G] and performing best for snail kite habitat. For the hydrologic performance measures associated with the other project objectives, the plan ranked high in terms of providing short hydroperiod wetlands, but investigation into the wood stork performance measures demonstrated that the abrupt change from shallow to deep water at the seepage wall boundary would create unnatural drydown patterns and abrupt reductions in stork feeding habitat during the breeding season. It would not provide flood protection to the 8.5 SMA. The permanent nature of the seepage barrier, its placement in the historical flow path, and the likelihood of increased flooding due to relocation of S–356 caused the plan to perform poorly in regards to future restoration. Alternative 3 had a slightly better WRAP score than either Alternative 1 or 2[B], but its implementation would still result in a net loss of 1,175 functional units from existing conditions.

Alternative 4

Alternative 4 performed well in all of the legislative requirement hydrologic performance measures. Full flood mitigation would be achieved through buyout, flowage easements, and life estates. No reductions in hydroperiods or water levels would occur in NESRS. In terms of performance for the other objectives, the plan would be less superior in providing for short hydroperiod wetlands. Damages due to flooding would

not occur due to acquisition of the area. This alternative is considered more compatible with future restoration than the structural alternatives, but would be less compatible than full buyout because the residents might experience an increase in flooding due to relocation of S–356. Performance was high for wood stork habitat and moderate for snail kite. Wrap scores for Alternative 4 were the highest of all alternatives evaluated by the procedure. Implementation of this alternative would result in a net gain of 2,248 functional units from existing conditions.

Alternative 5

Alternative 5 performed well in all of the legislative requirement hydrologic performance measures. Full flood mitigation would be achieved through buyout. No water depth or hydroperiod reductions would occur in NESRS. In terms of the performance of the other project objectives, the plan would be less superior in providing for short hydroperiod wetlands. Damages due to flooding would not occur due to acquisition of the area. It is considered more compatible with future restoration than structural options because there would be full flexibility in relocating S–356. Most importantly, restoration of the peripheral wetlands (Figure 9) [reproduced in Appendix G] that were once found in the 8.5 SMA would allow for the full ecological function to be restored and prevent loss of critical landscape remnants. Performance was high for the snail kite and wood stork. As with Alternative 4, this alternative also had a WRAP score that reflected a net gain of 2,248 functional units from existing conditions.

Alternative 6B

Alternative 6B reduces the spatial extent of lower water levels in NESRS by moving the canal and levee alignment to the east, but it still would reduce water depth over 8,000 acres in NESRS, reducing habitat for the endangered snail kite (Figure 36) [reproduced in Appendix G]. Limiting the protected area to the higher elevations in the 8.5 SMA would allow attainment of full flood protection. In providing 1-in-10 year flood protection to the residents, development is expected to increase and the any future projects related to restoration would have to maintain that level of flood protection. This may require increases in pumping to accommodate the relocation of S–356. This increased pumping would cause additional reductions in water depths in NESRS and additional losses of snail kite habitat. Once this 1-in-10 year flood protection is provided, there would be no potential for restoring water levels to the historic peripheral wetlands in the 8.5 SMA (Figure 9) [reproduced in Appendix G]. Performance was moderate for snail kites. The WRAP score for Alternative 6B suggests implementation of this alternative would result in a net gain of 1,606 functional units.

Alternative 6C

Alternative 6C performed poorly in mandatory hydrological performance measures related to restoration of NESRS, decreasing water depths in more than 27,000 acres in NESRS (Figure S.8.5.). The plan provided full

flood mitigation but fails to provide flood protection for 3,452 acres, 66% of the designated flood protection zone. Alternative 6C drastically decreases the extent of marl-forming wetlands due to the placement of the canal and levee in the middle of the existing marl-forming wetlands. This causes the loss of 75% of the existing marl-forming wetlands in the study area (556 acres). Alternative 6C is more compatible with future restoration than Alternative 1 because it moves water south into the C-111 project, but it is still less compatible than other alternatives. This alternative would provide the perception of flood protection, however, adequate flood protection would not be provided and therefore is not viewed as a sustainable solution. The alternative performed poorly for wood storks and snail kites. The WRAP score reflected a loss of 1,215 functional units from existing conditions.

Alternative 6D

The Federally Recommended Plan is based on Alternative 6D, as modified by several assurances related to design and operation. These assurances and modifications are described in detail in Chapter 10 of the FCAR (Appendix G).

The Federally Recommended Plan increases hydroperiod in NESRS by moving the canal and levee alignment to the east (relative to Alternative 1) and primarily limits hydroperiod reduction to lands within the flood-mitigated area east of the perimeter levee. The Recommended Plan provides the greatest degree of environmental benefits for the lowest cost among all project alternatives (based on cost per FU at a cost of $15,900 per FU when compared to Alternative 1). This represents approximately 80 percent additional wetland function potentially attained through total acquisition under Alternative 5 (5,213 FU) at less than half the cost, requiring no compensatory mitigation for unavoidable losses to wetland or fish and wildlife resources. See Section 6.4 of the GRR for a comparison of costs to FU.

The Recommended Plan provides suitable habitat for wood storks and an additional 2,731 acres of snail kite habitat compared to Alternative 1 (a five percent increase). The Recommended Plan results in an increase of short hydroperiod wetlands by 365 acres when compared with total acquisition (709 acres) at less than half the cost. The Recommended Plan would result in longer hydroperiods over an estimated 1,115 acres in NESRS. When compared to total acquisition, the Recommended Plan provides the same benefit over the same area at less than half the cost. In conjunction with the C-111 Project, the plan would also provide partial re-establishment of historical hydrologic regimes.

The Recommended Plan does not fully provide structural flood mitigation for 540 acres (primarily in the northern portion of the 8.5 SMA and east of the perimeter levee). It is our understanding that supplemental non-structural options shall be implemented, including re-alignment of the perimeter levee in final design, fee-simple acquisition, and/or the purchase of flowage easements.

Alternative 7

Alternative 7 performs well in that no reductions would occur in water depths or hydroperiods in NESRS. Structural flood mitigation would not occur under this alternative because residents would most likely incur more flooding as a result of raising the roads, particularly if the roads are not constructed with adequately sized culverts. The area would not receive flood protection and would be vulnerable to increases in water levels due to relocating S–356. DOI does not consider this alternative reasonable in that raising the roads, in kind, without providing for secondary drainage is at best a temporary remedy and at worst, would cause increased flooding due to the higher retention depths of the roads. Performance was moderate for the snail kite and wood stork. The WRAP score indicates a net gain of 1,290 functional units from existing conditions would occur with implementation of this alternative. All of the improvements to wetland function for this alternative, however, would be confined to ENP. The WRAP score for Alternative 6B suggests implementation of this alternative would result in a net gain of 1,209 functional units.

Alternative 8 [Alternative 8A]

Alternative 8 [Alternative 8A] would not significantly impact restoration in NESRS, but it also would not provide structural flood mitigation to most of the 8.5 SMA (Figure 37) [reproduced in Appendix G]. It would not provide flood protection, but would provide for increases in short hydroperiod wetlands. It would be more compatible with restoration due to the minimum of structural components and the orientation of enhanced flow paths and levees along natural flow-paths. Performance was moderate for both the snail kite and wood stork. The WRAP score indicates a net gain of 2,240 functional units from existing conditions would occur with implementation of this alternative. The creation of the flow-way within the western portion of the 8.5 SMA would allow for the creation of functional post-project wetlands.

Alternative 9

Alternative 9 would perform similarly to Alternative 2 [Alternative 2B].

4.3 METHODS FOR DETERMINING EFFECTS

The primary component of change in the evaluation of alternatives is the Hydrologic and Hydrogeologic Model. Thus, the determination of environmental impacts that result from the implementation of the model is the primary tool in the analysis process. It is important to understand the model that is used, the assumptions made, and the model results. The USACE completed the simulation model for the 8.5 SMA. The model input and output datasets have been reviewed by the various cooperating agencies. A brief discussion or introduction to the

model utilized in the simulation is provided below and the conditions that are being evaluated are discussed.

In addition to the hydrologic/hydrogeologic modeling, a suite of geographic information systems (GIS) softwares (ArcView 3.2, ERDAS Imagine 8.4, and pcARC/INFO 3.52) played a key role in the analysis of impacts. GIS was used to manipulate a wide array of GIS datasets, digital aerial photography, and associated databases, and was instrumental in identifying and quantifying spatial impacts of the various alternatives on a wide range of environmental and socio-economic resources in the 8.5 SMA.

4.3.1 Introduction to the Hydrologic/Hydrogeologic Model

The model that has been selected for use in the evaluation of the alternatives for the 8.5 SMA is the MODBRANCH Model. This model is a coupling of two models developed by the USGS, MODFLOW and BRANCH. The model allows both surface and ground water interactions to be simulated by the coupled BRANCH and USGS modular, three-dimensional, finite-difference ground-water flow (MODFLOW) models, referred to as MODBRANCH. MODFLOW simulates steady and non-steady flow in an irregularly-shaped flow system in which aquifer layers can be confined, unconfined, or combined. BRANCH simulates steady or unsteady flow in a single open-channel reach (branch) or throughout a system of branches (network) connected in a dendritic or looped pattern by solving the one-dimensional equations of continuity and momentum for the river flow. Channel-aquifer flows are leakage through a confining layer or riverbed. Computation of the leakage in the ground water and surface water systems allows these processes to be coupled for simulation purposes.

The ground water flow equation is solved using the finite-difference approximation. The BRANCH model uses a weighted four-point, implicit, finite-difference approximation of the unsteady-flow equations. A leakage term has been added to the equations in the BRANCH model and was coupled through the leakage quantity to the MODFLOW-96 model.

In order to use MODFLOW, initial conditions, hydraulic properties, and stresses must be specified for every model cell in the finite-difference grid. BRANCH input data consist of channel geometry and initial flow conditions defined at all cross-section locations and boundary conditions defined at channel extremities. Primary output from the ground water computational portion of the model is head or water surface elevation. Other output includes the complete listing of input data, drawdown, and water budget data. Time series of computed surface-water flow results can be obtained from the model. Model output, including discrete flow results at every time step or iteration; daily summaries of minimum, maximum, and average flow conditions; monthly flow-volume summaries; hydrograph plots of computed water levels and discharges; or comparative plots of computed results

versus measured data were used in the evaluation of the alternatives for the 8.5 SMA.

4.3.2 Model Setup

The MODBRANCH model was used by the USACE in the evaluation of the alternatives. This model was originally developed to evaluate flow and seepage within the canal systems of the southern Florida area including the 8.5 SMA. In general, the model covers an area roughly bounded on the west by the middle of the state, the north by the Tamiami Trail (US 41) and the east by the Atlantic Ocean and south by Florida Bay. Thus, the simulation model covers the eastern half of the Everglades and much of the C&SF project area.

The model consists of approximately 28,700 nodes. Each of the nodes within the model represents a specific hydrologic unit or area within the flow grid. Figure 3 of Appendix A (Hydraulic and Hydrogeologic Model Report) depicts the model flow grid network. Each of the nodes is coded with hydraulic properties such as conductivity, leakance, and flow potential. The model, once developed, was calibrated to insure that it accurately depicts surface water and ground water flow conditions.

4.3.3 Modeling Parameters/Assumptions

Hydraulic and hydrogeologic simulation models are based on mathematical equations that are used to represent or simulate “real world” conditions. To accomplish this simulation it is necessary that the conditions that drive the model simulation be developed and understood. The conditions which drive this model include Boundary Conditions, Operational Conditions, Climatic Conditions and finally Project or Alternative Conditions. Each of these conditions is described below.

Boundary Conditions. The boundary conditions for the simulation model represent those conditions found at the limit of the model confines. For the purposes of the simulations, model boundary conditions are necessary along the western, northern, and southeastern boundaries of the model. The model boundary conditions on the western and southeastern borders, because of their distance from the 8.5 SMA and their relatively static nature, are of less concern to the model than the northern boundary. The northern boundary, located approximately along the geographic location of Tamiami Trail, on the other hand, is a critical boundary condition. Its criticality is due to its location in respect to the 8.5 SMA and its significance as a location for flow to enter NESRS. For the purposes of the simulation, therefore, the boundary conditions for the north boundary is critical in the simulation of alternative effects.

Three boundary conditions were incorporated in the evaluation of the alternatives. These conditions include: (1) Base 83, (2) Base 95, and (3) MWD or what is known as D13R. Each of these boundary conditions is discussed below.

Base 83. Base 83 conditions represent the hydrologic conditions that were in effect at the time of the authorization of the 1992 GDM plan. Reflection of this Base 83 boundary condition is critical to the model and the evaluation of alternatives. Since this boundary condition is that which was in effect at the time of the authorization of the project, it represents the pre-MWD conditions (before any portion of, or modification to, the MWD project was implemented).
Base 95. This represents the conditions along Tamiami Trail as they exist today. That is, these model boundary conditions reflect the conditions that are generally in effect based on the Experimental Water Deliveries Program's operating conditions authorized in 1995. The simulations using these conditions can be used to evaluate current (1999-2000) conditions and allow engineers and scientists to determine the hydrobiological impacts of the experimental conditions in terms of water flow, water elevation and ecological factors.

MWD Full Implementation (D13R). The implementation of, and modifications to, the MWD project that have been ongoing since the completion of the GDM in 1992 are critical to the evaluation of the impact of alternatives. The simulation model represents the projected conditions along Tamiami Trail in the future with the MWD project in place. That is, the projected flows, water elevations, and other factors that represent how the boundary of the model will see the hydrology of the area are included in the model.

Operating Conditions. The C&SF system and all of the other structures and facilities that control flow to the eastern portion of the Everglades and southern portion of Miami-Dade County have rules which govern their operation. Based on many factors including climate conditions, antecedent moisture conditions, water elevations, quantities of flow, and consumptive use needs, the operation of various pumps, gates, and other water control structures are modified. The model has developed several sets of operating procedures intended to accurately simulate the impact of operational changes in the region. Thus, the operating procedures represent how the entire flow control system is operated for a specific scenario. Two operating conditions are recognized in the modeling: 1983 operating conditions and 1995 operating conditions. A third operating condition that includes a facsimile of the C-111 project has also been developed.

Flexibility. Operations of facilities, as discussed above, are governed by various performance rules. These rules specify the conditions that warrant certain operational procedures. Pumps are started and stopped, gates are opened and closed, and facilities are manipulated to move water from place to place and to keep water surface elevations at an appropriate level. The rules are to be considered guidelines. The implementation of these operational rules typically requires physical involvement of SFWMD staff. Thus, depending on staff

availability, implementation of the criteria spelled out in the rules are not as rigid as might occur if all facilities were operated by electronic decision making equipment. This is not to say that the operational rules are not followed. Rather, the specific implementation of the operation rule is given some flexibility.

An example of this flexibility may be the operations of a typical pump station. The rules for this hypothetical pump station may call for pumping to begin when the water surface in one area reaches a specified elevation. Pump startup requires an individual to physically be in the pump house to open the gates and begin pump operation. If the manning staff is not present at the exact moment that the water reaches the pump initiation level the water may be somewhat higher than specified in the rules. Conversely, when water levels have been brought down to a level where the rules call for the cessation of pumping, the pump station staff may not be immediately available. The results may be a lowering of water surfaces on the in-take side to lower levels than the rule specifies. This pump station was operated in accordance with the rules, just with some level of flexibility.

The operational procedures used in the model are specified exactly in the model code. Thus, in our example above, if the model is supposed to simulate that same pump station coming on when the water gets to a certain specified level, it happens. Similarly, at the exact model time step that the intake elevation reaches the pump stop elevation, the pump stops. The simulation model, thus, allows for no flexibility in operating plans.

1983 Operating Procedures. This operational procedure represents the authorized canal levels and operations prior to the implementation of the MWD or the Experimental Water Deliveries Program. Thus, this operational scenario can be expected to simulate the conditions in place prior to MWD authorization or implementation.

1995 Operating Procedures. The 1995 operational procedure reflects system facility operation in a similar manner as it was operated in 1995. This operational procedure is similar to that which is being used today.

C-111 Rules. The C-111 project calls for the placement of water control features south of the 8.5 SMA. These features are to serve a two-fold purpose. They are to be designed and constructed to facilitate continued agricultural practices in the South Dade Agriculture Areas. They are also being designed to aid in the management of the hydrology within the ENP. Model simulations for the future conditions must be made assuming that the C-111 project is constructed and operational. In general, the location of facilities has been determined for the planned C-111 improvements. However, as of this writing, the operational rules have not been developed or approved for this project. Therefore, a set of general assumed operating conditions were developed for the C-111 portion of the simulation model grid.

Climatic Conditions (Precipitation). The rainfall that occurs is one of the primary driving forces of the regional hydrology. For the purposes of model simulation, actual observed rainfall data are used as the basis for the evaluation. Two years of rainfall data have been developed for the simulation representing both a typical wet and dry year.

1989 – Dry Year. The 1989 rainfall is considered to be a dry year for the purposes of this evaluation. Thus, the effects to the system of lower-than-average rainfall can be assessed and the impacts of each alternative quantified.

1995 – Wet Year. In contrast to the 1989 precipitation, 1995 is considered to be a wet year. Thus, the simulations in the model utilizing the 1995 rainfall can be expected to produce results similar to that expected for a wet year rainfall. In addition, the 1995 rainfall dataset has been modified to include a hypothetical one-in-10-year rainfall event. This event, introduced in Week 16, allows for surcharging of the surficial aquifer levels to account for a major early season storm and then allows the remainder of the 1995 wet year rainfall to depict relatively severe conditions. It is necessary to include this hypothetical storm for design purposes. That is, the inclusion of the hypothetical 1-in-10-year rainfall into an otherwise typical wet year produces an extreme condition. Designing facilities for this extreme condition will assure that the relatively modest events that are typically expected can be accommodated.

Project Conditions. Project conditions are those conditions that are used in the model simulation to equate to the hydrologic conditions based on the period of implementation for the simulations. The project conditions are dictated based on what each simulation is designed to evaluate. For this study, five project conditions were developed that span the spectrum of project conditions to be evaluated. Additional simulations using other project conditions have been completed by the USACE modeling team to meet the needs of the various cooperating agencies and end-users.

Base 83. The Base 83 condition assumes stage and flow conditions and operations as they existed prior to the MWD project. The Base 83 condition provides the basis for determining whether the impacts of additional flooding in the 8.5 SMA due to implementing the MWD project, as required in the Everglades National Park Protection and Expansion Act of 1989, have been sufficiently mitigated. The water surface elevations resulting from the Base 83 condition were compared to all alternatives to insure that this requirement is achieved.

Base 95. In the period of time that has elapsed since the formulation of 1992 GDM, significant changes to the water conveyance system for the Everglades and south Miami-Dade County have occurred (i.e., the ENP-SDCS). To account for the additional conveyance systems that have come online, the Base 83

condition had to be modified. The condition that includes the modifications to the system that is in effect today is termed Base 95. This Base 95 condition assumes water stage, flow conditions, and operations as they currently exist. This existing condition simulation forms the basis to which impacts of each alternative are measured.

Base 83 Future Without Project. The Base 83 future without project condition is considered to be the scenario wherein the MWD project will be implemented with C-111 in place and the Authorized Plan (Alternative 1) will be constructed. Typically, the development of an EIS and GRR calls for the analysis of the future conditions without project. This normally equates to a future condition with a "do-nothing" alternative. In the case of this work effort, the "do-nothing" alternative is the construction of the Authorized Project.

The simulation model, therefore, must depict the scenario whereby the Authorized Project had been constructed to determine its impacts. An evaluation of this scenario was presented in the 1992 GDM. However, the simulation tool currently being used for this evaluation is significantly improved over the "Two by Two" model used previously. Thus, for this scenario, the Base 83 - Future Without Project condition assumes that the system is operating according to the 1983 operations with both the MWD project and C-111 in place and the Authorized Plan constructed.

Base 95 Future Without Project. Once the Base 83 future without project condition is simulated, there is the need to bring those same improvements to existing conditions. As stated above, the Base 95 conditions equate to the conditions that are currently in effect within the modeling region. To simulate the "without project" conditions the Base 95 conditions have to be modified to include the MWD and C-111 projects, along with the Authorized Plan. The Base 95 future without project is the basis against which all of the alternatives will be compared.

Future With Project. The "future with project" conditions assumes that the MWD project will be implemented and the system is operating according to the 1995 operations with C-111 in place. Each of the other ten alternatives (Alternatives 2B through 9) are simulated for comparison back to Base 95 future without project conditions.

Hydrological Effects of Structural and Operational Alternatives. Hydrologic and hydraulic models are designed to simulate real world conditions. Model output has been provided by the USACE that displays the results of the simulation based on a grid-cell by grid-cell representation. To aid in the evaluation of impacts to the 8.5 SMA and the ENP, information on water levels, flows, inundation, and mitigation have been developed and provided. Additionally, ecological information including an estimation of marl-forming short-

hydroperiod and peat-forming long-hydroperiod wetlands, endangered species habitat areas, flow to and storage within the ENP have been developed.

As with any mathematical simulation model, the validity of the input data used in the model and the assumptions used to drive the simulation are the critical components for accurate system depictions. The USACE recently completed a draft calibration report for the model used in this study. Based on discussion with the report author, the base model shows good correlation with the historic hydrologic conditions.

4.3.4 Water Quality

An important question related to all of the alternatives associated with the 8.5 SMA is the potential impact on water quality. The findings above, like many other studies in the past including those of Li and Associates (1997), PEER (1998), and DERM (1991), indicate that while there have been identified pollutant levels in both surface and groundwater samples their origin and magnitude are not well known. The purpose of this section of the report is to evaluate the potential for impact of pollutants from the introduction of the various alternatives that are being considered.

It is important when evaluating the potential water quality impacts from the implementation of various alternatives that the source of the flow from these alternatives is understood. Alternatives 1, 2B, 6B, 6C, 6D, 8A, and 9 all provide for a seepage collector canal within their design. The purpose of this canal is to provide the means whereby water levels within the surface aquifer can be drawn down to pre-project levels. The pre-project level has been established as the level that water would reach within the 8.5 SMA based on the 1983 levels. That is, flood mitigation requires water levels with the project to be less than or equal to water levels without the project.

In the case of Alternatives 1, 2B, 6B, 6C, 6D, 8A, and 9, maintenance of 1983 water levels within the 8.5 SMA while having increased water levels in the park is accomplished through the use of a seepage canal. Water from this canal is to be pumped back into L-31N for Alternative 1 and to the south and the C-111 buffer area for Alternatives 2B, 6B, 6C, 6D, 8A, and 9. Alternative 9 is proposed to deliver collected seepage water to both the L-31N and C-111 buffer area depending on the need. An evaluation of the potential water quality within the discharge from the seepage canal is important.

Background

The draft Analysis of Water Quality & Hydrologic Data from the C-111 Basin (Walker, 1997) prepared for the Department of Interior provides an understanding of the water quality that can be expected within the C-111 Basin. The report evaluates potential inflows and outflows from the C-111 Basin and

describes the phosphorus loading that can be expected. The report indicates that the majority of water that reaches C-111 comes from discharges through S-335 to the north and seepage from the ENP. Figure 8 of the report shows the total flows for calendar year 1991. The figure and the accompanying text indicate that a preponderance of the flow for that year, approximately 73 percent of the flow to C-111, originates as seepage from the ENP.

The report further goes on to state that an average concentration of phosphorus of ~6 ppb can be expected from the seepage water from the ENP. One of the key conclusions of the evaluation is:

> *Phosphorus loads and concentrations in the L31N and L31W canals are controlled largely by deliveries from the North (S334/S335) and seepage from the ENP. Impacts of local watershed contributions are difficult to detect in the presence of large volumes of recycled seepage from ENP. Based on the apparent lack of response in canal phosphorus concentrations to rainfall events in recent years, it is likely that most of the local watershed contributions are in the form of seepage (from ENP) instead of direct runoff…..*

The report further concludes that:

> *Relatively low phosphorus concentrations measured at L31N and L31W structures in recent wet years reflect high ENP stages and high volumes of seepage from ENP…….Over the long term, concentrations [of phosphorus] may decline as a result of phosphorus load controls being implemented at inflows to the Water Conservation Areas.*

In summary, this report indicates that:

(1) The majority of the flow that currently enters the L-31N system for discharge into the C-111 basin is comprised of seepage flow from ENP.

(2) The average concentration of phosphorus in seepage water from the ENP is ~6 ppb.

(3) Local watershed contributions to L-31N are in the form of seepage and not direct runoff.

The “Alternative Land Use Analysis – Eight and One-Half Square Mile Area, Final Report”, referred to herein as the PEER Report (PEER, 1998) also evaluated the potential impact on water quality based on various alternatives for the 8.5 SMA. The report concludes that “total phosphorus in ground water is currently unaffected by residential and agricultural activities in the 8.5 SMA and in the

surrounding area." The report notes that the soils that comprise portions of the 8.5 SMA have a capacity to absorb phosphorus. The report also notes that if the soils loose their capacity for absorption of phosphorus, a degraded water quality may occur based on the alternative.

Flow within the L-31N canal and C-111 System is comprised primarily of two sources of water: releases from S-335 to the north and seepage from the ENP. Evaluations by Walker, Li and Associates, and PEER agree that, in general, the water quality within the 8.5 SMA, as it relates to phosphorus levels (the primary targeted pollutant for the ENP) is not significantly impacted by the residential or agricultural activities of the 8.5 SMA.

Water Quality Evaluation

The historic groundwater flow pattern is generally from west to east. Thus, groundwater flow within the 8.5 SMA is from the ENP to L-31N, generally to the southeast. Thus, it can be expected that flow intercepted by the L-31N canal can be expected to exhibit the influence of a predominance of seepage from the ENP along with the pollutant loading associated with the 8.5 SMA. Walker, in his review of the C-111 water quality concludes that water quality impacts to L-31N from the residential and agricultural areas are difficult to detect due to the preponderance of seepage from the ENP (Walker, 1997).

The seepage collection canals that are to be part of Alternatives 1, 2B, 6B, 6C, 6D, 8A and 9 are designed to collect groundwater from the area adjacent to the canals. This collection and conveyance of groundwater lowers the water table in the immediate area of the canal and thus provides mitigation to 1983 base conditions.

Simulations by the USACE using the MODBRANCH Model have estimated that the peak flow that will be required to be removed from the 8.5 SMA by the seepage canal system for any of the pumping alternatives is 500 cfs. This flow was developed based on a perceived worst-case condition of a wet year (1995 rainfall) with the addition of a 1 in 10-year storm. Thus, the highest peak flow that can be expected from the 8.5 SMA with any of the alternatives is 500 cfs. Average flow from the 8.5 SMA will be significantly less than this 500 cfs maximum.

An evaluation of the potential for water flow through the aquifer within the 8.5 SMA using the SEEPW model was performed. Water surface elevations in the ENP and within the 8.5 SMA were used to develop the potential flow through the levee, and into the 8.5 SMA. Only those flows within the upper zones of the aquifer (those that could be expected to impact surface waters) were considered. The estimated flow from the seepage into the canals has been estimated to range between 500 to 700 cubic feet/day/foot of canal depending upon the location of the canal. The estimated average flows are provided below.

Expected Average Canal Flow
By Alternative

Alternative	Length of Seepage Canal (ft)	Expected Average Flow (cfs)
Alternative 1	40,200	270
Alternative 2B	40,200	270
Alternative 6B	20,600	150
Alternative 6C	35,410	260
*Alternative 6D	20,773	150
Alternative 9	40,200	270

*Recommended Plan

Direct runoff from the watershed is expected to be negligible. This is because there are few avenues for direct runoff and the volumes of water are relatively small. Additionally, the high permeability of the surface aquifer makes it the primary path for stormwater drainage. Thus, rainfall that falls on the surface of the 8.5 SMA for the most part is captured within the confines of the area and infiltrates into the ground.

As discussed in the PEER Report, phosphorus that enters the ground due to stormwater is typically bound in the soils. In the C-111 evaluation, Walker (Walker, 1997) found that it was difficult to detect changes in phosphorus levels due to stormwater infiltration from residential and agricultural areas.

The USACE has also evaluated the potential for seepage based on the levee and seepage canal alignment proposed for Alternative 6D. In general, they have developed a flow net evaluation of seepage flow and have determined that approximately 700 cubic-ft/day/foot of canal occurs. Further, their evaluation has determined that approximately 36 percent of this flow comes from the L-31N canal. It has been estimated that the phosphorus levels in L-31N can be expected to be about 20 ppb. This level is derived from an analysis by USACE on the water quality at S-331(Brown n.d.).

It has also been determined that approximately 64 percent of the water in the seepage canal is from water which flows as seepage from the ENP. Phosphorus levels in the ENP have been estimated to be as little as 1 ppb. In his C-111 study, Walker (1997) estimates that the water quality of the seepage water from the ENP is ~6 ppb. The expected range of phosphorus levels from the 8.5 SMA seepage canals can thus be expected to range from 7 ppb to 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, if the upper range of phosphorus levels from the 8.5 SMA is realized, treatment will be required.

Treatment

Water quality treatment for seepage water from the 8.5 SMA must be considered because the discharge levels may not meet the 10-ppb discharge levels. The treatment that may be utilized is dependent on the alternative. This treatment is presented in the discussion on each of the alternatives presented subsequently in this section.

4.3.5 Wetland Resources

The effect on wetlands as a result of altered hydroperiods and water elevations was approached in two ways, one facilitated by the USFWS and the other by the USACE. The USFWS used the WRAP) as a tool to compare the change in wetland function within the 8.5 SMA and an adjoining area approximately two miles into the ENP. The USACE utilized topographic data and hydrologic modeling to estimate changes in water level and hydroperiod, and subsequently equated this to a hydrologic definition.

Marl-prairie short hydroperiod wetlands, for the purposes of this hydrologic assessment, were defined as any area that has a hydroperiod ranging between 30 to 180 days (one to six months, based on an average 1989 - 1995 operating condition). The water table of short hydroperiod wetlands does not recede greater than –1.5 ft. NGVD for more than 30 consecutive days in the driest years, and does not exceed +2.0 ft. NGVD for 30 consecutive days in the wettest years. In order to evaluate the areal extent of wetlands for different alternatives, contour maps were prepared of pertinent water levels. Hydrographs of key indicator cells were reviewed and analyzed to discern differences between alternatives. Then, a custom Fortran program was utilized to determine which model cells would be defined as non-wetlands, short hydroperiod wetlands, or long hydroperiod wetlands. Although the classifications described above do not consider soils or vegetation in the wetland definition, it does facilitate the evaluation of modeled changes to wetland area within the 8.5 SMA and ENP.

The USFWS, in conjunction with the ENP, SFWMD, and HDR, prepared a map of wetlands for the study area as defined above. Wetland categories include Forested Wetland-ENP, Long Hydroperiod Wetland-ENP, Short Hydroperiod Wetland-Graminoid, Herbaceous Wetland-Low to Moderate Soil Disturbance, Herbaceous Wetland-High Soil Disturbance, Shrubby Wetland, Forested Exotic, Forested Native Wetland, Upland Forest Shrub, and Agricultural/Residential (definitions are provided in Section 3 of this report). Representative wetland sites of each wetland type were evaluated using WRAP. The "with-project" WRAP team consisted of representatives for the USFWS, ENP, USACE, FDEP, and DERM (representatives from the Miccosukee Tribe and SFWMD did not participate in this phase of the WRAP analysis). Hydroperiod contour mapping

generated from hydrologic models was then used to evaluate each wetland type under the future conditions for each alternative. Wetland acres for each condition were multiplied by the WRAP score for each wetland type, resulting in functional units. The functional units (FU) were then used to evaluate each alternative.

Land Management . Alternatives which result in land acquisition necessitate the consideration of restoration and management to enhance, to the extent reasonable, ecological functions. Based on input from the ENP and USFWS, it was determined that land purchased that is below elevation 6.5 feet NGVD would not require re-contouring. It is assumed that increased hydroperiods resulting from plan implementation would serve to effectively reduce the future establishment of exotic species. Between elevations 6.5 feet and 7.0 feet NGVD on non-wetland areas (primarily agricultural and residential land uses), removal of approximately 0.5' of soil would achieve a final elevation that would promote the establishment of desirable hydroperiods and wetland communities. Above elevation 7.0 feet NGVD, land cover is predominantly upland, and management for wetland resources is not prudent.

Areas purchased and currently dominated by exotic woody vegetation (e.g., Brazilian pepper, Australian pine) would require clearing and grubbing. These areas as well as disturbed herbaceous wetlands (e.g., marshes containing exotic species) would benefit from longer-term management using techniques such as controlled burns and site-specific chemical treatments. Detailed cost summaries for land restoration and management are presented in Appendix C.

4.4 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 1

4.4.1 Hydrological Effects

Alternative 1 (the future without project alternative) generally consists of a perimeter levee, seepage canal, and interior levee, which follow the northern and western boundaries of the 8.5 SMA. Proposed pump station S-357 is located at the northeastern terminus of the seepage canal adjacent to the L-31N canal.

Model simulations of existing conditions indicate that during the wet season water elevations may occasionally be above ground surface elevations, especially in the western portion of the 8.5 SMA. Alternative 1 allows water levels in the ENP Expansion Area to be raised in an effort to meet Natural Systems Model (NSM) recommended elevations. Alternative 1 provides flood mitigation for the entire 8.5 SMA, except for a small area on the eastern boundary adjacent to the L-31N canal. The lack of mitigation in this small area is not considered significant because of its size and elevation change (maximum approximately 0.4 feet). Most importantly, though, the water level is below ground surface. That is,

the change in water level elevation in this small area actually occurs below land surface in an area of the highest topography within the 8.5 SMA.

Another important hydrological effect of Alternative 1 is its beneficial effect on the NESRS area. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 112, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically. One indicator cell in NESRS shows that the duration of inundation has increased from 113 days in existing conditions to 364 days with Alternative 1. This can be expected because seepage flow through the perimeter levee is pumped to canal L-31N where it flows to the north and re-enters the ENP. Conversely, however, continuous inundation southwest of the 8.5 SMA is reduced significantly by this same transference of water.

4.4.2 Water Quality

Water from the seepage collector canal is to be discharged into L-31N for transference to the north and eventually into NESRS. As indicated in the water quality evaluation section, the phosphorus levels in the seepage water can be expected to range between 7 ppb and 12 ppb. The discharge standard is 10 ppb. Therefore, water quality treatment should occur. However, it must be noted that the phosphorus levels within L-31N are typically greater than 20 ppb. Thus, any discharge from seepage into L-31N will provide a reduction in the phosphorus levels within the canal. Further, a treatment area is projected to be constructed as part of the water deliveries to NESRS. This treatment area will treat the water within L-31N and thus is not a part of this project. It would result in an improvement in water quality in the system.

4.4.3 Wetlands

Assessments presented in the FCAR prepared by the USFWS and ENP concluded that this alternative creates a “hydrologic edge effect” (i.e., a reduction of water levels in the immediate vicinity of the seepage canal and levee system) that would impact wetlands near the levee and seepage canal and within ENP. This adverse edge effect would likely cause long-term drawdowns to these wetlands during project operations, ultimately resulting in diminished hydroperiods. Hydroperiod reduction would likely result in functional loss to short hydroperiod wetlands, and an increase in the potential for frequency of disruptive fires, encroachment of woody vegetation, and further persistence of exotic species.

Long hydroperiod marl prairie wetlands proximal to the levee and canal also would demonstrate functional changes, shifting from the existing vegetative composition to a short hydroperiod community. Forested exotic wetlands should

experience no effect from this alternative because the project's features and functions would neither benefit nor hinder ongoing management practices.

WRAP scores for wet and dry season conditions were averaged to calculate a single functional unit score by habitat type. Results of the WRAP analysis suggest a loss of 2,765 functional units (FU) (1,127 in ENP and 1,638 within the 8.5 SMA) compared to existing conditions.

Draw down associated with the levee and canal appear to result in the reduction of short hydroperiod marl prairies. Data indicate a reduction of 4,663 acres of this habitat within the project area while long hydroperiod (peat-forming) marl prairie increases by 11,859 acres. It is estimated that this alternative results in a total increase of 7,196 acres of wetland. Tables 10 and 11 provide summary data.

Approximately 345 acres of wetlands will be directly affected as a result of levee and canal construction. The majority of these impacts (336.1 ac.) are graminoid wetlands below the 7-ft. contour. Aquatic habitats associated with the proposed canal were not assessed by the WRAP team. Figures 16 and 17 show the areal extent of simulated wetland hydroperiods and substrate conditions under Base 95 and Alternative 1, respectively.

4.4.4 Fish and Wildlife

Increases in water depth and hydroperiod throughout the project area that improve wetland functions will benefit fish and wildlife resources over time. For this alternative, the construction of a canal will also provide an aquatic habitat for fish and wetland dependant species. Natural areas to the east of the proposed levee and canal are generally in a degraded condition (fragmented by roads and exotic species invasion) and provide only moderate habitat to wildlife resources. Habitat quality is expected to continue to degrade east of the levee as anthropogenic activities increase over time.

4.4.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan, and is found in Attachment A.

4.4.6 Socio-Economics

Land Use. A detailed discussion of the socioeconomic impacts associated with Alternative 1 is provided in Appendix E.

As shown in Table 12, the footprint of Alternative 1 exclusively uses publicly owned vacant land (approximately 663 acres) (see Figure 3 in Appendix E). Minimal land use impacts will occur near the southeastern portion of the 8.5 SMA due to the increase in the amount of land above the 10-year flood elevation. Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 1, an additional 60 acres of land will be rendered above the 10-year flood elevation (Figure 3 in Appendix E). Therefore, there would be a total of approximately 634 acres of land above the 10-year flood elevation. Assuming the development of all privately owned vacant and agricultural lands, approximately 592 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of 1 unit per 5 acres, with a variance from Miami-Dade County and enforcement of the existing density ordinances. These lands would accommodate only a portion of the anticipated population growth within the area (118 of the 174 houses needed during the projection period).

If this extent of development were to occur in the area, approximately 547 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $1.3 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.5 million, with the remainder being lost to non-residents.

The above analysis assumes that the zoning ordinance will be enforced. However, the County has not currently been enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately 1 unit per 3.65 acres rather than the 40 acres specified by the ordinance. Assuming that Miami-Dade County will continue not to enforce the density ordinance, there would not be any project induced growth within the 8.5 SMA, since vacant and agricultural lands are available to accommodate the projected future growth of the population. Using the current density of 3.65 acres per residential unit, vacant lands within the 8.5 SMA could accommodate about 462 new residential units. This is considerably in excess to the projected demand of 174 residential units over the projection period. Further, since there are sufficient vacant lands to accommodate future growth for this scenario, no loss of agricultural production is anticipated.

Relocations. Under the original authorized GDM plan, the USACE purchased 663 acres of land on the western boundary of the 8.5 SMA. The acquisition of this land resulted in one residential relocation. The total land acquisition cost was $4,078,200 and $32,000 for the one residential relocation.

Based on the existing land use of the 8.5 SMA, no additional residential, business, or agricultural lands will be required to construct this alternative.

Therefore, there will be no additional relocation of residents associated with Alternative 1.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

With the exception of the one relocation that has already occurred, the construction of Alternative 1 displaces no private landowner. A portion of property owners within the 8.5 SMA may benefit from this alternative. As stated in the Land Use Impact section for this alternative, Alternative 1 actually provides 10-year flood protection to an additional 60 acres of land within the 8.5 SMA, including residential, commercial, vacant, and agricultural lands. In addition, it is not anticipated that Alternative 1 will impact any of the cultural or "Social Clubs" located within the 8.5 SMA.

Even though the population consists primarily of a minority or low-income population, there are no disproportionate effects associated with Alternative 1. Therefore, there are no environmental justice impacts associated with this alternative.

Because of substantial minority and low-income populations exist within the 8.5 SMA, additional efforts are being made to ensure that they are informed regarding the proposed project and given an opportunity to comment on the alternatives. Efforts include providing public meeting notices in both English and Spanish; providing interpreters at formal public meetings to translate English to Spanish; providing court reporters to record public comment in both languages; and providing English and Spanish advertising on the radio and television. In addition, the Executive Summary portion of the DSEIS was printed in both English and Spanish.

In comparison to the other alternatives, Alternative 1 has slight effects on the minority community located within the 8.5 SMA.

4.4.7 Aesthetics

Viewing wildlife, wetlands, and relatively pristine open spaces are valued activities. Restoring the southern Everglades ecosystem will enhance the quality of these activities. Restoration means "a healthier environment that will support vigorous plant communities, larger fish and aquatic animal populations, large numbers of wading birds, alligators, and sustainable populations of wide-ranging

mammals in a natural setting, in perpetuity“ (USACE/SFWMD, 1999: 8-16). Improvements to the hydrologic function of wetlands will enhance the ecological quality and beauty of the area by encouraging native vegetation and discouraging exotic vegetation. However, the 8.5 SMA is visually flat; therefore, there are few wide-ranging panoramic vistas to be appreciated, except from man-made structures such as multi-story buildings, towers, or levees. From street or house-level inside the area, the views often are limited by trees, fence rows and man-made barriers. The levee proposed under this alternative, albeit relatively low in elevation, will nonetheless effect a slight decrease in visual appeal for adjacent landowners. Conversely, pedestrians on the levee would benefit from an improved view of the Everglades.

4.4.8 Recreational Resources

The proposed levees will facilitate access onto public land for pedestrian and bicycle traffic (and possibly wheelchairs). Any alternatives including buyout options provide an opportunity for passive recreation of this nature. Activities such as fishing along the canals and hunting, which is being temporally permitted in the ENP Expansion Area, would require regulation by ENP and the Florida Fish and Wildlife Conservation Commission (FFWCC).

4.4.9 Noise

The U.S. General Services Administration requires that for equipment used on government contracts, the noise levels at the site should not exceed certain limits. Construction activities and their respective sound level limits at a distance of 50 feet associated with this alternative include blasting (95 dBA) and earthmoving activities (ranging from 75 to 80 dBA). The residences closest to the construction activities and pump station are approximately 100 feet away and sound levels will be attenuated (i.e., reduced) to some degree. Operational noise impacts associated with proposed pumps are expected to occur on a periodic basis depending on water levels. An analysis was undertaken using FHWA Noise Model, Version 1.0 (FHWA TNM) to determine the propagation of noise at various distances from this pump. The objective of this analysis was to predict noise levels up to 1000 feet away from the pumping station at 50-foot intervals. The pumping station was modeled to produce a constant sound level of 75 dBA at a distance of 50 feet and was assumed to have a 20' x 20' square foot print. Receptors were identified at 4.92 feet above the ground. The model assumed a propagation environment consisting of lawn-covered terrain in order to obtain worst case results for the developed portions of the 8.5 SMA. Such an environment would produce a noise level lower than that over open water but greater than that over marsh grass.

Noise levels drop off quickly as the distance from the receiver to the source increases. At 150 feet, the noise level would be 63.7 dBA. Background noise levels in rural areas vary considerably depending upon wind and vegetation. Typical sound levels on a calm day may range from 45 to 50 dBA. During these times a tractor plowing nearby or, in this case, a stationary pump may become the dominant sound. However, this sound is not at a level that impacts resident's ability to function.

The monotonous background noise created by pump operation is expected to be accommodated by resident wildlife and not result in adverse effects. Noise abatement features such as sound proofing the pump house will be considered during the design phase if necessary.

4.4.10 Farmlands

The NRCS has determined that no farmlands would be directly or indirectly converted under Alternative 1 (see pertinent correspondence in Appendix B).

4.4.11 Hazardous Materials Contamination

Section 3.26 provides an overview of the potential for hazardous materials within the 8.5 SMA. It was conlcuded that the extent of any potential contamination, largely associated with unregulated activities (abandoned automobiles and boats, waste piles, outhouses etc.) is confined to small, localized areas, and not considered a significant issue of concern. The Non-Federal Sponsor shall investigate for hazardous substances as determined necessary by the Government to identify the existence and extent of a hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, on lands being acquired by the Government for the construction, operation, and maintenance of the Recommended Plan at the Government's expense

4.4.12 Cultural Resources

A cultural resource assessment of the project area was performed during March-April 2000. The survey encountered no cultural resources or sacred sites of significance to Native American Indians. Therefore, pursuant to §36 CFR 800.4(d)(1), the USACE has determined that no historic properties will be affected by the proposed action. A letter from the State Historic Preservation Office (Florida Division of Historical Resources) dated June 22, 2000, concurs with this "finding of no historic properties" (see Appendix B for pertinent correspondence).

4.5 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 2B

4.5.1 Hydrological Effects

Alternative 2B generally consists of a perimeter levee, seepage canal, and interior levee which follows the northern and western boundaries of the 8.5 SMA in a similar fashion to Alternative 1. A proposed pump station (S-357) is located at the southwestern terminus of the seepage canal adjacent to Richmond Drive. Water pumped from the seepage canal at this location is conveyed south to a proposed treatment area in the C-111 project area via a 2,000 foot pipeline.

Model simulations of existing conditions indicate that during the wet season water elevations may at times be above ground surface elevations, especially on the western portion of the 8.5 SMA. Alternative 2B allows water levels in the ENP Expansion Area to be raised in an effort to meet Natural System Model recommended elevations. Alternative 2B provides flood mitigation for the entire 8.5 SMA, except for a very small area on the eastern boundary adjacent to the L-31N canal. The lack of mitigation in this small area is not considered significant because of its size and elevation change (maximum approximately 0.4 feet). Most importantly though, the water level is below ground surface. That is, the change in elevation in this small area actually occurs below land surface in an area of the highest topography within the 8.5 SMA.

Another important hydrological effect of Alternative 2B is its beneficial effect on the NESRS area. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 134, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically. One indicator cell in NESRS shows that the duration of inundation has increased from 113 days in existing conditions to 364 days with Alternative 2B. As with Alternative 1, continuous inundation southwest of the 8.5 SMA is reduced significantly. This occurs not by the transference of water to the north and back into the ENP but by the conveyance of water south, away from the lower Shark River Slough area.

4.5.2 Water Quality

Water from the seepage canal which is to be constructed as part of Alternative 2B is envisioned to discharge through a 2,000 foot pipeline into the C-111 buffer area south of Richmond Drive. The phosphorus loadings from this alternative can be expected to range between 7 ppb and 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, a treatment facility will have to be constructed. The treatment facility envisioned consists of an approximately 200-acre area located 2,000 feet south of Richmond Drive in an area already owned for the planned C-111 buffer area. Discharge from the seepage canal will be pumped to the

treatment area. The treatment area will consist of a bermed area approximately 3,000 feet by 3,000 feet. Final design of the facility will establish water surface elevations within the treatment area. However, for planning purposes, it is expected that water surface elevations of no more than 4-feet above ground surface will exist in the treatment area. Water would enter an open water section of the facility. From there it would be directed, using baffles, to a shallower area where biological uptake can occur. It is expected that discharge from this facility can be directed to the C-111 system to the south. The cost of this facility is included in the overall cost of this alternative.

4.5.3 Wetlands

Wetland function analysis WRAP completed for the FCAR prepared for this study, concluded that impacts to wetland resources are basically the same for Alternative 2B as for Alternative 1.

Changes in wetland acreage for this alternative are nearly identical to those presented for Alternative 1. Predicted reductions in marl-forming short hydroperiod wetlands equal 5,104 acres while increases in peat-forming longer hydroperiod wetlands equal 12,687 acres, resulting in a net change of 7,583 acres. Direct impacts incurred by canal and levee construction are the same as those presented for Alternative 1 (Tables 10 and 11). Figure 18 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative2B.

4.5.4 Fish and Wildlife

The effects of this alternative on fish and wildlife resources are similar to those stated in Alternative 1. Habitat for fish and wildlife resources will be enhanced within the ENP. Continued habitat degradation within the 8.5 SMA will occur over the 50-year planning period, resulting in a loss of wetland functions and therefore habitat for fish and wildlife resources.

4.5.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.5.6 Socio-Economics

Land Use. A detailed discussion of the socioeconomic impacts associated with Alternative 2B is provided in Appendix E. As shown in Table 13, the footprint of Alternative 2B exclusively uses publicly owned vacant land (approximately 663

acres) (See Figure 4 in Appendix E). This land was acquired at a cost of $4,078,200 and $32,000 for one residential relocation. Minimal land use impacts will occur near the southeastern portion of the 8.5 SMA due to the increase in the amount of land above the 10-year flood elevation, an elevation of 7.7 feet NGVD. Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 2B, an additional 79 acres of land will be rendered above the 10-year flood elevation (Figure 4 in Appendix E). Therefore, there would be a total of approximately 653 acres of land above the 10-year flood elevation. Privately owned vacant and agricultural lands, approximately 608 acres of the land above the 10-year flood elevation, could potentially be developed for residential uses at a density of 1 unit per 5 acres, with a variance from Miami-Dade County. These lands would accommodate only a portion of the anticipated population growth within the area over the next fifteen years (122 of the 174 houses needed during the projection period).

If this extent of development were to occur in the area, approximately 563 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $1.4 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.6 million, with the remainder being lost to non-residents.
The above analysis assumes that the zoning ordinance will be enforced. However, the County has not currently been enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately 1 unit per 3.65 acres rather than the 40 acres specified by the ordinance. Assuming that the County will continue to enforce the density ordinance at current levels, there would not be any project induced growth within the 8.5 SMA, since vacant and agricultural lands are available to accommodate the projected future growth of the population. As with Alternative 1, vacant lands within the 8.5 SMA could accommodate about 462 new residential units, which is considerably more than the 174 households projected. Further, since there are sufficient vacant lands to accommodate future growth for this scenario, no loss of agricultural production is anticipated.

Relocations. Under the original authorized GDM plan, the USACE purchased 663 acres of land on the western boundary of the 8.5 SMA. The acquisition of this land resulted in one residential relocation. The total land acquisition cost was $4,078,200 and $32,000 for the one residential relocation.

Based on the existing land use of the 8.5 SMA, no additional residential, business, or agricultural lands will be required to construct this alternative. Therefore, there will be no additional relocation of residents associated with Alternative 2B.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

With the exception of the one relocation that has already occurred, Alternative 2B does not displace any private landowners, including residential, commercial, and agricultural land. A portion of property owners within the 8.5 SMA may benefit from this alternative. As stated in the Land Use Impact section for this alternative, Alternative 2B actually provides 10-year flood protection to an additional 79 acres of land within the 8.5 SMA, including residential, commercial, vacant and agricultural lands. In addition, it is not anticipated that Alternative 2B will impact any of the cultural or "Social Clubs" located within the 8.5 SMA.

Even though the population consists primarily of a minority or low-income population, there are no disproportionate effects of Alternative 2B

Therefore, there are no environmental justice impacts associated with this alternative. In comparison to the other alternatives, Alternative 2B has one of the lowest potential affects on the minority community located within the 8.5 SMA.

4.5.7 Aesthetics

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.5.8 Recreational Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.5.9 Noise

The effects noise would have on the surrounding environment are essentially identical to those stated in Alternative 1.

4.5.10 Farmlands

The NRCS has determined that no farmlands would be directly or indirectly converted under Alternative 2B (see pertinent correspondence in Appendix B).

4.5.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.5.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.6 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 3

4.6.1 Hydrological Effects

Alternative 3 generally consists of a perimeter levee similar to Alternatives 1 and 2B. However, in place of the interior seepage canal and levee, impacts to the 8.5 SMA are mitigated by the placement of a seepage barrier in the limestone. The initial purpose of the seepage barrier is to minimize the seepage that occurs from the ENP to the 8.5 SMA. This relatively impermeable barrier is to be constructed down to an area with low permeability to serve as a seepage reduction “curtain.”

Model simulations of existing conditions indicate that during the wet season water elevations may at times be above ground surface elevations, especially on the western portion of the 8.5 SMA. Alternative 3 allows water levels in the ENP Expansion Area to be raised in an effort to meet NSM recommended elevations. Alternative 3, however, was envisioned to be a flood protection alternative. That is, it was thought that the placement of a seepage barrier adjacent to the ENP Expansion Area would virtually eliminate seepage from the ENP. Model simulations show a marked reduction in seepage but not enough to provide flood protection or even full area mitigation. Water surface elevations with the seepage barrier are not significantly changed from existing conditions without any alternative in place. The majority of the area of the 8.5 SMA, therefore, is required to have flowage easements purchased so that the property owners are compensated for the additional levels of inundation that occur.

An important hydrological effect of Alternative 3 is its beneficial effect on the NESRS area. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 141, also from Appendix A,

shows that the time of inundation in NESRS is increased dramatically. As with other alternatives, the period of continuous inundation within the 8.5 SMA is reduced greatly.

4.6.2 Water Quality

Water quality is not anticipated to be an issue when considering this alternative because no direct discharge of water from the site will occur. Rather, water, which falls on the site and seepage through the seepage barrier, will continue to flow generally from west to east. As noted in the water quality evaluation, the impact of residential and agricultural areas to the flows in canal L-31N and eventually to C-111 are undetectable. That is, the predominance of seepage from the ENP with relatively low phosphorus levels (6-ppb) will dominate the flow.

4.6.3 Wetlands

Based on the WRAP analysis, Alternative 3 would result in a loss of 1,775 functional units (137 in ENP and 1,638 within the 8.5 SMA). Alternative 3 is designed with a seepage barrier without a canal, which minimizes wetland functional loss attributed to dry down associated with seepage into a canal, as is the case with Alternatives 1, 2B, and 9 (Tables 10 and 11).

Predicted short hydroperiod wetland reduction equals 7,423 acres while long hydroperiod peat-forming wetlands increase by 10,839 acres. Direct impacts to wetlands as a result of seepage barrier construction are commensurate with those presented for Alternative 1. Figure 19 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 3.

4.6.4 Fish and Wildlife

The effects of this alternative on fish and wildlife resources are essentially identical to those stated for Alternative 1.

4.6.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.6.6 Socio-Economic

Land Use. As shown in Table 14 in Appendix E, the construction footprint of Alternative 3 exclusively uses publicly owned vacant land (approximately 663

acres), similar to Alternatives 1 and 2B (Figure 5 in Appendix E). However, because this alternative will not adequately provide flood mitigation to the 8.5 SMA, flowage easements will be necessary on approximately 4,693 privately owned acres of land. In general, the cost of flowage easements is 95% of the fee simple cost. However, it should be noted that the cost of easements will be limited to the Fee Simple Value of property (modifying water and sewage systems may exceed the Fee Simple Value of the property). Appendix D estimates that $9,190 per acre to the toal of $54,1 million is considered compensation to land owners for the impacts associated with the periodic flooding of their lands. In addition, approimately $13.4 million has already been spent in fee simple acquisition by the USACE (663 acres) and the SFWMD (469 acres).

Minimal land use impacts will also occur near the southeastern portion of the 8.5 SMA due to the increase in the amount of land above the 10-year flood elevation (7.7 ft.NGVD) (Figure 5 in Appendix E). Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 3, an additional 14 acres of land will be rendered above the 10-year flood elevation. Therefore, there would be a total of approximately 588 acres of land above the 10-year flood elevation. Assuming the development of all privately owned vacant and agricultural lands, approximately 547 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of 1 unit per 5 acres, with a variance from Miami-Dade County. These lands would accommodate only a portion of the anticipated population growth within the area over the next fifteen years (109 of the 174 houses needed during the projection period).

If this extent of development were to occur in the area, approximately 512 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $1.3 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.5 million, with the remainder being lost to non-residents. As stated in Appendix E, these losses should be recovered within three years.

The above analysis assumes that the zoning ordinance will be enforced. However, the County has not currently been enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately 1 unit per 3.65 acres rather than the 40 acres specified by the ordinance. Assuming that Miami-Dade County will continue not to enforce the density ordinance, there would not be any project induced growth within the 8.5 SMA, since vacant and agricultural lands are available to accommodate the projected future growth of the population. Further, since there are sufficient

vacant lands to accommodate future growth for this scenario, no loss of agricultural production is anticipated.

Relocations. Under the original aurhotized GDM plan, the USACE purchased 663 acres of land on the western boundary of the 8.5 SMA. The acquisition of this land resulted in one residential relocation at a cost of $32,000. The SFWMD also owns 469 acres of the 5,825 acres necessary to construct this alternative.

Based on the existing land use of the 8.5 SMA, no additional residential, business, or agricultural lands will be required for the construction footprint of Alternative 3.

Approximately 4,693 privately-owned acres will require the purchase of flowage easements, which will compensate land owners for the impacts associated with the periodic flooding of their lands. It should be noted that the cost of easements will be limited to the fee simple value of the property. Therefore, if the cost of the flowage easement plus the cost of modifying water and sewage systems exceeds the fee simple value of the property, then the property owner would have the option of bearing the additional cost or selling the property to the federal government.

For those property owners choosing the Buy Out option, additional relocations would result from Alternative 3. In addition to the cost of land, these relocations would cost an estimated $28,000 each.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

With the exception of the one relocation that has already occurred, the construction of Alternative 3 does not relocate any private landowners, including residential, commercial and agricultural land. Flowage easements will be required on 4,693 acres of land. In some cases where the cost of modifying water and sewer systems together with the cost of the flowage easement exceeds the fee simple value, the property owner may choose the Buy Out option. If this occurs, additional relocations will result from Alternative 3

In addition, a portion of the property owners in the 8.5 SMA may benefit from this alternative. As stated in the Land Use Impact section for this alternative, Alternative 3 actually provides 10-year flood protection to an additional 14 acres of land within the 8.5 SMA. In addition, it is not anticipated that Alternative 3 will impact any of the cultural or “Social Clubs” located within the 8.5 SMA.

Because of the increased flooding potential on many of the parcels with this alternative, Alternative 3 may potentially increase the disproportionate effects on these minority and low-income populations. These populations will be fairly compensated for the impacts associated with the periodic flooding of their lands through either flowage easements or fee simple purchase. However, the effects from this increased flooding may potentially change land use affecting residences, farms and potentially the unique Hispanic cultural aspects of the 8.5 SMA. Therefore, environmental justice impacts may be associated with this alternative.

If fee simple acquisition is necessary during the purchase of flowage easements, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. (Public Law 91-646, as amended). This legislation provides for the uniform and equitable treatment of all persons displaced from their homes, farms, and businesses as a result of land acquisition for federal projects. In addition, the USACE will work with these residents to minimize the disruption of their households and the overall community. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers.

In comparison to the other alternatives, Alternative 3 has a minimal potential to affect the minority community within the 8.5 SMA, because of the periodic flooding which could occur on lands for which flowage easements have been purchased. However, these property owners will be able to remain in their community and will be compensated for these inconveniences.

4.6.7 Aesthetics

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.6.8 Recreational Resources

The effects of this alternative are essentially identical to those as stated for Alternative 1.

4.6.9 Noise

The effects of noise on the surrounding environment are essentially identical to those stated for Alternative 1.

4.6.10 Farmlands

The NRCS has determined that no farmlands would be directly or indirectly converted under Alternative 3 (see pertinent correspondence in Appendix B).

4.6.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.6.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.7 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 4

4.7.1 Hydrological Effects

Alternative 4 acknowledges that the higher water levels within the ENP Expansion Area will have a significant effect on inundation within the 8.5 SMA. Since this alternative does not use structural means to mitigate for flooding, alternative methods are proposed -- flowage easements, life-estates with flowage easements, and direct purchase. These approaches are described in Section 2.6 above.

The hydrological effects of the alternative can be considered similar to those of future conditions without any of the alternatives. That is, there is a beneficial effect on the NESRS area adjacent to the 8.5 SMA. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 146, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically.

4.7.2 Water Quality

Water quality is not anticipated to be an issue when considering this alternative because no direct discharge of water from the site will occur. Rather, water,

which historically falls on the site and seepage from the ENP, will continue to flow generally from west to east. As noted in the water quality evaluation, the impact of residential and agricultural areas to the flows in L-31N and eventually to C-111 are undetectable. That is, the predominance of seepage from the ENP with relatively low phosphorus levels (6-ppb) will dominate the flow. The purchase of a combination of flowage easements and fee simple acquisitions can be expected to reduce development and agricultural interests within the area and thus may have the potential for reducing potential pollutant loadings.

4.7.3 Wetlands

The FCAR concluded that a combination of proper post-construction management and hydrologic restoration is important to the success of this alternative. These activities would likely improve function of all wetland habitats in the study area and restore portions of existing non-jurisdictional lands as well. Wetlands that tend to be dominated by exotic species (Forested Exotic Wetlands and Shrubby Wetlands) would likely be converted to Herbaceous Wetlands (Low to Moderate and High Disturbance habitats) through mechanical removal, periodic maintenance, and increased hydroperiods. Additionally, those marginal wetlands that tended to be most impacted by intense land use could improve by the end of the project's life. Conclusions made in the FCAR assume that agricultural/residential lands that fall within the 180-day hydroperiod (generally just below the 7.0-ft. NGVD contour) would be restored to optimally functioning graminoid wetlands with minimum to moderate management intensity. Within the 180-day hydroperiod, rehydration by modeled flows, periodic (2- to 5-year intervals) prescribed burning, limited mechanical removal of Brazilian pepper, and initial herbicide treatment of particular exotic stands should be completely successful and result in maximum wetland restoration by 2050. Lands that demonstrate lesser hydroperiods would likely require some level of surface scraping and frequent exotic removal to maintain wetland function. The WRAP analysis concluded this alternative would result in a net gain of 2,448 wetland functional units, due largely to the recovery or improvement of degraded wetlands currently found within the 8.5 SMA.

Hydrologic modeling predicts an increase of 7,943 acres of wetland compared to Base 95 conditions. Peat-forming long hydroperiod wetlands account for an increase of 11,897 acres while marl-forming short hydroperiod wetlands account for a reduction of 3,954 acres. Increased hydroperiods appear to result in a shift from short hydroperiod marl-forming prairies towards peat-forming wetlands. Figure 20 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 4.

4.7.4 Fish and Wildlife

This alternative will enhance habitat available for fish and wildlife resources through improved hydrology. Wetland functions on publicly acquired parcels are expected to be enhanced and provide better-quality resources for opportunistic small and large mammals, reptiles and avifauna. Wildlife species diversity is expected to increase on lands in public holding.

4.7.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.7.6 Socio-Economic

Land Use. A detailed discussion of the socioeconomic impacts associated with Alternative 4 is provided in Appendix E.

Under Alternative 4, property owners would be given a choice of a government buy-out of their property, the government purchase of flowage easements, or the government purchase of life estates, with flowage easements. A detailed description of each of these options is provided in Section 2.6 above.

Essentially, the footprint of Alternative 4 covers the entire 8.5 SMA area (Figure 6 in Appendix E). Therefore, all 1,984 parcels and 6,413 acres would be impacted by this alternative.

In analyzing the potential impacts, the Social Impact Analysis (Appendix E) made several assumptions. The first assumption is that existing resident and non-resident landowners of agricultural lands would opt for a flowage easement in order to maintain the income associated with farming activities. Thus flowage easements would be obtained on 2,642 acres of agricultural land. A flowage easement would also be obtained on the 306-acre FAA parcel. Of the remaining private landowners, it was assumed that 1/8th would opt for the life dstate with flowage easement, 3/8th would accept the government buy out and ½ would opt for flowage easements.

These assumptions result in the following: the buy out of 1,514 acres (1,132 already owned), flowage easements on 4,654 acres and life estates with flowage easements on 245 acres.

The cost assoicated with these assumptions include $122,758,020 for land acquisition and relocations, which would include the purchase of flowage easements, the purchase of life estate with flowage easements, and of fee simple acquisition. This figure also includes $4,078,200 spent by USACE (663

acres in fee) and $9,342,510 spent by the SFWMD (469 acres in fee). Appendix D estimates the per acre value of the flowage easements and for life estates with floage easements at at $9,190 per acre and $5,500 for 306 acres owned by the FAA. Fee simple is estimated at $9,690 per acre.

With the implementation of Alternative 4, there will be no increase in the area that is considered above the 10-year flood elevation (Figure 6 in Appendix E). Therefore, this alternative would not result in an increase in development of the 8.5 SMA. It would actually reduce the population of the area due to relocations of some residents. However, if the County continues not to enforce the zoning ordinance, unauthorized residential or commercial development may continue to occur.

Relocations. Under the assumptions made in the Social Impact Analysis (Appendix E) and the Real Estate Appendix (Appendix D), it is estimated that 45 residential relocations, ten commercial relocations would be immediately displaced. Non-resident property owners who accept Government buy-out would not be physically impacted by the project and could purchase replacement upland tracts in other areas of the region, if lands are available. Those owners who chose to be compensated for either life estates with flowage easements or flowage easements would not be considered displaced as part of this alternative. However, it should be noted that if the cost of the Flowage easement together with modificaitons to the water and sewer systems exceeds the fee simple value of the property, then the property owner would be given the option of government buy-out or bearing the additional expenses themselves.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

Alternative 4 impacts all property owners to some extent. Some residents will be relocated and others will have the potential for increased flooding on their lands that may adversely impact their ability to live on or farm these lands. These landowners will be compensated either by the USACE purchasing flowage easements or by the fee simple land acquisition of the property. Unlike other alternatives, there is no increase in the amount of land above the 10-year flood elevation. Therefore, there are no anticipated benefits to any of the property owners within the 8.5 SMA under this scenario in terms of flood stage relocations. Alternative 4, however, has the potential to impact the cultural or “Social Clubs” located within the 8.5 SMA, depending upon whether the landowner opts for buyout or sells a flowage easement.

Because of the increased flooding potential on many of the parcels with this alternative, Alternative 4 may potentially increase the disproportionate effects on these minority and low-income populations. The effects from this increased flooding may potentially change land uses affecting residences, farms, and potentially the unique Hispanic cultural aspects of the 8.5 SMA. In addition, those residents who will be relocated as part of the buy-out or life estates with flowage easements options will be impacted due to the loss of their community and the unique Hispanic culture of the 8.5 SMA. Therefore, environmental justice impacts are associated with this alternative.

For the anticipated 45 households being relocated as a result of Alternative 4, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, as amended). This legislation provides for the uniform and equitable treatment of all persons displaced from their homes, farms, and businesses as a result of land acquisition for federal projects. In addition, the USACE will work with these residents to minimize the disruption to their households and the overall community by identifying replacement housing within the 8.5 SMA. For Alternative 4, sufficient undeveloped land within the 8.5 SMA may be available within the area located above the 10-year flood elevation for the 16 households being relocated as a result of this alternative. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers.

In comparison to the other alternatives, Alternative 4 has one of the higher potentials to affect the minority community within the 8.5 SMA due to the number of parcels affected by either buy-out, flowage easements, or life estates.

4.7.7 Aesthetics

There will be a slight positive impact on aesthetic resources given the non-structural nature of this alternative. The SOR regulations, which impinge upon those parcels acquired under the SFWMD's 8.5 SMA Wetlands Phase I acquisition project, require that public lands be managed and protected. Improvements such as the removal of refuse, road maintenance, and the removal of exotic vegetation will make this area more attractive and amenable to the public.

4.7.8 Recreation Resources

The effects of this alternative are similar to those stated in Alternative 1, but without the added recreational potential provided by the proposed structures.

4.7.9 Noise

There are no construction activities associated with this alternative, therefore, noise impacts are not an issue.

4.7.10 Farmlands

The NRCS has determined that 1,720 acres of farmlands would be directly converted and zero acres would be indirectly converted under Alternative 4 (see pertinent correspondence in Appendix B).

4.7.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.7.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.8 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 5

4.8.1 Hydrological Effects

The hydrological effects of Alternative 5 are generally the same as those discussed for Alternative 4. Alternative 5 acknowledges that the higher water levels within the ENP Expansion Area will have a significant effect on inundation within the 8.5 SMA. Since this alternative does not use structural means to mitigate for flooding, another compensatory method was used. All properties within the 8.5 SMA are to be purchased to eliminate the deleterious effects of increased water levels within the area.

The hydrological effects of the alternative can be considered similar to those of future conditions without any of the alternatives. That is, there is a beneficial effect on the NESRS area adjacent to the 8.5 SMA. Figure 110 of Appendix A

shows the duration of continuous inundation based on wet weather conditions. Figure 146, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically.

4.8.2 Water Quality

Water quality is not anticipated to be an issue when considering this alternative because no direct discharge of water from the site will occur. Rather, water, which falls on the site and seepage from the ENP, will continue to flow generally from west to east. The predominance of seepage from the ENP with relatively low phosphorus levels (6-ppb) will dominate the flow. Additionally, the acquisition of all of the land west of the levee will reduce the potential pollutant loadings associated with development within the area. Pollutants associated with agriculture activities may continue to exist if agricultural leases for property are considered.

4.8.3 Wetlands

The FCAR concluded that wetland functional change for this alternative was identical to Alternative 4 (increase of 2,448 FU). Similarly, shifts in wetland coverage remained the same as Alternative 4, due to the absence of any structural requirements (Tables 10 and 11). Figure 20 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 5.

4.8.4 Fish and Wildlife

This alternative will provide improved habitat for fish and wildlife resources through improved hydrology and management for the control of exotic species throughout the 8.5 SMA.

4.8.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.8.6 Socio-Economics

A detailed discussion of the socioeconomic impacts associated with Alternative 5 is provided in Appendix E.

Alternative 5 is the complete buy-out of the 8.5 SMA by the government for the proposed project (Figure 7 in Appendix E). Therefore, all 1,984 parcels and

6,413 acres will be impacted by this alternative. All private lands would be acquired either through a willing seller program or condemnation. This would include the relocation of approximately 853 residents (approximately 208 households). Approximately 2,642 acres of agricultural land will be purchased under Alternative 5. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $6.5 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $2.6 million and the loss to non-residents is about $3.9 million.

These losses would be relatively short-lived. According to the U.S. Department of Labor, Bureau of Labor Statistics data as presented in the "Restudy Report" (USACE/SFWMD, 1999), all displaced farm laborers would be re-employed within one year of losing their job. The loss of proprietors' income however, is expected to take longer, but should recover within three years. In addition, lost production could be made up elsewhere within the County or by applying more intense farming practices.

Relocations. All residents will be relocated under this Alternative No. 5. In addition, all businesses and farms will be displaced as part of this alternative. Total costs for this alternative is $164,765,770 for lands and relocations.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population.

Because of the total buy-out of all private land with this alternative, Alternative 5 may potentially increase the disproportionate effect on these minority and low-income populations. The relocation of residents within the 8.5 SMA will be adversely impacted due to the loss of their community and the unique Hispanic culture of the 8.5 SMA. Non-residents will also be impacted due to the fact that many of them have second homes and weekend houses at which they spend time with their families, work their farms, and socialize with neighbors. The cultural or "Social Clubs" located within the 8.5 SMA will also be adversely impacted under the total buyout alternative. Therefore, the loss of the community and unique Hispanic culture of the 8.5 SMA will also impact non-residents. Finally, both residents and non-residents who have agricultural land in the 8.5 SMA will be potentially impacted by this loss of income. Therefore, environmental justice impacts are associated with this alternative.

For the anticipated 208 households being relocated as a result of Alternative 5, the relocation process will be completed pursuant to the Uniform Relocation

Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, as amended). This legislation provides for the uniform and equitable treatment of all persons displaced from their homes, farms, and businesses as a result of land acquisition for federal projects.

For Alternative 5, the USACE will not be able to relocate any of the 208 households within the 8.5 SMA because this alternative consists of the buy-out of all property within this area.

In comparison to the other alternatives, Alternative 5 has the highest potential to affect the minority community within the 8.5 SMA.

4.8.7 Aesthetics

The effects of this alternative are essentially identical to those stated in Alternative 4.

4.8.8 Recreational Resources

The effects of this alternatives are essentially identical to those stated in Alternative 1 without the added recreational potential provided by the proposed structures.

4.8.9 Noise

There are no construction activities associated with this alternative, therefore, noise impacts are not an issue.

4.8.10 Farmlands

The NRCS has determined that 2,106 acres of farmlands would be directly converted and zero acres would be indirectly converted under Alternative 5 (see pertinent correspondence in Appendix B).

4.8.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.8.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.9 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 6B

4.9.1 Hydrological Effects

Alternative 6B generally consists of a perimeter levee, seepage canal, and interior levee that generally follow a north-south direction west of 202nd Ave. A proposed pump station is located at the southwestern terminus of the seepage canal adjacent to Richmond Drive. Water pumped from the seepage canal at this location is conveyed south to the C-111 system through a 2,000 ft. long pipeline to a treatment area.

Model simulations of existing conditions indicate that during the wet season water elevations may at times be above ground surface elevations, especially on the western portion of the 8.5 SMA. Alternative 6B allows water levels in the ENP Expansion Area to be raised in an effort to meet NSM recommended elevations. Alternative 6B provides flood mitigation for the eastern portion of 8.5 SMA, but not for the western and extreme northeastern. This lack of mitigation falls within an area that will be purchased and thus is not an issue.

Another important hydrological effect of Alternative 6B is its beneficial effect on the NESRS area. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 152, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically. Another positive effect occurs in the western portion of the 8.5 SMA. Lands with a surface elevation of less than 7.0 ft. NGVD receive significant inundation. Thus, it can be expected that ecological benefits will be derived in an area that is allowed to experience periodic flooding.

4.9.2 Water Quality

Water from the seepage canal which is to be constructed as part of Alternative 6B would discharge through a 2,000 ft. pipeline into a treatment area in the C-111 buffer area south of Richmond Drive. This alternative provides planned flood protection for a limited area within the 8.5 SMA. This flood protection may lead to an increased density designation resulting in more homes and more septic treatment systems.

The phosphorus loadings from this alternative can be expected to range between 7 ppb and 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, a

treatment facility will have to be constructed. The treatment facility envisioned consists of an approximately 200-acre area located 2,000 feet south of Richmond Drive in an area already acquired for the planned C-111 buffer area. Discharge from the seepage canal will be pumped to the treatment area. The treatment area will consist of a bermed area approximately 3,000 feet by 3,000 feet. Final design of the facility will establish water surface elevations within the treatment area. However, for planning purposes, it is expected that water surface elevations of no more than 4-ft. above ground surface will exist in the treatment area. Water would enter an open water section of the facility. From there it would be directed, using baffles, to a shallower area were biological uptake can occur. It is expected that discharge from this facility can be directed to the C-111 system to the south. The cost of this facility is included in the overall cost of this alternative.

4.9.3 Wetlands

Alternative 6B incorporates flood protection with levee and seepage canal features that protect mostly agricultural/residential lands approximately 7.0-ft. NGVD and higher, leaving a large western portion of the 8.5 SMA as a hydrologic buffer. These buffer lands would have to be acquired and managed. The FCAR concluded that existing wetlands would experience the same level of benefit as described for Alternatives 4 and 5. Similar to other structural alternatives involving the construction and operation of a seepage canal, a hydrologic edge effect is created near the levee and canal. This hinders optimal restoration of agricultural/residential lands west of the levee and canal. A net gain of 1,606 wetland functional units is predicted by the WRAP analysis.

The FCAR concluded that throughout the life of the project (50 years), the FAA tract (Graminoid Wetland >7.0 feet) would experience negative hydrologic impacts resulting from the construction of the seepage canal immediately south of the area. This would result in a 20% loss of wetland function due to decreases in vegetative ground cover, the encroachment of woody and exotic species, and the increased potential for disruptive fire.

In terms of wetland acreage, Alternative 6B results in a net gain of 7,114 acres of wetland. This appears to be a result of conversion of marl-forming prairie towards peat-forming prairie due to increased hydroperiods within the project area.

Direct impacts to wetlands within the 8.5 SMA totals approximately 13 acres. The large difference in wetland impacts between Alternative 6B and Alternatives 1, 2B, and 3 is a result of the higher elevation of the canal and levee (approximately 7.9-ft. NGVD) (Tables 10 and 11). Figure 21 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 6B.

4.9.4 Fish and Wildlife

For lands east of the proposed levee and canal, the effects of this alternative are similar to those stated in Alternative 1 and result in reduced habitat quality. For the lands in the proposed buyout area (west of the levee), the effects of this alternative are similar to those stated in Alternative 4, and result in habitat improvements for fish and wildlife resources.

4.9.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.9.6 Socio-Economics

A detailed discussion of the socioeconomic impacts associated with Alternative 6B is provided in Appendix E.

Of the 6,413 acres located in the 8.5 SMA, 4,346 acres or about 68 percent of the land will be required to implement Alternative 6B (Figure 8 in Appendix E). Table 15 shows the break down of land uses that will be impacted by this alternative. Of the 4,346 acres required, about 1,132 acres or 26 percent are presently in public ownership. Of the 4,346 acres required to implement this alternative, 4,196 would be acquired in fee simple, with flowage easements acquired on the remaining 150 acres. It is estimated that about 590 permanent residents in 143 households will be displaced with the implementation of this alternative. About 1,136 acres of this land is agricultural land. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $2.8 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $1.1 million and the loss to non-residents is about $1.7 million. These losses would be relatively short-lived. According to the U.S. Department of Labor, Bureau of Labor Statistics data as presented in the “Restudy Report” (USACE/SFWMD, 1999), all displaced farm laborers would be re-employed within one year of losing their job. This loss of proprietors’ income however, is expected to take longer but should recover within three years. In addition, lost production could be made up elsewhere within the county or by applying more intense farming practices.

Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 6B, an additional 1,643 acres of land will be rendered above the 10-year flood elevation. Therefore, there would be a total of approximately 2,217 acres of land above the 10-year flood

elevation (Figure 8 in Appendix E). Assuming the development of all privately owned vacant and agricultural lands, approximately 1,711 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of 1 unit per 5 acres, with a variance from Miami-Dade County. This acreage could accommodate a maximum of 342 new residential units. This capacity is slightly greater than the demand created by the 143 households displaced with Alternative 6B and the 174 new households projected in the future for this area.

If this extent of development were to occur in the area, approximately 1,310 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $3.2 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $1.3 million and about $1.9 million to non-residents.

The above analysis assumes that the zoning ordinance will be enforced. However, the County has not currently been stringently enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately 1 unit per 3.65 acres rather than the 40 acres specified by the ordinance. Assuming that the County continues to enforce the density ordinance at current levels, future development of the remaining privately owned area could occur at an even greater density than allowed for in the zoning ordinance.

Using the existing 3.65 residential density, the capacity of the 8.5 SMA could accommodate 469 new households that is in excess of the projected demand of households discussed above.

Relocations. Approximately 590 residents (143 households) will be relocated with the implementation of Alternative 6B. The relocation cost of 143 households is estimated to cost $28,000 per household or an estimated $6.1 million. In addition, the alternative will also displace 454 agricultural properties. This will result in a loss of income (as identified above) to these property owners.

Due to the large increase in the amount of land above the 10-year flood elevation, relocation opportunities may be available within the 8.5 SMA. However, property owners would still be required to obtain a variance from the County to develop at a 1 unit per 5 acre density.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered a low-income

population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

A portion of the property owners within the 8.5 SMA may benefit from this alternative. As stated in the Land Use Impact section for this alternative, Alternative 6B actually provides 10-year flood protection to an additional 1,643 acres of land within the 8.5 SMA, including residential, commercial, vacant and agricultural lands. Much of this property could be used to relocate these populations within the 8.5 SMA. In addition, it is not anticipated that Alternative 6B will impact any of the cultural or "Social Clubs" located within the 8.5 SMA.

Because of the amount of privately owned land being purchased with this alternative, Alternative 6B may potentially increase the disproportionate effect on these minority and low-income populations. The relocation of these residents from the 8.5 SMA will be an adverse impact due to the loss of their community and the unique Hispanic culture of the 8.5 SMA.

Non-residents will also be impacted due to the fact that many of them have second homes and weekend houses at which they spend time with their families, work their farms, and socialize with neighbors. Therefore, the loss of the community and unique Hispanic culture of the 8.5 SMA will also impact non-residents. Finally, both residents and non-residents who have agricultural land in the 8.5 SMA will be potentially impacted by this loss of income. Therefore, environmental justice impacts are associated with this alternative.

For the anticipated 129 households being relocated as a result of Alternative 6B, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as explained in section 4.8.6.

In addition, the USACE will work with these residents to minimize the disruption to their households and the overall community. For Alternative 6B, sufficient undeveloped land within the 8.5 SMA may be available within the area located above the 10-year flood elevation for the 129 households being relocated as a result of this alternative. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers.

In comparison to the other alternatives, Alternative 6B has a fairly high potential to affect the minority community within the 8.5 SMA, because of the number of relocations involved.

4.9.7 Aesthetics

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.9.8 Recreational Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.9.9 Noise

The effects of noise on the surrounding environment are essentially identical to those stated for Alternative 1.

4.9.10 Farmlands

The NRCS has determined that 885 acres of farmlands would be directly converted and zero acres would be indirectly converted under Alternative 6B (see pertinent correspondence in Appendix B).

4.9.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.9.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.10 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 6C

4.10.1 Hydrological Effects

The perimeter and interior levees and the seepage canal proposed under Alternative 6C generally follow a north-south alignment along the eastern boundary of the area designated by SFWMD as the Phase 1 - Save Our Rivers boundary. This area has been the subject of willing seller property acquisition by SFWMD as part of the Save Our Rivers program. A seepage collection canal will

be located between the levees designed to keep the groundwater levels within the eastern portion of the area at the same levels as existed prior to the implementation of the MWD project. The interior levee is positioned to prevent surface water from entering the seepage canal. A proposed pumping structure (S-357) located at the southern terminus of the levee/canal system will discharge seepage to a treatment area located in the C-111 buffer area.

Model simulations of existing conditions indicate that during the wet season water elevation may, at times, be above ground surface, especially in the western portion of the 8.5 SMA. This alternative allows water levels to be raised in the ENP in an effort to meet the NSM elevations. Flood mitigation is provided through a combination of the levees and seepage canal and the acquisition of flowage easements.

An important aspect of the project is the beneficial effect within the NESRS area. Model results show that the duration of inundation is increased based on the project. Thus, areas within the ENP and west of the perimeter levee are provided with the opportunity of increased ecological function while mitigating for flooding in the 8.5 SMA.

4.10.2 Water Quality

Water from the seepage canal which is to be constructed as part of Alternative 6C would discharge through a 2,000 foot pipeline into a treatment area in the C-111 buffer area south of Richmond Drive. The phosphorus loadings from this alternative can be expected to range between 7 ppb and 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, a treatment facility will have to be constructed. The treatment facility envisioned consists of an approximately 200-acre area located 2,000 feet south of Richmond Drive in an area already owned for the planned C-111 buffer area. Discharge from the seepage canal will be pumped to the treatment area. The treatment area will consist of a bermed area approximately 3,000-ft. by 3,000-ft.. Final design of the facility will establish water surface elevations within the treatment area. However, for planning purposes, it is expected that water surface elevations of no more than 4-ft. above ground surface will exist in the treatment area. Water would enter an open water section of the facility. From there it would be directed, using baffles, to a shallower area were biological uptake can occur. It is expected that discharge from this facility can be directed to the C-111 system to the south. The cost of this facility is included in the overall cost of this alternative.

4.10.3 Wetlands

Alternative 6C incorporates flood mitigation with levee and seepage canal features that protect mostly agricultural/residential lands to the east and preserve

mostly wetlands to the west of the levee and canal system. Wetlands west of the levee will experience some reduction in hydroperiod due to drawdown and will act as a buffer between the levee and canal system and the ENP. The majority of this land is publicly owned, recently purchased under the Save Our Rivers Program. The WRAP analysis predicts a loss of 1,805 functional units as a result of this alternative. This reduction is due to the direct impacts associated with the levee and canal system and drawdown effects of the canal.

Hydrologic modeling predicts a net gain of 6,688 total wetland acres within the 8.5 SMA and the project area. Short hydroperiod marl-forming wetlands are predicted to be reduced by 5,063 acres as a result of increased hydroperiods. Long hydroperiod peat-forming wetlands are predicted to increase by 11,751 acres.

Direct impacts to wetlands within the 8.5 SMA involve approximately 260 acres. The majority of these impacts are represented as graminoid wetland < 7.0 feet elevation (161 acres) and herbaceous wetland - low to moderate disturbance (74 acres). Figure 22 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 6C.

4.10.4 Fish and Wildlife

For lands east of the proposed levee and canal, the effects of Alternative 6C result in reduced habitat quality. For the lands west of the proposed levee, the effects of this alternative are expected to result in improved habitat for fish and wildlife resources due to improved water deliveries to ENP.

4.10.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.10.6 Socio-Economics

Of the 6,413 acres located in the 8.5 SMA, 1,743 acres or about 27 percent of the land will be required to implement Alternative 6C. Approximately 611 acres of land are privately owned and will need to be acquired. About 51 acres of this land is agricultural land. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $125,000. Assuming the existing estimated mix of residents versus non-residents (40.5% vs. 59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $53,000 and the loss to non-residents is about $72,000.

Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 6C, no additional land would fall at or above the 10-year flood elevation. Assuming the development of all privately-owned vacant and agricultural lands, approximately 534 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of one unit per five acres, assuming a variance is obtained from Miami-Dade County. This acreage could accommodate a maximum of 107 new residential units. This capacity is less than the demand created by the 17 households displaced with the construction of the project and the 174 new households projected for the area.

If the above-projected development were to occur in the area, approximately 499 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $1.2 million. Assuming the existing estimated mix of residents versus non-residents remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.49 million and a loss of $0.73 million to non-residents.

The above analysis assumes that the East Everglades Overlay Zoning Ordinance will be enforced. However, the County has not currently been stringently enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately one unit per four acres rather than the one unit per 40 acres specified by the ordinance. Assuming that Miami-Dade County continues to enforce the density ordinance at current levels, future development of the remaining privately owned area could be developed at the existing 3.65 density to accommodate the 191 households relocated and projected in the future.

Relocations. Approximately 70 permanent residents (17 households) will be relocated with the implementation of Alternative 6C. In addition to the cost to acquire the land, the relocation of these residents will cost an estimated $28,000 per household or about $563,000. In addition, the alternative will also displace several agricultural properties (51 acres). This will result in a loss of income (as identified above) to these property owners. Opportunities for relocation due to implementation of this alternative may be available within the 8.5 SMA.

Environmental Justice. As stated in Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm works within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied**.**

Although relocations are involved with the implementation of Alternative 6C, impacts on minority and low-income populations may be minimized to some extent because housing opportunities may be available in the portion of the 8.5 SMA located above the 10-year flood elevation. In addition, non-residents could potentially be impacted due to the fact that many of them have second homes and weekend houses at which they spend time with their families, work their farms, and socialize with neighbors.

For the anticipated 17 households being relocated as a result of Alternative 6C, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

In addition, the USACE will work with these residents to minimize the disruption to their households and the overall community. For example, sufficient undeveloped land within the 8.5 SMA may be available within the area located above the 10-year flood elevation for the households being relocated as a result of this alternative. The USACE would maintain a list of willing sellers to assist residents to located available property within the 8.5 SMA, if they desire to remain in the community. It is not anticipated that Alternative 6C will impact any of the cultural or “Social Clubs” located within the 8.5 SMA. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers.

In comparison to the other alternatives, Alternative 6C has a minimal potential to affect the minority community within the 8.5 SMA because of the minimal number of relocations involved (17 households) and their potential for relocation within the 8.5 SMA.

4.10.7 Aesthetics

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.10.8 Recreational Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

The proposed levees will facilitate access onto public land for pedestrian and bicycle traffic (and possibly wheelchairs). As a condition to land acquisition using

public monies, management of natural resources may require that provisions be made for public access.

4.10.9 Noise

The effects of noise on the surrounding environment are essentially identical to those stated in Alternative 1.

4.10.10 Farmlands

The NRCS has determined that 45 acres of farmlands would be directly converted and zero acres would be indirectly converted under Alternative 6C (see pertinent correspondence in Appendix B).

4.10.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.10.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.11 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 6D

4.11.1 Hydrological Effects

Alternative 6D is similar in nature and design to Alternative 6C. This alternative consists of an perimeter and interior levee as well as a seepage canal located between that specified for Alternative 6B and Alternative 6C. Unlike Alternatives 6C or 6D, however, Alternative 6D's seepage canal is located well inside the perimeter levee. The canal system runs from 205th Avenue north from 168th Street to 132nd Street, then east along 132nd Street to the L-31N canal. A proposed pump station (S-357) located at the southern terminus of the levee/canal system will discharge seepage to a treatment facility in the C-111 buffer area.

Alternative 6D is designed to provide flood mitigation for the area east of the levee. Simulation results show that this alternative fully provides this mitigation. Water levels within the ENP are raised significantly and localized impacts of

drawdown in the seepage canal are reduced when compared to other alternatives. A detailed evaluation of hydrologic effects is provided in Appendix A.

The following discussion of the performance of Alternative 6D is reproduced from the FCAR prepared by DOI, Figure 24 supports the discussion below:

> *The Federally Recommended Plan is based on Alternative 6D, as modified by several assurances related to design and operation. These assurances and modifications are described in detail in Chapter 10 of the FCAR (Appendix G).*
>
> *The Federally Recommended Plan increases hydroperiod in NESRS by moving the canal and levee alignment to the east (relative to Alternative 1) and primarily limits hydroperiod reduction to lands within the flood-mitigated area east of the perimeter levee. The Recommended Plan provides the greatest degree of environmental benefits for the lowest cost among all project alternatives (based on cost per FU at a cost of $15,900 per FU when compared to Alternative 1). This represents approximately 80 percent additional wetland function potentially attained through total acquisition under Alternative 5 (5,213 FU) at less than half the cost, requiring no compensatory mitigation for unavoidable losses to wetland or fish and wildlife resources. See Section 6.4 of the GRR for a comparison of costs to FU.*
>
> *The Recommended Plan provides suitable habitat for wood storks and an additional 2,731 acres of snail kite habitat compared to Alternative 1 (a 5 percent increase). The Recommended Plan results in an increase of short hydroperiod wetlands by 365 acres when compared with total acquisition (709 acres) at less than half the cost. The Recommended Plan would result in longer hydroperiods over an estimated 1,115 acres in NESRS. When compared to total acquisition, the Recommended Plan provides the same benefit over the same area at less than half the cost. In conjunction with the C-111 Project, the plan would also provide partial re-establishment of historical hydrologic regimes.*
>
> *The Recommended Plan does not fully provide structural flood mitigation for 540 acres (primarily in the northern portion of the 8.5 SMA and east of the perimeter levee). It is our understanding that supplemental non-structural options shall be implemented, including re-alignment of the perimeter levee in final design, fee-simple acquisition, and/or the purchase of flowage easements.*

4.11.2 Water Quality

Water from the seepage canal which is to be constructed as part of Alternative 6D is envisioned to discharge through a 2,000 foot pipeline into a treatment area in the C-111 buffer area south of Richmond Drive. The phosphorus loadings from

this alternative can be expected to range between 7 ppb and 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, a treatment facility will have to be constructed. The treatment facility envisioned consists of an approximately 200-acre area located 2,000 feet south of Richmond Drive in an area already acquired for the planned C-111 buffer area. Discharge from the seepage canal will be pumped to the treatment area. The treatment area will consist of a bermed area approximately 3,000 feet by 3,000 feet. Final design of the facility will establish water surface elevations within the treatment area. However, for planning purposes, it is expected that water surface elevations of no more than 4-feet above ground surface will exist in the treatment area. Water would enter an open water section of the facility. From there it would be directed, using baffles, to a shallower area where biological uptake can occur. It is expected that discharge from this facility can be directed to the C-111 system to the south. The cost of this facility is included in the overall cost of this alternative.

4.11.3 Wetlands

The improved hydrology is predicted to result in a net increase of wetland acreage (7,464 acres) within the 8.5 SMA and the surrounding area of potential affect. Short hydroperiod marl-forming wetland would be reduced by 4,298 acres while long hydroperiod peat-forming wetlands are predicted to increase by 11,762 acres. The reduction in short hydroperiod wetlands appears to be the result of drawdown effects near the canal in addition to shifts towards long hydroperiod wetlands caused by increased hydroperiods. Approximately 130 acres of wetland will be directly impacted as a result of construction of the levee and canal system.

The FCAR provided an assessment of wetland impacts based on the use of the WRAP and hydrologic modeling (USFWS/NPS 2000). It concluded that some hydrologic improvement from construction and operation of this plan would likely be realized along the levee alignment (compared to other alternatives) as the canal is distant and a significant edge effect is not apparent. Functional lift of these lands should be consistent with maximum lift attainable through total acquisition of the area, including conversions of shrubby and exotic-dominated habitats to native landscapes over the project life of 50 years.

According to the FCAR, throughout the life of the project, the FAA tract (Graminoid Wetland >7.0 feet) would experience negative hydrologic impacts resulting from the construction of the seepage canal immediately south of the area (USFWS/NPS 2000). This would result in a 20 per cent functional loss as some vegetative ground cover would be lost, the encroachment of woody and exotic species would increase, and the potential for disruptive fire would increase. Other than the FAA tract, approximately 360 acres is estimated to remain in the projected area. Wetland function of these lands is predicted to be lost to development within the life of the project.

West of the levee and canal, long hydroperiod wetlands, forested wetlands, and forested exotic wetlands in ENP would experience benefits identical to those associated with alternatives 4, 5, and 6B. Alternative 6D would increase wetland function by 1,322 FU (1,290 in ENP and 32 within the 8.5 SMA).

Alternative 6D represents an improvement of 4,087 FU compared to Alternative 1. A total lift of 2,417 FU is realized in ENP and is attributed to unimpeded restoration flows resulting from the implementation of the MWD. Levee alignment will be optimized during the design phases to minimize impacts to wetlands. Figure 23 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 6D. The water level effect of this alternative relative to full MWD Project implementation is shown in Figure 24.

4.11.4 Fish and Wildlife

For lands east of the proposed levee and canal, the effects of Alternative 6D result in reduced habitat quality due to predicted future expansion of agricultural and residential land uses. For lands west of the proposed levee, the effects of this alternative are expected to result in improved habitat for fish and wildlife resources due to improved water deliveries to ENP.

4.11.5 Listed Species

A Biological Assessment (BA), has been prepared under the provisions of Section 7 of the Endangered Species Act (50 CFR 402.02), for the Recommended Plan (Alternative 6D with conditions) for five listed species that are known to, or might occur in the project area, including the wood stork, snail kite, eastern indigo snake, Florida panther, and Cape Sable seaside sparrow (Attachment A). Based on the information presented in the BA, the USACE has concluded that the project would not be likely to adversely affect any of the five listed species. Coordination with the USFWS has been initiated and concurrence with this determination requested. The following summarizes the conclusions reached for each species.

Wood Stork. The wood stork is a highly mobile species with no known roosting or nest sites within the project area. The nearest such site is along the Tamiami Trail (Tamiami West colony, located about five miles north of the 8.5 SMA). There is no particularly important resource for the species in the project area. It is determined that the project would not be likely to adversely affect the wood stork.

Snail Kite. The snail kit is a highly mobile species with no known roosting or nest sites within the project area, nor any Designated Critical Habitat within the

project impact area. There is no particularly important resource for the species in the project area. It is determined that the project would not be likely to adversely affect the snail kite.

Eastern Indigo Snake. The indigo snake probably occurs in the upland portions of the project area and therefore could potentially be affected by construction activities associated with implementation of the project. All standard protection measures that have been jointly developed with the USFWS will be implemented (see Attachment A). It is determined that the project would not be likely to adversely affect the indigo snake.

Cape Sable Seaside Sparrow. Potential adverse effects on the sparrow would involve project-induced changes in hydrological conditions in the portion of Designated Critical Habitat for the sparrow, Population F, which lies immediately southwest of the 8.5 SMA. Hydrologic modeling for average year rainfall was completed for the analysis. Hydrologic modeling shows that, on average, the project would not likely result in adverse affects to the Cape Sable seaside sparrow.

Florida Panther. ENP staff have been tracking radio-collared panthers since 1986, and presently have been following an estimated 90% of the individuals in the area. Records for a 15-month old male panther and 4-year old female panther indicate sitings near, but not within the 8.5 SMA. The nearest known denning area is 15 to 20 miles away. The project would not introduce any barrier to panther movements since they are known not to be impeded by levees or canals. Noise and human presence during the two-year project construction period could divert panther movements from the immediate area, but would produce no long-term effects on utilization of adjacent habitat. Therefore, it is determined that the project would not be likely to adversely affect the Florida panther.

4.11.6 Socio-Economics

With Alternative 6D, 2,881 acres (45 percent) of the 6,413 acres located in the 8.5 SMA will be required to implement this alternative. Approximately 2,335 acres of land will need to be acquired in fee simple and 546 acres will need to have flowage easements. Of the total 2,881 acres required for Alternative 6D, 1,132 acres have been acquired and are in public ownership. About 215 acres of the land needing to be acquired is agricultural land. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $526,000. Assuming the existing estimated mix of residents versus non-residents (40.5% vs. 59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $221,000 and the loss to non-residents is about $305,000.

Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 6D, no additional land would fall at or above the 10-year flood elevation. Assuming the development of all privately-owned vacant and agricultural lands, approximately 534 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of one unit per five acres with a variance from Miami-Dade County. This acreage could accommodate a maximum of 107 new residential units. This capacity is less than the demand created by the 35 households displaced with the construction of the project and the 174 new households projected for the area.

If this extent of development were to occur in the area, approximately 215 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $526,000. Assuming the existing estimated mix of residents versus non-residents remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $221,000 and a loss of $305,000 to non-residents.

The above analysis assumes that the zoning ordinance will be enforced. However, the County has not currently been enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately one unit per four acres rather than one unit per 40 acres specified by the ordinance. Assuming that Miami-Dade County continues to enforce the density ordinance at current levels, future development of the remaining privately owned area could be developed at an even greater density than allowed for in the zoning ordinance.

Relocations. With the implementation of Alternative 6D, approximately 144 permanent residents (35 households) will be relocated. In addition to the cost to acquire the land, the relocation of these residents will cost an estimated $28,000 per household or about $980,000. In addition, the alternative will also displace several agricultural properties (215 acres). This will result in a loss of income (as identified above) to these property owners. Opportunities for relocation due to the implementation of Alternative 6D may be available within the 8.5 SMA. Levee alignments will be optimized during the design phase to minimize impacts to residents.

Environmental Justice. As stated in Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low income population. The

Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

Although relocations are involved with the implementation of Alternative 6D, impacts on minority and low-income populations may be minimized to some extent because housing opportunities may be available in the portion of the 8.5 SMA located above the 10-year flood elevation. In addition, non-residents could potentially be impacted due to the fact that many of them have second homes and weekend houses at which they spend time with their families, work their farms, and socialize with neighbors. It is not anticipated that Alternative 6D will impact any of the cultural or "Social Clubs" located within the 8.5 SMA.

For the anticipated 35 households being relocated as a result of Alternative 6D, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as explained in Section 4.8.6.

In addition, the USACE will work with these residents to minimize the disruption to their households and the overall community. For Alternative 6D sufficient undeveloped land within the 8.5 SMA may be available within the area located above the 10-year flood elevation for the households being relocated as a result of these alternatives. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers.

In comparison to the other alternatives, Alternative 6D has a minimal potential to affect the minority community within the 8.5 SMA because of the minimal number of relocations involved (35 households) and their potential for relocation within the 8.5 SMA.

4.11.7 Aesthetics

Viewing wildlife, wetlands, and relatively pristine open spaces are valued activities. Restoring the southern Everglades ecosystem will enhance the quality of these activities. Restoration means "a healthier environment that will support vigorous plant communities, larger fish and aquatic animal populations, large numbers of wading birds, alligators, and sustainable populations of wide-ranging mammals in a natural setting, in perpetuity" (USACE/SFWMD, 1999: 8-16). Improvements to the hydrologic function of wetlands will enhance the ecological quality and beauty of the area by encouraging native vegetation and discouraging exotic vegetation. However, the 8.5 SMA is visually flat; therefore, there are few wide-ranging panoramic vistas to be appreciated, except from man-made structures such as multi-story buildings, towers, or levees. From street or

house-level inside the area, the views often are limited by trees, fence rows and man-made barriers. The levee proposed under this alternative, albeit relatively low in elevation, will nonetheless effect a slight decrease in visual appeal for adjacent landowners. Conversely, pedestrians on the levee would benefit from an improved view of the Everglades.

4.11.8 Recreational Resources

The proposed levees will facilitate access onto public land for pedestrian and bicycle traffic (and possibly wheelchairs). As a condition to land acquisition using public monies, management of natural resources may require that provisions be made for public access.

4.11.9 Noise

The U.S. General Services Administration requires that for equipment used on government contracts, the noise levels at the site should not exceed certain limits. Construction activities and their respective sound level limits at a distance of 50 feet associated with this alternative include blasting (95 dBA) and earthmoving activities (ranging from 75 to 80 dBA). Operation of the pump station also has its own sound level limits at a distance of 50 feet which is 75 dBA. The closest residents to the construction activities and pump station are approximately 100 feet so the sound levels will be attenuated (i.e., reduced) to some degree. Operational noise impacts associated with proposed pumps are expected to occur on a periodic basis depending on water levels. Operation of this pump is estimated to produce a sound level of 75 dBA at a distance of 50 feet. An analysis was undertaken using FHWA Noise Model, Version 1.0 (FHWA TNM) to determine the propagation of noise at various distances from this pump. The objective of this analysis was to predict noise levels up to 1000-ft. away from the pumping station at 50-foot intervals. The pumping station was modeled to produce a constant sound level of 75 dBA at a distance of 50 feet and was assumed to have a 20' x 20' square foot print. Receptors were identified at 4.92 feet above the ground. The propagation environment was described as lawn covered terrain, which would produce a noise level lower than that over open water but greater than that over marsh grass.

Noise levels drop off quickly as distance from the receiver to the source increases. At 150-ft. the noise level would be 63.7 dBA. Background noise levels in rural areas vary considerably depending upon wind and vegetation. Typical sound levels on a calm day may range from 45 to 50 dBA. During these times a tractor plowing nearby or, in this case, a stationary pump may become the dominant sound. However, this sound is not at a level that impacts resident's ability to function.

The monotonous background noise created by pump operation is expected to be accommodated by resident wildlife and not result in adverse effects. Noise abatement features such as sound proofing the pump house will be considered during the design phase if necessary.

4.11.10 Farmlands

The NRCS has determined that 128 acres of farmlands would be directly converted and zero acres would be indirectly converted under Alternative 6D (see pertinent correspondence in Appendix B).

4.11.11 Hazardous Materials Contamination

Section 3.26 provides an overview of the potential for hazardous materials within the 8.5 SMA. It was conlcuded that the extent of any potential contamination, largely associated with unregulated activities (abandoned automobiles and boats, waste piles, outhouses etc.) is confined to small, localized areas, and not considered a significant issue of concern. The Non-Federal Sponsor shall investigate for hazardous substances as determined necessary by the Government to identify the existence and extent of a hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, on lands being acquired by the Government for the construction, operation, and maintenance of the Recommended Plan at the Government's expense

4.11.12 Cultural Resources

A cultural resource assessment of the project area was performed during March-April 2000. The survey encountered no cultural resources or sacred sites of significance to Native American Indians. Therefore, pursuant to §36 CFR 800.4(d)(1), the USACE has determined that no historic properties will be affected by the proposed action. A letter from the State Historic Preservation Office (Florida Division of Historical Resources), dated June 22, 2000, concurs with this “finding of no historic properties.”

4.12 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 7

4.12.1 Hydrological Effects

The hydrological effects of Alternative 7 will be similar to those described for Alternatives 4 and 5. Alternative 7 acknowledges that the higher water levels within the ENP Expansion Area will have a significant effect on inundation within

the 8.5 SMA. Structural means to mitigate for the flooding include the raising of all roads to elevations above the flooding affects on the adjoining properties, however, are not mitigated for the additional water levels. Thus, flowage easements, as discussed under Alternative 4, are to be used to provide flood elevation mitigation for property owners. Flowage easements allow the landowner to retain full rights of ownership of the property and be compensated for the increase levels of flooding by granting a flowage easement to the government.

The hydrological effects of the alternative can be considered similar to those of future conditions without any of the alternatives. That is, there is a beneficial effect on the NESRS area adjacent to the 8.5 SMA. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 146, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically.

4.12.2 Water Quality

Water quality is not anticipated to be an issue when considering Alternative 7 because no direct discharge of water from the site will occur. Rather, water, which historically falls on the site and seepage from the ENP, will continue to flow generally from west to east. As noted in the water quality evaluation, the impact of residential and agricultural areas to the flows in canal L-31N and eventually to C-111 are undetectable. That is, the predominance of seepage from the ENP with relatively low phosphorus levels (6-ppb) will dominate the flow. The purchase of a combination of easements and fee simple acquisitions is not expected to reduce development and agricultural interests within the area.

4.12.3 Wetlands

Because lands would remain in private ownership, habitat management would be difficult on existing public owned lands. Without management, model flows would improve hydrology throughout the study area, but improvements to wetland function would be difficult to estimate. The intensity of agricultural and residential land use would likely increase in areas that do not experience frequent flooding ($\geq$ 7.0 ft. NGVD) whereas intensity would likely decrease in the lower elevations ($\leq$ 6.5 ft. NGVD) where existing land uses would continue to be vulnerable to inundation. Exotic species cover would potentially increase in area, especially where these species are already established, decreasing wetland function of those tracts. The FCAR further concludes that throughout the project's life, as new developments establish, existing wetland functions would be decreased or be lost. As existing land uses diminish in areas receiving too much water to maintain adequate living or cultivation conditions, habitat connectivity and buffer area would increase, thereby improving wetland function. Compared

to base 95 existing conditions, overall wetland functions are predicted to increase by 1,290 functional units.

Increased hydroperiods result in a net wetland increase of 7,943 acres throughout the project area. This is manifested as increased coverage of longer hydroperiod peat-forming prairies and the conversion of marl-forming prairies to peat-forming systems (Tables 10 and 11). Figure 20 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 7.

4.12.4 Fish and Wildlife

Increased hydroperiods are expected to provide for some recovery of wetlands in low lying portions of the 8.5 SMA. Consistent with this hydrologic improvement, habitat for fish and wildlife will be enhanced, providing more habitat for wetland dependant species. However, due to the continued occupation of the 8.5 SMA by local residents, management for exotic species is not a viable option, and some amount of future land conversion from open space to residential or agricultural can be expected.

4.12.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.12.6 Socio-Economics

A detailed discussion of the socioeconomic impacts associated with Alternative 7 is provided in Appendix E.

Although there is no structural element of this alternative, land use impacts would still occur to some extent due to the number of flowage easements required (Figure 11 in Appendix E). In order to implement this alternative, the following lands will be required. Of the remaining 5,839 acres below the 1 in 10-year flood zone, 1,132 acres have been acquired by the federal government and the SFWMD for about $13.4 million. Of the remaining 4,707 acres, 303 acres will be acquired in fee simple to accommodate road construction and maintenance at a cost of $2.9 million. Flowage easements will be required on the remaining 4,404 acres. It should be noted that the cost of flowage easements will be limited to the fee simple value of the property. In some cases, the cost of modifying the property (modifying water and sewage systems) may exceed the fee simple Value of the property. In this case the property will be purchased in fee simple. For cost estimating purposes it was assumed that 50 such properties would be purchased affecting both resident and non-resident property owners and tenants. The purchase of flowage easements on 4,404 acres of land at a cost $39.3

million is considered compensation to land owners for the impacts associated with the periodic flooding of their lands.

Currently, about 574 acres of land within the 8.5 SMA are located above the 10-year flood elevation. No new additional land above this elevation would result with the implementation of Alternative 7. Therefore, the expected development of the area above the 10-year flood elevation will remain the same as the existing conditions. These lands could only accommodate a portion of the anticipated growth over the next fifteen years (107 of the 174 houses needed during this projection period). However, if the zoning ordinance is not enforced and the vacant lands in the 8.5 SMA are developed at the current 3.65 density, the area could accommodate approximately 462 new residential units.

Relocations. Under the original authorized GDM plan, the USACE purchased 663 acres of land on the western boundary of the 8.5 SMA. The acquisition of this land resulted in one residential relocation.

Based on the existing land use of the 8.5 SMA no additional residential, business or agricultural lands will be required for the construction footprint of Alternative 7.

Approximately 4,404 acres will require the purchase of flowage easements, which will compensate land owners for the impacts associated with the periodic flooding of their lands. It should be noted that the cost of easements will be limited to the fee simple value of the property. Therefore, if the cost of the flowage easement plus the cost of modifying water and sewage systems exceeds the fee simple value of the property, then the property owner would have the option of bearing the additional cost or buy out. For those property owners choosing the buy out option, additional relocations would result from Alternative 7. In addition to the cost of the land, these relocations would cost an estimated $28,000 each.

Environmental Justice. As stated in Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.55 SMA. Currently, this property is unoccupied.

Alternative 7 does not relocate any private landowners, including residential, commercial and agricultural land. However, individual parcels may receive an increased amount of flooding. These landowners will be compensated by the USACE purchasing flowage easements. Some relocations may occur if the cost of the flowage easements together with the modification costs exceed the fee simple value of the property. It is not anticipated that Alternative 7 will impact any of the cultural or “Social Clubs” located within the 8.5 SMA.

Because of the increased flooding potential on many of the parcels anticipated with this alternative, disproportionate effects may increase on these minority and low-income populations. The effects from this increased flooding may potentially change land use affecting residences, farms and potentially the unique Hispanic cultural aspects of the 8.5 SMA. Therefore, environmental justice impacts may be associated with this alternative.

If fee simple acquisition is necessary during the purchase of flowage easements, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. In addition, the USACE will work with these residents to minimize the disruption to their households and the overall community. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers.

In comparison to the other alternatives, Alternative 7 has a minimal potential to affect the minority community within the 8.5 SMA, because of the periodic flooding which could occur on lands that flowage easements have been purchased. However, these property owners will be able to remain in their community and will be compensated for these inconveniences.

4.12.7 Aesthetics

There will be a slight impact on aesthetic resources given the non-structural nature of this alternative. The SOR regulations, which impinge upon those parcels acquired under the SFWMD's 8.5 SMA Wetlands Phase I acquisition project, require that public lands be managed and protected. Improvements such as the removal of refuse, road maintenance, and the removal of exotic vegetation will make this area more attractive and amenable to the public.

4.12.8 Recreational Resources

The majority of the properties in the 8.5 SMA are likely to remain private property. This limits the opportunity for recreation in the project area.

4.12.9 Noise

Effects of noise on the surrounding environment are similar to this stated for Alternative 1.

4.12.10 Farmlands

The NRCS has determined that no farmlands would be directly or indirectly converted under Alternative 7 (see pertinent correspondence in Appendix B).

4.12.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.12.12 Cultural Resources

The effects of this alternative are essentially the same as those stated for Alternative 1.

4.13 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 8A

4.13.1 Hydrological Effects

Alternative 8A generally consists of a perimeter levee and interior levee, which run from the northeast portion of the 8.5 SMA to a southwestern terminus adjacent to Richmond Drive. A proposed pump station is located at the southwestern terminus of the seepage canal. Water is pumped from the seepage canal at this location and allowed to flow through a treatment area south towards the C-111 system.

Model simulations of existing conditions indicate that during the wet season water elevations may at times be above ground surface elevations, especially on the western portion of the 8.5 SMA. Alternative 8A allows water levels in the ENP Expansion Area to be raised in an effort to meet NSM recommended elevations. Alternative 8A provides almost no flood mitigation for 8.5 SMA. Therefore, flooding of most of the 8.5 SMA must be mitigated by the use of flowage easements similar to Alternative 4.

An important hydrological effect of Alternative 8A is its beneficial effect on the NESRS area. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figure 158, also from Appendix A, shows that the time of inundation in NESRS is increased dramatically. Another positive effect occurs to the area southwest of the 8.5 SMA. Periods of inundation in the southern portion of Shark River Slough are extended.

4.13.2 Water Quality

Water from the collection swale which is to be constructed as part of Alternative 8A is envisioned to discharge through a 2,000 foot pipeline into a treatment area in the C-111 buffer area south of Richmond Drive. It is expected that the majority of this flow will be from both the ENP and the developed area to the east. The phosphorus loadings from this alternative can be expected to range between 7 ppb and 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, a treatment facility will have to be constructed. The treatment facility envisioned consists of an approximately 200-acre area located 2,000 feet south of Richmond Drive in an area already owned for the planned C-111 buffer area. Discharge from the seepage canal will be pumped to the treatment area. The treatment area will consist of a bermed area approximately 3,000 feet by 3,000 feet. Final design of the facility will establish water surface elevations within the treatment area. However, for planning purposes, it is expected that water surface elevations of no more than 4-feet above ground surface will exist in the treatment area. Water would enter an open water section of the facility. From there it would be directed, using baffles, to a shallower area were biological uptake can occur. It is expected that discharge from this facility can be directed to the C-111 system to the south. The cost of this facility is included in the overall cost of this alternative.

4.13.3 Wetlands

The FCAR indicates this plan should maintain good water quality throughout the 8.5 SMA wetlands and provide a similar hydropattern to ENP wetlands as described in WRAP evaluations for Alternatives 4 and 5. Additionally, restoration of agricultural/ residential lands west of the levee would be required to maximize the WRAP scores, similar to Alternatives 4 and 5. Some negative effects appear to correlate with the operation of the S–357 pump station because it decreases water levels within a 0.5-mile radius during pumping operations. The WRAP assessment predicts an increase of 2,240 function units under this alternative.

Shorter hydroperiod marl-forming prairies decrease in areal extent by approximately 3,954 acres while longer hydroperiod peat-forming prairies increase in coverage by 11,897 acres (Tables 10 and 11) This suggests a general shift from the short hydroperiod marl-forming communities toward longer hydroperiod peat-forming communities. Figure 25 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 8A.

4.13.4 Fish and Wildlife

For lands east of the proposed levee, the extent and quality of existing habitat is low, and any potential impacts to fish and wildlife resources are minimal. For

lands west of the proposed levee, wetland quality and therefore habitat quality, are anticipated to improve as a result of hydrologic enhancement. The floodway area will also support wetland communities and provide future habitat for fish and wildlife resources.

4.13.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.13.6 Socio-Economics

A detailed discussion of the socioeconomic impacts associated with Alternative 8A is provided in Appendix E.

The land use impacts associated with Alternative 8A are similar to those of Alternative 6B (See Figure 12 in Appendix E). Of the 6,413 acres located in the 8.5 SMA, 5,803 acres or about 90 percent of the land will be required to implement this alternative. Table 16 shows the break down of land uses that will be impacted by this alternative. Some relocations may occur if the cost of the flowage easements together with the modification costs exceed the fee simple value of the property. About 901 acres of this land is agricultural land. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $2.2 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.9 million and the loss to non-residents is about $1.3 million. According to the “Restudy Report” (USACE/SFWMD,1999), the loss of proprietors’ income should be recovered within three years and displaced farm laborers should be re-employed within a year.

Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 8A, an additional 36 acres of land will be rendered above the 10-year flood elevation. Therefore, there would be a total of approximately 610 acres of land above the 10-year flood elevation. Assuming the development of all privately owned vacant and agricultural lands, approximately 569 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of 1 unit per 5 acres, with a variance from Miami-Dade County. This acreage could accommodate a maximum of 114 new residential units. Therefore, this is not sufficient to accommodate the displaced residents (129 households and the 174 future projected households).

If this extent of development were to occur in the area, approximately 529 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $1.3 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.5 million and about $0.8 million to non-residents.

The above analysis assumes that the zoning ordinance will be enforced. However, the County has not currently been stringently enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately 1 unit per 3.65 acres rather than the 40 acres specified by the ordinance. Therefore, the induced growth on the remaining privately owned lands could be significantly higher if the zoning ordinance and variance program are not fully enforced.

Relocations. Approximately 529 residents (129 households) will be relocated with the implementation of Alternative 8A. In addition, the alternative will also displace three commercial properties and 901 acres of agricultural land. This will result in a loss of income (as identified above) to these property owners. Additional relocations may occur on those properties where flowage easements are required, if the total cost exceeds the fee simple value of the property.

Due to the minimal increase in the amount of land above the 10-year flood elevation, opportunities to relocate these households within the 8.5 SMA will be minimal.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

A small portion of the property owners within the 8.5 SMA may benefit from this alternative. As stated in the Land Use Impact section for this alternative, Alternative 8A actually provides 10-year flood protection to an additional 36 acres of land within the 8.5 SMA. In addition, it is not anticipated that Alternative 8A will impact any of the cultural or “Social Clubs” located within the 8.5 SMA.

Because of the amount of privately owned land being purchased with this alternative, Alternative 8A may have a disproportionate effect on these minority and low-income populations. The relocation of these residents from the 8.5 SMA will be adversely impacted due to the loss of their community and the unique

Hispanic culture of the 8.5 SMA. Non-residents will also be impacted due to the fact that many of them have second homes and weekend houses at which they spend time with their families, work their farms, and socialize with neighbors. Therefore, the loss of the community and unique Hispanic culture of the 8.5 SMA will also impact non-residents. Finally, both residents and non-residents who have agricultural land in the 8.5 SMA will be potentially impacted by this loss of income. Therefore, environmental justice impacts are associated with this alternative.

For the anticipated 129 households being relocated as a result of Alternative 8A, the relocation process will be completed pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

In addition, the USACE will work with these residents to minimize the disruption to their households and the overall community. In order to mitigate any disproportionate effects and to preserve a sense of place and community for those households affected, the USACE will assist in the determination of land available for relocations within the 8.5 SMA and outside of areas where flowage easements would be required. The USACE and the SFWMD will maintain a list of willing sellers. However, because of the limited land available above the 10-year flood elevation and the number of relocations, all of these residents may not be able to relocate within the 8.5 SMA.

In comparison to the other alternatives, Alternative 8A has a high potential to affect the minority community within the 8.5 SMA, because of the number of relocations involved and the minimal amount of land available for relocation within the 8.5 SMA.

4.13.7 Aesthetics

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.13.8 Recreational Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.13.9 Noise

The effects of noise on the environment are essentially identical to those stated for Alternative 1.

4.13.10 Farmlands

The NRCS has determined that 701 acres of farmlands would be directly converted and zero acres would be indirectly converted under Alternative 8A (see pertinent correspondence in Appendix B).

4.13.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.13.12 Cultural Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.14 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE 9

4.14.1 Hydrological Effects

Alternative 9 is a combination of Alternatives 1 and 2B. Although not specifically simulated using the model, it is expected that the hydrological effects will be a combination of those effects identified for Alternatives 1 and 2B. Alternative 9, like Alternatives 1 and 2B, consists of a perimeter levee, seepage canal, and interior levee, which follows the northern and western boundaries of the 8.5 SMA. A proposed pump station is located at both the northeastern (S-357A) and southwestern (S-357B) terminus of the seepage canal adjacent to the L-31N canal and Richmond Drive, respectively.

Model simulations of existing conditions indicate that during the wet season water elevations may be above ground surface elevations, especially on the western portion of the 8.5 SMA. Alternative 9 allows water levels in the ENP Expansion Area to be raised in an effort to meet NSM recommended elevations. Alternative 9 provides flood mitigation for the entire 8.5 SMA, except for a small area on the eastern boundary adjacent to the L-31N canal. The lack of mitigation in this small area is not considered to be significant because of its size and elevation changes (maximum approximately 0.4 feet). Most importantly, though, the water level is below ground surface. That is, the change in elevation in this small area actually occurs below land surface in an area of the highest topography within the 8.5 SMA.

Another important hydrological effect of Alternative 9 is its beneficial effect on the NESRS area. Figure 110 of Appendix A shows the duration of continuous inundation based on wet weather conditions. Figures 112 and 134, also from Appendix A, show that the time of inundation in NESRS is increased dramatically. The environmental significance of this change in flow patterns is discussed in a subsequent section of this report.

4.14.2 Water Quality

During the initial stages of Alternative 9, seepage water will be collected and discharged to the north, to Canal L-31N. Treatment will be within a treatment area (pond) to be constructed as part of another conveyance project, as discussed under Alternative 1. During the later phases of this alternative, seepage water will be handled as in Alternative 2. That is, water from the seepage canal is envisioned to discharge through a 2,000-foot pipeline into a treatment area in the C-111 buffer area south of Richmond Drive in an area already owned for the planned C-111 buffer area. The phosphorus loadings from this alternative can be expected to range between 7 ppb and 12 ppb. The discharge standard for phosphorus is 10 ppb. Thus, a treatment facility will have to be constructed. The treatment facility envisioned consists of an approximately 200-acre area located 2,000 feet south of Richmond Drive. Discharge from the seepage canal will be pumped to the treatment area. The treatment area will consist of a bermed area approximately 3,000 feet by 3,000 feet. Final design of the facility will establish water surface elevations within the treatment area. However, for planning purposes, it is expected that water surface elevations of no more than 4-feet above ground surface will exist in the treatment area. Water would enter an open water section of the facility. From there it would be directed, using baffles, to a shallower area were biological uptake can occur. It is expected that discharge from this facility can be directed to the C-111 system to the south. The cost of this facility is included in the overall cost of this alternative.

4.14.3 Wetlands

The FCAR concluded that Impacts to wetland resources are the same for Alternative 9 as for Alternatives 1 and 2B. Wetlands increase by 7,391 acres, primarily as a result of increases in long hydroperiod wetlands. Short hydroperiod wetlands decline in areal coverage by 4,883 acres.

As with Alternatives 1 and 2B, Alternative 9 impacts approximately 345 acres of wetlands as a result of levee and canal construction. The majority of these impacts (336.1 ac.) are graminoid wetlands below the 7-foot contour. Figure 18 shows the areal extent of simulated wetland hydroperiods and substrate conditions under Alternative 9.

4.14.4 Fish and Wildlife

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.14.5 Listed Species

A Biological Assessment has been prepared for the Recommended Plan.

4.14.6 Socio-Economics

Land Use. A detailed discussion of the socioeconomic impacts associated with Alternative 9 is provided in Appendix E.

As shown in Table 17, the footprint of Alternative 9 exclusively uses publicly owned vacant land (approximately 663 acres) (Figure 13 in Appendix E). This land was acquired at a cost of $4,078,200 and $32,000 for one residential relocation. Minimal land use impacts will occur near the southeastern portion of the 8.5 SMA due to the increase in the amount of land above the 10-year flood elevation (7.7 ft. NGVD). Currently, only 574 acres of the 8.5 SMA are located above the 10-year flood elevation. With the implementation of Alternative 9, an additional 78 acres of land will be rendered above the 10-year flood elevation. Therefore, there would be a total of approximately 652 acres of land above the 10-year flood elevation. Assuming the development of all privately owned vacant and agricultural lands, approximately 606 acres of the land above the 10-year flood elevation could potentially be developed for residential uses at a density of 1 unit per 5 acres, with a variance from Miami-Dade County. These lands would accommodate only a portion of the anticipated population growth within the area over the next fifteen years (121 of the 174 households anticipated).

If this extent of development were to occur in the area, approximately 561 acres of agricultural lands would be lost to residential development. Utilizing the average annual agricultural income per acre in Miami-Dade County ($2,445), the value of annual agricultural income potentially lost is estimated at about $1.4 million. Assuming the existing estimated mix of residents (40.5%) versus non-residents (59.5%) remains constant, the estimated amount of annual agricultural income potentially lost to residents is about $0.6 million, with the remainder being lost to non-residents. These losses are expected to be temporary and should be recovered within three years.

The above analysis assumes that the zoning ordinance will be enforced. However, the County has not been stringently enforcing the residential density of the 8.5 SMA. The average residential density for the 8.5 SMA area is approximately 1 unit per 3.65 acres rather than the 40 acres specified by the

ordinance at current levels. Assuming that the County will continue to enforce the density ordinance, there would not be any project induced growth within the 8.5 SMA, since vacant and agricultural lands are available to accommodate the projected future growth of the population. Further, since there are sufficient vacant lands to accommodate future growth for this scenario, no loss of agricultural production is anticipated.

Relocations. Under the original authorized GDM Plan, USACE purchased 663 acres of land on the western boundary of the 8.5 SMA. The acquisition of this land resulted in one residential relocation.

Based on the existing land use of the 8.5 SMA, no additional residential, business, or agricultural lands will be required to construct this alternative. Therefore, there will be no additional relocation of residents associated with this alternative.

Environmental Justice. As stated in the Section 3 of this document, the majority of the population residing in the 8.5 SMA is Hispanic. In addition, although specific income data do not exist, given the rural nature and the reported presence of migrant farm workers within the 8.5 SMA, a substantial percent of the residents within the 8.5 SMA could be considered as a low-income population. The Miccosukee Tribe of Indians has purchased one parcel within the 8.5 SMA. Currently, this property is unoccupied.

With the exception of the one relocation that has already occurred, Alternative 9 does not displace any private landowners, including residential, commercial and agricultural land. A portion of the property owners in the area may benefit from this alternative. As stated in the Land Use Impact section for this alternative, Alternative 9 actually provides 10-year flood protection to an additional 78 acres of land within the 8.5 SMA, including residential, commercial, vacant and agricultural lands. In addition, it is not anticipated that Alternative 9 will impact any of the cultural or “Social Clubs” located within the 8.5 SMA.

Even though the population consists primarily of a minority or low-income population, there are no disproportionate effects for Alternative 9. Therefore, there are no environmental justice impacts associated with this alternative.

In comparison to the other alternatives, Alternative 9 only minor effects on the minority community located within the 8.5 SMA.

4.14.7 Aesthetics

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.14.8 Recreational Resources

The effects of this alternative are essentially identical to those stated for Alternative 1.

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4.14.9 Noise

The effects of noise on the environment are essentially identical to those described in Alternative 1.

4.14.10 Farmlands

The NRCS has determined that no farmlands would be directly or indirectly converted under Alternative 9 (see pertinent correspondence in Appendix B).

4.14.11 Hazardous Materials Contamination

The effects of this alternative are essentially identical to those stated for Alternative 1.

4.14.12 Cultural Resources

The effects of this alternative are essentially the same as those stated for Alternative 1.

4.15 SECONDARY IMPACTS

The implementation of the Recommended Plan (Alternative 6D with conditions) is not expected to induce additional development within the 8.5 SMA other than that necessary to accommodate the normal projected increase in population. Miami-Dade County projections were used in determining future population levels in the 8.5 SMA. These projections show a substantial amount of growth in the initial 15 years (almost doubling in a 15 year period) and leveling off thereafter. The county's assumption, as presented in its letter in May 2000, is not based on an analytical analysis of population growth in the area. It is based on the carrying capacity of the land, assuming that a density of 1 residential unit per 5 acres would be permitted. The assumptions ignore the fact that within Miami-Dade County there are more desirable and developable lands available to accommodate future growth. Further, the County assumes that all lands, particularly vacant and agricultural lands, would be converted to residential use.

About 25 percent of existing land in the area is in public ownership and not likely to be converted. About 42 percent is in some type of agricultural production, which provides income and wages to local area residents and laborers. It unlikely that all these lands would be converted into residential use. The residents of the 8.5 SMA are not expected to eliminate an important source of income to their households.

Jurisdictional wetlands are located primarily along the western edge of the 8.5 SMA bordering the Everglades. About 1,132 acres of these lands are presently in public ownership and an additional 1,203 will be acquired to implement the Recommended Plan alternative 6D. Further, flowage easements on an additional 546 acres required for this alternative will significantly restrict the construction of new structures without the consent of the project's non-federal sponsor. Finally, about 306 acres, owned by the FAA, contains wetlands that will remain in public ownership. Thus, a total of 3,187 acres, or about 50% of the land in the 8.5 SMA, will be under direct public control either through ownership or the restrictive covenants associated with the purchase of flowage easements. The remaining acreage, where jurisdictional wetlands exist, will be subject to regulatory control by appropriate Federal, State or local regulatory agencies. The WRAP analysis indicated that there would be no wetlands functional loss due to implementation of Alternative 6D. Given the combination of land acquisition, flowage easement acquisition and regulatory controls, there should likewise be no future net loss of wetlands productivity. The SFWMD has committed itself to continuing a policy of land acquisition from willing sellers, even after the structural alternative is implemented.

4.16 CUMULATIVE IMPACTS

A cumulative impact, according to the CEQ's NEPA-implementing regulations, is "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

The 8.5 SMA is but one component of the MWD Project, which, in turn, is but one component of the ongoing and comprehensive effort to restore the South Florida and Everglades regional ecosystem. The linchpin of this effort is the Central and Southern Florida Flood Control Project Comprehensive Restudy, now referred to as the Comprehensive Everglades Restoration Project (CERP). Several other past, current, and future projects that will cumulatively affect the Southeast Florida/Southern Everglades regional environment are identified below:

PROJECT	RESPONSIBLE AGENCY
Past Actions	
Modified Water Deliveries to Everglades National Park – Raising Tigertail Camp	USACE
Experimental Program of Water Deliveries to Everglades National Park – Test Iterations 1-5 (Shark River Slough Iterations)	USACE
Experimental Program of Water Deliveries to Everglades National Park – Test Iteration 6 (Taylor Slough Iteration)	USACE
Experimental Program of Water Deliveries to Everglades National Park – Test Iteration 7 (modified Taylor Slough Iteration)	USACE
Current Actions	
Experimental Program of Water Deliveries – Emergency Deviation from Test Iteration 7, Interim Structural and Operational Plan	USACE
Modified Water Deliveries to Everglades National Park – Conveyance Between SCA 3A and WCA 3B (Conveyance and Seepage Control Project)	USACE
Modified Water Deliveries to Everglades National Park – Conveyance Between WCA 3B and Northeast Shark River Slough (Tamiami Trail Project)	USACE
Additional Lands – 8.5 Square Mile Area (willing seller land acquisition program	FDEP
East Coast Buffer/Water Preserve Areas Project	SFWMD
Lower East Coast Regional Water Supply Interim Plan	SFWMD
Future Actions	
Comprehensive Everglades Restoration Plan	USACE/SFWMD
South Dade Canals (C-111) Project	USACE
Experimental Program of Water Deliveries – Emergency Deviation from Test Iteration 7, Interim Operational Plan	USACE
Lower East Coast Regional Water Supply Plan South Florida Ecosystem Restoration Plan	SFWMD

Collectively all of the above actions are needed to reach the fullest possible re-hydration of the southern Everglades. Virtually all of the above actions were incorporated in the CERP analysis. The CERP analysis was designed to consider the entire South Florida ecosystem and in doing so modeled the hydrological conditions of the area on a broad scale. In the analysis of the hydrological modeling, a set of performance measures were applied to ecological targets to determine the restoration benefits of the hydrological improvements. The CERP also made some fundamental assumptions about the future status of the 8.5 SMA and other on-going projects within the ecosystem prior to completing the CERP's modeling. The CERP assumed that the authorized MWD Project and the 8.5 SMA flood mitigation component (Alternative 1) were in place as designed and providing the expected flows to Northeast Shark River Slough. No unacceptable adverse environmental impacts were identified. In addition, analysis of the various alternatives proposed for the 8.5 SMA identified no

unacceptable adverse environmental impacts. The 8.5 SMA project does not have a significant effect on the hydrological-ecological restoration targets of the MWD project. Moreover, the Recommended Plan results in the acquisition of substantial acreage of the marl prairie community, whereas the authorized plan did not. Therefore, the Recommended Plan for 8.5 SMA is expected to have a net beneficial cumulative effect.

4.17 UNAVOIDABLE ADVERSE IMPACTS

The Recommended Plan (Alternative 6D with conditions) will result in a net environmental benefit to the MWD project through improved flows through the NESRS. Direct impacts to fish and wildlife habitat, including wetlands, will be offset through the net ecosystem benefits of the MWD project. A Biological Assessment (BA) under the provisions of Section 7 of the Endangered Species Act (50 CFR 402), was prepared by the USACE, and has concluded that the project would not be likely to adversely affect any listed species (Attachment A). Coordination with the USFWS has been initiated and concurrence with this determination requested.

The Recommended Plan will result in the relocation of approximately 35 owner occupied residential households, 52 non-owner occupied residents and one business. All households that will be relocated will be afforded new housing and relocation benefits consistent with the Federal Uniform Relocation and Real Property Acquisition Policy Act of 1970 (P.L.91-646, as amended).

4.18 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY

The overall goal of the larger MWD project, and that of the 8.5 SMA project, is to achieve re-hydration of NESRS to the extent practicable, within constraints related to flood mitigation for the 8.5 SMA. In short, this is a restoration project, not a development project. It is understood that this type of project cannot go forward at the expense of maintaining long-term productivity of the environment. The purpose of rewetting NESRS is to restore the historic patterns of flooding and there by restore the historic plant and animal populations of this part of the Everglades. The Recommended Plan (Alternative 6D with conditions) will reduce the negative environmental impacts relative to unregulated development within the 8.5 SMA, including loss of wetlands habitat, densification of housing, release of contaminants into groundwater, wildlife disturbance due to human activities; invasion of exotic plant species, disturbance by domestic animals, and irreversible conversion of short-hydroperiod wetlands into croplands. With implementation, about 50 percent of land, including a significant portion of the jurisdictional wetlands, will come under public control in terms of fee simple

ownership and flowage easements. Regulatory agencies will have jurisdiction over remaining wetlands within the area. Alternative 6D will enhance and maintain natural wetland and associated habitat productivity over the long-term. The only anticipated short term adverse effects are expected to occur during the project construction period. They are discussed in Section 4.1.1. Short term uses relate to the time during which design and construction are taking place. The condition of reduced flows to the NESRS will continue until such time as it takes for Alternative 6D to be implemented.

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ALTERNATIVE

The Recommended Plan (Alternative 6D with conditions) will require a combination of state and federal funding, labor, energy, and project materials to build, operate, and maintain. The estimated cost of the Recommended Plan is $88,170,300. Earth will be required from on-site and off-site sources for the construction of approximately 34,500 feet of perimeter levee, 20,800 feet of interior levee, and 20,800 feet of canal. A total volume of fill required for construction of the levees is estimated to be approximately 380,000 cubic yards. One pump station will be constructed which will require long-term maintenance and operation. Energy requirements will be negligible. Approximately 200 acres of land south of the 8.5 SMA will be required for the construction of a treatment area through which water collected within the seepage canal will be conveyed to the C-111 buffer area.

SECTION 5.0
ENVIRONMENTAL COMMITMENTS AND RECOMMENDATIONS

The project for the 8.5 SMA is an integral part of the MWD Project for ENP. Portions of the MWD Project have been implemented, but the benefits from the project cannot be fully utilized until the part for the 8.5 SMA is completed. The Recommended Plan as shown in Figure 3h will consist of perimeter and interior levees as well as a seepage canal and pump station.

The design of the Recommended Plan will be further evaluated, refined, and optimized during subsequent project development phases. The following bulleted items list commitments to ensure the project is developed in a manner that is consistent with the goals of maximizing the hydro-ecology of the NESRS while minimizing cost and impacts to the residents of the 8.5 SMA.

(a) The perimeter levee location and footprint shall maximize the amount of wetlands included west and north of the perimeter levee, following the approximate boundary in Alternative 6D.

(b) Following the approximate boundary in Alternative 6D, the levees and seepage canal system should be optimized to minimize impacts to the residents of 8.5 SMA. For example, the levee's location should avoid residences and wetlands where practicable.

(c) Water quality treatment shall be provided for the existing runoff at the time of implementation to meet applicable state water quality standards and applicable permitting requirements and not cause degradation of ambient conditions. The water quality treatment for the Recommended Plan assumes regulatory control and enforcement actions.

(d) The Recommended Plan, including all required lands, shall become a project feature of the MWD Project. Therefore, construction and land acquisition shall be implemented as part of the project. The Federal government will retain title to the project lands and grant the non-Federal sponsor an outgrant for the lands to implement operation and maintenance responsibilities including sufficient rights for project operation, maintenance, management, repair and rehabilitation.

(e) The periodic flooding of landowners east of the proposed levee, before and after project implementation, will remain unchanged from conditions in existence prior to implementation of the MWD Project. Flood mitigation, not flood protection, should be provided by the design and operation of the Recommended Plan. No deviations are intended from the operations specified in the Manual (i.e., increased pumping in the seepage canal or the inclusion of additional pumps) due to anticipated public demand for increased flood relief inside the perimeter levee of the 8.5 SMA Project

(f) Implementation of the Recommended Plan shall not adversely harm the restoration levels of ENP's hydrology greater than that simulated through modeling of Alternative 6D. A monitoring, evaluation, and reporting program shall be implemented to ensure operations are consistent with these levels.

(g) Operations of the 8.5 SMA Project shall be detailed in an Operations and Maintenance Manual. As appropriate, this Manual shall be agreed to by ENP, USFWS, USACE, and SFWMD, and include provisions for monitoring, emergency operations as well as mechanisms for dispute resolution to assure compliance in a manner satisfactory to all agencies.

(h) Seepage canal design will incorporate, insofar as practicable, enhancements that will increase the potential for improved water quality through biological treatment, and increase habitat for fish and wildlife. Additionally, all lands north and west of the perimeter levee and within the 8.5 SMA will be restored and managed to maximize the ecological quality of the area to the extent practicable.

(i) A Biological Assessment (BA) has been prepared under the provision of Section 7 of the Endangered Species Act. The BA evaluated likely project effects on five listed species that are known to, or might occur in the area affected by the project, including the wood stork, snail kite, eastern indigo snake, Florida panther, and Cape Sable seaside sparrow. This BA concluded that the project is not likely to adversely affect any of the listed species. Coordination with the USFWS has been initiated and their concurrence with this determination requested.

(j) Appropriate and reasonable noise abatement features such as walls surrounding the facility or interior building soundproofing will be constructed as needed in the vicinity of the proposed pumping facility. It is recommended that the Recommended Plan be constructed at 100 percent Federal expense with the non-Federal sponsor being responsible for operation, maintenance, repair, replacement and rehabilitation of the Recommended Plan with a 75 percent Federal contribution for operations and maintenance and that the following items of local cooperation, in addition to the items of local cooperation contained in the General Design Memorandum for the Modified Water Deliveries to Everglades National Park, dated June 1992, shall be required of the non-Federal Sponsor.

(k) For so long as the project remains authorized, operate and maintain, repair, replace, and rehabilitate the completed Recommended Plan or functional portion of the Recommended Plan in accordance with applicable Federal and State laws and specific directions prescribed by the Government;

(l) Operate and manage at no cost to the Government all lands for the Recommended Plan north and west of the perimeter levee in accordance with a jointly developed management plan consistent with the purposes of the MWD Project to maximize ecological function and structure, restore

hydrological conditions, effectively control exotic species, incorporate fish and wildlife enhancement features, and maintain wetland function;

(m) Cost share 25% of the operation and maintenance costs of the Recommended Plan and provide 100% of the post-construction operation and management costs of the lands for the Recommended Plan north and west of the perimeter levee;

(n) Convey for fair market value consideration and reasonable incidental costs of acquisition all lands, easements, and rights-of-way owned by the non-Federal Sponsor to the Government for the Recommended Plan together with all maps, appraisals and other acquisition materials that may be of use to the Government;

(o) Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the Recommended Plan and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors;

(p) Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the Recommended Plan to the extent and in such detail as will properly reflect total project costs;

(q) To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the Recommended Plan in a manner that will not cause liability to arise under CERCLA;

(r) Participate in and comply with applicable Federal flood plain management and flood insurance programs in accordance with Section 402 of Public Law 99-662, as amended;

(s) Prevent future encroachments on the project lands, easements, and rights-of-way, which might interfere with the proper functioning of the Recommended Plan;

(t) Not less than once each year, inform affected interests of the limitations of the mitigation afforded by the Recommended Plan;

(u) Publicize flood plain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain, and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with mitigation levels provided by the Recommended Plan;

(v) Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by title IV of the Surface Transportation and Uniform Regulations

Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

(w) Comply with all applicable Federal and State laws and regulations, including section 601 of the Civil Rights Act of 1964, Public Law 880352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

(x) Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

(y) That as between the Government and the Non-Federal Sponsor that the non-Federal Sponsor shall be the operator of the Project for purposes of CERCLA liability.

(z) That the Non-Federal Sponsor shall investigate for hazardous substances as are determined necessary by the Government to identify the existence and extent of a hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, on lands being acquired by the Government for the construction, operation, and maintenance of the Recommended Plan at the Government's expense.

It is also recommended that the original Project Cooperation Agreement for the MWD Project be modified to remove Article 16 as it does not apply.

SECTION 6.0
COMPLIANCE WITH FEDERAL STATUTES, EXECUTIVE ORDERS, AND POLICIES

Coordination and evaluation of required compliance with specific Federal Acts, Executive Orders, and other policies for the nine alternatives and two variations is being considered, in part through the coordination of this FSEIS document with appropriate agencies and the public. This compliance was established for Alternative 1 (current authorized plan) in conjunction with the GDM/EIS on MWD Project to ENP (1992). This section describes how the Recommended Plan (Alternative 6D) complies with all applicable federal statues, executive orders, and policies.

6.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

The project is in compliance with Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, *et seq.* P.L. 91-190, at this stage of planning. Scoping for the SEIS was initiated in April 1, 1999, and a scoping letter identifying significant issues was distributed on June 3, 1999. A DEIS was circulated to all identified stakeholders, agencies, and concerned organizations on April 3, 2000. A Notice of Availability was sent to all previous participants in public scoping, and published in the Federal Register on April 14, 2000. The alternatives ananlysis was presented to the SFWMD Governing Board public meeting of April 10, 2000. A public workshop on the project was held in Homestead, Florida, on the evening of April 26, 2000. Public questions and commentary were accepted at this workeshop, which was held with bilingual translation available. Additional information of adjustments to Alternative 6B, called “Alternative 6C” and “Alternative 6D”, were circulated to all recipients of the Draft SEIS on May 9, 2000. The project was further discussed at public meetings of the SFWMD Board of Directors, in Homestead, Florida, on May 1, 2000, and on May 11, 2000. The public comment period closed on May 31, 2000; however, the SFWMD did not provide recommendations to the Fereral agencies until June 21, 2000. This document has been revised to incorporated public and agency comment and will again be coordinated with the public and concerned agencies for a period of no less than 30 days before a ROD is prepared for signature of the reponsible Federal officials. The Council on Environmental Quality (CEQ has identified the MWD FSEIS as USEPA # 000102. Pertinent correspondence is reproduced in Appendix B.

6.2 ENDANGERED SPECIES ACT OF 1973

A Biological Assessment (BA), under the provisions of the endangered species act (50 CFR 402), has been prepared and has concluded that the project would

not be likely to adversely affect any listed species (Attachment A). Coordination with the USFWS has been initiated and concurrence with this determination requested.

6.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project has been coordinated with the USFWS. A Coordination Act Report (CAR) in June of 2000 was submitted by the USFWS, along with two Supplements, dated respectively April 25 and May 9, 2000. A final Coordination Act Report was submitted. This project is in full compliance with the Fish and Wildlife Coordination Act of 1958, 48 Stat. 401, as amended, 16 U.S.C. 661, *et seq.* P.L. 86-624.

6.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966

Consultation with the Florida State Historic Preservation Officer (SHPO), has been completed in accordance with the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470a, *et seq*. P.L. 89-655; the Archeological and Historic Preservation Act, as amended and Executive Order 11593. In a letter dated June 22, 2000, SHPO concurred with the USACE's finding of no historic properties.

6.5 CLEAN WATER ACT OF 1972

The project is currently in compliance with The Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, *et seq*. P.L. 92-500. A Section 404(b)(1) evaluation report has been prepared for the Recommended Plan and is included in Attachment B.

6.6 CLEAN AIR ACT OF 1972

At this stage of planning, this project is currently in full compliance with Section 309 of the Clean Air Act of 1972, as amended, 42 U.S.C. 1857h-7, *et seq.* P.L. 91-604.

6.7 COASTAL ZONE MANAGEMENT ACT OF 1972

Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451, et seq. P.L. 92-583

The project is consistent with the Florida Coastal Zone Management Program (see letter dated July 13, 1999 from the State of Florida Department of Community Affairs concurring with our consistency determination in Appendix B).

6.8 FARMLAND PROTECTION POLICY ACT OF 1981

Coordination with the NRCS has been initiated consistent with the Farmland Protection Policy Act of 1980 and 1995, P.L. 97-98 (See letter dated March 10, 2000 Appendix B).

6.9 WILD AND SCENIC RIVER ACT OF 1968

No designated Wild and Scenic river reaches would be affected by project related activities. The Wild and Scenic River Act of 1968, as amended, 16 U.S.C. 1271, *et seq*. P.L. 90-542, is not applicable.

6.10 FEDERAL WATER PROJECT RECREATION ACT

The principles of the Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), *et seq*. P.L. 85-72, do not apply to this project.

6.11 RIVERS AND HARBORS ACT OF 1899

The proposed work would not obstruct navigable waters of the United States. The proposed action has been subject to the public notice, public hearing, and other evaluations normally conducted for activities subject to the Rivers and Harbors Act of 1899, 33 U.S.C. 401, *et seq*. The project is in full compliance.

6.12 ANADROMOUS FISH CONSERVATION ACT

As defined in the Anadromous Fish Conservation Act, (16 USC 757a-757g; 79 Stat. 1125) as amended by PL 89-304, anadromous fish species will not be affected.

6.13 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

The project is in compliance with the Migratory Bird Conservation Act, 16 U.S.C. 715-715d, 715e, 715f-715r; 45 Stat. 1222, and the Migratory Bird Treaties and other international agreements listed in the Endangered Species Act of 1973, as amended, Section 2(a) (4).

6.14 E.O. 11980, PROTECTION OF WETLANDS

This project is in compliance with the goals of this Executive Order.

6.15 E.O. 11988, FLOOD PLAIN MANAGEMENT

This project is in compliance with the goals of this Executive Order.

6.16 E.O. 12898, ENVIRONMENTAL JUSTICE

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, provides that” each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low-income populations.”

This project is being developed consistently with E. O. 12898, and is currently in compliance.

SECTION 7.0
PUBLIC INVOLVEMENT

As part of the preparation of this FSEIS, affected stakeholders have been afforded several opportunities for public input. Public involvement included numerous public forums to allow for residents, cooperating agencies, and affected stakeholders to present their issues and concerns. Table 18 summarizes public comment and interagency coordination to date.

Meetings held to specifically discuss this project included agency and stakeholder scoping meetings, technical team meetings, and formal public meetings. Numerous verbal and written comments were received from residents and non-residents, business owners, elected officials, special interest groups, tribal representation and the environmental community. During formal public meetings, all input was documented on tape by a stenographer and comment cards filled out by attendees were assembled. At the technical meetings, input was received from agency representatives, special interest groups, and other various stakeholders. Cooperative efforts were pursued to gain an understanding of issues and include input in the most effective manner possible.

All public meetings were announced (noticed) at least two weeks in advance while technical meetings were open to all interested parties who were notified via a network of electronic mail and telephone correspondence. In an effort to gather as much information and insight as possible, several visits were made to the 8.5 SMA, hosted by residents, business owners, and government agency and tribal representatives.

Input from the public played an important role in the decision-making process. Written comments were received during the formal 45-day comment period following the completion of the Draft GRR/SEIS. In addition, public workshops were held on April 26, 2000 and May 1, 2000 in Homestead, and presentations were conducted at SFWMD Governing Board meetings on April 12, 2000, May 10, 2000, and June 15, 2000. Public comment was facilitated at all of the above workshops and meetings.

The various stakeholder and interest groups expressed their differing views on the project as follows:

- Miccosukee Tribe - The Tribe supports the Authorized Plan or Alternative 1 because of its minimal cost, expeditious implementation schedule, minimal impact to the residents of the 8.5 SMA, and what they considered an acceptable level of environmental benefits to ENP and NESRS. The tribe expressed concerns with ongoing tree island mortality in the WCA's north of the 8.5 SMA because water was being "held back" in the WCA's due to lack of facilities to move it southward. The tribe further expressed concerns that alternatives that would require condemnation, could potentially" drag out" the process of building the 8.5 SMA component, which was seen as the keystone in the implementation of the rest of the MWD project.

- Miami-Dade County – The county will be affected by any alternative that impacts future development and future local costs. County Administration expressed significant concerns relating to the potential for increased development (density) within the 8.5 SMA, and they were also concerned with incurred costs due to implementation of any alternative, equitable distribution of costs for services to its citizens, and County requirements to provide local services to the area. The County Commission is generally unwilling to support any alternative that includes condemnation of private property.

- Landowners within the 8.5 SMA - Many landowners within the 8.5 SMA expressed an opinion that Everglades restoration is not dependent on the acquisition of 8.5 SMA and did not agree with relocation as an acceptable method of flood mitigation. Many of these residents and landowners preferred Alternative 7, and were in opposition to any alternative that results in relocation or the loss of property use within their community. On the other hand, several landowners did express a desire and willingness to sell their property within the 8.5 SMA, particularly given fair compensation and relocation assistance.

- Agricultural Community - Agricultural views on this project include the concern for potential effects resulting from the flooding of farmlands, change in stage and/or regulation schedules that could impact farming operations east of L-31N, economic impacts to west and south Miami-Dade farmers, and water quality impacts.

- Environmental Groups (i.e., Sierra Club, World Wildlife Fund, Audubon, etc.) – The environmental groups overwhelmingly supported the non-structural (i.e., acquisition) alternatives such as Alternatives 4 and 5. They believe buyout is necessary to restore hydropatterns to NESRS and ENP, to maintain water quality, and to protect existing habitats and enhance future habitats while ensuring that there is no impact to threatened and endangered species. These groups are concerned with and opposed to development in proximity to ENP.

MAILING LIST

List of the 8.5 SMA Final GRR/SEIS Recipients

Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
COOPERATING AGENCIES								
		Office of Environmental Policy & Compliance 1849 C Street, Room 2340	Washington	DC	20240		X	
Boggs	Jim	USFWS, 2001 U.S. Highway 60	Vero Beach	FL	32961		X	
Cunniff	Shannon	DOI, (MIB-7060), 1849 C. Street NW	Washington	D.C.	20240		X	
Director	Regional	NPS, 61 Forsyth Street	Atlanta	GA	30303		X	
Forsythe	Stephen	USFWS, P.O. Box 2676	Vero Beach	FL	32961-2676		X	
Gonzalez	Martin	USACE, 400 West Bay Street	Jacksonville	FL	32232		X	
Hamilton	Sam	USFWS, 1875 Century Blvd.	Atlanta	GA	30345-3301		X	
Hardesty	Gary	USACE, Pulaski Bldg. 20 Massachusetts Ave., NW, Rm. 7106	Washington	D.C.	20314		X	
Jodrey	Donald	DOI, Office of the Solicitor, 1849 C. Street NW, Rm. 6543	Washington	D.C.	20240		X	
Leary	William	CEQ, 722 Jackson Place NW Washington DC 20503	Washington	D.C.	20503		X	
Magley	Mike	USACE, 60 Forsythe St., SW, Room 9M15	Atlanta	GA	30303		X	
Ring	Richard	Everglades National Park 40001 State Road 9336	Homestead	FL	33034		X	
Sikkema	Dave	ENP, 40001 State Road 9336	Homestead	FL	33034		X	
Worth	Dewey	SFWMD, 3301 Gun Club Road	West Palm Beach	FL	33406		X	
GOVERNMENTAL AGENCIES								
Adams	John	SFWMD 9002 NW 58th Street	Homestead	FL	33178		X	
Bush	Eric	FDEP, P.O. Box 4970	Jacksonville	FL	32232		X	
		Florida State Clearinghouse Dept. of Com. Affairs, 2555 Shumard Oak Blvd.	Tallahassee	FL	32399-2100		X	
Coffin	Christine	USDA 15600 SW 288th Street Ste 402	Homestead	FL	33033		X	
		State Conversationist USDA, P.O. Box 141510	Gainsville	FL	32605-1510		X	
Daltry	Wayne	SW Fla. Reg. Planning Counc., P.O. Box 3445	N. Ft. Myers	FL	33918-3445		X	
		DERM Miami-Dade County 33 SW 2nd St., Suite 3	Miami	FL	33130		X	
Deutsch	Peter	US Rep., 1010 Kennedy Drive	Key West	FL	33040		X	
Diaz-Balart	Lincoln	US Rep., 8525 NW 53rd Terrace, Suite 102	Miami	FL	33166		X	
Director	Office of the	Ctr. For Env. Health Injury Control, 1600 Clifton Rd.	Atlanta	GA	30333		X	
Division	Water Resources	USGS, 9100 NW 36th Street, Suite 106	Miami	FL	33178		X	
Duncan	Gene	Water Resource Dir., MTI, P.O. Box 440021	Miami	FL	33144		X	

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Finch	Frank	SFWMD, P.O. Box 24680	West Palm Beach	FL	33416-4680		X	
Garcia	Rudy	State House of Rep., 7475 West 4th Ave.	Hialeah	FL	33014		X	
Graham	Senator Bob	524 Hart Senate Office Bldg	Washington	DC	20510		X	
Griffin	Jacquelyn	USACE 400 W Bay Street Rm G18A	Jacksonville	FL	32232-0019		X	
Hartman	Bradley	FFWCC, 620 S. Meridian St.	Tallahassee	FL	32399-1600		X	
Harvey	Richard	EPA, 400 North Congress Ave., Suite 120	West Palm Beach	FL	33401		X	
Hughes	Eric	EPA, P.O. Box 4970	Jacksonville	FL	32232		X	
Lau	Stephen	USFWS, 255 - 154th Ave.	Vero Beach	FL	32968-9041		X	
Lehtienen	Dexter	Miccosukee Tribe of Indians, 7700 N. Kendall Dr., Suite 303	Miami	FL	33126		X	
Lehtinen	Dexter	6005 SW 102 Street	Miami	FL	33156		X	
Lorion	Joette	Miccosukee Tribe of Indians, 7700 N. Kendall Dr., Suite 303	Miami	FL	33126		X	
McAliley	Neal	US Dept. of Justice, 99 NE 4th Street, Rm. 415	Miami	FL	33132-2111		X	
Meeder	Linda	South Dade Soil & Water Conservation District 15600 SW 288th Street Suite 402	Homestead	FL	33033		X	
Meek	Carrie	US Rep., 3550 Biscayne Blvd., Suite 500	Miami	FL	33137		X	
Moss	Dennis	BC Comm., 10710 SW 211th St., Suite 206	Miami	FL	33177		X	
Mueller	Heinz	EPA, 61 Forsyth Street, SW	Atlanta	GA	30303-3104		X	
		Office of Regional Environmental Clearance US Dept of HUD (Rm 600-C), 75 Spring Street, SW	Atlanta	GA	30303-3388		X	
		Office of the State Historic Preservation R.A. Gray Bldg., 500 S. Bronough St.	Tallahassee	FL	32399-0250		X	
Officer	Regional Environmental	U.S. Dept of Interior Office of Env Policy & Compliance 1849 "C" Street NW Room 2340	Washington	DC	20240		X	
Penelas	Alex	Mayor Miami-Dade County 111 NW 1st Street Ste 2910	Miami	FL	33128-1994		X	
Planning Dept.	Miami-Dade County	111 NW 1st Street Suite 11-310 Attn: Lee Rawlinson	Miami	FL	33128		X	
Poole	Mary Ann	FL Fish & Wildlife Commission 255 154th Ave	Vero Beach	FL	32968-9041		X	X
Pybos	Don	Miami-Dade Coop, 18710 SW 288th Street	Homestead	FL	33030		X	
Rice	Terry	Miccosukee Tribe of Indians, 7700 N. Kendall Dr., Suite 303	Miami	FL	33126		X	
Ros-Lehtinen	Ileana	US Rep., 9210 SW 72nd St., Suite 100	Miami	FL	33173		X	
Ross	Molly	Dept of Interior	Washington	DC	20240		X	

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		1849 C Street NW Rm 3150						
Scheidt	Dan	USEPA 980 College State Road	Athens	GA	30605		X	
Shiver	Steve	Mayor-City of Homestead, 790 N. Homestead Blvd.	Homestead	FL	33030-6299		X	
Stierheim	Merrett	County Manager Suite 2910 111 NW 1st Street	Miami	FL	33128-1994		X	
Thorp	Scott	SFWMD, 2195 NE 8th Street	Homestead	FL	33030		X	
Vauelia	Hector	West Kendall Comm. Coun. CC11, 15231 SW 154th Ave.	Miami	FL	33187		X	
Wallace	Otis	Mayor-City of Fla. City, P.O. Box 343570	Florida City	FL	33034		X	
Zebuth	Herbert	FDEP, P.O. Box 15425	West Palm Beach	FL	33416		X	
PUBLIC RECIPIENTS								
		Orange Audubon Society P O Box 1142	Maitland	FL	32751	X		
Abascal	Orlando	3301 SW 27th Terrace	Miami	FL	33133	X		
Abilio	Sanabria	3059 SW 19 Street	Miami	FL	33145		X	
Adams	Alma	407 Forrest Drive	Lawrenceburg	KY	40342	X		
Adams	Franklin	Izaak Walton League 761 15th Street SW	Naples	FL	34120-1913	X		
Adams, Dir (SFWMD)	John	801 Sansbury Way	West Palm Beach	FL	33411		X	
Afont	Aleida	2011 G Becquer	San Juan	PR	00926	X		
Aguilar	Cipriana	4184 SW 97 Court	Miami	FL	33165			X
Aguirre	Efren & Marina	1424 Arbor Vitae Road	Deerfield	IL	60015	X		
Aldecocea	Gonzalo	9601 102nd Place North	Maple Grove	MN	55369			X
Alessandrini	Celia	5003 SW 127th Place	Miami	FL	33175		X	
Almanza		2634 SW 108th Court	Miami	FL	33165			X
Almenares	Luis	3100 W 68 Place	Hialeah	FL	33018	X		
Altarriba	Miguel	5500 W 12th Lane	Hialeah	FL	33012		X	
Alvarez	Domingo	1864 SW 25 Street	Miami	FL	33133	X		
Alvarez	Silvio	139 Montague Avenue	Winchester	VA	22601	X		
Amador	Domingo	28 Linden Avenue	Floral Park	NY	11001	X		
Amador	Pedro	1429 Sorolla Avenue	Coral Gables	FL	33134	X		
Ammirati	A & L	3870 N A1A Apt 201	Ft. Pierce	FL	34949	X		
Amsler	Roger	964 S 750th W	Rensselaer	IN	47978	X		
Anderson	Lois	912 3rd Street #4	Langdon	ND	58249	X	X	X
Anderson	Lucie	Ridge Audubon Society 1122 Circle Drive	Lake Wales	FL	33853	X		
Andreano	Mike	12200 SW 199 Avenue	Miami	FL	33196		X	
Andreu	Leonor	10821 SW 93 Street	Miami	FL	33176		X	
Anglerau	Joseph	1708 N Pleasant Drive	Chandler	AZ	85225		X	
Aponte-Gutierrez	Rafael	Ashford Medical Center 505	San Juan	PR	00907	X		
Arce	Isabel	410 W 30 Place	Hialeah	FL	33012	X		
Arce	Gabriel	3099 NW 16th Street	Miami	FL	33125	X		
Arce Jr.	Gabriel	26420 SW 122 Avenue	Naranja	FL	33032	X		
Arean Elias	Damaso Roberto	7105 Miami Lakes Drive #N-12	Miami Lakes	FL	33014	X		
Arenas	Enrique	11831 SW 123rd Avenue	Miami	FL	33186	X		

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Arguelles	Armando	13450 SW 30 Street	Miami	FL	33175	X		
Aristides	Sads	P O Box 361	N Miami Beach	FL	33164		X	
Aristides	Sans	P O Box 361	N Miami Beach	FL	33164		X	
Armada	Alberto	5230 NW 4 Street	Miami	FL	33126	X		
Armas	J. A.	255 University Drive	Coral Gables	FL	33134		X	X
Armas	Lazaro	20404 SW 160 Street	Miami	FL	33187	X		
Armstrong	W. K.	16475 SW 214 Avenue	Miami	FL	33187		X	
Arquilla	Londi	994 Williamsburg Pk	Barrington	IL	60010	X		
Artigus	Salvador	55 SW 63 Court	Miami	FL	33144	X		
Ashton	Richard	19029 US 19 N Bldg 31-F	Clearwater	FL	33764			X
Avila	Ada	4622 SW 82 Court	Miami	FL	33155	X		
Avila	John	811 W 50th Street	Hialeah	FL	33012	X		
Avshalom	Edri	15615 SW 213 Avenue	Miami	FL	33187	X		
Ayala	Rodolfo	21 W 45 Place	Hialeah	FL	33012	X		
Balbin	Sergio	519 Cedar Forest Circle	Orlando	FL	32828	X		
Balman	Dave	Airboat Assoc of Florida P O Box 650611	Miami	FL	33165	X		
Balmori	Fernando	Calle 6 L-3 Capey Gardens	San Juan	PR	00926			X
Barbeito	Antonio	7720 SW 78 Street	Miami	FL	33143	X		
Barley	Mary	P O Box 1915	Islamorada	FL	33036			X
Barros	Bernabe	13985 SW 25 Terrace	Miami	FL	33175	X		
Bean	Merle	4045 45th Street	Des Moines	IA	50301	X		
Bechler	John	106 W Calumet Avenue	George	IA	51237		X	
Beggs	Richard	5325 Marilyn Lane	St. Cloud	FL	34772	X		
Belcher	Gary	233 Lorraine Circle	Bloomingdale	IL	60108	X		
Bell	Susan	10612 SW 71 Lane	Miami	FL	33173		X	
Berger	Dave	2009 Prospect Street	La Crosse	WI	54603		X	
Bilbao	Jose	9311 SW 4 Street #105	Miami	FL	33174			X
Bilsky	Kenneth	159 John Duggan Road	Tiverton	RI	2878	X		
Biondi	Lisa	381 Carlisle Drive	Vineland	NJ	08360		X	
Black	Mike	P O Box 97-1298	Miami	FL	33197		X	X
Blackard	J.T.	10345 NW 2nd Court	Miami	FL	33150	X		
Blanclard	Herbert	1728 358th Avenue	Wever	IA	52658	X		
Blau	Gary	20450 NW Second Avenue	Miami	FL	33169			X
Blossfield	Charles	838 N Marion	Oak Park	IL	60302	X		
Blute	John	22 Greenleaf Drive	Danvers	MA	01923	X		
Bodolay	Steve	260 Ocean Drive #27	Miami Beach	FL	33139		X	
Boni	Sergio	10393 SW 115 Street	Miami	FL	33176		X	
Borgia	Lisa	P O Box 440021 Tamiami Station	Miami	FL	33144			X
Boudet	Jose	12343 SW 265 Terrace	Miami	FL	33032	X	X	
Bowen	Ronald	12867 Waterhaven Circle	Orlando	FL	32828			X
Braceras	Jorge	55 NE 1st Street	Miami	FL	33132		X	
Bracers	Fermin	1020 NW 34 Avenue	Miami	FL	33125	X		
Bramblett	O.C.	18950 SW 136th Street	Miami	FL	33196		X	
Braun	Florette	FP&L 700 Universe Blvd	Juno Beach	FL	33408	X		X
Bravo	Hilda	P O Box 67	Englelwood	CO	80151	X		
Bryant	Janet	5793 SW 34th Terrace	Ft. Lauderdale	FL	33312			X

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Burdon	Carlos	8360 SW 87th Terrace	Miami	FL	33143	X		
Burger	John	4400 Cleveland Place	Metairie	LA	70003	X		
Burton	M. E.	1926 Eaton Avenue	Owensboro	KY	42301	X		
Bush	Eric (FDEP)	P O Box 4970	Jacksonville	FL	32232		X	
Butoryak	Frank	1708 SE 28 Street	Coral Gables	FL	33904	X		
Buy Today Inc.		P O Box 32247	Palm Beach Gardens	FL	33420	X		
Cabage	Albert	3149 Bluebell Lane	Indianapolis	IN	46224	X		
Cabezas	Lazaro	11072 SW 65 Street	Miami	FL	33173	X		
Cabezudo	Victor	P O Box 883	Cidra	PR	739	X		
Cabrera	Aura	20890 SW 152 Street	Miami	FL	33187	X		
Cabrera	Carlota	2957 SW 36 Street	Miami	FL	33133	X		
Caiaffa	Armando	11000 SW 65 Street	Miami	FL	33173	X		
Cali	Ronald	6024 Anviel Avenue	Sarasota	FL	34243		X	
Cali	Anthony	58 Sherwood Avenue	Yonkers	NY	10704		X	
Callaizakis	Gus & Marie	P O Box 161109	Miami	FL	33116		X	
Cambo	Marta	Cond Amapola 14 Apt 405	Isla Verde Carolina	PR	00979	X	X	
Campbell	Stella	790 1575 Road	Delta	CO	81416	X		
Cao	Roberto	491 E 27 Street #2	Hialeah	FL	33013	X		
Capote	Raul	30 NW 41 Avenue	Miami	FL	33126	X		
Cardona	Wilma	7103 3rd Avenue 1A	Brooklyn	NY	11209		X	
Carlin	Stan	P O Box 517	Melbourne	FL	32902	X		
Carmona	Benito	7400 SW 50 Terrace, Suite 200	Miami	FL	33155	X		
Carnero	Carlos & Rafaela	13422 Beloit Woods Lane	Orlando	FL	32824	X		
Carney	Stephen	Carney Env. Con., 6435 SW 85th St.	Miami	FL	33143		X	
Carney	Alix	6435 SW 35 Street	Miami	FL	33143	X		
Carney	Stephen	6435 SW 85 Street	Miami	FL	33143		X	
Carr	Orlando	4570 SW 128 Avenue	Miami	FL	33175	X		
Carroll Esq	Dione	7700 N Kendall Drive #303	Miami	FL	33156		X	
Casanas	Manuel	3035 SW 98 Court	Miami	FL	33165	X		
Casimiro	Sandy	14001 SW 194 Avenue	Miami	FL	33196	X		
Castellanos	Rodolfo & Olga	2411 SW 36 Avenue	Miami	FL	33145	X		
Castor	William	753 E Lark Drive	Barefoot Bay	FL	32976		X	
Cesarec	Frankie	P O Box 901001	Homestead	FL	33090		X	
Cespedes	Emilio	9850 SW 82 Terrace	Miami	FL	33173	X		
Chapman	Edward	12375 SW 202 Avenue	Miami	FL	33196		X	
Chavez	Orlando	2881 NW 5th Street	Miami	FL	33125			X
Chicvara	Richard	15220 SW 88th Court	Miami	FL	33157	X		
Chinquina	Don	Director Tropical Audubon Society Inc. 5530 Sunset Drive	Miami	FL	33143		X	
Ciccariello	R	71 Merriam Street	Somerville	MA	2143	X		
Cipponeri	Victor	3943 Winnebago	St. Louis	MO	63116	X		
Claro	Esmildo	5418 SW 128 Place	Miami	FL	33175	X		
Clinkenbeard	Virgene	12 Cottonwood Court	Washington	IN	47501	X		
Cloutier	Frances	1106 Fairways Blvd	Troy	MI	48098	X		
Coats	James	715 SW Rustic Circle	Stuart	FL	34997	X		
Cohen	Jacob	3944 NE 167th Street #402	N. Miami Beach	FL	33160	X		

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Coleman	Richard	Sierra Club 203 Lake Pansy	Winter Haven	FL	33881	X		
Coles	Eldon	2496 Walnut Hill Rd	Holland	KY	42153	X		
Concepcion	Julio	831 NW 18 Place	Miami	FL	33125		X	
Concepcion	Norberto	12655 SW 190th Terrace	Miami	FL	33177		X	
Congressman	Peter Deutsch	1010 Kennedy Drive #310	Key West	FL	33040		X	
Conolos	Sean	6868 Brook Hollow Road	Lake Worth	FL	33467			
Cooley	Richard	P O Box 307	Strasburg	VA	22657		X	
Cooper	J. T.	2901 SW 4th Court	Gainesville	FL	32601		X	
Cooperman	N. J.	72773 Fleetwood Circle	Palm Desert	CA	92260		X	
Copenhaver	Evelyn	P O Box 13	Rural Retreat	VA	24368		X	
Coronas	Mariano	P O Box 148	San Lorenzo	PR	00754	X		
Corron	D. Ray et al	105 Binnacle Drive	Moneta	VA	24121	X		
Corton	Maria	1721 SW 133 Avenue	Miramar	FL	33027	X		
Costantino Jr.	John	9115 SW 52 Street	Miami	FL	33165	X		
Coto De Orbeth	Enaique	97 Celava Court	Kissimmee	FL	34945	X		X
Crawford	Jim	411 Coggeshall Street	Oxford	NC	27565	X		
Cree	Evan	103 6th Avenue N #3	St Petersburg	FL	33701		X	
Crespi	Salomon	16 Rollscourt Drive	Toronto,	Canada	M2L1X5	X		
Cross Creek	Trust	6967 SW 115 Place E	Miami	FL	33173	X	X	
Crushshon	Herbert	P O Box 4197	San Juan	PR	00902		X	
Cruz	Carmelo	Calle 30 SE #1231 Capara Terrace	San Juan	PR	00921	X		
Cruz	Frank & Idolidia	5826 Pierce Street	Hollywood	FL	33021	X		
Cruz	Isabel	2852 SW 1 Street	Miami	FL	33135	X		
Cruz	Jose	611 NW 61 Avenue	Miami	FL	33126	X		
Cruz	Jose & Guadalupe	16161 SW 200 Avenue	Miami	FL	33187	X		
Cruz Pino	Rolando	P O Box 6220 Station #1	Bayamon	PR	960	X		
Cuesta	Pedro	7123 SW 21 Street	Miami	FL	33155	X		
Curzio	Charles	3641 NW 18 Street	Miami	FL	33125	X		
Cushman	Ken	15451 SW 208 Avenue	Miami	FL	33187	X		
Daley	Anne	P O Box 158	Green Village	NJ	07935	X	X	
Dalisay	George	3830 NW 78 Lane	Hollywood	FL	33024	X		
Danner	Irene	51 S Colonial Ave	Westminster	MD	21157	X		
Davidson	Paul	15552 71st Place N	Loxahatchee	FL	33470			X
Davis	Darryl	800 H NW	Childress	TX	79201	X		
Davis	Justine	5450 SW 116 Avenue	Miami	FL	33165	X		
De La Torre	Roberto	303 W 42 Street Apt 1100	New York	NY	10036	X		
de Navea	Carlos	12575 SW 189 Street	Miami	FL	33177			X
De Velasco	Eduardo	16651 SW 205 Avenue	Miami	FL	33187	X		
Deady	Erin	Audubon of Florida 444 Brickell Avenue Ste 850	Miami	FL	33131	X		
Del Rio	Maria	2715 SW 95th Court	Miami	FL	33165	X		
Delgado	Humberto	19309 NW 45 Avenue	Carol City	FL	33055	X		
Delgado	Oliverio	11820 SW 34th Street	Miami	FL	33175		X	
Delgado	Pablo	P O Box 322	Gurabo	PR	00778	X		
Delluelbes	Roberto	2054 SW 22nd Terrace	Miami	FL	33145	X		
DeSousa	Jose	16070 SW 153 Avenue	Miami	FL	33187		X	
DeVries	LeRoy	6624 Cherry Valley Road	Middleville	MI	49333			X

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Diamond	Craig	Sierra Club 1307 Leewood	Tallahassee	FL	32312	X		
Diaz	Antonio	15490 SW 209 Avenue	Miami	FL	33187	X		
Diaz	Frank	910 W 64 Street	Hialeah	FL	33012		X	
Diaz	Gerardo	12470 SW 104 Terrace	Miami	FL	33186		X	
Diaz	Martin	12124 SW 131 Avenue	Miami	FL	33186	X		
Diaz	Maximo Oscar	400 SW 55 Avenue	Miami	FL	33134	X		
Dibernardo	Sheree	P O Box 960722	Miami	FL	33296			X
Dieter	Gladys	3476 White Pine Drive	Walnut Port	PA	18088	X		
Digon	Vivian	2154 SW 99th Avenue	Miami	FL	33165		X	
Dilley	Luther	2554 S 12th Street	Ironton	OH	45638		X	
Dinwiddie	George	68011 Sweet Lake Rd	Sturgis	MI	49091-9592	X		
Doebler	Lizabeth	9550 SW 188 Terrace	Miami	FL	33157		X	
D'Oleby	Elena	20420 SW 120 Street	Miami	FL	33196	X		
Dominguez	Celedonio	6376 SW 39 Street	Miami	FL	33155	X	X	X
Dominguez	Orlando	5835 N Washtenaw	Chicago	IL	60659		X	
Dominguez	Rosa	95 SW 49 Avenue	Miami	FL	33134			X
Donlon	C.W.	1409 NY Route 26	Vestal	NY	13850	X		
Draper	Eric	National Audubon Society 444 Brickell Avenue #850	Miami	FL	33131	X		
Dreessen	Donald	719 S	Mt. Prospect	IL	60056		X	
Driggers	Emma	244 Hartwell Rd	Lavonia	GA	30553	X		
Duncan	Kenneth	330 W 45 Street	Hialeah	FL	33012		X	
Duncan	Truman	P O Box 440021 Tamiami Station	Miami	FL	33144		X	
Durando	Rosa	10308 Heritage Farms	Lake Worth	FL	33467	X		
Eastin	Robert	1811 Fairway Drive	Dodge City	KS	67801		X	
Eber	Robert	54606 Princess Avenue	Elkhart	IN	46514	X		
Ehrhard	Joretta	1320 Crestview Road	Albert Lea	MN	56007	X		
Eifler	Victor	170 Norton Road	Burlington Flats	NY	13315	X		
El Hassan	Juan	10040 SW 41 Terrace	Miami	FL	33165	X	X	X
Eliason	George	2202 N. West Shore Blvd., #250	Tampa	FL	33607	X	X	X
Ellsworth	Elmon	1035 S 1500 East	Salt Lake City	UT	84105			X
Enterprises Inc	Libagi	724 NW 133rd Avenue	Miami	FL	33182		X	
Eremita	Nunzio	2 Radcliff Road	Staten Island	NY	10305		X	
Eriksson	Lars	P O Box 4211	Rio Rico	AZ	85648	X		
Erwin	John	3000 S 15 1/2 Road	Harrietta	MI	49638	X		
Escorcia	Helvia	100 W 49 Street	Hialeah	FL	33012	X		
Estenoz	Shannon	World Wildlife Fund 1909 Harrison Street Suite 207	Hollywood	FL	33020		X	X
Eye	Clair	233 N Val Vista Drive #950	Mesa	AZ	85213		X	
Fabre	Antonio	13038 SW 68 Lane	Miami	FL	33183		X	
Facterman	Michael	1920 NW 107th Terrace	Coral Springs	FL	33071	X		
Fadden	Wayne	1611 Hickory Street	South Milwaukee	WI	53172	X		
Falcon	Eduardo	15651 SW 205 Avenue	Miami	FL	33187	X		
Farace	Richard	275 Champney Bay Court	Naples	FL	34102	X		
Faranda	Mary	5117 Maria Drive	Boynton Beach	FL	33436	X		
Farinas	Julio	212 Walton Heath Drive	Atlantis	FL	33462	X		

List of the 8.5 SMA Final GRR/SEIS Recipients

Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Faust	Dean	1825 Grant Avenue	Britt	IA	50423		X	
Feakes	Laura	15315 SW 106 Terrace #401	Miami	FL	33196			X
Feeney	Linda	93805 Pleasant Grove Road	Inverness	FL	34452		X	
Fernandez	Agustin & Miriam	275 W 60 Street	Hialeah	FL	33012	X		
Fernandez	Casiano	8895 SW 11 Street	Miami	FL	33174	X		
Fernandez	Hery	2451 Brickell Avenue 10-P	Miami	FL	33129	X	X	
Fernandez	Juana	20175 SW 152 Street	Miami	FL	33187		X	
Fernandez	Luis	1201 SW 142 Avenue	Miami	FL	33184	X		
Fernandez	Maria	50 NW 43 Place Apt 14	Miami	FL	33126	X		
Fernandez	Pedro	157 SW 20 Road	Miami	FL	33129	X		
Fernandez	Ramon	4760 NW 1 Street	Miami	FL	33126	X		
Fernandez	Roberto & Lerida	19910 SW 160 Street	Miami	FL	33187	X		
Fernandez	Sarah	1361 Bella Vista Avenue	Coral Gables	FL	33156		X	
Fill	Robert	25651 S River Road	Mt. Clemens	IL	48045	X	X	
Finlan	Mary	43 N Krome Avenue	Homestead	FL	33030		X	
Fiskelli	Freddy	16700 SW 68 Street	Ft. Lauderdale	FL	33331		X	
Fitch	John	The Conservancy 1450 Merrihue Drive	Naples	FL	33942	X		
Flack	Bonnie	120 Rancho Vista Drive	Las Vegas	NV	89106	X		
Fleitas	Manuel	9560 SW 183 Street	Miami	FL	33157	X		
Flicker	John	The Nature Conservancy 222 S Westmonte Drive Suite 300	Altamonte Springs	FL	32714-4269	X		
Flint	Joyce	2504 Lilac Lane	Janesville	WI	53545		X	
Foldessy	Joseph	9440 Tangerine Place Apt 107	Ft. Lauderdale	FL	33324			X
Fons	David	675 Brewer Road	Leonard	MI	48367			X
Fons	Mary	675 Brewer Road	Leonard	MI	48367		X	
Fortin	Madeleine	21801 SW 152 St.	Miami	FL	33182		X	
Foster	David	6100 SW 82 Avenue	Miami	FL	33143	X		
Fosz	Steve	11421 NW 14th Court	Pembroke Pines	FL	33026		X	
Franqui	Mario	219 W 106 Street #1E	New York	NY	10025		X	
Fredersdorf		3315 Pendelton Drive	Wheaton	MD	20902		X	
Fuentes	Ed	16551 SW 218 Avenue	Miami	FL	33187	X		
Fuller	Manley	P O Box 6870	Tallahassee	FL	32314		X	
Gaggi	Rose	283 Bay 8 Street	Brooklyn	NY	11228		X	
Galdo	Jose	3105 Riverdale Road	The Villages	FL	32159	X		
Garcell	Emilio	9138 Grand Canal Drive	Miami	FL	33174	X		
Garcia	Alberto & Ida	510 E 59 Street	Hialeah	FL	33103	X		X
Garcia	Anthony	11200 SW 93 Street	Miami	FL	33196	X		
Garcia	Carlos	1305 W 46 Street #126	Hialeah	FL	33012	X		
Garcia	Carlos	P O Box 2604	Ocala	FL	34478		X	
Garcia	Carlos	704 Miramar Avenue	San Juan	PR	00907		X	
Garcia	Carlos & Patsy	15821 SW 209 Avenue	Miami	FL	33187		X	
Garcia	Dagoberto	1429 SW 14 Terrace	Miami	FL	33145	X		
Garcia	Heriberto	7745 SW 75 Terrace	Miami	FL	33143		X	
Garcia	Jose	De Diego Avenue #522	Rio Piedras	PR	00923	X		
Garcia	Jose & Nora	10873 NW 1st Lane	Miami	FL	33172	X		X

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Garcia	Gricelia	70 NW 35th Avenue	Miami	FL	33125	X		
Garcia	Miguel	2855 Auburn Avenue	Columbus	GA	31906	X		
Garcia	Raquel	461 NW 31 Avenue	Miami	FL	33125		X	
Garcia	Rolando	591 W 53 Street	Hialeah	FL	33012		X	
Gardin	M. R.	P O Box 844	West Palm Beach	FL	33402			X
Gardner	Louise	315 Spruce Street	Clearfield	PA	16830	X		
Gastmeyer	Roberta	Sierra Club Loxahatchee GR P.O. Box 6271	Lake Worth	FL	33461	X		
Gibney	Richard	2202 N. West Shore Blvd, #250	Tampa	FL	33607	X	X	X
Gil	Maria	10832 SW 61 Terrace	Miami	FL	33173	X		
Gilbert	Robert	7 Maple Glen Court	Randolph	MA	2368		X	
Gill	Paul	115 Lakeview Drive	Caldwell	OH	43724		X	
Gillem	L C & Myrtle	710 W Old Hickory Blvd	Madison	TN	37115		X	
Girgenti	Vincent	11 Valerie Lane	Danbury	CT	06811	X		
Glenn	Janet	1023 Greenridge Lane	Columbia	SC	29210	X		
Glockmann	William	Rare Fruit Council 9830 SW 114th Street	Miami	FL	33176-4146	X		
Gobel Jr.	J.	P O Box 960070	Miami	FL	33296			X
Gobel Jr.	Juana	P O Box 960070	Miami	FL	33296			X
Goitz	Elizabeth	5230 SW 89th Place	Miami	FL	33165	X		
Goldwebber	Seymore	Dade County Agriculture Council 7900 SW 126th Terrace	Miami	FL	33156	X		
Gonzalaz	Bill	Dealers of America, 10800 Sw 211th St.	Miami	FL	33189		X	
Gonzalez	Alejandro	4511 NW 5 Street	Miami	FL	33126	X		
Gonzalez	Dulce Maria	305 NW 77 Avenue	Miami	FL	33126	X		
Gonzalez	Fernando & Ofelia	9454 SW 77th Avenue Apt S7	Miami	FL	33156	X		
Gonzalez	Flamen	325 Reinette Drive	Miami Springs	FL	33166	X	X	
Gonzalez	Francisco	P O Box 450279	Miami	FL	33245	X		
Gonzalez	Jose	11935 SW 189 Street	Miami	FL	33177	X		
Gonzalez	Nelson	Jardines De Arecibo I-23 Calle J	Arecibo	PR	06612	X		
Gonzalez	Pedro	8 Deer Hollow Drive	Howell	NJ	07731			X
Gonzalez	Rafael	9747 Cedros Avenue	Panorama City	CA	91402	X		
Gonzalez	Segundo	434 15th Street	Brooklyn	NY	11215	X		
Gonzalez de Cruz	Maria	15959 SW 6 Street	Pembroke Pines	FL	33027	X		
Gonzalez-Rauchmann	Maria	6461 SW 20 Street	Miami	FL	33155	X		
Gothe	Rose	2107 Fairland Street	Pittsburge	PA	15210	X		
Grabill	Samuel	1024 18th Street	Audubon	IA	50025		X	
Gran	Enrique	1315 SW 104 Court	Miami	FL	33174	X		
Grana	Dian	P O Box 248106 Univ of Miami	Coral Gables	FL	33124	X		
Grassia	Thomas	5 Commonwealth Road	Natick	MA	01760	X		
Grathwohl	Richard	P O Box 500065	Marathon	FL	33050			X
Green	Emery	6540 NW 46th Street	Ft. Lauderdale	FL	33319	X		
Greenberg	Meyer	11088 Rios Road	Boca Raton	FL	33498	X		
Greenleaf	Donald	26409 S Eastlake Drive	Sun Lakes	AZ	85248	X		

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Greensbaum	Alan	1012 Hoperidge Court	Colonial Heights	VA	23834		X	
Grenet	Emilio	7921 SW 20 Street	Miami	FL	33155	X		
Grenet	Emilio	7921 SW 20 Street	Miami	FL	33155		X	
Grosse	Jerry	10580 94th Place	Seminole	FL	33772		X	
Grosso	Richard	3305 College Avenue	Ft. Lauderdale	FL	33314			X
Grosz	Agnes	10 North Street	Adams	MA	01220		X	
Guadagno	Vincent	15844 Forsythia Circle	Delray Beach	FL	33484		X	
Gueuara	John	4120 Euclid Avenue	Tampa	FL	33629		X	
Gurney	Susan	5706 NE 21 Drive	Ft. Lauderdale	FL	33308			X
Gutierrez	Jesus	603 NW 23 Place	Miami	FL	33125		X	
Haber	James	5745 Ellsworth Avenue	Pittsburgh	PA	15232	X		
Haddad	Miguel	9101 W Okeechobee Road	Hialeah Garden	FL	33018		X	
Haddock	David	The Pacific Legal Foundation 10360 Old Placerville Rd Suite 100	Sacramento	CA	95827	X		
Hall	Alan	2615 S Putters Lane	Melbourne	FL	32901		X	
Hamano	Sadako	25 Segatogue Lane	Centereach	NY	11720	X		
Hamaty	Edward	9720 SW 123rd Street	Miami	FL	33176		X	
Hamilton	John	5369 Peck Road	Erie	PA	16510		X	
Hamm	Raymond	212 Watanga Avenue	Elizabethton	TN	37643	X		
Hanes	Luis	3431 SW 111 Avenue	Miami	FL	33165	X		
Harris	Elliott	111 SW 3 Street 6th Floor	Miami	FL	33130	X		
Harris	Phyllis	429 SW 17th Terrace	Homestead	FL	33030	X		
Harvard	Judith	368 Paga Mine Road	Cartersville	GA	30120	X		
Harvey	Robert	12800 SW 7th Court G407	Pembroke Pines	FL	33027		X	
Harvey (US EPA)	Richard	400 N Commonwealth #120	West Palm Beach	FL	33401			X
Hawthorne	Lloyd	16649 N County Road 349	McAlpin	FL	32062		X	
Hayward	William	P O Box 246	Duck Hill	MS	38925	X		
Heicher	Lawrence	362 S 88th Street	Milwaukee	WI	53228		X	
Heirtzler	C. R.	Rt 1, Box 122	Buna	TX	77612	X		
Hernandez	Cesareo	8906 NW 173 Terrace	Miami	FL	33018	X		
Hernandez	Juan	31 Central Avenue P O Box 703	Ridgefield Park	NJ	07660	X		
Hernandez	Julio	26331 SW 132 Avenue	Miami	FL	33032	X		
Herskowitz	Jack	9100 S Dadeland Blvd #1404	Miami	FL	33156	X		
Hilgendorf	John	1876 Pine Ridge Court	Bloomfield Hills	MI	48302			X
Hill	Jack	32625 County Road 17	Haxtun	CO	80731	X		
Hinrichs	Raymond	138 N Hale	Palatine	IL	60067	X		
Hinton	Walton	14521 Rosewood Road	Miami Lakes	FL	33014		X	
Hipple	Bruce	1647 Sky Terrace SE	Salem	OR	97306		X	
Hirschfeld	Helen	League of Women Voters Broward County 202 SW 63rd Avenue	Plantation	FL	33317	X		
Hoffman	Allen & Jane	9555 Old Mazon Road Box 100	Gardner	IL	60424	X		X
Holloway	John	P O Box 228	Mexia	TX	76667	X		

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Homa	Gary	8847 Escondido Way	Boca Raton	FL	33433	X		
Honaski	Raymond	12321 Happy Hollow	Cockeysville	MD	21030	X		
Hosticka	Allen	4012 Gremley Terrace	Schiller Park	IL	60167	X		
Houben	Ron	P O Box 9797	Naples	FL	34101		X	
Houghton (BCEPOA)	Richard	5901 SW 114 Terrace	Miami	FL	33156	X		
Hub	John	1011 N Main Street	Naperville	IL	60563		X	
Humble	James	P O Box 1569	Homestead	FL	33090		X	X
Humphries	Charles	1311 Alhambra Circle	Coral Gables	FL	33134	X		
Hurd	Richard	1656 Walnut Valley Road	Dover	AR	72837		X	
Iezzi	Veronica	3101 Sunset Avenue	Longport	NJ	08403	X		
Ishmael	Ruth	1602 Matador Street	Abilene	TX	79605	X		
Iturrey	Modesta	5800 SW 27 Street	Miami	FL	33155			X
J. B. J.		8133 NW 66 Street	Miami	FL	33166		X	
James	C. P.	RR3 Box 1570	Atoka	OK	74525	X		
James	Rosalie	P O Box 31	Olympia Fields	IL	60461	X		
Jaramillo	David	14631 SW 150 Avenue	Miami	FL	33196	X		
Johnson	Judie	P O Box 571265	Miami	FL	33257			X
Joly	L.	2815 Rineyville Big Spring	Rineyville	KY	40162		X	
Jones	Ronald	Dept. of Bio. Sci., FIU/University Park	Miami	FL	33199		X	
Jones	Donald	5 Mead Place	Pompton Plains	NJ	07444		X	
Jones	Michael	P O Box 560114	Miami	FL	33256	X		
Jones, Ph.D. (FIU)	Ronald	University Park, OE 148	Miami	FL	33199		X	X
Jorge	Guillermo	330 SW 134 Avenue	Miami	FL	33184	X		
Jorgenson	George	2725 Juniper Street	Norfolk	VA	23513		X	X
Josey Jr.	Clyde	439 S Strand Dirve	Norwood	NC	28128	X		
Kalpupersaud	Kawall	9100 SW 213 Street	Miami	FL	33189	X		
Kanagie	Rosemary	12365 SW 18 Street Apt 111	Miami	FL	33175	X		
Kelley	Clarence	14850 SW 199 Avenue	Miami	FL	33196		X	
Kelley	Harold	811 Rhododendron Place	Aiken	SC	29801	X		
Kelly	Gloria	5510 Woodhaven Road	Pincknyville	IL	62274			X
Kennon	Jesse	P O Box 440727	Miami	FL	33144		X	
Khamusi	Hasan or Husaina	18490 Webster	Southfield	MI	48076	X		
Khan	Mohamed	56 S Middletown Road	Pearl River	NY	10965	X		
Kindred	Ralph	2548 Whatley Blvd	Sebring	FL	33872		X	
Kissner	Linda	Oklawaha Valley Audubon Society P O Box 641	Eustis	FL	32727-0741	X		
Knodel	Gail	Florida Lime and Avocado Committees P O Box 900188	Homestead	FL	33090-0188	X		
Kobal	Helen	11 Beaconlight Avenue	Keansburg	NJ	07734		X	
Kobusch	William	2418 Franklin Aven NE	Cedar Rapids	IA	52402		X	
Koch	James	2201 Avenue B SW	Winter Haven	FL	33880	X		
Komlos (NAS)	Shawn	444 Brickell Avenue #850	Miami	FL	33131		X	
Kong	Stanley	2721 SW 92nd Place	Miami	FL	33165	X		
Korkosz	Jeanne	32287 Hamilton Court #103	Solon	OH	44139	X		
Kraft	Peter	200 SE 2nd Street Box 412	Linton	ND	58552		X	

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Kraud	Randall	217 S 1300 East	Burnettsville	IN	47926	X		
Kraus	Mark	444 Brickell Avenue #850	Miami	FL	33131		X	
Krishna	Paul	137 Holly Lane	Pilesgrove	NJ	08098	X		
Kronenberg	Marvin	85 Mary Chilton Road	Needham	MA	02492		X	
Labrada	Art	7821 SW 29 Street	Miami	FL	33155	X		
Lake Region	Audubon Society	c/o Street Nature Center 115 Lameraux Road	Winter Haven	FL	33884	X		
Lamenca	Norberto & Estrella	6450 SW 25 Street	Miami	FL	33155	X		
Lamorena	Rafael	11811 SW 168 Terrace	Miami	FL	33177	X		
Landrian	Mario	1260 NW 95th Avenue	Plantation	FL	33322	X		
Lane	Mabel	127 Crestview Apt 1	N Little Rock	AR	72116	X		
Lane	Mabel	127 Crestview	N Little Rock	AR	72116		X	
Lange	Oscar	7822 Airport Road	Middleton	WI	53562		X	
Langston	Talley	3009 Grayson Street	Baltimore	MD	21216		X	
Lapointe	Capt Buddy	Marathon Guides Association P O Box 500065	Marathon	FL	33050-0065	X		
Larralde	Eduardo	10410 SW 16 Street	Miami	FL	33165	X		
Lazaro	Daniel	6841 SW 78 Terrace	S Miami	FL	33143			X
Lazaro	Oterino	3914 Doral Drive	Tampa	FL	33634	X		
Lee	Charles	1331 Palmetto Avenue	Winter Park	FL	32789		X	X
Lee	Johanna	16100 SW 88 Avenue Road	Miami	FL	33157			X
Lee	S.	71 Island Parkway	Island Park	NY	11558		X	
Leon	Alfredo	14200 SW 197 Avenue	Miami	FL	33196	X		
Lepetrie	James	12600 SW 207 Avenue	Miami	FL	33196		X	
Lerman	Alfred & Tilde	3504 Wildflower Drive	Coral Springs	FL	33065			X
Levy	Charles	P O Box 376	Terra Alta	WV	26764		X	
Leyva	Luis	4930 SW 91st Avenue	Miami	FL	33165	X		
Linares	Alfredo Elias	33 SW 20 Avenue	Miami	FL	33135	X	X	
Linares	Luis	12881 SW 60 Terrace	Miami	FL	33183	X	X	
Lindahl (MFL Inc)	Lennart	4524 Gun Club Road #201	West Palm Beach	FL	33415			X
Loaiza	Carlos	6039 SW 152 Court	Miami	FL	33193	X		
Lopez	Arline	23 Shelburne Drive	Oak Brook	IL	60523	X	X	
Lopez	Eduardo	Urb Torrimar B3 #4 Toledo Street	Guaynabo	PR	00966	X	X	X
Lopez	Hernan	7951 SW 35 Terrace	Miami	FL	33155			X
Lopez	Iluminado	P O Box 401	Bronx	NY	10451		X	
Lopez	Joaquina	P O Box 13	Caguas	PR	00726	X		
Lopez	Rafael	8461 SW 179 Street	Miami	FL	33156	X		
Lopez	Raul	13301 SW 202 Avenue	Miami	FL	33196	X		
Lopez Vila	Gilberto	P O Box 19 1683	San Juan	PR	00919	X		
Lorenz	Jerry	National Audubon Society 444 Brickell Avenue #850	Miami	FL	33131		X	X
Lorie	P.R.	716 W Pinewood Court	Lake Mary	FL	32746	X		
Losner	William	1550 N Krome Avenue	Homestead	FL	33030	X		
Loubriel	Manuel	Sta Rosa St 19 Blk-21-7	Bayamon	PR	00959	X		
Love	James	676 Mt. Oak Avenue NE	St Petersburg	FL	33702	X		
Lubeck	Elisabeth	35-53 82nd Street	Jackson Heights	NY	11372	X		
Luiz, Art	Hughes,	3313 Sherwood Blvd	Del Rey	FL	33445	X		

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	Barry		Beach					
Machado	David	2225 SW 60 Court	Miami	FL	33155	X	X	
Machado	Francisco	P O Box 1117	Isabela	PR	00662	X		
MacVicar	Tom	4524 Gun Club Road Suite 201	West Palm Beach	FL	33415		X	
Maddock	Sidney	Biodiversity Legal Foundation 47310 Rocky Rollinson Road	Buxton	NC	27920		X	
Maimon	Moshe	7534 Black Olive Drive	Tamarac	FL	33321		X	
Majol	Investment Corp	P O Box 558570	Miami	FL	33255		X	
Malligo	Lee	3400 Bridger Road	Cooper City	FL	33026			X
Maloney	Richard	3048 Phillips	Berkley	MI	48072		X	
Mandiola	Angel	1110 Granada Blvd	Coral Gables	FL	33134	X		
Manya	Felix	3221 SW 104 Avenue	Miami	FL	33165	X		
Marah	Jesus	P O Box 970591	Miami	FL	33197	X		
Marrero	Emilio	6910 Leonardo Street	Coral Gables	FL	33146	X		
Marten	Florence	S 975 County Road J	Mondoui	WI	54755		X	
Martin	Carmen	23-15-44 Drive	L. I. City	NY	11101			X
Martin	Ricardo	4211 SW 142 Place	Miami	FL	33175	X		
Martinez	Brothers Corp	36 NE 52 Terrace	Miami	FL	33137	X		
Martinez	Clara	6901 Trionfo Street	Coral Gables	FL	33146	X		
Martinez	Euclides	13900 SW 205 Avenue	Miami	FL	33196		X	
Martinez	Felix	1939 N Kilbourn Avenue	Chicago	IL	60639		X	
Martinez	Pedro	14001 SW 199 Avenue	Miami	FL	33196	X		
Martinez	Raul	Sebastian Olano #1900	Fair View	PR	00926	X		
Marvet	Larry	Sierra Club 5561 SW 7th Street	Plantation	FL	33317	X		
Marzoa	Rene	7365 SW 23 Street	Miami	FL	33155	X		
Mas	Acosta	P O Box 194786 El Mon	San Juan	PR	00919			X
Mathe	Laszlo	530 NW 71 Street	Miami	FL	33150	X	X	
Mato	Candido	14821 SW 202 Avenue	Miami	FL	33196	X		
Mato	Santiago	19660 SW 204 Street	Miami	FL	33187	X		
Mauro	Graziano & Hortensia	2174 NW 17 Street	Miami	FL	33125	X	X	
Mayoz	Orestes	9341 Collins Avenue #608	Surfside	FL	33154	X		
McDaniel	Joanne	11209 St. Andrews Court	Riverview	FL	33569-7045			
McDonald	Bonnie	P O Box 84	Orange Beach	AL	36561	X	X	
McDonald	Leo	21416 Hamilton Avenue	Farmington Hills	MI	48336		X	
McDonald	Stephen	1708 Schnell Drive	Arabi	LA	70032		X	
Medici	Edward	1419 John R	Troy	MI	48083			X
Medina	G. E.	10660 SW 7 Terrace	Miami	FL	33174	X		
Melchior	J.	15726 SW 63 Avenue	Archer	FL	32618	X		
Mele	Mildred	c/o J Goritski 21 Randolph Avenue	Randolph	NJ	07869			X
Melendez	Antonio	6 Apt Falder Megen Court	Stony Point	NY	10980		X	
Mendyk	Tim	4645 S Maverick Way	Boise	ID	83709		X	
Menendez	Marino	F35 40th Street Colinas de Montecarlo	San Juan	PR	00924			X
Mercer	William	990 NE 97 Street	Miami Shores	FL	33138	X		
Mermelstein+A 578	David	9121 SW 66 Terrace	Miami	FL	33173	X	X	

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		Miccosukee Tribe c/o Lehtinen O'Donnell 7700 N Kendall Drive #303	Miami	FL	33156		X	
Middleton	Robert	4764 Pallister Place N	Mobile	AL	36618		X	
Migueo	Faustino	521 SW 78 Place	Miami	FL	33144	X		
Milagros	Ocariz	P O Box 590985	Miami	FL	33159	X		
Milan	Jorge	16520 SW 104th Avenue	Miami	FL	33157			X
Milbert	Jerome	14220 SW 207 Avenue	Miami	FL	33196	X		X
Milian	Gladys	3030 SW 92 Place	Miami	FL	33165		X	
Millanes	Jose	18830 NW 77 Court	Hialeah	FL	33015		X	
Miller	Michael	70 Kidder Street East End	Wilkesl-Barre	PA	18702	X		
Mincer	Lyle	14800 NE 183rd Court	Brush Prairie	WA	98606	X		
Molina	David	15820 SW 203 Avenue	Miami	FL	33187	X		
Moore	Dennis & Kathy	3132 State Street	White Oak	PA	15131	X		
Moore	L. L.	P O Box 1330	Hamilton	AL	35570	X		
Mora	Francisco	1597 West 77 Street	Hialeah	FL	33014		X	
Moran	Robert	1767 78th Avenue	Baton Rouge	LA	70807	X		
More, Jr.	Armando	1801 Ferdinand Street	Coral Gables	FL	33134			X
Morgan	Jayne	19806 SW 85 Loop	Dunnellon	FL	34432		X	
Moruiz	Manuel	7701 NW 33rd Street	Hollywood	FL	33024	X		
Movida	Elizabeth	2261 Riverdale Drive N	Miramar	FL	33025	X		
Mowrey	Dale	723 Columbus Road	Grandville	OH	43023	X		
Moya	Armando	6745 SW 132 Ave #304	Miami	FL	33183	X		
Moyal	Abner	3500 Mystic Pointe Dr	Aventura	FL	33180		X	
Muhlberger	Joseph	2125 Wyoming Blvd NE	Albuquerque	NM	87112	X		
Munoz	Antonio	21845 SW 168 Street	Miami	FL	33187	X		
Munoz	Emilia	3050 NW 99 Street	Miami	FL	33147	X		
Munoz	John	9691 SW 120 Avenue	Miami	FL	33186		X	
Murphy	Daniel	106 Harbor Drive	Ludington	MI	49431	X		
Murray	Donald	18 Lyman Wheelock Road	South Easton	MA	02375	X		
Murray	Lewis & Noelia	P O Box 763	Bronson	FL	32621	X		
Murray	Noelia Lee	11650 NE 88 Lane	Bronson	FL	32621	X		
Musgrove	Martha	The Miami Herald One Herald Plaza	Miami	FL	33132-1693	X		
Nat'l Park Service	Land Acq Office	2900 S Horseshoe Drive Suite 100	Naples	FL	34104		X	
Neale	Dalton	17787 Common Road	Roseville	MI	48066		X	
Neuharth	John	The Nature Conservancy 3969 Loquat Avenue	Miami	FL	33133	X		
Nicholas	Gregory	7703 SW 178 Street	Miami	FL	33157			X
Nickerson	Joseph & Linda	5357 SW 48 Street	Davie	FL	33314	X		
Noguera	Rodolfo	8942 SW 40th Terrace	Miami	FL	33165	X		
Nolla	Luis	P O Box 13158	San Juan	PR	00908	X	X	X
Norden	C	820 S Logan	Moscow	ID	83843	X		
Noriega	Luis Fernando	14211 SW 96 Terrace	Miami	FL	33186		X	X
Nosti	Jose	Avenida Aragua Apatdo 199	Maracay, Edo. Aragua	Venezuela				X
Nunez	M	AA1 Jardin Street Garden Hills	Guaynabo	PR	00966	X		
Ojeda	Fulgencio	8376 SW 159 Place	Miami	FL	33193		X	
Ortega	Antonio	20850 SW 152 Street	Miami	FL	33187	X		

List of the 8.5 SMA Final GRR/SEIS Recipients

Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Ortega	Antonio	20850 SW 152 Street	Miami	FL	33187	X		
Ortega	William	2229 Labuanum Avenue	Charlotte	NC	28205		X	
Ortiz	Fabricio	21280 SW 236 Street	Miami	FL	33031		X	
Osborn	Ernest	217 Cardinal Lane	Enterprise	AL	36330	X		
O'Toole	Hugh	302 Baymount Drive	Statesville	NC	28625	X		
Ottman	Beverly	1183 Blossom Court	Oshkosh	WI	54902	X		
Outman	Robert	7490 Heather Walk Drive	Weeki Wachee	FL	34613	X		
Pagan	Ramon	10507 Sunflower Lane	San Antonio	TX	78213	X		
Pajon	Francisco	16650 SW 209 Avenue	Miami	FL	33187		X	
Pantner	Anton	P O Box 020010	Miami	FL	33102			X
Papacalodoucas	A.	465 E Orange Street	Tarpon Springs	FL	34689		X	
Paredes	Luis	7235 W 14 Court	Hialeah	FL	33014		X	
Parks	Dr. Paul	Florida Wildlife Federation 1549 Live Oak Drive	Tallahassee	FL	32301	X		
Patterson	Richard	555 Forestdale Drive	Auburn	AL	36830	X		
Peake	Robert	813 S Quincy	Arlington	VA	22204	X		
Pedemonte	Juan	3912 Ponce de Leon	Coral Gables	FL	33134	X		
Pedrazas	Mercedes	2282 Raquet Club Dr	Palm City	FL	34990	X		
Pelaez	Harry Matthew	P O Box 280	Bayamon	PR	00960			X
Pena	Alice	14390 SW 199 Avenue	Miami	FL	33196		X	
Pena	Eleanor	14390 SW 199 Avenue	Miami	FL	33196	X		
Peralta	Cesar	P O Box 265	Yanco	PR	00698			X
Perera	Emilio	13101 SW 205 Avenue	Miami	FL	33196	X		
Perez	B.	P O Box 192232	San Juan	PR	00919	X		
Perez	Florangel	1500 Venetia Avenue	Coral Gables	FL	33134	X		
Perez	Floro	P O Box 812604	Boca Raton	FL	33481	X		
Perez	Jose	230 NW 62 Court	Miami	FL	33126			X
Perez	Jose	10750 SW 27 Street	Miami	FL	33165	X		
Perez	Juan	10296 NW 9th Street Cir Apt 102	Miami	FL	33172		X	
Perez	Julio	21250 SW 160 Street	Miami	FL	33187	X		
Perez	Lazaro	16520 SW 145 Court	Miami	FL	33177	X		
Perez	Luis	P O Box 2804	Bayamon	PR	00960	X		
Perez	Nestor	P O Box 443	Miami	FL	33144	X		
Perez	William	5870 SW 20 Street	Miami	FL	33155		X	
Perez	Nilda	590 Clifton Avenue	Newark	NJ	07107	X		
Perez	Jose	Calle 47 S #868 URB Las Lomas	Rio Piedras	PR	00921	X		
Perez Golon	Manuel	12875 SW 199 Avenue	Miami	FL	33196		X	
Perez-Linares	Jose	1223 Luchetti Apt 502	Santurce	PR	00907	X		
Pettey Jr.	Robert	105 Jacobs Landing Dr.	Hazel Green	AL	35750	X		
Petty	Lloyd	163 Brentview Drive	Grafton	OH	44044	X		
Phillips	Elda	615 SW 23 Avenue	Miami	FL	33135	X		
Phillips	Gary	P O Box 699	Batavia	IL	60510	X		
Pianelli	Vincent	110 Fiesta Way	Fort Lauderdale	FL	33301	X		
Pinero	Ibleonardo	4020 SW 124 Avenue	Miami	FL	33175	X		
Pinon	Juan	4201 Collins Ave #1802	Miami Beach	FL	33140	X		
Pinto	Cesar	11800 SW 34 Street	Miami	FL	33175		X	
Pittenger, Jr.	H. D.	16651 SW 212 Avenue	Miami	FL	33187		X	
Plummer	Tommy Lee	1314 SW 25th Place	Boynton Beach	FL	33426	X		

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Pohl	Wilfried	2570 Bond Avenue	Columbus	GA	31903	X		
Pomponi	John	8752 Pt Charity Drive	Pigeon	MI	48755			X
Pontecorvo	John	1411 45th Street	North Bergen	NJ	07047	X		
Porro	Rosalia	9111 SW 9 Terrace	Miami	FL	33171	X	X	X
Porter	Edward	4736 North Bay Road	Miami Beach	FL	33140		X	
Powell	Barbara Jean	22951 SW 190 Avenue	Miami	FL	33170		X	
Prasad	Dr. A.	4710 Love Road	Orchard Lake	MI	48323	X		
President		Audubon Society of the Everglades Box 16914	West Palm Beach	FL	33416-6914		X	
Prieto	Canoelaria	1851 NW 22 Place	Miami	FL	33125	X		
Prieto	Marcelo	14020 Leaning Pine Drive	Miami Lakes	FL	33014	X		
Prieto	Rodolfo	8133 NW 66 Street	Miami	FL	33166	X		
Prieto	Armando	1851 NW 22 Place	Miami	FL	33125		X	
Prieto	Maritza	1231 Medina Avenue	Coral Gables	FL	33134	X		
Prohaska	Bernard	305 N Hickory Street	Platteville	WI	53818		X	
Pryor-Reed	Nathaniel	P O Box 1213	Hobe Sound	FL	33475		X	X
Puerto Jr.	Arturo	1215 SW 35th Avenue	Miami	FL	33135	X		
Puig	Lazaro	12710 SW 27 Terrace	Miami	FL	33175			X
Purington	William	230 Downing Road	Roper	NC	27970	X		
Rabelo	Daniel	525 Gregory Avenue	Weehauken	NJ	07087	X		
Radicio	Estela	2960 SW 6 Street	Miami	FL	33135	X		
Rains Jr.	John	Izaak Walton League 5314 Bay State Road	Palmetto	FL	32561-9712	X		
Ramierez	Martinez	Box 148	Humacao	PR	00792	X		
Ramirez	Ossier	9010 SW 31 Terrace	Miami	FL	33165	X		
Ramos	Osvaldo	5602 Tughill Drive	Tampa	FL	33624	X		
Rams Sr.	Victor	5840 W Flagler Street	Miami	FL	33149		X	
Ranchers	Doctors	P O Box 560969	Miami	FL	33256	X		
Rauch	Ralph	154 Georgetown Avenue	Pittsburg	PA	15229		X	
Ravelo	Jorge	1860 NW 17 Avenue	Miami	FL	33125			X
Reiter	Craig	961 Mabel	St. Louis	MO	63122	X		
Remon	Miguel	401 Ocean Drive 524	Miami Beach	FL	33139		X	
Rescigno	Michael & Judy	16451 SW 205 Avenue	Miami	FL	33187	X		
Reuter	George	12652 Partridge Road North	Stillwater	MN	55082	X		
Reyes	Carlos	13341 SW 79 Street	Miami	FL	33183	X		
Reyes Jr.	Ramon	3068 NW 31 Street	Miami	FL	33142	X		
Reyes Jr.	Teofilo	Calle 26 LL-14 Jardines de Capapra	Bayamon	PR	00959	X		
Ribas	Jose	3927 NW 7 Street	Miami	FL	33126	X		
Richardson	Michael	First National Bank of Homestead 1550 N Krome Avenue	Homestead	FL	33030	X		
Ridings	Hank & Cynthia	16985 SW 207 Avenue	Miami	FL	33187		X	
Rios	Carlos	1334 Roosevelt Avenue	San Juan	PR	00922	X		
Rios	Luis	3296 W 14 Lane	Hialeah	FL	33012	X		
Risser	Charles	6447 SR 12	Pandora	OH	45877	X		
Rist	Karsten	18014 SW 83 Court	Miami	FL	33157		X	
Rivera	Blanca	P O Box 36 4584	San Juan	PR	00936	X		
Rivera	Blanca	P O Box 36-4584	San Juan	PR	00968	X		
Rivera	Luis	21718 SW 164th Street	Miami	FL	33187	X		
Robayna	Ramiro	1190 SW 10 Avenue	Miami	FL	33129	X		

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Roche	Ramon	14050 SW 202 Avenue	Miami	FL	33196	X		
Rodriguez	Alberto & Esdras	10600 SW 60 Street	Miami	FL	33173	X		
Rodriguez	Anthony	15525 SW 209 Avenue	Miami	FL	33187		X	
Rodriguez	Frank	662 East 21 Street	Hialeah	FL	33013	X		
Rodriguez	Hector	1723 Yangtze	San Juan	PR	00926	X		
Rodriguez	J. R.	523 SW 78 Place	Miami	FL	33144	X		
Rodriguez	James	82190 Severn Drive	Boca Raton	FL	33433		X	
Rodriguez	Jesus	956 W Grand Street Apt 1	Elizabeth	NJ	07202	X		
Rodriguez	Jose	2400 SW 60 Court	Miami	FL	33155	X	X	X
Rodriguez	Joseph	8120 SW 98 Court	Miami	FL	33173	X	X	X
Rodriguez	Justiniano	11831 SW 18 Street #8	Miami	FL	33175	X		
Rodriguez	Maybeth	3340 SW 17th Street	Miami	FL	33145			X
Rodriguez	Nelmesio	4050 SW 2nd Terrace	Miami	FL	33134	X		
Rodriguez	Norberto	401 To To Lochee Drive	Hialeah	FL	33010	X		
Rodriguez	Ramon	P O Box 351178	Miami	FL	33135	X		
Rodriguez	Raul	P O Box 336	San Lorenzo	PR	00754	X		
Rodriguez	Richard	Calle Milagros Cabeza C-13 Carolina Alta	Carolina	PR	00987	X		
Rodriguez	Vincente	2990 SW 111 Avenue	Miami	FL	33165	X	X	
Roehl	W.C.	5377 SE Major Way	Stuart	FL	34997	X		
Rogers	Dennis	2642 SE 19 Court	Homestead	FL	33035	X		
Romain	Gerardo	62 Ramierez Silva Ensanche Martinez	Mayaguez	PR	00680			X
Roman	Luis	P O Box 362996	San Juan	PR	00936	X		
Romero	Hugo & Josefa	9350 SW 183 Terrace	Miami	FL	33157	X	X	
Rosa	Antonio	631 SW 87 Court	Miami	FL	33174	X		
Rosenberg	Donald	Suite 3050, One SE Third Avenue	Miami	FL	33131	X		
Roseo	Olya & Joaquin	2385 SW 15th Street	Miami	FL	33145	X		
Roszak	James	14499 Pin Oak Drive	Strongsville	OH	44136	X		
Rucabado	Manuel Hoyo	27 Calle Jazmin	San Juan	PR	00927	X		
Ruzzo Jr.	James	465 Gardiner Road Lot #25	West Kingston	RH	02892	X		
Ryan	Jean	37 Haddon Street Apt 3	Bridgeport	CT	06605	X		
Saave	Juan	520 Brickellt Drive Apt 815	Miami	FL	33131	X		
Salabarria	Juan	2020 SW 199 Avenue	Miami	FL	33196	X		
Salazar	Anna	575 New Jersey Avenue	Lyndhurst	NJ	7071			X
Salvador	Arnaldo	P O Box 201	Canovanas	PR	729	X		
Samter	Ron	1717 N Bayshore Drive PH - A32	Miami	FL	33132	X		
Sanborn	Jim	P O Box 901461	Homestead	FL	33090		X	
Sanchez	Mr.	3095 SW 19th St.	Miami	FL	33145		X	
Sanchez	Hector	1515 Sarria Avenue	Coral Gables	FL	33146		X	
Sanchez	Roejo	5620 SW 59 Court	Miami	FL	33143	X		X
Sand	Barbara	1436 Kimball Avenue	Waterloo	IA	50702		X	
Sandler	Mike	2239 S Halsted Street	Chicago	IL	60608	X	X	
Santana	Hermenegildo	1440 SW 19th Street	Miami	FL	33145	X		
Santos	Alberto & Ida	3145 SW 99 Court	Miami	FL	33165			X
Santos	Isela	965 E 19 Street	Hialeah	FL	33013			X
Santovenia	Daniel	12495 SW 197 Avenue	Miami	FL	33196		X	

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Sanz	Angel	10330 SW 50 Street	Miami	FL	33165	X		
Sanz	Gerardo	R-Apolo Artimisa PP 15	Guaynabo	PR	969	X		
Sapp	Steve	Dade County Farm Bureau 1850 Old Dixie Highway	Homestead	FL	33033	X		
Sarver Jr.	Col T. R.	7412 Brightleaf Lane	Wilmington	NC	28411	X		
Sasser	Dorothy	11311 Amy Lane	Orlando	FL	32836		X	
Sastre Jr.	Juan	P O Box 110493	Hialeah	FL	33011			X
Saud	Antonio	12499 SW 9th Street	Miami	FL	33184	X		
Sauter Jr.	L. J.	4811 North 16th Road	Arlington	VA	22207			X
Savedoff	Stuart	427 Biltmore Way	Coral Gables	FL	33134	X		
Scandella	Diana	P O Box 165436	Miami	FL	33116			X
Schacherl	Walter	1526 Markdale East	Lehigh-Acres	FL	33936		X	
Scharr	George	2761 Cameron Road	Falls Church	VA	22042	X		
Scherf	Brian	(Fl Biodiversity) P O Box 220615	Hollywood	FL	33022		X	X
Schettini	Francisco	3915 Nemo Road	Randallstown	MD	21133	X		
Schock	Andrew	National Wildlife Federation 1330 W Peachtree St Suite 475	Atlanta	GA	30309	X		
Schoefer	John	226 E Lyons Street	Marissa	IL	62257	X		
Schwartz	Louis	9890 SW 58 Street	Miami	FL	33173	X	X	
Scott	Ronald	1800 W Fork Road	Newkirk	OK	74647	X		
Scott	Roscoe	3033 Broadway Street	Indianapolis	IN	46205	X		
Seara	M.	20830 SW 240 Street	Homestead	FL	33031	X		
Sebek	Frank	43W190 Faireno Drive	Elburn	IL	60119			X
Segal	Simon	2740 NW 112 Avenue	Miami	FL	33172	X	X	
Sewell	Brad	40 W 20th Street	New York	NY	10011		X	
Shaw	Pete	3911 SW 54 Street	Ft. Lauderdale	FL	33312		X	
Shepard	Lucille	198 Hill Road	Michigan Center	MI	49254		X	
Shepherd	Frank	P O Box 522188	Miami	FL	33156	X		X
Shufflett	Shirley	330 W 45 Street	Hialeah	FL	33012		X	
Sica	Richard	4209 Lomac Street	Montgomery	AL	36106		X	
Siegfried	George	1044 Asbury	Evanston	IL	60202		X	
Silvero	John	1121 Crandon Blvd Apt D705	Key Biscayne	FL	33149	X		
Silvestri	Loui	18355 NW 12th Street	Pembroke Pines	FL	33027			X
Simons	Leonard	7171 SW 7 Street	Miami	FL	33144	X	X	
Sinclair	Charles	1900 West Commercial Blvd, #138	Ft. Lauderdale	FL	33309	X	X	X
Sivo, Jr.	G. Thomas	150 Manchester Street	Hartford	CT	6112		X	
Slahetka		P O Box 5542	Bayonet Point	FL	34674		X	
Slayton	Robert	Sanibel-Captiva Audubon Society P O Box 957	Sanibel Island	FL	33957	X		
Small	Evelyn	195 Dorset E Bldg	Boca Raton	FL	33434		X	
Smetzer	Larry	President Florida B A S S Federation 485 Ponoka Street	Sebastion	FL	32958	X		
Smidon	Gordon	W 9554 Britzke Road	Cambridge	WI	53523		X	
Smith	Florence	6600 Del Hanen Avenue	Prospect	KY	40059		X	
Smith	Joe & Mary	1407 E Dogwood Lane	Mt. Prospect	IL	60056		X	
Smith	Ted	546 Heashetts View Lane	Childersburg	AL	35044		X	
Smith	Judy	Monograph Acquisition Service Colorado State University	Ft Collins	CO	80523-1019		X	
Snow	Michele	714 W 11th Street	Hastings	MN	55033	X	X	X
Snure	Harold	1313 W Hyacinth Circle	Barefoot Bay	FL	32976		X	

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Sosa	Arael	11005 SW 6 Street	Miami	FL	33174	X		
Sowell	Wendell	4414 Brush Hill Road	Nashville	TN	37216	X	X	X
Speer	Harry	6265 Mondean	San Antonio	TX	78240		X	
St. Luis Ranch,		724 NW 133rd Avenue	Miami	FL	33182	X		
Staiman	Mr. & Mrs.	3635 Johnson Avenue Apt 3C	Bronx	NY	10463	X		
Stasko	Carl	113 Hollow Drive RR 2	Moscow	PA	18444	X		
Stecklein	Lloyd	23581 415th Avenue	Bellevue	IA	52031		X	
Stefan	Chestor	6014 N Neva	Chicago	IL	60631		X	
Stein	Robert	1890 County Road 381	San Antonio	TX	78253	X		
Stevens	Bernice	1304 Oglewood Ave	Knoxville	TN	37917		X	
Stickling	Charles	531 Bedford Road Apt 210	Bedford	TX	76022	X	X	
Strahl	Dr. Stuart	Audubon of Florida 444 Brickell Ave Suite 850	Miami	FL	33131		X	
Suarez	Maribel	640 S 900 E	Salt Lake City	UT	84102	X		
Suarez	Pedro	760 San Esteban Avenue	Coral Gables	FL	33146	X		
Suela	Dale	P O Box 73	Steward	IL	60553	X		
		Superial Account Inc. 2801 NW 7 Street	Miami	FL	33125	X		
Surrancy	Nathaniel	10710 SW 211th Street Ste 206	Miami	FL	33177	X		
Suther	John	945 S Mt. View Avenue	Tacoma	WA	98465	X		
Swartzentruber	Fred	221 Hartzler Drive	Belleville	PA	17004		X	
Sweat	Lewis	5709 NW 158 Street	Miami Lake	FL	33014	X		
Swenson	Roy Erik	8044 N Keating Avenue	Skokie	IL	60076	X		
Tapanes	Rafael	10206 SW 3 Street	Miami	FL	33174	X		
Tapia	Sergio	100 Lincoln Road Apt 1402	Miami Beach	FL	33139	X		
Teofilo	Victoria	1928 S Miami Avenue	Miami	FL	33129	X		
Thomas	Landon	18990 SW 152 Street	Miami	FL	33187		X	
Thompson	LeRoy	5860 SW 89 Place	Miami	FL	33173		X	
Timpton	R. H.	5980 Winchester Park Drive	New Orleans	LA	70128	X		
Tirrell	Roderick	Sierra Club Florida Chapter 2101 NE 55 Ct	Ft. Lauderdale	FL	33308-3111	X		
Tizol	Dolores & Luis	1810 SW 98 Court	Miami	FL	33165	X	X	X
Toledo	Armando	16240 SW 203 Avenue	Miami	FL	33187	X		
Tolila	Roger	Maalot DAFNA 13.5/10	Jerusalem Israel		97762		X	
Tompkins	Eleanor	2619 Sunset Blvd	Cedar Falls	IA	50613	X		
Torres	Alejandrina	8730 SW 133 Avenue Road #10-#218	Miami	FL	33183	X		
Torres	Nora	Utuado N 143 Forest View	Bayamon	PR	956	X		
Travisamo	Richard	39 Doral Lane	Southington	CT	6489	X		
Trincado	Nora	13090 SW 199 Avenue	Miami	FL	33196		X	
Tripi	Lenore	2 Myson Street	W Tslip	NY	11795		X	
Trowbridge	Harry	722 Reit Lane #3	Arcadia	WI	54612	X		
		Tygart Resources Inc. 108 McCurdy Drive	Pittsburgh	PA	15235		X	
Urteaga	Ruth	314 Sunrise Blvd	Forked River	NJ	8731	X		
Usherson	Robert	111 NW 1st Street Suite 1220	Miami	FL	33128		X	
Vachuda	Tomas	425 Lexington Avenue	New York	NY	10017		X	X
Valdes	Eladio	16284 SW 82 Street	Miami	FL	33193	X		
Valdes	Ernesto	2725 SW 95 Court	Miami	FL	33165		X	
Valdes	Sergio	630 E 15 Place	Hialeah	FL	33010	X		
Valls	Ruben & Justa	1539 SW 103 Avenue	Miami	FL	33174	X		

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Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Valve-Investments		P O Box 32247	Palm Beach Gardens	FL	33420		X	
Vanela, Councilman	Hector	W Kendall Council 15231 SW 154 Avenue	Miami	FL	33187			X
Vanicky	Michael	11 Turkey Hill Road	Haddam	CT	6438		X	
Varcia	Oneida	490 Westpark Drive Apt 105	Miami	FL	33172	X		
Vargas	Luis	14494 SW 299 Terrace	Leisure City	FL	33033	X		
Vartuli	Frank	617 Glenbrook Road	Stamford	CT	6906	X		
Vazquez	George	1121 Andora Avenue	Coral Gables	FL	33146	X		
Vega	Ema	20200 SW 79 Avenue	Miami	FL	33189	X		
Velazquez	Juan	12825 SW 197 Avenue	Miami	FL	33196	X		
Vellow	Tim	2500 SW 113 Place	Miami	FL	33165			X
Veloz	Ignacio	P O Box 360129	San Juan	PR	936	X		
Vergara	Rev. Jaime	Howard 251 University Gardens	Rio Piedras	PR	927	X		
Villafane	Jorge	P O Box 56	Caguas	PR	726	X		
Villanueva	Roberto	280 W 57th Street	Hialeah	FL	33012			X
Villeta	Carlos	561 W 38 Place	Hialeah	FL	33012			X
Vincent	Ray	703 Powder Horn Road	Dorchester	SC	29437	X		
Vinetas	Jorge & Ana	6999 SW 147 Place	Miami	FL	33193	X		
Vivar	William	7055 W 105h Court	Hialeah	FL	33014	X	X	
Voldchausen	Sharon	425 Lexington Avenue	New York	NY	10017		X	X
Wagner	Mrs. G. F.	21315 Jacobs Ford Road	Lignum	VA	22726		X	
Wahrburg	Sylvia	8625 SW 20 Terrace	Miami	FL	33155	X		
Walker	Frederick	326 Wisteria Drive	Dayton	OH	45419	X		
Waller	Bradley	8925 SW 148 Street #212	Miami	FL	33176		X	
Weisenberger Jr.	Harry	5405 N Rt 44 Hwy	Jersey Shore	PA	17740	X		
Weisflog	Clara	1460 N Bluebird Lane	Homestead	FL	33035		X	
Welch	Robert	6 Pletcher Drive	Yorkville	IL	60560	X		
Weldon	Jack	3436 Pembroke Place	Bedford	TX	76021	X		
Whitmarsh	Rosa	19 SW 38th Court	Miami	FL	33134	X		
Whitmire	Hattie	2010 NW 75 Avenue	Sunrise	FL	33313	X		
Wilbanks	Margaret	1801 NE 180 Street	N Miami	FL	33162	X		
Wiley	W.	196 Hampton Court	Jupiter	FL	33458	X		
Williams	Charlotte	241 Pilgrim Circle	Wilmington	NC	28401	X		
Windham	Lillian	23444 Alzira Circle	Boca Raton	FL	33433	X		
Wingate	L. D.	12638 Quercus Lane	Wellington	FL	33414	X		
Winsick	Opal & Henry	1600 Reasonover Road Box 232	Cedar Mountain	NC	28718	X		
Wofford	Joseph	327 Highview	San Antonio	TX	78228	X		
Woodward	Raymond	14701 SW 205 Avenue	Miami	FL	33196			X
Woolin	Martin	4959 Pine Tree Drive	Miami Beach	FL	33140	X		
Wu	Ming-Chi	3201 Santa Monica Drive	Denton	TX	76205	X		
Wyatt-Shaw	G.	2396 Ben Hill Road	Atlanta	GA	30311		X	
Wyrostek	Walter	916 N Young Blvd	Desoto	TX	75115	X	X	X
Yabor	Antonio Michael	20 Montilla Avenue	Coral Gables	FL	33134	X		X
Yabor de Diaz	Lourdes	12124 SW 131 Avenue	Miami	FL	33186	X		X
Yanes	Regina	9953 SW 21 Street	Miami	FL	33165	X		
Younes	Cesar	5661 W 21 Court	Hialeah	FL	33016	X		
Zoberg	David	8367 Bird Road	Miami	FL	33155		X	

List of the 8.5 SMA Final GRR/SEIS Recipients

Last Name	First Name	Address	City	State	Zip	Summary	GRR/SEIS	CD-ROM
Zollo	Joseph	490 SE 7 Avenue	Pompano Beach	FL	33060		X	
Zollo	Michael	12809 Meadow Breeze Drive	West Palm Beach	FL	33414		X	

SECTION 8.0
LIST OF PREPARERS

Terrance Breyman	USACE-Headquarters
Gary Hardesty	USACE-Headquarters
Mary Arnot	USACE-Jacksonville District
John Brady	USACE-Jacksonville District
Chris Brown	USACE-Jacksonville District
Mike Choate	USACE-Jacksonville District
Barbara Cintron	USACE-Jacksonville District
Martin Gonzalez	USACE-Jacksonville District
Esteban Jimenez	USACE-Jacksonville District
Elmar Kurzback	USACE-Jacksonville District
Jonathan Moulding	USACE-Jacksonville District
Don Nelson	USACE-Jacksonville District
Karl Nixon	USACE-Jacksonville District
James Riley	USACE-Jacksonville District
George Strain	USACE-Jacksonville District
Cheryl Ulrich	USACE-Jacksonville District
Dennis Barnett	USACE-South Atlantic Division
John Rushing	HDR, Atlanta, GA
Ted Pruett	HDR, Jacksonville, FL
Christina Casado	HDR, Ft. Lauderdale, FL
Angela Dinkla	HDR, Ft. Lauderdale, FL
Shannon Renz	HDR, Ft. Lauderdale, FL
Chuck Sinclair	HDR, Ft. Lauderdale, FL
Sue Clark	HDR, Tampa, FL
Deborah Daigle	HDR, Tampa, FL
George Eliason	HDR, Tampa, FL

Richard Gibney	HDR, Tampa, FL
Jeanine Hunt	HDR, Tampa, FL
Joanne McDaniel	HDR, Tampa, FL
Barry Meyer	HDR, Tampa, FL
Doris Saunders	HDR, Tampa, FL
Larry Saunders	HDR, Tampa. FL (contract employee)
Michelle Sutton	HDR, Tampa, FL
Barry Wharton	HDR, Tampa, FL
George Trask	Gulf Coast Property Acquisition, Inc.
Paul West	Gulf Coast Property Acquisition, Inc.

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CENTRAL AND SOUTHERN FLORIDA PROJECT
MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK, FLORIDA

8.5 SQUARE MILE AREA

SUPPLEMENT TO THE FINAL ENVIRONMENTAL IMPACT STATEMENT

TABLES

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

July 2000

HDR Engineering, Inc.

Table 1. SFWMD Quarterly Pesticide Surface Water and Sediment Monitoring in the 8.5 Square Mile Area Detected Parameters from Sites S331 and G211

Surface Water

Site	Date	Compound (ug/kg)						
		Atrazine	DDD	DDE	DDT	Endosulfan	Heptachlor Epoxide	Hezazinone
S331	12/8/98	0.012						
	8/4/99	0.031						
G211	4/19/99	0.059	0.0065	0.0058	0.0027	0.0025	0.001	0.032
	8/4/99							

Sediment

Site	Date	DDE						
S331	12/8/98	2.3						
	4/19/99	1.5						
G211	4/19/99	4.1						

Source: SFWMD Pesticide Surface Water and Sediment Quality Reports, December 1998, April 1999, and August 1999

Table 2
Surface (Standing) Water Quality Sampling in the 8.5 Square Mile Area - Detected Parameters
Hurricane Irene Post-Storm Event
October 22, 1999

Parameter	Units	Surface Water Standard (62-301 FAC)	STATIONS									
			8SQM-1	8SQM-2	8SQM-3	8SQM-4	8SQM-5	8SQM-6	8SQM-7	8SQM-8	8SQM-9	8SQM-10
1,2,4-Trichlorobenzene	ug/l	NS					3.6					
2-4-dimethylphenol	ug/l	NS	3.4		3.2	2.5					3.4	
Acenaphthene	ug/l	<2.7					2.6					
Ammonia- Nitrogen	ug/l	NS			0.27	0.2						
Arsenic	ug/l	<50	2.5	4.6	6.7	6.1		2.1		4.6	7.4	5.5
Barium	ug/l	NS		5.9		7.5	5.5	7.1	6.2	5.8	6.4	9.3
Calcium	ug/l	NS	57.3	62.3	58.7	62.7	50	44.3	58.6	56.5	49.7	68.9
Cadmium	ug/l	**										0.01
Copper	ug/l	**		1.6		1						
Chromium	ug/l	**	2.5	2.2		4.3						
Hardness	ug/l	NS	161.5	172.4	159.3	172.1	134.8	120.2	158.2	152.9	136.4	193.4
Hg-Fresh	ug/l	NS		4.7		11.1	4.1		3.2		4.2	5.8
Methylene Chloride	ug/l	<1,580 Annual Avg.						5.74				
Magnesium	ug/l	NS	3.1	4.09	3.1	3.8	2.4	2.32	2.89	2.9	3	5.19
Manganese	ug/l	NS	39.5	45.3	70	43.2	52.3	47.9	64	76.4	33	20.4
NOx	ug/l	NS				0.01				0.02		
Phenols	ug/l	1.0 (total Phenols)	9	9	10	11			13	14	10	
Pyrene	ug/l	<11.0					4.4					
Sb	ug/l	NS					3					
TKN	ug/l	NS	1.6	1.1	0.9	1.29	0.5	0.5	0.8	0.8	1.1	1.7
Total Phosphorous	ug/l	***	930	700	270	580			140	140	270	860
Toluene	ug/l	NS			4.66	4.32	0.49	0.51	1.24	2.18		
Zn	ug/l	**	13	17.5	21.6	11.3	5	5.8	8.1	8.7	9	22.1

NS=No Standard

Source: Dade County Department of Environmental Resource Management

**Calculated based on hardness

***Established in Modified Consent Decree as <10ug/l

Table 3
Surface (Standing) Water Quality Sampling in the 8.5 Square Mile Area - Coliform
Hurricane Irene Post Storm Event

Parameter	Date Sampled	Units	Surface Water Standard (62-301 FAC)	Sample Points	
				SW186th at 197th	SW 168th at 209th
Fecal Coliform	10/18/99	cfu/100 ml	<1000	6,000	5,500
	10/20/99			1,500	
	10/21/99				7,700
	10/22/99			4,000	510
	10/25/99			2,620	1,010
	10/28/99			7,000	120
Total Coliform	10/18/99	cfu/100 ml	<1000	25,000	37,000
	10/20/99			>5,600	
	10/21/99				>7,700
	10/22/99			3,800	420
	10/25/99			2,620	1,740
	10/28/99			15,600	200

Source: Dade County Department of Environmental Resource Management

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Species	Common Name
Acrostichum danaeifolium *	Leather fern
Agalinis purpurea	False-foxglove
Aletris lutea	Colic-root
Andropogon glomeratus	Bluestem, bushy
Anemia adiantifolia *	Pine fern
Annona glabra	Pond apple
Apteria aphylla	Nodding Nixie
Ardisia elliptica	Shoebutton Ardisia
Ardisia escallonoides	Marlberry
Aristida purpurascens	Three-awn grass
Aster carolinianus	Aster, climbing
Baccharis glomerulifolia	Groundsel tree
Baccharis halimifolia	Saltbush
Bacopa monnieri	Water hyssop
Bacopa caroliniana	Water hyssop
Bidens alba	Spanish needle
Bischofia javanica	Bishopwood
Blechnum serrulatum	Swamp fern
Bletia purpurea *	Pine pink
Boehmeria cylindrica	Button hemp
Buchnera floridana	Bluehearts
Calopogon tuberosus	Grass pink
Cassia bicapsularis	Cassia
Casuarina spp.	Australian pine
Centella asiatica	Coinwort
Cestrum diurnum	Day jessamine
Chara sp.	Stonewort
Chiococca pinetorum	Pineland snowberry
Chloris glauca	Finger grass
Cirsium horridulum	Thistle
Cladium jamaicense	Sawgrass
Conocarpus erecta	Buttonwood
Conoclinium coelestinum	Mist flower
Crinum americanum	String lily
Cyperus haspan	Flatsedge, sheathed
Cyperus odoratus	Sweet rush
Cyperus spp.	Sedges
Diodia virginiana	Buttonweed
Eleocharis atropurpurea	Spike rush
Eleocharis cellulosa	Gulf spike rush

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Species	Common Name
Eleocharis interstincta	Spike rush
Eragrostis elliottii	Lovegrass
Erianthus giganteus	Plumegrass, sugarcane
Eupatorium capillifolium	Dog fennel
Eupatorium leptophyllum	Thoroughwort
Eupatorium sp.	Thoroughwort
Ficus aurea	Strangler fig
Ficus sp.	Strangler fig
Helenium vernale	Everglades daisy
Heliotropium polyphyllum	Heliotrope
Hydrocotyle spp.	Water pennywort
Hymenocallis latifolia	Spider lily
Ipomoea sagitatta	Morning glory, glades
Ilex cassine	Dahoon holly
Juncus megacephalus	Bighead rush
Juncus roemerianus	Black rush
Justicia ovata	Water-willow
Lantana involucrata	Wild sage
Lemna minor	Duckweed
Linum medium var. texanum	Flax, stiff yellow
Lobelia glandulosa	Lobelia
Ludwigia peruviana	Primrose willow
Ludwigia repens	Ludwigia
Ludwigia curtissii	Waterprimrose
Ludwigia sp.	Ludwigia
Lythrum lineare	Loosestrife
Magnolia virginiana	Sweet bay
Mecardonia acuminata	Mecardonia
Melaleuca quinquenervia	Melaleuca
Melothria pendula	Creeping cucumber
Metopium toxiferum	Poisonwood
Mikania scandens	Climbing hemp weed
Mitreola petiolata	Miterwort, stalked
Muhlenbergia capillaris	Muhly
Myrica cerifera	Wax myrtle
Myrsine guianensis	Myrsine
Nephrolepis biserrata	Boston fern
Nephrolepis exaltata	Boston fern
Nephrolepis sp.	Boston fern
Neyraudia reynaudiana	Burma reed

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Species	Common Name
Nymphaea odorata	Water-lily
Nymphoides aquatica	Floating hearts
Oecoclades maculata	African orchid
Osmunda regalis	Royal fern
Oxypolis filiformis	Water dropwort
Parthenocissus quinquefolia	Virginia creeper
Passiflora suberosa	Corky-stemmed passion vine
Pennisetum purpureum	Napier grass
Panicum erectifolium	Panicum, erect leaf
Panicum hemitomum	Maidencane
Panicum repens	Torpedograss
Panicum tenerum	Panicum, blue joint
Peltandra virginica	Arrow arum
Persea palustris	Swamp bay
Phyla nodiflora	Creeping Charlie
Pluchea odorata	Marsh fleabane
Pluchea rosea	Marsh fleabane
Pluchea sp.	Marsh fleabane
Polygonum sp.	Smartweed
Polypodium aureum	Golden polypody
Proserpinaca palustris	Mermaid-weed
Psidium guajava	Guava
Psilotum nudum	Whisk fern
Psychotria nervosa	Wild coffee
Pteris longifolia	Brake fern
Pteris longifolia var. *bahamensis*	Brake fern
Pteris vittata	Brake fern
Ricinus communis	Castor bean
Rhoeo spathacea	Oyster plant
Rhynchospora (*Dichromena*) *colorata*	White sedge
Rhyncospora divergens	Beakrush, spreading
Rhyncospora inundata	Beakrush, horned
Rhyncospora microcarpa	Beakrush, southern
Rhyncospora tracyi	Beakrush, Tracy's
Rivina humilis	Bloodberry
Sabal palmetto	Sabal palm
Sagittaria graminea	Arrowhead, coastal
Sagittaria lancifolia	Arrowhead
Salix caroliniana	Willow

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Salvinia rotundifolia	Water fern
Sambucus canadensis	Elderberry
Samolus ebracteatus	Water pimpernel
Sarcostemma clausum	Milk withe
Schinus terebinthifolius	Brazilian pepper
Scirpus validus	Great bulrush
Schizachyrium gracile	Bluestem
Schizachyrium rhizomatum	Bluestem
Schizachyrium semiberbe	Bluestem
Species	Common Name
Serenoa repens	Saw palmetto
Smilax spp.	Catbriar
Solanum erianthum	Nightshade
Solidago stricta	Goldenrod, willowleaf
Solidago sp.	Goldenrod
Spermacoce glabra	Buttonweed
Sporobolus virginicus	Dropseed
Terminalia cattapa	Tropical almond
Thelypteris augescens *	Abrupt-tip maiden fern
Thelypteris kunthii *	Wood fern
Tillandsia spp.	air plants
Toxicodendron radicans	Poison Ivy
Trema lamarckiana	West Indian trema
Trema micrantha	Florida trema
Trismeria trifoliata	Goldenrod fern
Typha spp.	Cattails

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Fishes

Species	Common Name
Notemigonus crysoleucas	Golden Shiner
Erymizon succetta	Lake Chubsucker
Ictalurus nebulosus	Brown Bulhead
Ictalurus natalis	Yellow Bulhead
Notorus gyrinus	Tadpole Madtom
Clarias batrachus	Walking Catfish
Lucania goodei	Bluefin Killifish
Adinia xenica	Diamond Killifish
Fundulus seminolis	Seminole Killifish
Fundulus confluentus	Marsh Killifish
Fundulus chrysotus	Golden Topminnow
Cyprinodon variegatus	Sheepshead Minnow
Jordanella floridae	Flagfish
Gambusia affinis	Mosquitofish
Heterandria formosa	Least Killifish
Poecilia latipinna	Sailfin Molly
Labidesthes sicculus	Brook Silverside
Elassoma evergladei	Everglades Pygmy Sunfish
Micropterus salmoides	Largemouth Bass
Lepomis gulosus	Warmouth
Lepomis punctatus	Spotted Sunfish
Lepomis microlophus	Redear Sunfish
Lepomis marginatus	Dollar Sunfish
Lepomis macrochirus	Bluegill
Enneacanthus gloriosus	Blue-spotted Sunfish
Etheostoma fusiforme	Swamp Darter
Cichlasoma bimaculatum	Black Acara

Amphibians

Species	Common Name
Siren lacertina	Greater Siren
Pseudobranchus striatus	Everglades Dwarf Siren
Notophthalmus viridescens	Peninsula Newt
Amphiuma means	Two-toed Amphiuma
Scapheiopus holbrooki	Eastern Spadefoot
Bufo terrestris	Southern Toad

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Bufo quercicus	Oak Toad
Bufo marinus	Giant Toad
Eleutherodactylus planirostris	Greenhouse Frog

Species	Common Name
Hyla squirella	Squirrel Treefrog
Hyla cinerea	Green Treefrog
Hyla septentrionalis	Cuban Treefrog
Limnaoedus ocularis	Little Grass Frog
Pseudacris nigrita	Florida Chorus Frog
Acris gryllus	Florida Cricket Frog
Rana grylio	Pig Frog
Rana utricularia	Southern Leopard Frog
Gastrophryne carolinensis	Eastern Narrow-mouthed Toad

Reptiles

Species	Common Name
Chelydra serpentina	Snapping Turtle
Sternotherus odoratus	Stinkpot
Kinosternon bauri	Striped Mud Turtle
Kinosternon subrubrum	Florida Mud Turtle
Terrapene carolina	Florida Box Turtle
Chrysemys floridana	Florida Cooter
Chrysemys nelsoni	Florida Red-bellied Turtle
Deirochelys reticularia	Chicken Turtle
Trionys ferox	Florida Softshell
Anolis carolinensis	Green Anole
Anolis sagrei	Brown Anole
Hemidactylus turcicus	Mediterranean Gecko
Hemidactylus garnoti	Indo-Pacific Gecko
Sphaerodactylus notatus	Reef Gecko
Ophisaurus compressus	Island Glass Lizard
Cnemidophorus sexlineatus	Six-lined Racerunner
Leiolopisma laterale	Ground Skink
Eumeces inexpectatus	Southeastern Five-lined Skink
Natrix cyclopion	Florida Green Water Snake
Natrix taxispilota	Brown Water Snake
Natrix fasciata	Florida Water Snake
Liodytes alleni	Striped Swamp Snake
Seminatrix pygaea	Black Swamp Snake

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Storeria dekayi	Florida Brown Snake
Thamnophis sirtalis	Eastern Garter Snake
Diadophis punctatus	Southern Ring-necked Snake
Farancia abacura	Mud Snake
Coluber constrictor	Southern Black Racer
Masticophis flagellum	Eastern Coachwhip

Species	Common Name
Opheodrys aestivus	Rough Green Snake
*Drymarchon corais couperi**	Eastern Indigo Snake
Elaphe guttata	Corn Snake
Elaphe obsoleta	Rat Snake
Lampropeltis getulus	Florida Kingsnake
Cemophora coccinea	Scarlet Snake
Tantilla oolitica	Rim Rock Crowned Snake
Micrurus fulvius	Eastern Coral Snake
Agkistrodon piscivorus	Florida Cottonmouth
Sistrurus miliarius	Dusky Pygmy Rattlesnake
*Alligator mississippiensis**	American Alligator

Mammals

Species	Common Name
Didelphis marsupialis	Opossum
Scalopus aquaticus	Eastern Mole
Lasiurus intermedius	Eastern Yellow Bat
Nycticeius humeralis	Evening Bat
Tadarida brasiliensis	Freetail Bat
Dasypus novemcinctus	Armadillo
Sylvilagus palustris	Marsh Rabbit
Sylvilagus floridanus	Eastern Cottontail
Oryzomys palustris	Rice Rat
Peromyscus gossypinus	Cotton Mouse
Sigmodon hispidus	Hispid Cotton Rat
Rattus rattus	Black Rat
Mus musculus	House Mouse
Urocyon cinereoargenteus	Gray Fox
Procyon lotor	Raccoon
Spilogale putorius	Spotted Skunk
Mephitis mephitis	Striped Skunk

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

*Felis concolor coryi***	Florida Panther
Lynx rufus	Bobcat
Canis domesticus	Domestic Dog
Odocoileus virginianus	Whitetail Deer

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Birds

Species	Common Name
Podilymbus podiceps	Pied-billed Grebe
Phalacrocorax auritus	Double-crested Cormorant
Anhinga anhinga	Anhinga
Ardea herodias occidentalis	Great Blue Heron
Ardea herodias	Great White Heron
Butorides striatus	Northern Green Heron
Egretta caerulea	Little Blue Heron
Bubulcus ibis	Cattle Egret
Egretta rufescens	Reddish Egret
Egretta alba	Great Egret
Egretta thula	Snowy Egret
Egretta tricolor	Tricolored Heron
Nycticorax nycticorax	Black-crowned Night Heron
Nyctanassa violacea	Yellow-crowned Night Heron
Ixobrychus exilis	Least Bittern
*Mycteria americana***	Wood Stork
Plegadis falcinellus	Glossy Ibis
Eudocimus albus	White Ibis
Ajaia ajaja	Roseate Spoonbill
Anas platyrhynchos	Mallard
Anas rubripes	Black Duck
Anas fulvigula	Mottled Duck
Aythya affinis	Lesser Scaup
Oxyura jamaicensis	Ruddy Duck
Lophodytes cucullatus	Hooded Merganser
Mergus serrator	Red-breasted Merganser
Cathartes aura	Turkey Vulture
Coragyps atratus	Black Vulture
Elanoides forficatus	Swallow-tailed Kite
Buteo jamaicensis	Red-tailed Hawk
Buteo lineatus	Red-shouldered Hawk
*Haliaeetus leucocephalus**	Bald Eagle
Circus cyaneus	Northern Harrier
Pandion haliaetus	Osprey
Colinus virginianus	Bobwhite
Aramus guarauna	Limpkin
Rallus elegans	King Rail

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Gallinula chloropus	Common Gallinule
Porphyrula martinica	Purple Gallinule
Pluvialis squatarola	Black-bellied Plover
Species	Common Name
Arenaria interpres	Ruddy Turnstone
Capella gallinago	Common Snipe
Actitis macularia	Spotted Sandpiper
Tringa solitaria	Solitary Sandpiper
Tringa melanoleuca	Greater Yellowlegs
Tringa flavipes	Lesser Yellowlegs
Calidris canutus	Red Knot
Calidirs melanotos	Pectoral Sandpiper
Calidris minutilla	Least Sandpiper
Calidris alpina	Dunlin
Calidris pusilla	Semipalmated Sandpiper
Calidris mauri	Western Sandpiper
Tryngites subruficollis	Buff-breasted Sandpiper
Limnodromus scolopaceus	Long-billed Dowitcher
Micropalama himantopus	Stilt Sandpiper
Himantopus mexicanus	Black-necked Stilt
Steganopus tricolor	Wilson's Phalarope
Larus delawarensis	Ring-billed Gull
Larus atricilla	Laughing Gull
Sterna forsteri	Forster's Tern
Sterna maxima	Royal Tern
Sterna caspia	Caspian Tern
Chlidonias niger	Black Tern
Zenaida asiatica	White-winged Dove
Zenaida macroura	Mourning Dove
Melopsittacus undulatus	Budgerigar
Coccyzus americanus	Yellow-billed Cuckoo
Coccyzus erythropthalmus	Black-billed Cuckoo
Crotophaga ani	Smooth-billed Ani
Tyto alba	Barn Owl
Otus asio	Screech Owl
Bubo virginianus	Great Horned Owl
Athene cunicularia	Burrowing Owl
Strix varia	Barred Owl
Caprimulgus carolinensis	Chuck-will's-widow
Chordeiles minor	Common Nighthawk
Megaceryle alcyon	Belted Kingfisher

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Colaptes auratus	Common Flicker
Melanerpes carolinus	Red-bellied Woodpecker
Tyrannus verticalis	Western Kingbird
Muscivora forficata	Scissor-tailed Flycatcher
Myiarchus crinitus	Great Crested Flycatcher
Sayornis phoebe	Eastern Phoebe
Species	Common Name
Iridoprocne bicolor	Tree Swallow
Riparia riparia	Bank Swallow
Stelgidopteryx ruficollis	Rough-winged Swallow
Hirundo rustica	Barn Swallow
Corvus brachyrhynchos	Common Crow
Troglodytes aedon	House Wren
Thryothorus ludovicianus	Carolina Wren
Mimus polyglottos	Mockingbird
Dumetella carolinensis	Gray Catbird
Toxostoma rufum	Brown Trasher
Turdus migratorius	American Robin
Hylocichla mustelina	Wood Trush
Catharus guttatus	Hermit Trush
Catharus ustulatus	Swainson's Trush
Catharus minimus	Gray-cheeked Thrush
Catharus fuscescens	Veery
Polioptila caerulea	Blue-Gray Gnatcatcher
Bombycilla cedrorum	Cedar Waxwing
Lanius ludovicianus	Loggerhead Shrike
Vireo griseus	White-eyed Vireo
Mniotilta varia	Black and White Warbler
Dendroica magnolia	Yellow Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica dominica	Yellow-throated Warbler
Dendroica discolor	Prairie Warbler
Dendroica palmarum	Palm Warbler
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Geothlypis trichas	Common Yellowthroat
Passer domesticus	House Sparrow
Sturnella magna	Eastern Meadowlark
Agelaius phoeniceus	Red-winged Blackbird
Icterus spurius	Orchard Oriole
Icterus pectoralis	Spotted-breasted Oriole

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

Icterus galbula	Northern Oriole
Quiscalus major	Boat-tailed Grackle
Molothrus ater	Brown-headed Cowbird
Piranga olivacea	Scarlet Tanager
Piranga rubra	Summer Tanager
Cardinalis cardinalis	Cardinal
Pheucticus ludovicianus	Rose-breasted Grosbeak
Guiraca caerulea	Blue Grosbeak
Passerina cyanea	Indigo Bunting
Species	Common Name
Passerina ciris	Painted Bunting
Spiza americana	Dickcissel
Carduelis pinus	Pine Siskin
Carduelis tristis	American Goldfinch
Pipilio erythrophthalmus	Rufous-sided Towhee
Passerculus sandwichensis	Savannah Sparrow
Ammodramus savannarum	Grasshopper Sparrow
Poecetes gramineus	Vesper Sparrow
Spizella passerina	Chipping Sparrow
Spizella pussilla	Field Sparrow
Zonotrichia leucophrys	White-crowned Sparrow
Zonotrichia albicollis	White-throated Sparrow
Melospiza lincolnii	Lincoln's Sparrow

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* Plants Listed as Threatened by the State of Florida
** Plants Listed as Endangered by the State of Florida

Source: Chapter 581.185, Florida Statutes Chapter 5B-40, Florida Administrative Code. Rules of the Department of Agriculture and Consumer Services, Division of Plant Industry.

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* Animals Listed as Federally listed as threatened
** Animals Listed as Federally listed as endangered

Source: 50 CFR 17.11-12 Code of Federal Regulations.

Table 4. East Everglades- 8.5 Square Mile Area Plant and Animal Species List

The preceding species list was generated from DERM field inspections during April to May of 1996, lists of vegetative communities and associated plants compiled by Hilsenbeck, Hofstetter and Alexander (1979), and plant community descriptions in the Everglades SWIM plan (SFWMD 1992).

Table 5. Existing Condition WRAP Polygon Scores, Acreages, and Functional Units for the 8.5 Square Mile Area, Miami-Dade County, Florida

Wetland Type	Score	Acres	Functional Units
Everglades National Park			
Forested Wetland	0.91	889	809
Forested Exotic	0.53	3,209	1701
Long Hydroperiod Graminoid	0.88	7,188	6,325
Short Hydroperiod Graminoid	0.90	3,081	2,773
Subtotal		14,367	11,608
8.5 SMA			
Graminoid Wetland <7.0 feet	0.72	1,448	1,043
Graminoid Wetland @>7.0 feet	0.53	300	159
Herbaceous Wetland low-moderate Disturbance <7.0 feet	0.69	572	395
Herbaceous Wetland high Disturbance <7.0 feet	0.56	82	46
Shrubby Wetland < 7.0 feet	0.54	143	73
Forested Exotic Wetland 6.5–7.0 feet	0.51	128	65
Forested Exotic Wetland @>7.0 feet	0.46	7	3
Forested Native Wetland	0.86	15	13
Subtotal		2,594	1,797
TOTAL		16,867	13,405

Source: DCAR, march, 2000

Table 6. Species Listed by Florida Game and Freshwater Fish Commission as Threatened, Endangered, and Species of Special Concern, Excluding Federally-listed Species

Common Name	Scientific Name	Designated Status
Reptiles		
Miami black headed snake	*Tantilla oolitica*	Threatened
American alligator	*Alligator mississipiensis*	Special Concern
Birds		
Roseate spoonbill	*Ajaia ajaja*	Special Concern
Limpkin	*Aramus guarauna*	Special Concern
Little blue heron	*Egretta caerulea*	Special Concern
Tricolored heron	*Egretta tricolor*	Special Concern
Snowy egret	*Egretta thula*	Special Concern
White ibis	*Eudocimus alba*	Special Concern
Fish		
Mangrove rivulus	*Rivulus marmoratus*	Special Concern
Mammals		
Everglades mink	*Mustela vison evergladensis*	Threatened
Mussels		
Florida tree snail	*Liguus fasciatus*	Special Concern

Source: Florida Game and Freshwater Fish Commission 1997.

Table 7. Tabulation of Detailed Existing Land Uses in the 8.5 SMA

Land Use Type	Acreage
Residential	211.5
Residential with Agriculture	958.6
Commercial	15.7
Mixed Agriculture	159.8
Mixed Agriculture/Utilities	39.7
Nursery	38.5
Row Crop	1051.7
Specialty Farm	211.6
Tree Crop	313.8
Rural Land in Transition	16.7
Public	1625.2
Undedicated ROW	22.1
Utilities	80.1
Vacant Land	1668.0
TOTALS	6413.0

Source: HDR's adaptation of DERM's 1999 land use survey of the 8.5 SMA

Table 8. Tabulation of Existing Land Use Classifications in the 8.5 SMA Used for Analysis

Land Use Category	No. of Parcels	Acreage
Residential	74*	211
Commercial	4	16
Agriculture	721**	2,774
Public Land	612***	1625
Easements	28****	102
Vacant	545*****	1,685
Totals	1,984	6,413

Notes:

* Does not include 260 residential units on agricultural land (residential w/agriculture). However, acreage includes ½ acre residential land on each of these parcels (132 acres).

** Includes 260 parcels of residential with agriculture, also one 40-acre utility parcel that is actively being farmed.

*** distributed among the following agencies: USACE (259 parcels, 663 acres), SFWMD (160 parcels, 468 acres), Miami-Dade County (185 parcels, 174.1 acres), USDA (5 parcels, 13 acres), Trustees of the Internal Improvement Trust Fund (2 parcels, 0.5 acres), and FAA (1 parcel, 306 acres).

**** Includes 17 parcels of undedicated right-of-way and 2 parcels, 40 acres of powerline corridor.

***** Includes 8 parcels, totaling 17 private acres, of “rural land in transition”

Table 9. Impact Summary Matrix

Alternative	Water Quality	Wetlands^	WRAP Score^	Listed Species					Unique Farmlands Conversion^^	Cultural Resources	Cost	Relocations		Environmental Justice
				Florida Panther	Eastern Indigo	Snail Kite	Wood Stork	CSSS	Direct/Indirect			Residential	Commercial	
1	L	7,196	-2,765	TBD	TBD	TBD	TBD	TBD	0/0	No Impacts	$30,585,500	0	0	L
2B	L	7,583	-2,765	TBD	TBD	TBD	TBD	TBD	0/0	No Impacts	$33,884,000	0	0	L
3	L	3,416	-1,775	TBD	TBD	TBD	TBD	TBD	0/0	No Impacts	$235,802,000	*0	*0	L-M
4	L	7,943	2,448	TBD	TBD	TBD	TBD	TBD	1,720/0	No Impacts	$131,979,500	17	4	L-M
5	L	7,943	2,448	TBD	TBD	TBD	TBD	TBD	2,106/0	No Impacts	$178,950,500	208	4	H
6B	L	7114	1,606	TBD	TBD	TBD	TBD	TBD	885/0	No Impacts	$147,709,700	129	0	M
6C	L	6,688	-1,805	TBD	TBD	TBD	TBD	TBD	45/0	No Impacts	$62,833,800	17	0	L-M
6D**	L	7464	1,322	BA	BA	BA	BA	BA	128/0	No Impacts	$88,139,000	35	0	L-M
7	L	7,943	1,290	TBD	TBD	TBD	TBA	TBD	0/0	No Impacts	$134,590,400	*0	0	L-M
8A	L	6473	2,240	TBD	TBD	TBD	TBA	TBD	701/0	No Impacts	$153,726,000	104	0	M
9	L	7,391	-2,765	TBD	TBD	TBD	TBA	TBD	0/0	No Impacts	$39,903,700	0	0	L

H: High Opportunity for Adverse Effects
M: Moderate Opportunity for Adverse Effects
L: Low Opportunity for Adverse Effects
Wetlands: Change in Acres (loses or gains)
WRAP: Functional Units
BA: Biological Assessment Prepared - Not Likely to Adversly Effect
TBD: To be Determined for Preferred Alternative
Unique Farmlands: Acres Purchased (does not include flowage easments which can still be farmed)
Cost: Dollars
Relocations: Total Number of Units
* Relocations may be required where flowage easements are necessary
** Federally Preferred Alternative
^ Change compared to base 95 condition
^^ Acres converted

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Table 10
Results of Alternatives Analysis

This table presents the comparison of all alternatives to Base 95 (existing) conditions for each performance measure

4. Analyze Effects to Ecological Functions													
Measure	**Units**	**Base 95**	**Alt 1**	**Alt 2B**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6B**	**Alt 6C**	**Alt 6D**	**Alt 7**	**Alt 8A**	**Alt 9**
a. Total Wetlands	Area (Ac)	64,881	62,343	62,012	63,694	66,285	66,285	65,104	62,831	64,833	66,285	65,285	62,179
b. Short-Hydroperiod Marl Forming Wetlands	Area (Ac)	5,971	1,690	1,249	1,070	2,399	2,399	2,074	3,004	2,055	2,399	1,908	1,470
c. Long-Hydroperiod Peat Forming wetlands	Area (Ac)	58,910	60,653	60,763	62,624	63,886	63,886	63,030	59,827	62,778	63,886	63,377	60,709
d. WRAP Score	Functional Units	13,405	10,640	10,640	11,630	15,853	15,853	15,011	11,600	14,727	14,695	15,645	10,640

Table 11a
Results of Alternatives Analysis

This table presents the comparison of all alternatives to Base 95 (existing) conditions for each performance measure

Table 11. Change in Wetland Area and WRAP Functional Units Compared													
Measure	**Units**	**Base 95**	**Alt 1**	**Alt 2B**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6B**	**Alt 6C**	**Alt 6D**	**Alt 7**	**Alt 8A**	**Alt 9**
a. Total Wetlands	Area (ac)		7,196	7,583	3,416	7,943	7,943	7,114	6,688	7,464	7,943	6,473	7,391
b. Short-Hydroperiod Marl Forming Wetlands	Area (ac)		-4,663	-5,104	-7,423	-3,954	-3,954	-4,279	-5,063	-4,298	-3,954	-4,445	-4,883
c. Long-Hydroperiod Peat Forming wetlands	Area (ac)		11859	12687	10839	11897	11897	11393	11571	11762	11897	10918	12274
d. WRAP* Score	Functional Units		-2,765	-2,765	-1,775	2,448	2,448	1,606	-1,805	1,373	1,290	2,240	-2,765

*Detailed WRAP information provided in Appendix G, Table 18, Chapter 6

Table 11b
Results of Alternatives Analysis

This table presents the comparison of all alternatives Alternative 1 conditions for each performance measure

Table 11. Change in Wetland Area and WRAP Functional Units Compared													
Measure	**Units**	**Base 95**	**Alt 1**	**Alt 2B**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6B**	**Alt 6C**	**Alt 6D**	**Alt 7**	**Alt 8A**	**Alt 9**
a. Total Wetlands	Area (ac)			387	-1,640	747	747	-548	-508	268	785	-1,664	610
b. Short-Hydroperiod Marl Forming Wetlands	Area (ac)			-441	-620	709	709	-82	-400	365	747	-723	195
c. Long-Hydroperiod Peat Forming wetlands	Area (ac)			828	-1,020	38	38	-466	-108	-97	38	-941	415
d. WRAP* Score	Functional Units			-2,765	-1,775	2,448	2,448	1,606	-1,805	1,373	1,290	2,240	-2,765

*Detailed WRAP information provided in Appendix G, Table 18, Chapter 6

Table 12. Summary of Alternative 1 Land Requirements

Item	No. of Parcels	Private Acres	Public Acres	Total
Residential	0	0	0	0
Commercial	0	0	0	0
Agriculture	0	0	0	0
Communication	0	0	0	0
Easements	9	0	3	3
Vacant	196	0	343	343
Totals	205	0	346	346

Table 13. Summary of Alternative 2B Land Requirements

Item	No. of Parcels	Private Acres	Public Acres	Total
Residential	0	0	0	0
Commercial	0	0	0	0
Agriculture	0	0	0	0
Communication	0	0	0	0
Easements	9	0	3	3
Vacant	196	0	343	343
Totals	205	0	346	346

Table 14. Summary of Alternative 3 Land Requirements

Item	No. of Parcels	Private Acres	Public Acres	Total
Residential	82*	343	0	343
Commercial	3	14	0	14
Agriculture	621**	2,162	0	2,162
Communication	1	0	306	306
Easements	9***	95	0	95
Vacant	914****	2,116	435*****	2,551
Totals	1,630	4,730	741	5,471

Notes:

* Does not include 238 parcels of residential with agriculture. Each unit is include in the acreage as 0.5 acre per parcel.
** Includes 238 parcels of residential with agriculture and one 40 acre utility parcel
*** Includes 7 parcels (undedicated right-of-way) and two 40 acre utility parcels.
**** Includes 7 parcels of “rural land in transition”
***** 343 acres are part of the structural footprint of Alternative 3.

Table 15. Summary of Alternative 6B Land Requirements

Item	No. of Parcels	Private Acres	Public Acres	Total
Residential	71*	250	0	250
Commercial	0	0	0	0
Agriculture	462**	1,175	0	1,175
Communication	1	0	<1	<1
Easements	17***	96	0	96
Vacant	1,058****	1,586	1,110	2,696
Totals	1,609	3,107	1,110	4,217

Notes:

* Does not include 179 parcels of residential with agriculture. Each unit is included in the acreage as 0.5 acre per parcel.

** Includes 179 parcels of residential with agriculture and one 40 acre utility parcel

*** Includes 15 parcels (undedicated right-of-way) and two 40 acre utility parcels.

**** Includes 514 parcels of public lands and 6 parcels totaling 9 acres of “rural land in transition”

Table 16. Summary of Alternative 8A Land Requirements

Item	No. of Parcels	Private Acres	Public Acres	Total
Residential	83*	333	0	333
Commercial	3	14	0	14
Agriculture	656**	1,932	0	1,932
Communication	1	0	306	306
Easements	22***	95	0	95
Vacant	1,268***	1,711	1,114	2,825
Totals	2,042	4,085	1,420	5,505

Notes:

* Does not include 247 parcels of residential with agriculture. Each unit is included in the acreage as 0.5 acre per parcel.
** Includes 247 parcels of residential with agriculture
*** Includes 16 parcels (undedicated right-of-way)
**** Includes 577 parcels of public lands and 9 parcels of “rural land in transition”

Table 17. Summary of Alternative 9 Land Requirements

Item	No. of Parcels	Private Acres	Public Acres	Total
Residential	0	0	0	0
Commercial	0	0	0	0
Agriculture	0	0	0	0
Communication	0	0	0	0
Easements	9	0	3	3
Vacant	196	0	343	343
Totals	205	0	346	346

Table 18
Summary of Public Coordination

Meeting / Event	Attended	Date	Site	Purpose
Pre-Scoping Meeting	Various agencies and interested stakeholders	April 1, 1999	Homestead	Introduction meeting, preliminary discussion of work effort for EIS.
Pre-Scoping Meeting (SERA)	Various agencies and interested stakeholders	April 8, 1999	Ft. Lauderdale	Agency and public comment on project.
Scoping Meeting (NEPA requirement)	Public invited - included all residents, agencies, and interested stakeholders	June 21, 1999	Homestead	Project description was presented. Received public comment on project.
Technical Team Meeting	Technical representatives from various agencies.	August 4, 1999	West Palm Beach	Evaluate potential alternatives for further evaluation. Discuss modeling requirements.
Public Comment (Working Group of the SFERTF)	Public, various agencies, and interested stakeholders	Sept. 1-2, 1999	Homestead, Key Largo	Round table discussion with technical panel. Public comment received.
Public Workshop (NEPA requirement)	Public, various agencies, and interested stakeholders	October 6, 1999	Homestead	Presentation of 8.5 SMA alternatives. Public comment received.
Technical Team Meeting	Technical representatives from various agencies and interested stakeholders	October 7, 1999	Homestead	Discussion of critical issues, modeling needs, and performance measures.
Technical Team Meeting	Technical representatives from various agencies and interested stakeholders	October 27, 1999	Jacksonville	Modeling and alternatives analysis.

Table 18 (Continued)
Summary of Public Coordination

Meeting / Event	Attended	Date	Site	Purpose
Technical Team Meeting	Technical representatives from various agencies and interested stakeholders	November 1999	Jacksonville	Modeling requirements and environmental issues.
SFWMD Governing Board Presentation	Governing Board and public	December 15, 1999	West Palm Beach	Presented status of project.
Technical Team Meeting	Technical representatives from various agencies and interested stakeholders	January 4, 2000	Miami	Local cost issues discussed.
Technical Team Meeting	Technical representatives from various agencies and interested stakeholders	January 10, 2000	Ft. Lauderdale	Performance measures and modeling.
Public Workshop (Hosted by SFWMD)	Public, various agencies, and interested stakeholders	January 18, 2000	Homestead	Presentation of performance measures, modeling, and schedule. Public comment received.
Technical Team Meeting	Technical representatives from various agencies and interested stakeholders	January 19, 2000	Homestead	Discussion of performance measures.
SFWMD Governing Board Meeting	Governing Board and public	February 23, 2000	West Palm Beach	Present performance measures.