

LIMITED REEVALUATION REPORT



PICAYUNE STRAND RESTORATION PROJECT



**U.S. Army Corps
of Engineers**
Jacksonville District

This page intentionally left blank

PICAYUNE STRAND RESTORATION PROJECT
LIMITED REEVALUATION REPORT

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	1-1
1.1 Study Authority	1-1
1.2 Purpose and Need	1-2
1.2.1 Manatee Mitigation Feature	1-2
1.2.2 Manatee Consultation History	1-3
1.3 Location	1-6
1.4 Requirements	1-10
1.5 Project History	1-10
1.6 Prior Reports and Environmental Documents	1-10
1.7 Decision to be Made	1-11
1.8 Real Estate	1-12
1.8.1 Land Requirements Changes	1-13
2.0 DESIGN AND COST CHANGES	2-1
2.1 Funding since Authorization	2-1
2.2 Changes in Scope of Authorized Project	2-1
2.3 Changes in Local Cooperation Requirements	2-2
2.4 Change in Location of the Project	2-2
2.5 Project Design Changes	2-2
2.5.1 Changes in Total Project First Costs	2-2
2.5.2 Cost Discrepancies Between Main Report and TPCS	2-4
2.5.3 Section 902 limit	2-5
2.5.4 Construction Costs	2-8
2.5.5 Real Estate Costs (Lands and Damages)	2-9
2.5.6 Pre-construction, Engineering, and Design (PED) Costs	2-10
2.5.7 Construction Management Costs	2-11
2.6 Changes in Cost Allocation	2-11
2.7 Changes in Cost Apportionment	2-14
2.8 Manatee Mitigation Feature	2-14
3.0 EVALUATION OF BENEFITS	3-1
3.1 Cost Effectiveness of Remaining Benefits	3-7
3.2 Benefits Achieved due to Implementing Prairie Canal Restoration	3-9
3.2.1 Hydrologic Changes	3-9
3.2.2 Plant Community Changes	3-10
3.3 Monitoring and Adaptive Management	3-10
3.3.1 Monitoring	3-11
3.3.2 Adaptive Management	3-11
4.0 RECOMMENDATIONS	4-1
5.0 LIST OF PREPARERS	5-1
6.0 REFERENCES	6-1

LIST OF FIGURES

Figure E-1. Vicinity Map of the Picayune Strand Restoration Project.....	5
Figure E-2. Location of the Picayune Strand Restoration Project and Other Adjacent Public Lands.....	7
Figure 1-1 . Current Design of the Picayune Strand Restoration Project	1-7
Figure 1-2. Picayune Strand Restoration Project Location and Adjacent Areas	1-9
Figure 2-1. Proportion of Total Cost Increase, by Category.....	2-4
Figure 2-2. Proportion of Construction Cost Increase by Component	2-4
Figure 3-1. Estimated Benefit Areas for each Phase of Canal Plugging	3-3
Figure 3-2. Adjacent public lands benefiting from the PSRP restoration.....	3-6
Figure 3-3. Picayune Strand and adjacent publicly owned lands	3-7

LIST OF TABLES

Table 2-1. Federal & Non-Federal cost allocation per fiscal year	2-1
Table 2-2. Comparison between original and current cost estimates.....	2-3
Table 2-3. Input Table for 902 Limit calculation	2-5
Table 2-4. Input Table for 902 Limit calculation	2-6
Table 2-5. Section 902 Limit Input Table.....	2-7
Table 2-6. Planning, Engineering and Design Costs to Date.....	2-11
Table 3-1. Average annual benefits with and without the completion of Faka Union and Miller canal plugging.....	3-4
Table 3-2. Environmental Benefits (habitat unit lift) by construction phase.....	3-8
Table 3-3. Environmental Benefits	3-8
Table 3-4. Cost Estimate for Monitoring in 2004 Final PIR/EIS (Table H-13, Appendix H)	3-13
Table 3-5. PSRP Ecological Response and Water Quality Monitoring Tasks (2012 Transfer Agreement, Appendix 5)	3-14
Table 3-6. PSRP Tasks Associated with Environmental Compliance, Assessment of Ecological Response and Hydrological Data, and Control of Exotic Plants (2012 Transfer Agreement, Appendix 5).....	3-15
Table 5-1. Preparers	5-1

APPENDICES

APPENDIX A – ENGINEERING DESIGN

APPENDIX B – COST APPENDIX

APPENDIX C – REAL ESTATE

APPENDIX D – ENVIRONMENTAL

APPENDIX E – ADAPTIVE MANAGEMENT PLAN

ACRYNOYMS

AOU - American Ornithologists' Union
BA – Biological Assessment
BO – Biological Opinion
BODR – Basis of Design Report
CARL – Conservation and Recreational Lands
CEQ – Council on Environmental Quality
CERCLA – Comprehensive Environmental Response Compensation and Liability Act
CERP – Comprehensive Everglades Restoration Program
CERPRA – Comprehensive Everglades Restoration Plan Regulation Act
CFR – Code of Federal Regulations
CFS – cubic feet per second
CO₂ – Carbon Dioxide
CORPS – Corps of Engineers
CWCCIS - Civil Works Construction Cost Index System
CZMA – Coastal Zone Management Act
DDR – Design Documentation Report
DO – Dissolved Oxygen
DOF – Division of Forestry
EA – Environmental Assessment
EC – Engineering Circular
EDC – Engineering During Construction
EIS – Environmental Impact Statement
EFH – Essential Fish Habitat
EO – Executive Order
EOR – Engineer of Record
ERDC – Engineering Research and Development Center
ESA – Endangered Species Act
FDEP – Florida Department of Environmental Protection
FDOT – Florida Department of Transportation
FFS – Florida Forestry Service
FONSI – Finding of No Significant Impact
FWC – Florida Fish and Wildlife Commission
FU – Fuka Union
FY – Fiscal Year
GHG – Greenhouse Gas
GSSHA - Gridded Surface Subsurface Hydrologic Analysis
H&H – Hydraulic and Hydrology
HDT – Hydraulic Design Tool
HUL – Habitat Unit Lift
HSWA – Hazardous and Solid Waste Amendments
HTRW – Hazardous, Toxic, Radioactive Waste
LCR – Lands, Canals and Roads
LERRD – Lands, Easements, Rights of Way, Relocations and Disposal Areas
lidar - Laser Interferometry Detection and Ranging

LRR – Limited Reevaluation Report
MAG – Monitoring and Assessment Group
MHHW – Mean High Higher Water
MMPA – Marine Mammal Protection Act
MOM - Management Option Matrices
NAVD – North American Vertical Datum
NEPA – National Environmental Policy Act
NFS – non federal sponsor
NGGE – Northern Golden Gate Estates
NMFS – National Marine Fisheries Service
NOA - Notice of Availability
NOAA – National Oceanic and Atmospheric Administration
NPDES – National Pollutant Discharge Elimination System
NRCS – Natural Resource Conservation Service
OMB - Office of Management and Budget
OMRR&R – Operation, Maintenance, Repair, Replacement and Rehabilitation
PED – Pre-Construction, Engineering, and Design
PIR – Project Implementation Report
POI – Port of the Islands
PSRP – Picayune Strand Restoration Project
PSSF – Picayune Strand State Forrest
RCW – Red Cockaded Woodpecker
RCRA – Resource Conservation and Recovery Act
RECOVER - Restoration Coordination and Verification
SAJ –South Atlantic Jacksonville
SAV - Submerged Aquatic Vegetation
SCDA - Supervisory Control and Data Acquisition
SFWMD – South Florida Water Management District
SGGE – Southern Golden Gate Estates
SHPO – State Historic Preservation Officer
SLR – Sea Level Rise
T&E – Threatened and Endangered Species
TPCS – Total Project Cost Summary
TMDLs – Total Maximum Daily Loads
TSCA – Toxic Substances Control Act
USACE – U.S. Army Corps of Engineers
U.S.C. – United States Code
USFWS- U.S. Fish and Wildlife Service
USGS – U.S. Geological Survey
WAI - Wetland Affinity Index
WBID – Water Body Identification Number
WRDA – Water Resources Development Act

EXECUTIVE SUMMARY

The Central and Southern Florida Comprehensive Everglades Restoration Plan, Picayune Strand Restoration Project encompasses an area of environmentally sensitive lands in southwestern Collier County, Florida (See Figure E-1 and Figure E-2). Covering an area of 55,247 acres, the project was authorized in the Water Resources Development Act of 2007 to restore natural water flow across 93 square miles of Collier County lands that were drained for an extensive residential development. The South Florida Water Management District is the non-federal sponsor.

The purpose of this Limited Reevaluation Report is to request a post-authorization change for the project to increase the authorized project cost to \$617.9 million (FY 15 price level) and to confirm that including the manatee mitigation feature (discussed below) is within the Chief of Engineers discretionary authority. The Picayune Strand Restoration Project was authorized in the Water Resources Development Act of 2007 at a total cost of \$375.3 million (FY 05 price level). The current Section 902 limit is \$505.2 million (FY 15 price level).

The project was authorized consistent with the 2004 Final Project Implementation Report and Environmental Impact Statement, which recommended Alternative 3D. The Project Implementation Report and Environmental Impact Statement also describe the need for a manatee mitigation feature south of the Picayune Strand Restoration Project near the Port of the Islands Basin (south of “Port of the Islands” area on Figure 1-2). At the time of authorization, it was unclear whether a feature would be needed. A study conducted by the U.S. Geological Survey from 2009 to 2011 identified that the project would have a significant effect on the Port of the Islands refugium, potentially resulting in an increased potential for manatee mortality due to cold stress. This feature is required to prevent adverse project effects on the West Indian manatee, which are prohibited under the Marine Mammal Protection Act. While the requirement to compensate for the loss of the cold weather refugium that existed downstream of the Faka Union weir was included in the 2004 Final Project Implementation Report and Environmental Impact Statement, details regarding the scope of the mitigation required were not finalized at that time. An interagency team of biologists has been involved with defining the scope, design, and cost of this feature. Guidance provided by ER 1105-2-100 part G-13.c. indicates authorization of this feature falls within the authority of the Chief of Engineers in consultation with the Assistant Secretary of Army for Civil Works. This Limited Reevaluation Report also recommends approval by the Chief of Engineers. All other features discussed within this Limited Reevaluation Report were included in the 2004 Final Project Implementation Report and Environmental Impact Statement.

The overarching objective of the authorized plan is the hydrologic restoration, preservation, and protection of the Southwest Florida ecosystem while providing flood protection to the adjacent lands. The project area is in the center of a block of surrounding state and Federal nature preserves and wildlife areas (See Figure E-2). The completed project will result in a much larger contiguous natural area, providing valuable wildlife habitat that was

previously lost due to development. The plan consists of constructing three pump stations, spreader basins, and levees, filling and plugging existing canals, and removing existing roadways to restore natural sheetflow to rehydrate the wetlands within Picayune Strand and reduce point source freshwater discharge to the estuary along with flood risk reduction features and necessary mitigation feature. When completed, the project will successfully achieve all of the planning objectives authorized in the 2004 Final Picayune Strand Restoration Project Implementation Report and Environmental Impact Statement:

- Reestablish natural freshwater flows to the estuary
- Restore historic hydropatterns, sheetflow and flowways
- Reestablish natural plant distribution and composition
- Increase surface aquifer recharge
- Restore habitat for listed species
- Increase fish and wildlife resources
- Restore ecological connectivity and provide contiguous habitat
- Provide resource based recreational opportunities
- Restore natural fire regime

The Picayune Strand Restoration Project Implementation Report and Environmental Impact Statement were completed in 2004. Prior to the authorization in 2007, the non-federal sponsor initiated preconstruction, engineering and design efforts and started construction activity under the State of Florida's Acceler8 initiative. Roadway removal and the Prairie Canal backfilling effort were completed in 2007.

In 2008, the U.S. Army Corps of Engineers and the non-federal sponsor decided the Corps would complete construction of the project. During detailed design, revisions to the pump stations including updating the telecommunication system and phasing of construction were required based on design criteria agreed upon jointly by the Corps and non-federal sponsor. The revised construction phasing, constructing the pump stations and levees first was required by the Savings Clause requirement to ensure upstream neighborhood conditions were not changed. The Corps awarded a contract for the construction of the first (Merritt) pump station and associated tieback levee, spreader basin, road removal and canal plugging activities in 2009. The Merritt project was completed in 2014. The second pump station (Faka Union) and associated tieback levee, spreader basin and, road removal construction contract was awarded in 2010 and is scheduled for completion in 2015. The final pump station (Miller) and related tieback levee, spreader basin and road removal construction was awarded in 2013 with a final project completion target of 2017. The remaining project components to be constructed are the Southwestern (formerly 6Ls Farm) protection feature, the manatee mitigation feature, and additional road removal and canal plugging that was not included in other contracts. The restoration benefits will be realized when all identified roads are degraded and the Merritt, Faka Union and Miller Canal plugs can be installed. In order to plug the Faka Union and Miller Canals, the Southwestern protection feature (earthen levee to maintain existing levels of flood protection) and the manatee mitigation feature (excavated oxbow basin adjoining the Faka Union Canal) must be completed.

The 2004 Project Implementation Report and Environmental Impact Statement were prepared based on feasibility-level engineering study and analysis, resulting in a project plan and cost estimate that were conceptual in nature and subject to refinement during engineering and design. Design refinements to the three pump stations and associated earthwork are the major drivers in increasing the project's total cost. Some refinements stemmed from the need for larger, more complex pump stations (including telecommunications), detailed surveys of the project area revealing previously unknown topographic features and additional tram roads requiring removal, and requiring a revised, full project-width tieback levee to preclude recirculation of water from the pump stations. An increase in engineering, design and construction management costs have also resulted in increasing the project's total cost above the authorized level.

The Picayune Strand Restoration Project is an important component in the Comprehensive Everglades Restoration Plan and essential for the recovery of the South Florida ecosystem. Since authorization, a substantial investment (over \$470 million) has been made constructing the sequential project components required to ultimately restore the project area to pre-drainage conditions. When completed in full, the project will provide the hydrologic, biological, and estuarine restoration as described in the 2004 Final Project Implementation Report and Environmental Impact Statement. The additional funding requested is necessary to complete the project and realize the ecological benefits envisioned in the 2004 Final Project Implementation Report and Environmental Impact Statement, as well as connect the surrounding Federal and state parks, preserves, and refuges. If the additional funding is not authorized, the protection features will not be constructed and full restoration will not be achieved, resulting in the failure to realize approximately 70 percent of the hydrologic benefits, 62 percent of the biological benefits, and 100 percent of the estuarine benefits.

This page intentionally left blank

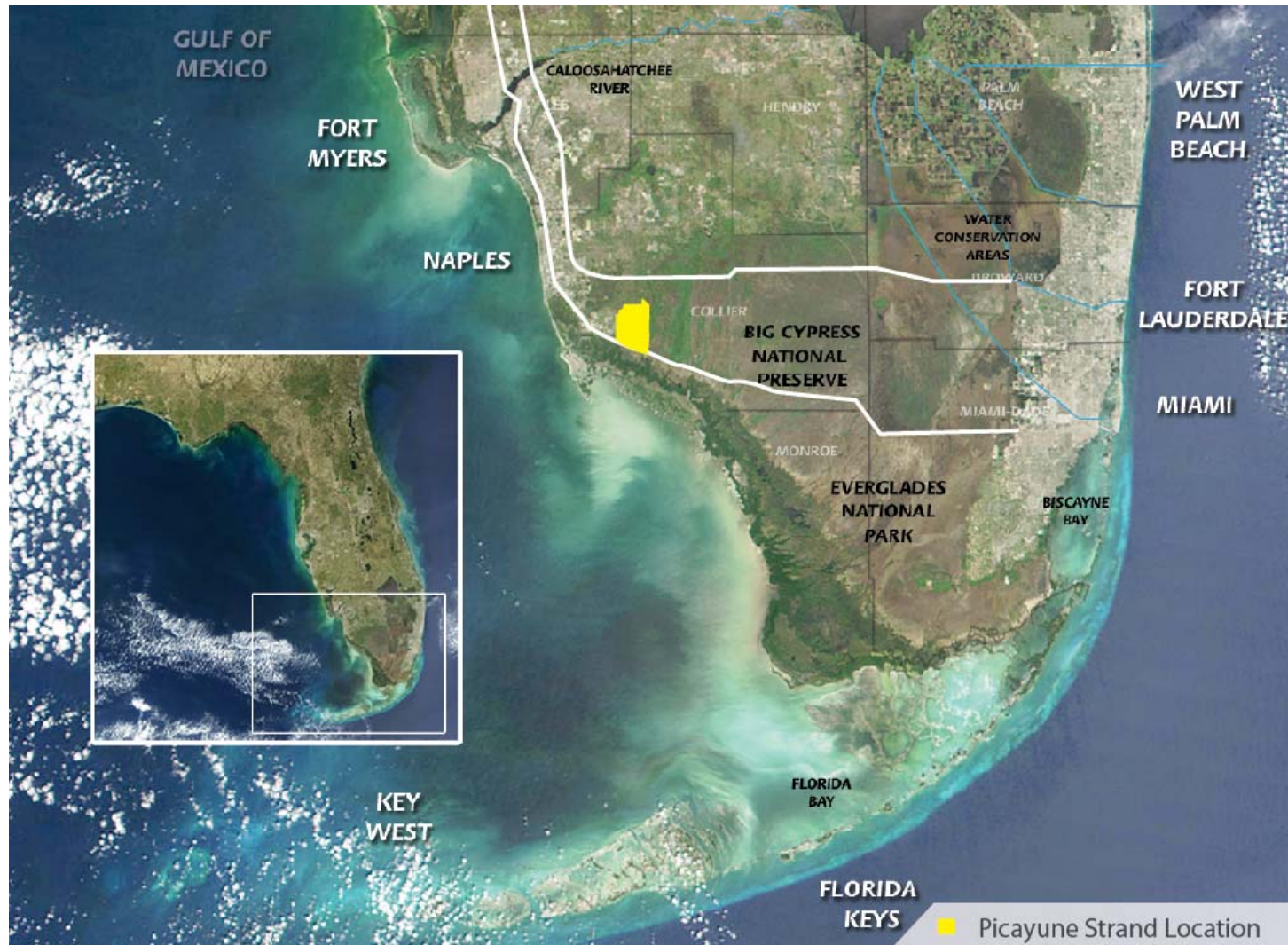


Figure E-1. Vicinity Map of the Picayune Strand Restoration Project

This page intentionally left blank

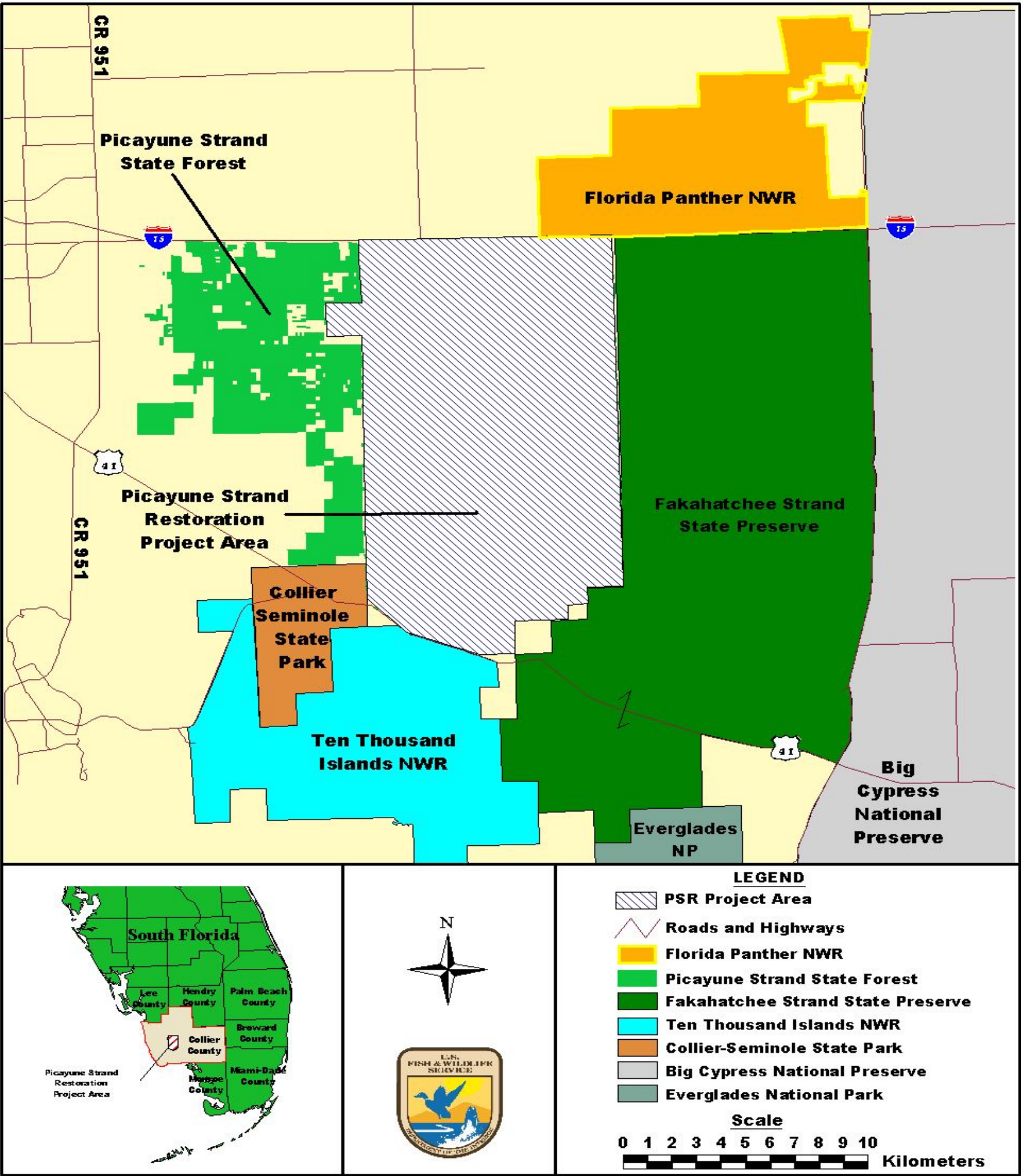


Figure E-2. Location of the Picayune Strand Restoration Project and Other Adjacent Public Lands

This page intentionally left blank

1.0 INTRODUCTION

The Picayune Strand Restoration Project (PSRP) encompasses an area of sensitive environmental land located in southwestern Collier County, Florida. It is located southwest of the Florida Panther National Wildlife Refuge, north of Ten Thousand Islands National Wildlife Refuge, east of the South Belle Meade State Conservation and Recreation Lands (CARL) project, west of the Fakahatchee Strand State Preserve, and northeast of Collier Seminole State Park. The South Belle Meade CARL project known as “Belle Meade” and the Southern Golden Gate Estates (SGGE) CARL project were combined to create the Picayune Strand State Forest. The central location of the PSRP among these nature preserves and wildlife areas reflects its importance to ecosystem connectivity of the region. For more information on the SGGE history and area, please see Section 1 of the 2004 Final Project Implementation Report and Environmental Impact Statement (2004 Final PIR/EIS)(U.S. Army Corps of Engineers (Corps), 2004). The PSRP consists of removing the infrastructure of a 55,247 acre subdivision and restoring its pre-development hydrology and ecology.

This Limited Reevaluation Report (LRR) presents a revised cost estimate and updated economic analysis of the authorized project. It evaluates the authorized project within the context of the existing socioeconomic conditions of the study area and the cost increase of the refined detailed design developed during preconstruction, engineering and design (PED). This LRR requests the authorization for a total project cost of \$617.9 million (See Sec. 2.5.2 for detailed discussion of the cost figures). The current 902 limit authorized cost is \$505.2 million in Fiscal Year (FY) 15 price levels. Additionally, this report requests a determination as to whether the manatee mitigation falls within the Chief of Engineer’s discretionary authority, and if so, authorization of the feature. During the detailed design, refinements were determined necessary to realize all the benefits prescribed in the 2004 Final PIR/EIS and work best within the Southwest Florida system. These design refinements resulted in project infrastructure more complex than envisioned in the 2004 Final PIR/EIS. Since these refinements are needed to achieve the project goals and the benefits have not changed since the 2004 Final PIR/EIS and WRDA 2007 authorization, no additional Congressional authorization of the updated project design is necessary.

1.1 STUDY AUTHORITY

The 2004 Final PIR/EIS was completed in September of 2004 under the authority of Section 601(d) of the Water Resources Development Act (WRDA) of 2000, which states:

(d) AUTHORIZATION OF FUTURE PROJECTS

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

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

(A) a description of the project; and

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

The 2004 Final PIR/EIS was approved by the Office of the Chief of Engineers on September 15, 2005. The project was authorized for construction in Section 1001(15) of WRDA 2007. The 2004 Final PIR/EIS presents the results and recommendations of investigations into restoration of natural water flow across 93 square miles of western Collier County that were drained as a result of an extensive residential development.

1.2 PURPOSE AND NEED

This LRR requests the authorization for a total project cost of \$617.9 million and to confirm that including the manatee mitigation feature is within the Chiefs discretionary authority. The PIR/EIS cost and the current total project cost (detailed in Appendix B – Cost Estimate) differences are due to multiple factors. The project components portrayed in the 2004 Final PIR/EIS were conceptual and required significant refinement. Greater detailed information obtained through PED phase investigations provided a more accurate cost. Additional information regarding the project cost increase is detailed within Section 2.0 of this report and Appendix A – Engineering Design.

As stated in the 1999 Central and South Florida Project Restudy, known as the Comprehensive Everglades Restoration Plan (CERP), the restoration of SGGE, now known as the PSRP is *“to restore and enhance the wetlands in Golden Gate Estates and in adjacent public lands by reducing over-drainage. Implementation of the restoration plan would also improve the water quality of coastal estuaries by moderating the large salinity fluctuations caused by freshwater point discharge of the Faka Union Canal. The plan would also aid in protecting the City of Naples’ eastern Golden Gate well field by improving groundwater recharge.”* Refer to Section 1 of the 2004 Final PIR/EIS for more information on the purpose and need of the PSRP.

1.2.1 MANATEE MITIGATION FEATURE

A portion of the Southwest Florida manatee population currently uses the Port of the Islands (POI) Basin as a warm water refugium during the colder months of the year. The passive thermal refuge or “refugium” appears to be maintained by freshwater discharged from the canal system in the PSRP site that routes through the Faka Union Canal and over Faka Union Weir Number 1 located immediately north of US-41 (Tamiami Trail) and the POI Basin. The anticipated reduction in flow from the PSRP to the POI Basin resulting from plugging of project canals raised concern for the continued viability of the refugium under restored conditions and the potential for increased winter manatee mortality. The 2004 Final PIR/EIS acknowledged that an additional source of water, most likely groundwater, may be needed in the POI to maintain the existing refugium (Section 9.6.8 and 11.12 of Final PIR/EIS).

Manatees are protected under the Marine Mammal Protection Act (MMPA) of 1972 which prohibits “take” of marine mammals in U.S. waters. Under MMPA “take” is defined as *“harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill.”* Manatees are also listed under the ESA of 1973 as endangered. Under ESA, “take” is *“to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any*

such conduct.” Based on the best available scientific information, the PSRP may have an adverse effect on the manatee refugium at POI potentially resulting in increased manatee mortality due to cold stress. Therefore, the project must protect manatees at POI by ensuring the continued existence of the refugium according to USFWS. Through informal consultation, the Corps developed the proposed manatee mitigation feature which increases project costs.

In summary, on October 17, 2001, the Corps provided a Biological Assessment to FWS requesting formal consultation on West Indian Manatee. FWS did not respond to this request for formal consultation and cited several reasons including changes in the hydrologic modeling platform and pending results of hydrologic model. In the 2004 Final Coordination Act Report for PSRP, FWS noted that additional biological, engineering and hydrologic information would be needed. Thus, in 2004 a species effect determination was not reached for West Indian manatee within the FWS 2004 Biological Opinion due to lack of sufficient information. In order to better understand potential effects on manatee due to PSRP implementation, the Corps contracted with U.S. Geological Survey (USGS) to model effects of reductions in flow from the Faka Union Canal on the manatee refugium at Port of the Islands. Results from the USGS study indicated that PSRP implementation would negatively affect the manatee refugium and could result in an increase in manatee mortality due to cold stress. Manatees are protected under the Endangered Species Act of 1973 (ESA), as amended, and the Marine Mammal Protection Act (MMPA) of 1972. Although the ESA allows for incidental take of endangered species, MMPA does not offer any such provisions. Therefore, the Corps convened a multiagency technical team to develop alternatives for a manatee mitigation feature within Port of the Islands that would result in an "no adverse affect" determination under ESA and thus be compatible with MMPA provisions. The technical analysis to support implementation of a manatee mitigation features is included within the U.S. Army Corps of Engineers 2014 Supplemental Biological Assessment for PSRP and the U.S. Fish and Wildlife Service 2014 Biological Opinion Amendment.

1.2.2 MANATEE CONSULTATION HISTORY

In October 2001, the Corps provided a Biological Assessment (BA) that requested initiation of consultation under the ESA on the West Indian manatee (manatee), the red-cockaded woodpecker, the Florida panther, the wood stork, the snail kite, and the eastern indigo snake. In the BA, the Corps determined that the project “may affect, but would not likely adversely affect” the manatee. The USFWS did not respond to this initial request for concurrence for the following reasons:

- Several immediate changes in the project development schedule;
- the lack of details provided with the identified selected plan;
- subsequent development of new alternatives;
- pending results of several iterations of the hydrological model; and
- a change in the hydrological model platform.

In October 2003, the USFWS completed consultation with the Corps on the Prairie Canal Early Start portion of the PSRP. The USFWS concurred with the Corps' determination that the backfill of the Prairie Canal on the eastern extent of the project "may affect, but would not likely adversely affect" the Florida Panther, the wood stork, the Everglades snail kite, the manatee and manatee critical habitat, the American crocodile, red-cockaded woodpecker, the eastern indigo snake, and the bald eagle. In August 2004, the USFWS requested additional information concerning the manatee including project effects on its warm water refugium and critical habitat. The USFWS and U.S. Geological Service (USGS) provided the Corps with updated information on the status of the southwest Florida regional population of the manatee and USGS manatee studies conducted in the project vicinity.

On October 20, 2004, the Corps provided a second more extensive BA. In that BA, the Corps determined that the project "may affect, but is not likely to adversely affect" West Indian Manatee critical habitat. The Corps determined that they did not have sufficient information to reach an effect determination for the manatee. Also on October 24, 2004, USFWS issued a consultation letter for the PSRP in which a "no effect" concurrence was made for the Everglades snail kite critical habitat and American crocodile critical habitat, and "may affect, not likely to adversely affect" the Everglades snail kite, American crocodile, red-cockaded woodpecker, bald eagle, eastern indigo snake, and West Indian manatee critical habitat. The USFWS concluded in the consultation letter that monitoring of manatee behavior was necessary to determine effects and potential incidental take of the manatee population.

On October 22, 2004, the USFWS provided a final Fish and Wildlife Coordination Act (FWCA) Report to the Corps, noting additional information needs including: (1) an accurate description of the anticipated hydrology and its effects on surrounding public lands and federally-threatened and endangered species; (2) a plan for protecting wetlands in the upper project watershed and explaining how project operations would affect flooding concerns, particularly in NGGE; (3) a completed Project Operations Manual; (4) a completed Water Quality and Ecological Monitoring Plan; (5) completion of consultation on threatened and endangered species; and (6) analysis of Off-Road Vehicle (ORV) use if proposed on the project site. The USFWS noted the concurrence of the Florida Fish and Wildlife Conservation Commission (FWC) with the USFWS position on project concerns and a lack of response or concurrence by the National Oceanic and Atmosphere Administration, National Marine Fisheries Service (NMFS).

In the 2004 Final PIR/EIS, the Corps agreed to "cooperate with the USFWS and USGS manatee researchers and manage flows at the weir interactively (probably by installation of a well-supplied alternate freshwater source) to assure that lack of freshwater does not add to natural cold stress (Section 11.12 of Final PIR/EIS)."

In 2004 through 2006, multiple meetings were held to discuss aspects of the PSRP including potential impacts of the PSRP on the manatee. In 2006, the USFWS provided comments on the PSRP road removal permit which included project commitments to reduce impacts on the manatee and other listed species, including: 1) completion of the

committed funding for the project baseline monitoring plan, 2) initiation of an Assessment and Adaptive Management (AAM, now Monitoring and Assessment Group [MAG], 3) contaminant remediation, 4) compensation for wetland impacts, 5) pre-construction wildlife surveys, 6) pre-construction contractor education, 7) site access restrictions, and 6), financial assurances for project completion.

In 2007, the USFWS, Corps, and SFWMD attended an interagency conference in Gainesville, Florida to discuss the PSRP and southwest Florida manatee issues with state and federal manatee experts. At the time, there were a number of uncertainties related to the effects on manatees, including:

- The effect of PSRP on the thermocline/halocline in the existing thermal refuge at marina basin used by the manatee;
- the potential for PSRP to impact the volume and timing of freshwater in the Faka Union Canal and at Faka Union weir number 1 upstream of marina basin used by the manatee;
- the effects of the redistribution of freshwater to receiving estuaries and potential effects on the regional distribution/behavior of manatees in the Ten Thousand Islands, including exposure to additional boat traffic leading to injury/mortality; and.
- the effects of the redistribution of freshwater on manatee critical habitat.

Based on these uncertainties, the Corps, SFWMD, and USFWS determined that more information was needed. In March 2007, the USGS submitted a Scope of Work (SOW) entitled “Monitoring and Assessing Effects of the PSRP Restoration Project on the Manatee”. This SOW was negotiated by the USFWS, Corps and SFWMD in response to concerns regarding the potential effects changes in hydrology may have on the thermocline/halocline that supports the manatee warm water refugium in the POI basin. The SOW also included monitoring in the upper estuaries. Monitoring directly funded by the project is confined to the 2008 Corps/District contract that identifies three tasks, which focus on water in or near the POI basin:

- 1) Task A - Real-time and deep-water sensors to determine salinity and temperature in POI basin, the juncture of the POI basin and the Faka Union Canal; and isotope analysis to verify the presence/absence of a groundwater source in the POI Basin.
- 2) Task B – Compile and analyze data from existing stage stations upstream and downstream of Faka Union Weir and establish a salinity/temperature station downstream of FU-1 weir to monitor the fresh water lens at the weir to analyze availability of fresh water for drinking.
- 3) Task C – Monitor temperatures and salinities in the upstream/downstream segments of tributaries surrounding POI by establishing additional monitoring stations in the upper-river estuaries to complement real-time monitoring stations at the Tamiami Trail bridges and in the lower estuaries.

An additional task, Task E – Interpret hydrology and other data to identify important and sensitive habitat areas associated with tasks A-C, was included in the SOW but was not

funded by the Corps. Other manatee monitoring was included in the monitoring plan but was not funded by the project including aerial and telemetry baseline surveys, as well as water quality and quantity assessments funded by USGS and the USFWS.

On November 10, 2008, the USFWS received the PSRP Supplemental BA from the Corps dated November 6, 2008. In the 2004 BA, insufficient information was available for the USFWS to concur with a “may affect, not likely to adversely affect” determination for the West Indian manatee. Based on updated information provided in the November 2008 BA, the USFWS concurred with that determination and provided rationale for that concurrence in a BO dated March 2009. In the 2009 BO, the USFWS stated that “if through research, observation, or monitoring it is discovered that manatees are being adversely affected by the PSRP, reinitiation of consultation would be necessary” and outlined a number of potential measures that could be used to alleviate stress on manatees. The USFWS concurred with the Corps’ determination of “may affect, not likely to adversely affect” the West Indian manatee based on the project commitments, assumptions, and analyses provided in the 2009 BO.

In February 2011, USGS, USFWS, SFWMD, and the Corps met to discuss the results of the USGS pre-construction monitoring conducted from 2009 to 2011. The study indicated that a reduction of freshwater flow to the refugium resulting from the PSRP construction and operation may result in additional manatee mortality during the cold, dry season (Stith, et al, 2011). Based on the information provided by this study, the project team determined that the PSRP had the potential to negatively affect the existing manatee refugium at the POI Basin, primarily as a result of freshwater flow reduction to the basin during the cooler winter months. From 2011 to 2014, an interagency team of biologist and engineers worked to formulate alternatives to mitigate for the potential effects of the PSRP. The details of the selected alternative for the manatee mitigation feature is described in the attached draft Environmental Assessment (Appendix D)

1.3 LOCATION

Development of the PSRP area, previously known as SGGE, began in the early 1960’s within Collier County in Southwest Florida. Private interests planned to develop a 173 square mile (111,000 acre) residential subdivision. Today this development is split into two entities by Interstate 75. Northern Golden Gate Estates (NGGE) remains a residential subdivision, SGGE had very limited development and was acquired by the State of Florida, Florida Department of Environmental Protection from private owners for restoration. The SGGE area is now known as the Picayune Strand State Forest.

The PSRP consists of approximately 94 square miles located between Interstate 75 and US Highway 41 (Figure 1-1). It is situated southwest of the Florida Panther National Wildlife Refuge, north of Ten Thousand Island National Wildlife Refuge and Collier-Seminole State Park, east of the Belle Meade Conservation and Recreation Lands Project Area, and west of the Fakahatchee Strand State Preserve.

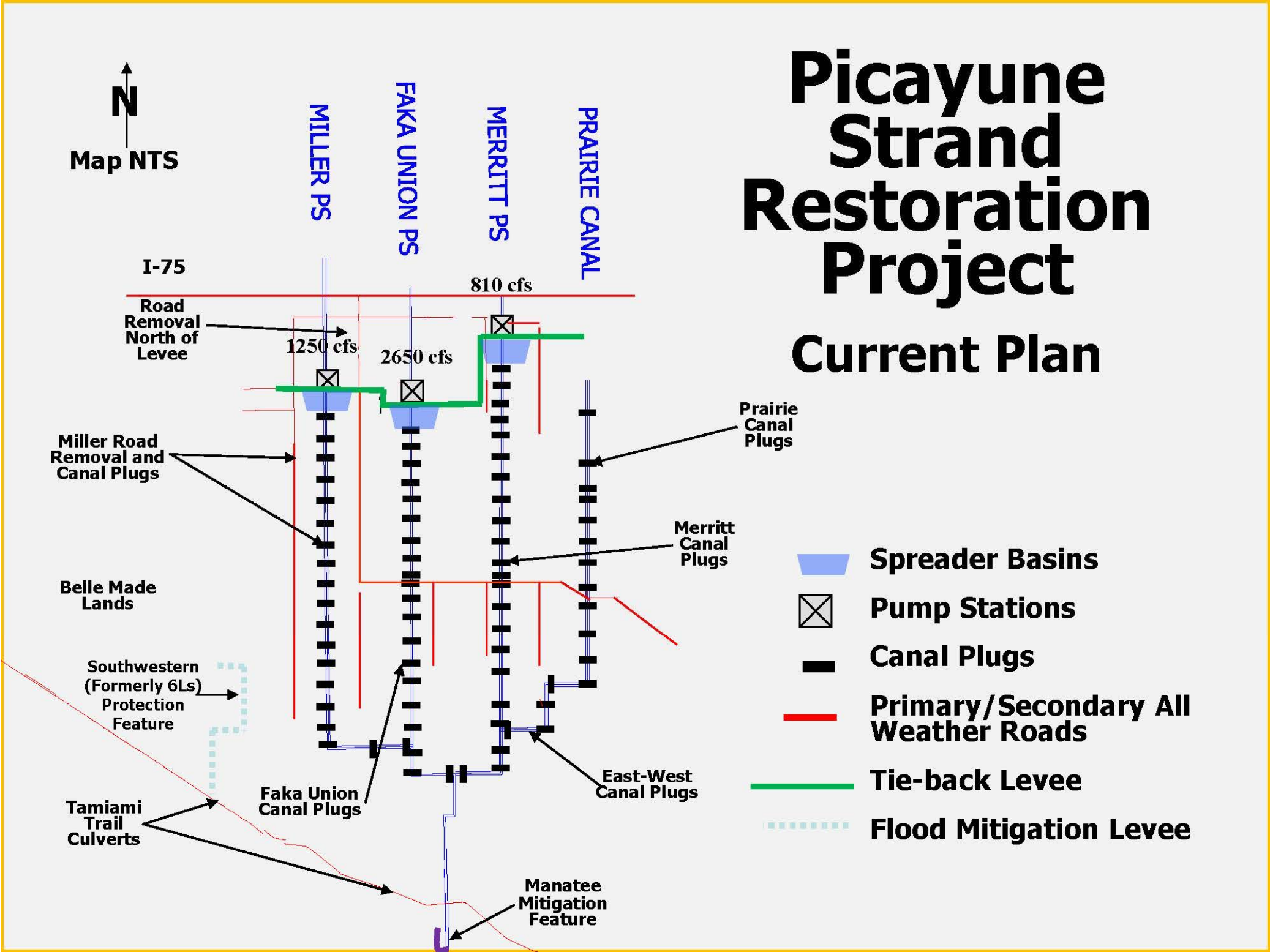


Figure 1-1 . Current Design of the Picayune Strand Restoration Project

This page intentionally left blank

The manatee mitigation feature is located just south of US-41 (Tamiami Trail), adjacent to the Faka Union Canal and POI Basin (Figure 1-2).

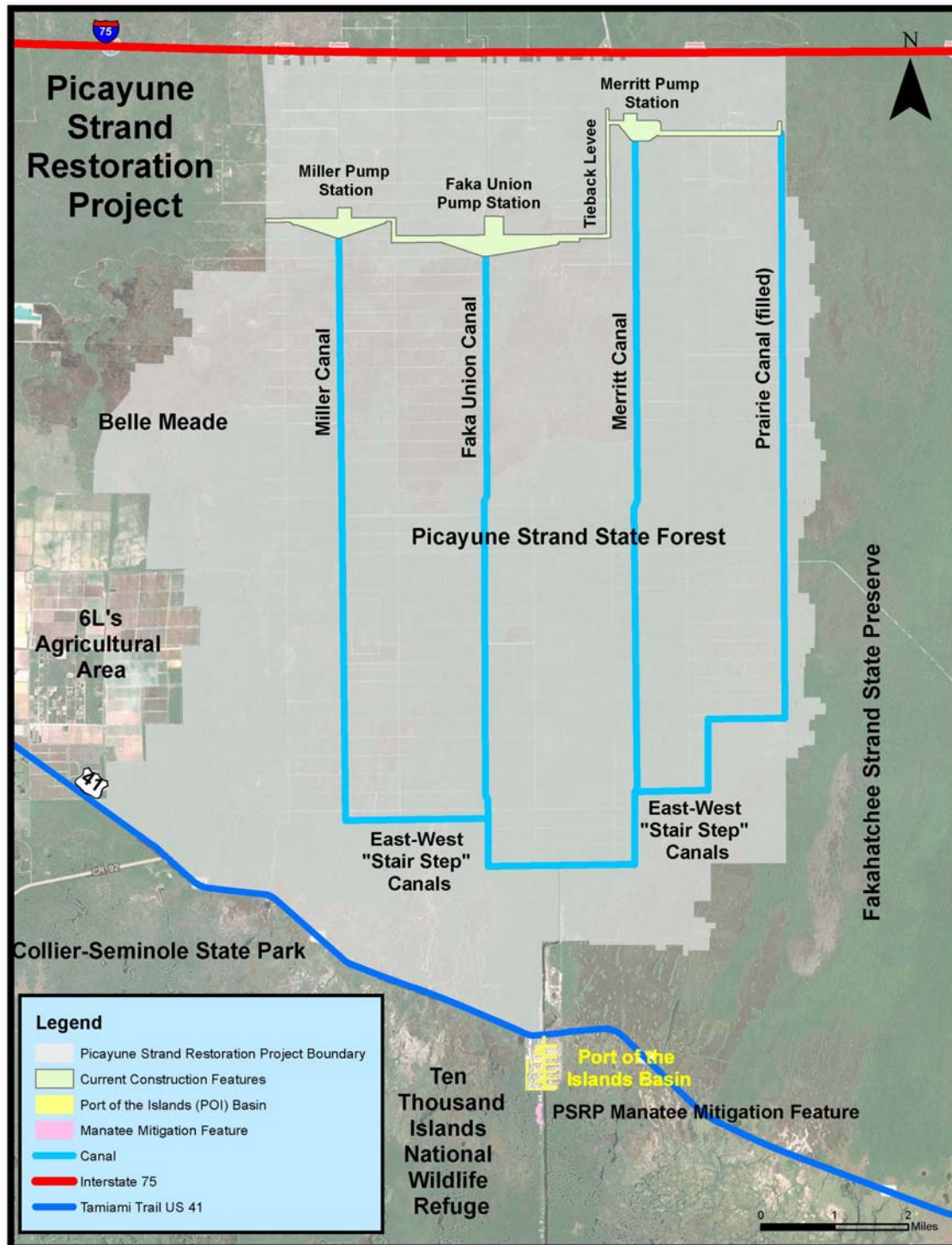


Figure 1-2. Picayune Strand Restoration Project Location and Adjacent Areas

1.4 REQUIREMENTS

In a letter dated March 25, 2009, the South Florida Water Management District (SFWMD) as the non-federal sponsor restated its strong support for this ecosystem restoration project. The SFWMD entered into a Project Partnership Agreement (PPA) with the Corps on August 13, 2009, agreeing to serve as local sponsor and to cost share the project in accordance with Section 601 of WRDA 2000. The Master Agreement for Cooperation in Constructing and Operating, Maintaining, Repairing, Replacing, and Rehabilitating Projects Authorized to be Undertaken Pursuant to the Comprehensive Everglades Restoration Plan Cooperation, also signed August 13, 2009 between the Corps and SFWMD, within the PPA identifies the parties' responsibilities for PSRP. The SFWMD continues to support this project.

1.5 PROJECT HISTORY

A detailed project history can be found within Section 1 of the 2004 Final PIR/EIS and is incorporated into this document by reference. The PSRP was authorized for construction in WRDA 2007. Under the Acceler8 initiative, wherein the SFWMD initiated construction of "foundation" restoration projects concurrent with Corps preparation of the PIR/EIS for authorization, the SFWMD started design and construction. The upper two miles of the Prairie Canal were plugged in early 2004 and the lower five miles plugged in 2006-2007. The Corps took over the construction after the completion of the Prairie Canal phase and continued the project with the established "east to west" project sequencing, in sync with historic sheetflow to be restored.

The Merritt Pump Station construction contract was awarded in October 2009 with construction beginning in December 2009. This phase includes the Merritt Pump Station, tieback levee, spreader channel, road removal, and Merritt Canal plugging. The Merritt Pump Station component was physically completed in 2014.

The Faka Union Pump Station construction contract was awarded in November 2010 with construction starting in January 2011. The Faka Union construction phase includes the Faka Union Pump Station, tieback levee, spreader channel, road removal, and Faka Union Canal plugging. The Faka Union construction contract is scheduled to be completed in 2015. The Miller Pump Station construction contract was awarded in September 2013. The project is currently scheduled for completion in 2017 subject to approval of the proposed revised authorized cost limit. The Faka Union and Miller Canals cannot be plugged until the completion of the southwestern flood protection feature and the manatee mitigation feature contingent upon approval of the increased project cost.

1.6 PRIOR REPORTS AND ENVIRONMENTAL DOCUMENTS

A number of studies related to the Golden Gate Estates development and canal network have been conducted over the past 30 years. These studies have been reviewed and were referenced for hydrological, biological, and ecological information related to the study area and the progression of this project. All of these studies assumed some limited development in SGGE. Brief summaries of these studies can be found in Section 1.5 of the 2004 Final PIR/EIS. The pertinent Corps studies are listed below:

- 1980 U.S. Army Corps of Engineers, Golden Gate Estates Reconnaissance Report
- 1986 U.S. Army Corps of Engineers, Golden Gate Estates Feasibility Report
- 1999 Central and Southern Florida Project Comprehensive Review Study Integrated Feasibility Report and Programmatic Environmental Impact Statement, Comprehensive Everglades Restoration Plan.
- 2004 CERP Picayune Strand Restoration Project Final Project Implementation Report and Environmental Impact Statement

1.7 DECISION TO BE MADE

This LRR requests the authorization for a project cost of \$617.9 million. The current Section 902 limit authorized cost is \$505.2 million.

This LRR also describes the need for a manatee mitigation feature south of the PSRP near the POI Basin (south of “Port of the Islands” area on Figure 1-2). At the time of PIR/EIS authorization, it was unclear whether or not a feature would be needed. A study conducted by the U.S. Geological Survey (USGS) from 2009 to 2011 identified that the PSRP would have a significant adverse effect on the POI refugium.

In summary, on October 17, 2001, the Corps provided a Biological Assessment to FWS requesting formal consultation on West Indian Manatee. FWS did not respond to this request for formal consultation and cited several reasons including changes in the hydrologic modeling platform and pending results of hydrologic model. In the 2004 Final Coordination Act Report for PSRP, FWS noted that additional biological, engineering and hydrologic information would be needed. Thus, in 2004 a species effect determination was not reached for West Indian manatee within the FWS 2004 Biological Opinion due to lack of sufficient information. In order to better understand potential effects on manatee due to PSRP implementation, the Corps contracted with U.S. Geological Survey (USGS) to model effects of reductions in flow from the Faka Union Canal on the manatee refugium at Port of the Islands. Results from the USGS study indicated that PSRP implementation would negatively affect the manatee refugium and could result in an increase in manatee mortality due to cold stress. Manatees are protected under the Endangered Species Act of 1973 (ESA), as amended, and the Marine Mammal Protection Act (MMPA) of 1972. Although the ESA allows for incidental take of endangered species, MMPA does not offer any such provisions. Therefore, the Corps convened a multiagency technical team to develop alternatives for a manatee mitigation feature within Port of the Islands that would result in an “no adverse affect” determination under ESA and thus be compatible with MMPA provisions. The technical analysis to support implementation of a manatee mitigation feature is included within the U.S. Army Corps of Engineers 2014 Supplemental Biological Assessment for PSRP and the U.S. Fish and Wildlife Service 2014 Biological Opinion Amendment.

This feature is required to prevent adverse project effects on the West Indian manatee in the POI Basin, which is prohibited under the Marine Mammal Protection Act. While the need for this feature was included in the 2004 Final PIR/EIS, details regarding the scope were not discussed. An interagency team of biologists have been involved with defining the scope, design, and cost of this feature. Guidance provided by ER 1105-2-100 part G-

13.c. indicates authorization of this feature falls within the authority of the Chief of Engineers in consultation with the Assistant Secretary of Army for Civil Works (ASA CW). This LRR requests a determination as to whether this feature falls within the Chief of Engineers discretionary authority.

1.8 REAL ESTATE

In the 2004 Final PIR/EIS, the description of the lands required for the recommended plan were based on an analysis of the lands needed for construction, operation, maintenance, repair, replacement and rehabilitation of the Project. Section 13 Recommendations of the 2004 Final PIR/EIS and the Chief of Engineers' Report contained the following:

- a. For any lands or acreage within the former Southern Golden Gate Estates Subdivision comprised of 55,247 acres acquired by the non-federal Sponsor or the Florida Department of Environmental Protection prior to May 31, 2004, the creditable value shall be a sum not to exceed \$75,394,333, subject to a Peer Review Report by a party designated by the Deputy Assistant Secretary of the Army (Civil Works) and approval of the Peer Review Report by the Deputy Assistant Secretary of the Army (Civil Works) and subject to a determination that the lands are required for the Project.
- b. For lands, easements and rights-of-way within the former Southern Golden Gate Estates Subdivision comprised of 55,247 acres acquired by the non-federal Sponsor or the Florida Department of Environmental Protection after May 31, 2004, the creditable value shall be the actual acquisition cost of such real property interests at the time the interests are acquired, subject to a determination that the lands are required for the Project and that the costs are reasonable, allowable and allocable.
- c. Subject to a Peer Review Report by a party designated by the Deputy Assistant Secretary of the Army (Civil Works) and approval of the Peer Review Report by the Deputy Assistant Secretary of the Army (Civil Works), the incidental/administrative costs incurred by the Florida Department of Environmental Protection for the acquisition of all lands, easements, and rights-of-way within the former Southern Golden Gate Estates Subdivision shall not exceed the sum of \$29,158,914.
- d. If the lands, easements and rights-of-way which lie outside the boundaries of the former Southern Golden Gate Estates Subdivision were acquired prior to execution of the Project Partnership Agreement, the creditable value shall be their purchase price, subject to a determination that the lands are required for the Project and that the costs are reasonable, allowable and allocable, together with their reasonable and necessary incidental costs of acquisition.
- e. The value of lands, easements, or rights-of-way required for the Project which lie outside the boundaries of the former Southern Golden Gate Estates Subdivision acquired by the non-federal Sponsor after the effective date of the Project Partnership Agreement executed for this Project shall be the actual acquisition cost of such real property interests at the time the interests are acquired, subject to a determination that the lands are required for the Project and that the costs are reasonable, allowable and allocable, together with their reasonable and necessary incidental costs of acquisition.

The real estate component of the recommended plan was tentative in nature for planning purposes only. In the 2004 Final PIR/EIS, the Lands and Damages for the Project were estimated at a cost of \$193,043,100 broken down as follows:

Southern Golden Gate Estates-total \$172,338,212

- a. Actual acquisition costs for lands acquired by FDEP prior to May 31, 2004 - not to exceed \$75,394,333-credited to non-federal sponsor;
- b. Administrative costs for all lands acquired in SGGE both before and after May 31, 2004 - not to exceed \$29,158,914-credited to non-federal sponsor;
- c. Actual acquisition costs of Department of Interior Farm Bill Funds of \$31,312,693 - credited to the Federal Government;
- d. DOI Farm Bill federal funds expended for acquisition/administrative cost of FDEP of \$3,761,290 - credited to Federal government;
- e. DOI Farm Bill federal funds expended for PL91-646 costs of \$3,010,982 - credited to Federal government;
- f. Estimated land acquisition costs to be expended by FDEP or SFWMD for lands in SGGE acquired after June 1, 2004 - estimated in the 2004 Final PIR/EIS at \$22,000,000 with a 35% contingency (\$7,700,000) for a total of \$29,700,000;

Belle Meade-perpetual Flowage Easement - 8,868 acres at cost of \$6,834,020 with a 35% contingency (\$2,391,907) for a total of \$9,225,927.

Other lands outside of SGGE - 575.20 acres at a cost of \$2,643,100 with a 35% contingency (\$925,085) for a total of \$3,568,185.

Future Federal Administrative Costs of \$1,868,500 with a contingency of 35% (\$653,975) for a total of \$2,522,475.

Future non-federal Administrative costs for lands outside of SGGE of \$2,600,000 with a 35% contingency (\$910,000) for a total of \$3,510,000.

Future non-federal PL91-646 costs of \$500,000 with a 35% contingency (\$175,000) for a total of \$675,000.

FDEP 91-646 relocation cost of \$891,325 with a 35% contingency (\$311,972) for a total of \$1,203,301.

1.8.1 LAND REQUIREMENTS CHANGES

In the 2004 Final PIR/EIS, the total estimated land requirement was approximately 64,690 acres, with 55,247 acres in the Southern Golden Gate Estates (SGGE) CARL Area, to be required in fee title. A perpetual flowage easement would be required over approximately 8,868 acres in the Belle Meade State Conservation and Recreation Land (CARL) Area. Fee title would be required over approximately 20 acres for installation of the Tamiami Trail Culverts and over 397 acres required for construction of the five levees. Additionally, a temporary road easement would be required over 5.20 acres for the period of construction. More detail was discussed in Appendix F of the 2004 Final PIR/EIS. The following paragraphs detail the changes recommended in this LRR from the 2004 Final PIR/EIS:

Southern Golden Gate Estates

The 55,247 acres in the Southern Golden Gate Estates CARL Area are still required in fee title. The real estate costs have increased on the lands acquired after June 1, 2004. This was based on the fact that these lands were acquired by condemnation and the court awards and stipulated final settlements were higher than anticipated in the 2004 Final PIR/EIS. Actual land acquisition costs expended by FDEP for lands in SGGE acquired after June 1, 2004 through 2011 are \$18,391,500. Additionally there are approximately 300 parcels awaiting final judgments or Stipulated Final Settlements at an estimated cost of \$13,000,000 excluding any contingency.

Lands outside of Southern Golden Gate Estates

In 2013, additional more detailed hydraulic and hydrologic analysis for Port of Islands, Private Lands area, Belle Meade area, and Fakahatchee Strand State Preserve using more recent lidar and the Gridded Surface Subsurface Hydrologic Analysis (GSSHA) model platform was completed. Below is a discussion of each area.

Belle Meade Area

In the 2004 Final PIR/EIS, the preliminary H&H analysis used for the 2004 Final PIR/EIS showed that approximately 8,868 acres would be inundated by the Project and therefore a perpetual flowage easement was required over the approximately 9,021 acres in the Belle Meade State Conservation and Recreation Land (CARL) Area. More detailed H&H analysis was performed in 2013 using more recent lidar and the GSSHA model platform. The analysis was completed to verify the land acquisition and estates required in the Belle Meade Area. Results from the 2013 H&H Analysis have indicated that the required acreage in the Belle Meade Area impacted by the Project was reduced to approximately 6,894.55. The takings analysis for the 2004 Final PIR/EIS did not consider that removal of the roads in SGGE would remove all access to the lands required in the Belle Meade Area. Impacting the properties both hydrologically and by removal of access would result in the requirement for fee title versus a perpetual flowage easement. Of the approximately 6,896.55 acres required in the Belle Meade Area, FDEP has acquired 5,696.75 acres at an estimated cost of approximately \$10,854,807, excluding FDEP administrative costs associated with the acquisition of these lands. SFWMD was requested by FDEP to acquire any additional lands required for the Project in Belle Meade. SFWMD will acquire the additional approximately 1,197.80 acres at an estimated cost of \$7,222,659, excluding SFWMD's administrative costs and contingency. SFWMD and FDEP estimated administrative costs for the acquisition of these lands at \$2,350,071. Total estimated real estate costs for lands in Belle Meade are \$20,427,537, excluding contingency.

Southwestern (formerly 6Ls Farm) Protection Feature

The preliminary hydraulic and hydrologic (H&H) analysis used for the 2004 Final PIR/EIS showed an increase in water levels that could impact 6Ls Farm, southwest of the project. The Southwestern Protection feature was designed to prevent an increase in surface water levels due to operating the project. More detailed H&H analysis was performed using more recent lidar and the GSSHA model platform. The analysis was completed to verify the land acquisition and protection features prescribed in the 2004 Final PIR/EIS to mitigate a reduction in the level of service for flood protection as required in Section 601(h)(5) or "Savings Clause" of the WRDA 2000. The results of the more detailed H&H analysis

determined that the levee could be reduced to only 8.75 miles (Figure A-2) instead of the original PIR length of approximately 17.25 miles. The 2004 Final PIR/EIS estimated 252 acres would be required in fee for this feature within the Belle Meade area. Since the lands in the Belle Meade Area are now all being required in fee, the cost of the lands required for this feature are included in the Belle Meade real estate cost estimate above.

Private Lands and Port of the Islands

In the Real Estate Appendix – Appendix F, it was estimated that for the construction of the protection features around the Private Lands located northwest of the Southern Golden Gate Estates and for the Port of the Islands a total of approximately 145 acres would be required. The remaining approximately 252 acres were required for the 6L Farm Protection Feature discussed above.

Private Lands Protection Feature and Pump Station

The preliminary H&H analysis used for the 2004 Final PIR/EIS showed an increase in water levels that could impact the privately owned lands (or “private lands”) northwest of the project. The Private Lands Protection Feature was intended to protect the private lands on the boundary with Belle Meade at the northwest corner of the project when it was shown to cause an increase above existing conditions in surface water levels. More detailed H&H analysis was performed in 2013 using more recent lidar and the GSSHA model platform. The analysis was completed to verify the land acquisition and protection features prescribed in the 2004 Final PIR/EIS to mitigate a reduction in the level of service for flood protection as required in Section 601(h)(5) or “Savings Clause” of WRDA 2000. The results of the 2013 detailed H&H analysis determined that the Private Lands Protection Feature and Pump Station included in the 2004 Final PIR/EIS are not necessary. Therefore the lands formerly recommended for acquisition for this feature are not required.

Port of the Islands Protection Feature

The preliminary H&H analysis used for the 2004 Final PIR/EIS showed an increase in water levels that could impact the Port of the Islands housing development. The Port of the Islands Protection Feature was intended to protect the private lands in the Port of the Islands area shown to have an increase in surface water levels. More detailed H&H analysis was performed in 2013 using more recent lidar and the GSSHA model platform. The analysis was completed to verify the land acquisition and protection features prescribed in the 2004 Final PIR/EIS to mitigate a reduction in the level of service for flood protection as required in Section 601(h)(5) or “Savings Clause” of the WRDA 2000. The results of the 2013 detailed H&H analysis determined that the Private Lands Protection Feature and Pump Station included in the 2004 Final PIR/EIS were not necessary. Therefore, the lands formerly recommended for acquisition for this feature are not required.

Fakahatchee Strand State Preserve

In the 2004 Final PIR/EIS, no lands in the Fakahatchee Strand State Preserve, lying east of the SGGE, were identified as being required for Project operations; therefore, there was no real estate cost estimate for any lands within this area. Detailed H&H analysis performed in 2013 using more recent lidar and the GSSHA model platform concluded that approximately 1,864.62 acres will be hydrologically impacted by the Project operations.

A perpetual flowage easement is recommended over this acreage. FDEP has acquired fee to approximately 1,813.62 acres at an estimated cost for the fee of \$765,439. Estimating that a perpetual flowage easement would be at 90% of fee or lower, the estimated credit for these lands would be \$688,895. The remaining approximately 51 acres will be acquired by the SFWMD at an estimated cost of \$108,000. Total estimated costs for these lands are \$796,895, excluding FDEP's and SFWMD's administrative costs and contingency.

Manatee Mitigation Feature

The manatee mitigation feature is located just south of US-41 (Tamiami Trail), adjacent to the Faka Union Canal and POI Basin. This feature will occupy approximately ten acres and be located on State lands within the Ten Thousand Island National Wildlife Refuge. The SFWMD will certify these lands before construction of the manatee mitigation feature.

See attached Real Estate Plan, Appendix C, for more details and information related to the changes in Real Estate requirements of the Picayune Strand Restoration Project.

2.0 DESIGN AND COST CHANGES

The design refinements detailed in this report reflect the difference between the preliminary design envisioned by the 2004 Final Project Implementation Report and Environmental Impact Statement (PIR/EIS) and the detailed design developed during the project's engineering and design phase. The project purpose has not changed. The authorized project is still intended to provide hydrologic and ecologic restoration of the previously developed area as stated in the 2004 Final PIR/EIS while maintaining existing levels of flood protection for the adjacent developed lands.

2.1 FUNDING SINCE AUTHORIZATION

The following Table 2-1 breaks down the Federal allocation and the South Florida Water Management District (SFWMD), contribution per fiscal year.

Table 2-1. Federal & Non-Federal cost allocation per fiscal year

Fiscal Year	Federal Allocation	Non-FED Sponsor Contribution
Sunk Cost thru 2006	\$ 8,372,038	\$ 15,886,737
2007	\$ 708,007	\$ 11,552,498
2008	\$ 1,648,952	\$ 3,318,275
2009	\$ 3,079,945	\$ 617,066
2010*	\$ 98,136,726	\$ 1,031,631
2011**	\$ 93,554,793	\$ 125,967,791
2012	\$ 33,922,454	\$ 1,434,299
2013	\$ 67,159,000	\$ 1,763,399
Total	\$ 306,581,915	\$ 161,571,696
*FY 10 FED includes lands purchased by DOI		
**FY 11 Non-FED included land contributions to date		

2.2 CHANGES IN SCOPE OF AUTHORIZED PROJECT

There are no substantial proposed changes to the project scope with the exception of the manatee mitigation feature. The intention to restore the 55,247 acre former Southern Golden Gate Estates subdivision to pre-development hydrology and ecology remains unchanged.

The manatee mitigation feature is required to prevent adverse project effects on the West Indian manatee in the POI Basin, which is prohibited under the Marine Mammal Protection Act. While the requirement to compensate for the loss of the cold weather refugium that existed downstream of the Faka Union weir was included in the 2004 Final PIR/EIS, details regarding the scope of the mitigation required were not finalized at that time. Through further detailed consultation with the FWS, concurrence was recently reached on the design of the manatee mitigation feature necessary to provide the West Indian manatee with a refugium to mitigate for the loss of the refugium at the Faka Union canal. Guidance provided by ER 1105-2-100 part G-13.c. indicates authorization of this feature falls within the authority of the Chief of Engineers in consultation with the Assistant Secretary of Army

for Civil Works (ASA CW). This LRR concludes that the inclusion of this feature in the project falls within the Chief of Engineers discretionary authority and recommends its approval.

2.3 CHANGES IN LOCAL COOPERATION REQUIREMENTS

There are no changes to the local cooperation requirements previously identified in paragraph 10 of the September 15, 2005 Chief of Engineers Report and Memorandum, Subject: Comprehensive Everglades Restoration Plan, Picayune Strand Restoration Project, Collier County, Florida and agreed to in the Project Partnership Agreement signed on August 13, 2009.

2.4 CHANGE IN LOCATION OF THE PROJECT

There are no changes to the overall location of the Picayune Strand Restoration Project (PSRP) (Figure E-2).

2.5 PROJECT DESIGN CHANGES

2.5.1 CHANGES IN TOTAL PROJECT FIRST COSTS

There has been a significant increase in total cost since the project was originally authorized. A detailed comparison between the original cost estimate and current cost estimate is provided in Table 2-2. Please note that Table 2-2 was designed to provide an “apples to apples” comparison between the original first cost estimate and the current first cost estimate. The “original cost” reported in the table is from the 2004 PIR. The original project cost at FY05 price levels was estimated to be \$349.4 million. At FY15 price levels, the original project cost is \$417.5million. The current estimate is \$617.9 million.

Table 2-2. Comparison between and original and current cost estimates

Category	Original Cost (1Q05 dollars)	Original Cost (1Q15 dollars)	Current Estimate (1Q15 dollars)	\$ Change
Buildings, Grounds, and Utilities	\$2,094,000	\$2,796,000	\$8,457,000	\$5,661,000
Roads, Railroads, and Bridges	\$34,065,000	\$45,474,000	\$33,184,000	(\$12,290,000)
Channels and Canals	\$5,382,000	\$7,185,000	\$10,923,000	\$3,738,000
Levees and Floodwalls	\$7,401,000	\$9,879,000	\$45,132,000	\$35,253,000
Pump Stations	\$67,476,000	\$90,075,000	\$185,617,000	\$95,542,000
Floodway Control and Diversion Structures	\$8,528,000	\$11,384,000	\$1,877,000	(\$9,507,000)
Fish & Wildlife Facilities	\$7,433,000	\$9,860,000	\$20,875,000	\$11,015,000
Subtotal (Construction)	\$132,379,000	\$176,653,000	\$306,065,000	\$129,412,000
Lands and Damages (Real Estate)	\$193,041,000	\$209,127,000	\$213,435,000	\$4,308,000
PED	\$11,369,000	\$15,011,000	\$70,583,000	\$55,572,000
Construction Management	\$12,633,000	\$16,679,000	\$27,864,000	\$11,185,000
Subtotal (Non-Construction)	\$217,043,000	\$240,817,000	\$311,882,000	\$71,065,000
Grand Total	\$349,422,000	\$417,470,000	\$617,947,000	\$200,477,000

NOTES:

- 1) Reference EM 1110-2-1304, 13 March 2014 for FY15 CWCCIS escalation factors.
- 2) PED and CM accounts are calculated as a percentage of construction costs. Original estimate used 9% and 10%.
- 3) Only portions of the real estate cost were escalated. Costs associated with lands that were already acquired as of 2004 were escalated.
- 4) There is a minor difference between the Lands and Damages 2004 PIR/EIS RE Appendix estimate and M-CACES estimate, due to rounding differences.

The largest increase in cost is associated with construction (\$129 million in FY15 dollars), as shown in Figure 2-1. The second largest increase in cost is associated with PED (\$56 million in FY15 dollars). Table 2-2 shows the increase in total costs, by category and the increase in construction cost, by component. Figure 2-2 shows the proportion of construction cost increase defined by component and shows that most of the construction cost increase is associated with pump stations. Levee costs are also a substantial part of the construction cost increase.

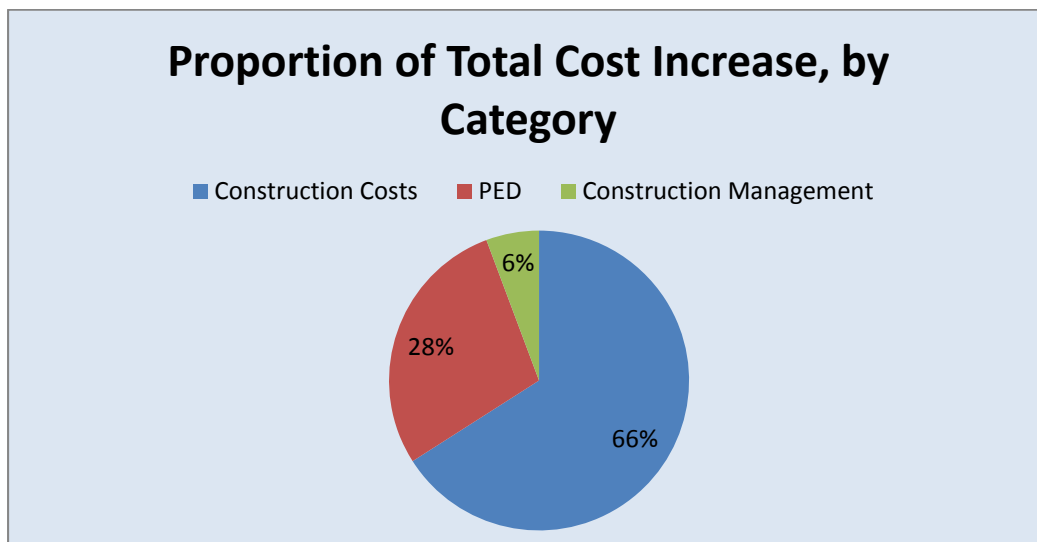


Figure 2-1. Proportion of Total Cost Increase, by Category

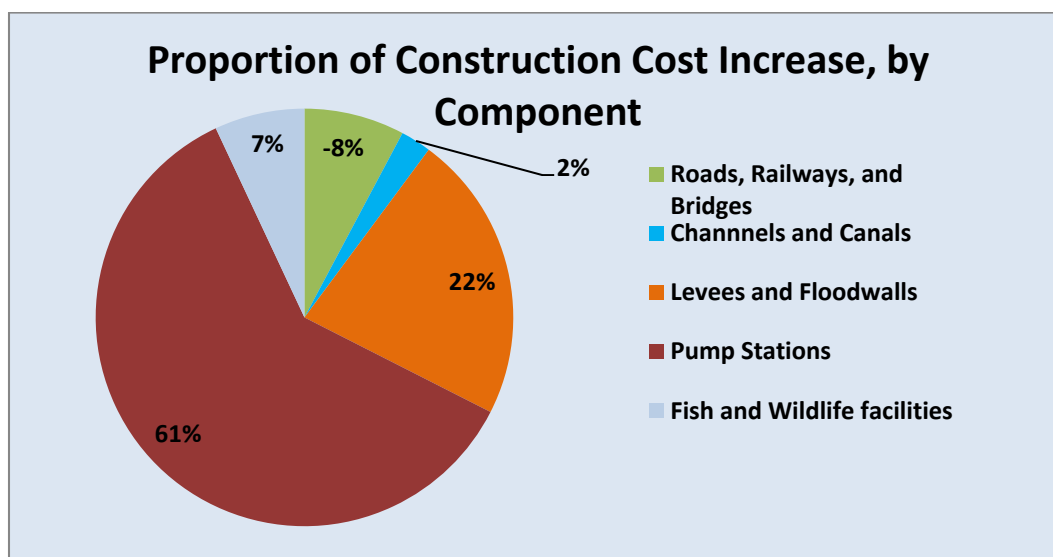


Figure 2-2. Proportion of Construction Cost Increase by Component

2.5.2 COST DISCREPANCIES BETWEEN MAIN REPORT AND TPCS

It should be noted that total project cost and total fully funded project cost reported in this document and are not identical to the estimates provided in the Total Project Cost Summary (TPCS) shown in Appendix B, Sub-Appendix A, page 2. The figures in the TPCS are given in October 2013 (FY14) price levels and are escalated using Civil Works Construction Cost Index System (CWCCIS) escalation factors. The current figures reported here are shown in October 2014 (FY15) price levels and escalated based on March

2014 Office of Management and Budget (OMB) escalation factors. The differences in the numbers are described in table 2-3 and below.

Table 2-3. Input Table for 902 Limit calculation

	Project Cost Estimate	Fully Funded Cost
TPCS	\$619,626,000	\$623,461,000
Current	\$617,946,700	\$625,273,450

The differences noted in the table reflect slight changes in the cost since the TPCS was approved in December 2013. These differences include:

- A more up to date accounting of sunk costs, including costs incurred by the non-federal sponsor
- Updated escalation factors
- All awarded contracts are considered as “sunk costs”

All the costs reported in this document reflect the differences mentioned above and are considered the current cost. The project cost at current (FY15) price levels is \$617,946,700, and the fully funded cost (inflated through the mid-point of construction) is \$625,273,450. The current cost is consistent with the FY 16 budget request.

2.5.3 SECTION 902 LIMIT

Total project costs, after being adjusted for inflation, are projected to exceed the 20% allowance provided by Section 902 of the WRDA of 1986 (33 U.S.C. 2280). Therefore, this Post-Authorization Change Report is required. The total fully funded project cost is \$625.3 million. The Section 902 limit, calculated using current (FY15) price levels, is \$505.2 million. Table 2-4 shows the 902 Limit as calculated by the certified Corps 902 Limit tool. Table 2-5 shows the 902 Limit computation input table. Total project and fully funded costs are not identical to the estimates provided in the TPCS as discussed previously in Section 2.5.2. The authorized cost reported in Table 2-5 (\$375 million) is the total cost that was authorized by law in WRDA 2007. This figure was escalated from the 2004 PIR estimate (\$349 million). The 902 Limit reported here is consistent with the FY16 Budget request for Picayune Strand.

**Table 2-4. Input Table for 902 Limit calculation
(Table G-4 / ER 1105-2-100 Appendix G)**

MAXIMUM COST INCLUDING INFLATION THROUGH CONSTRUCTION		
FY 15	-	Thousands Dollars
Line 1		
a.	Current Project estimate at current price levels:	\$617,947
b.	Current project estimate, inflated through construction:	\$625,273
c.	Ratio: Line 1b / line 1a	1.0119
d.	Authorized cost at current price levels:	\$425,106
(Column (h) plus (i) from table G-3)		
e.	Authorized cost, inflated through construction:	\$430,146
(Line c x Line d)		
Line 2		
	Cost of modifications required by law:	\$0
Line 3		
	20 percent of authorized cost:	\$75,066
.20 x (table G-3, columns (f) + (g))		
Line 4		
	Maximum cost limited by section 902:	\$505,212
Line 1e + line 2 + line 3		

Table 2-5. Section 902 Limit Input Table

Project Name:	PICAYUNE STRAND
Date Prepared:	4/2/2014

Total Authorized Cost:	\$375,330
Authorized Cost for Construction	\$164,462
Authorized Cost for Real Estate	\$210,868
Date of Authorized Price Level:	10/1/2006
First Year of Expenditure:	10/1/1999

Current Cost Estimate (At Current price level):	\$617,947
Current Cost for Construction (Construction Portion of Current Cost):	\$404,340
Current Cost for Real Estate (Real Estate Portion of Current Cost):	\$213,607
Current Fully Funded Cost Estimate (Inflated thru mid-point of Construction):	\$625,273
Date of Current Price Level:	10/1/2014

Costs of modifications specified by Law	
--	--

Project Purpose:	13 - PUMPING PLANT
-------------------------	---------------------------

Date of EM 1110-2-1304 Used	Sep-13
Type of CWCCIS Used	QUARTERLY PUMPING STATIONS (13)
Date of Real Estate Index Used	20-Feb
Type of Real Estate Index Used	CPI (U)

INDEX INPUTS		
Fiscal Year	CWCCIS Index	Rent-Residential Index
FY 07	658.14	228.00
FY 08	696.70	237.14
FY 09	715.95	245.86
FY 10	705.25	248.89
FY 11	738.68	249.62
FY 12	770.37	255.65
FY 13	773.09	262.71
FY 14	779.96	269.96
FY 15	795.17	272.32

EXPENDITURE INPUTS		
Fiscal Year	Construction Expenditures (\$ 1,000's)	Real Estate Expenditures (\$ 1,000's)
FY 00	64	0
FY 01	783	0
FY 02	1561	0
FY 03	3013	0
FY 04	3801	0
FY 05	1746	0
FY 06	1924	0
FY 07	1325	0
FY 08	1649	0
FY 09	3050	154,892
FY 10	60052	0
FY 11	93555	6138
FY 12	45587	60
FY 13	85188	87
FY 14	9936	200

The following sections provide more information about the increases in project cost.

2.5.4 CONSTRUCTION COSTS

As described in the previous section, construction costs have increased significantly since the project was authorized. The largest component of this increase is construction of the pump stations with a cost increase of approximately \$96 million. The original estimate included in the PIR/EIS included all three pump stations and was completed based on the PIR design concept at year 2000 cost levels and escalated to year 2005 price levels. The original estimate assumed that all pump stations would be constructed under one contract and followed concepts of pump stations in the late 1990's. When the detailed design was initiated in 2007, the design configuration had evolved, taking advantage of experience with existing facilities in south Florida, a better understanding of the needs of the area and Corps experience with Hurricane Katrina. Some refinements include the inclusion of form suction intake pumps; the addition of one pump per station to increase the reliability of the station, increase of building size to allow layout for safer maintenance operations, and

layout changes to allow a single person to operate the station. Additional refinements are included in Appendix A.

The second largest component of the cost increase is levee construction. The total cost of levee construction increased by approximately \$35 million. Detailed design showed that a tieback levee that spans the northern width of the project and connects the three pump stations to prevent recirculation of water to the upstream side of the pump stations would be needed in lieu of the smaller berms provided in the 2004 Final PIR/EA. In addition, further survey and geotechnical investigations performed during design and construction warranted a more costly method of construction than assumed in the 2004 Final PIR/EIS.

In the 2004 Final PIR/EIS cost estimate, the cost for the construction of the Southwestern protection features assumed that all earthen material would be obtained from the construction site. However, subsequent geotechnical investigations revealed that a majority of the onsite material is unsuitable for levee construction. Therefore, the current estimate for the Southwestern (6Ls Farm) protection feature assumes that the foundations for the levees will be excavated and replaced with suitable quarry fill hauled in from offsite.

Another significant construction cost increase is in the Buildings, Grounds, and Utilities category, which increased by \$5.7 million measured in FY15 price levels. The sub-components included in the Buildings, Grounds, and Utilities category were accounted for in the Pumping Plant work category in the 2004 Final PIR/EIS estimate. Therefore, this increase is due to a reallocation as opposed to an increase in total project cost. Additionally, the approximate \$11 million cost of the manatee mitigation feature was included as a cost increase under the Fish and Wildlife Facilities category.

More information about the various increases in construction cost is provided in Appendix A.

2.5.5 REAL ESTATE COSTS (LANDS AND DAMAGES)

Real Estate costs have also increased from \$193,043,100 in the 2004 Final PIR/EIS to \$213,435,000. The original cost estimate was developed using: (a) estimated land costs in the Belle Meade Area for a perpetual flowage easement versus actual acquisition costs for the fee title; (b) no land or administrative costs for lands in Fakahatchee Strand; and (c) an estimated land cost for lands in SGGE to be acquired after June 1, 2004. The requirement for fee acquisition in Belle Meade, the requirement of a perpetual flowage easement in Fakahatchee Strand, and more detailed costs and estimated costs for lands in SGGE, all have led to a significant increase. Additionally, final judgments for lands not acquired as of June 1, 2004 have been higher than anticipated in the 2004 Final PIR/EIS as noted in Table 2-2. The Real Estate costs were calculated to conform to the Section 13 of the PIR dated 2004 pages 13-6 and 13-7 which provide:

I recommend that credit for the value of the lands, easements, and rights-of-way required for the Project shall be as follows:

- a. For any lands or acreage within the former Southern Golden Gate Estates Subdivision comprised of 55,247 acres acquired by the Non-Federal Sponsor or the Florida Department of Environmental Protection prior to

May 31, 2004, the creditable value shall be a sum not to exceed \$75,394,333, subject to a Peer Review Report by a party designated by the Deputy Assistant Secretary of the Army (Civil Works) and approval of the Peer Review Report by the Deputy Assistant Secretary of the Army (Civil Works) and subject to a determination that the lands are required for the Project.

b. For lands, easements and rights-of-way within the former Southern Golden Gate Estates Subdivision comprised of 55,247 acres acquired by the Non-Federal Sponsor or the Florida Department of Environmental Protection after May 31, 2004, the creditable value shall be the actual acquisition cost of such real property interests at the time the interests are acquired, subject to a determination that the lands are required for the Project and that the costs are reasonable, allowable and allocable.

c. Subject to a Peer Review Report by a party designated by the Deputy Assistant Secretary of the Army (Civil Works) and approval of the Peer Review Report by the Deputy Assistant Secretary of the Army (Civil Works), the incidental/administrative costs incurred by the Florida Department of Environmental Protection for the acquisition of all lands, easements, and rights-of-way within the former Southern Golden Gate Estates Subdivision shall not exceed the sum of \$29,158,914.

d. If the lands, easements and rights-of-way which lie outside the boundaries of the former Southern Golden Gate Estates Subdivision were acquired prior to execution of the Project Cooperation Agreement, the creditable value shall be their purchase price, subject to a determination that the lands are required for the Project and that the costs are reasonable, allowable and allocable, together with their reasonable and necessary incidental costs of acquisition.

e. The value of lands, easements, or rights-of-way required for the Project which lie outside the boundaries of the former Southern Golden Gate Estates Subdivision acquired by the Non-Federal Sponsor after the effective date of the Project Cooperation Agreement executed for this Project shall be the actual acquisition cost of such real property interests at the time the interests are acquired, subject to a determination that the lands are required for the Project and that the costs are reasonable, allowable and allocable, together with their reasonable and necessary incidental costs of acquisition.

More details can be found in Appendix C

2.5.6 PRE-CONSTRUCTION, ENGINEERING, AND DESIGN (PED) COSTS

The PED costs have increased significantly since the project was authorized. Measured in FY15 dollars, the total cost of PED increased by approximately \$56 million. The 2004 Final PIR/EIS estimate assumed that PED cost would be approximately 9% of total construction cost. The current estimate projects the PED cost to be approximately 23% of

total construction cost. See Table 2-6 below for PED expenditures to date. More information about the various increases in PED cost is provided in Appendix A. The appendix also provides the history of PED activities that have already occurred.

Table 2-6. Planning, Engineering and Design Costs to Date

	Federal	Non-Federal
Project Implementation Report (PIR)	\$ 6,420,000	\$ 2,568,000
Modeling and Design Costs	\$ 18,008,000	\$ 16,897,000
Engineering During Construction	\$ 14,830,000	\$ 1,326,000
Limited Revaluation Report	\$ 361,000	
Totals:	\$ 39,619,000	\$ 20,791,000

2.5.7 CONSTRUCTION MANAGEMENT COSTS

Measured in FY14 dollars, the total cost of construction management has increased by approximately \$11 million. The original estimate in the PIR/EIS and the current cost for construction management are 9% of the construction cost. More information about the increase in the engineering management cost is provided in Appendix A.

2.6 CHANGES IN COST ALLOCATION

Due to changes outlined above, the allocation of costs has changed since authorization. In the 2004 Final PIR/EIS, most of the cost was associated with real estate. In comparison, within the current cost estimate, most of the project cost is associated with construction. Real Estate is the second largest category of allocated costs. Real estate and construction costs have both increased significantly since the 2004 Final PIR/EIS. In absolute terms, PED and Construction Management costs have both increased significantly. Figure 2-3 provides a comparative breakdown of total project costs.

Though the total allocation of costs has changed since 2004, the allocation of costs between different construction components has not changed dramatically. Pump stations were the largest component of construction cost in 2004, and they continue to be the largest component. As a proportion of the total, levees and floodwalls have increased since 2004. Two construction categories have decreased as a proportion of the total: Culverts and Roads. Figure 2-4 provides a comparative breakdown of construction costs.

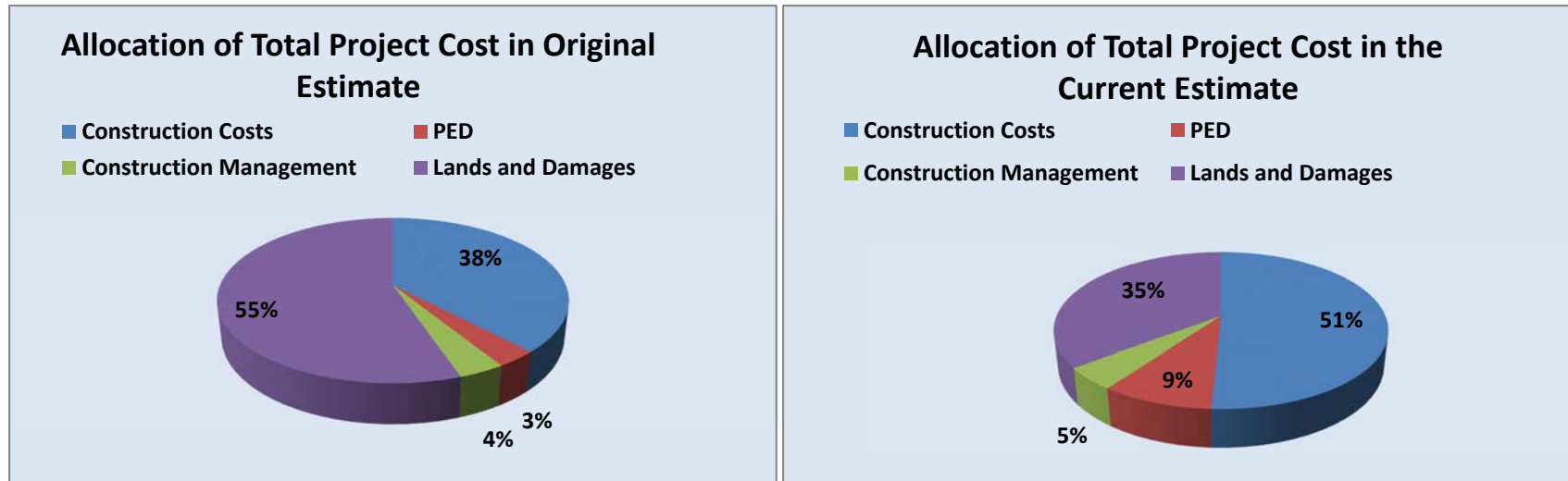


Figure 2-3. Comparison of total project costs

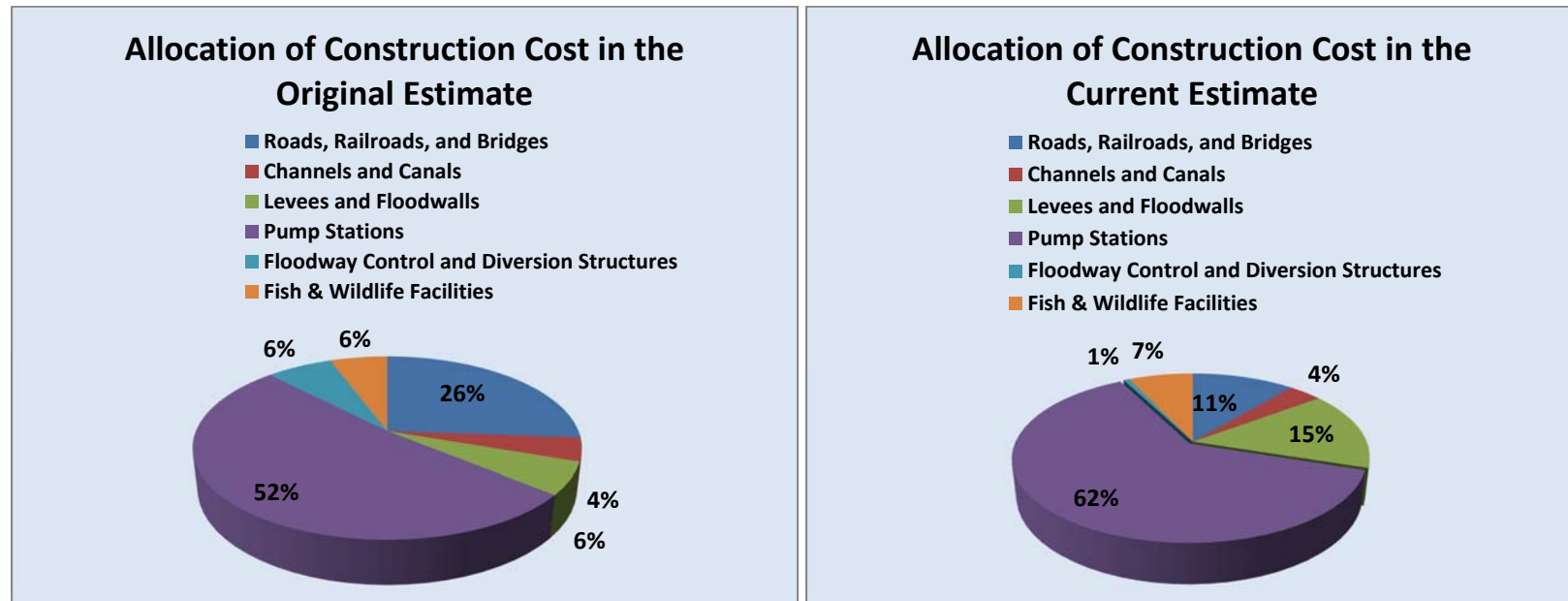


Figure 2-4. Comparison of total construction costs

2.7 CHANGES IN COST APPORTIONMENT

There are no proposed changes in cost apportionment. The PSRP is a component of the Comprehensive Everglades Restoration Program which is programmatically cost shared with the non-federal Sponsor.

2.8 MANATEE MITIGATION FEATURE

A portion of the Southwest Florida manatee population currently uses the Port of the Islands (POI) Basin as a warm water refugium during the colder months of the year. The refugium appears to be maintained by fresh water discharged from the canal system in the PSRP site that routes through the Faka Union Canal and over Faka Union Weir #1 located immediately north of US-41 (Tamiami Trail) and the POI Basin. The anticipated reduction in flow from the PSRP to the POI Basin resulting from plugging of project canals raised concern for the continued viability of the refugium under restored conditions, thereby creating the potential for increased winter mortality to the manatees utilizing the site.

The PSRP was authorized for construction in the WRDA of 2007. Prior to construction authorization, informal consultation with the U.S. Fish and Wildlife Service (USFWS) for the West Indian manatee under the Endangered Species Act (ESA) was determined to be incomplete based on insufficient information for a manatee effects determination. The 2004 PIR/EIS acknowledged there was a potential adverse impact to the endangered manatee, indicated that additional consultation was required, and predicted that a project modification would be required to mitigate for the anticipated loss of the fresh water source during periods of natural cold stress. The 2009 Biological Opinion (BO) determination (USFWS, 2009) that the project “was not likely to adversely affect” the manatee was caveated pending the results of detailed studies by the U.S. Geological Survey (USGS) of manatee use of the POI Basin. Subsequent analysis of best available data (Stith, et al., 2011) indicated that a reduction of freshwater flow to the refugium resulting from the PSRP construction and operation may result in additional manatee stress, injury or mortality during the cold, dry season when manatees are dependent on the refugium for shelter. Based on the information provided by these studies, the project team determined that a manatee mitigation feature was necessary to maintain the existing manatee refugium at POI Basin.

An interagency team with representatives from the Corps, SFWMD, USFWS, Florida Fish and Wildlife Conservation Commission (FWC) and the FDEP formulated potential mitigation options in order to maintain the function of the refugium. Design and construction will be completed by SFWMD. The design of this feature is included in Appendix A, Engineering Appendix. The draft EA and BA are included in Appendix D. Additionally, the cost of the manatee mitigation feature has been included in the certified cost estimate. Currently, the fully funded cost of manatee mitigation is estimated to be approximately \$11 million. The cost of the manatee mitigation feature is included in the cost estimate under the account Fish and Wildlife Facilities (WBS 06) (Appendix B). Approximately \$21 million is included in the project cost estimate under the WBS 06 account pre-construction environmental monitoring, adaptive management, and design and construction of the manatee mitigation feature. The overall environmental monitoring associated with the PSRP will be paid for in O&M funds.

3.0 EVALUATION OF BENEFITS

The environmental benefits of the Picayune Strand Restoration Project (PSRP) as described in the 2004 Final Project Implementation Report and Environmental Impact Statement (PIR/EIS) will still be achieved at completion of the total project. The objective is to re-establish wetlands conditions over most of the PSRP lands. In order to achieve this, water must be freely conveyed freely from the north and retained on the land, which is currently over-drained. The reason that full restoration benefits cannot be achieved without installation of plugs in the canals is that the original cause of dehydration of the 55,000+ acre area was over-drainage. The canals were constructed to drain the mesic-to-wetland area to support a residential housing development. Data from monitoring wells installed in Picayune Strand by the SFWMD show that the N-S trending canals were highly effective: the drainage effect extends in a perpendicular direction far from each N-S canal, leading to the current condition of an overall lowered groundwater table throughout the area. The desired restoration would raise the ground water table and re-establish surficial sheet flow, not just in close proximity to the canals, but throughout the area. Before canal plugs could be installed, however, it was necessary to install the pumps, berms and protective levees in order to comply with the Comprehensive Everglades Restoration Plan's commitment to not decrease the existing level of flood protection on adjacent lands. Without the pumps located near the northern end of the canals, flooding probability would increase in the residential lands of Northern Golden Gate Estates, located immediately north of I-75. The drainage provided by un-plugged canals is too effective, in that they rapidly shunt water draining from north of the project (higher lands) down the waterways and out into the Ten Thousand Islands. Too little residual water remains in the canals at the end of the rainy season to sustain the high water table needed to support restoration of wetlands and wet mesic forest during the long winter dry season. That is why the sequence of construction (levees and pump stations first; plugging canals second) is the only logical way to proceed with construction. This project could not have been reverse-constructed, for it would have led to undesirable flooding north of I-75 in residential areas.

In addition to benefits in the PSRP area, benefits would be gained in the adjacent Fakahatchee Strand State Forest, Belle Meade State Conservation and Recreation Lands (CARL), Collier-Seminole State Park, and the Florida Panther Wildlife Refuge. Benefits for estuarine communities (Collier-Seminole State Park and Ten Thousand Islands National Wildlife Refuge) were also included as a result of the PSRP. Without the implementation of the yet to be constructed protection features and Miller and Faka Union Canal plugging, approximately 70 percent of the hydrologic benefits, 62 percent of the biological benefits, and 100 percent of the estuarine benefits would be lost (Table 3-1). The location of the adjacent benefitted areas outlined in Table 3-1 is shown in Figure 3-2. In addition to the loss of quantitative benefits, there would be a significant loss of qualitative benefits in the region. These include the loss of: a major flow-way through Picayune Strand, reestablishment of the natural flows to the estuaries, and restoration of ecological connectivity. A number of project objectives as described in the 2004 Final PIR/EIS would not be met for 25,240 of 59,294 acres with the loss of the Miller canal plugging and for 43,918 of 59,294 acres with the loss of the Faka Union and Miller canal plugging within Picayune Strand, including:

- Restoration of natural hydropatterns, sheetflow, and flowways,
- Provision of resource based recreational opportunities,
- Restoration of natural fire regime,
- Reestablishment of natural plant distribution and composition,
- Restoration of habitat for listed species,
- Increasing fish and wildlife resources,
- And increasing surface aquifer recharge.

In addition, two of three decision criteria used to select Alternative 3D in the 2004 Final PIR/EIS would not be met; specifically, the elimination of point discharge to the estuary and restoration to more than 50% of historic hydrologic conditions would not be met. The other major loss would be that the PSRP would not provide the intended connectivity of surrounding Federal and state parks, preserves, and refuges (Figure 3-3). The goal of more natural distribution of water to the Ten Thousand Islands National Wildlife Refuge would not be met and no estuarine benefits would be achieved. The implementation of the full PSRP will result in a contiguous public land holding of about 2,602,144 acres in Southwest Florida.

Figure 3-1 depicts the hydrological restoration expected from each incremental component when the Prairie, Merritt, Faka Union and Miller Canals are plugged; including hydrological benefits extending to the estuarine boundaries of the project area."

Phased restoration is expected as each component is completed. Since each canal is approximately 2 miles apart, after filling Prairie Canal, Merritt Canal will produce drainage effects 1 mile east of Prairie Canal and the filled Prairie Canal restoration area will be 1-3 miles east of Prairie Canal. Likewise when Merritt Canal is filled, Faka Union Canal will produce drainage effects 1 mile east of Merritt Canal, and the filled Merritt Canal restoration area will be 1-3 miles east of Merritt Canal. If Faka Union and Miller Canal are being filled at the same time, anticipated restoration would occur concurrently (green), with the drainage effects extending west 3 miles from Miller Canal. The East-West, Stair-Step Canal also has drainage effects extending three miles upstream and an indefinite distance downstream towards the coast.

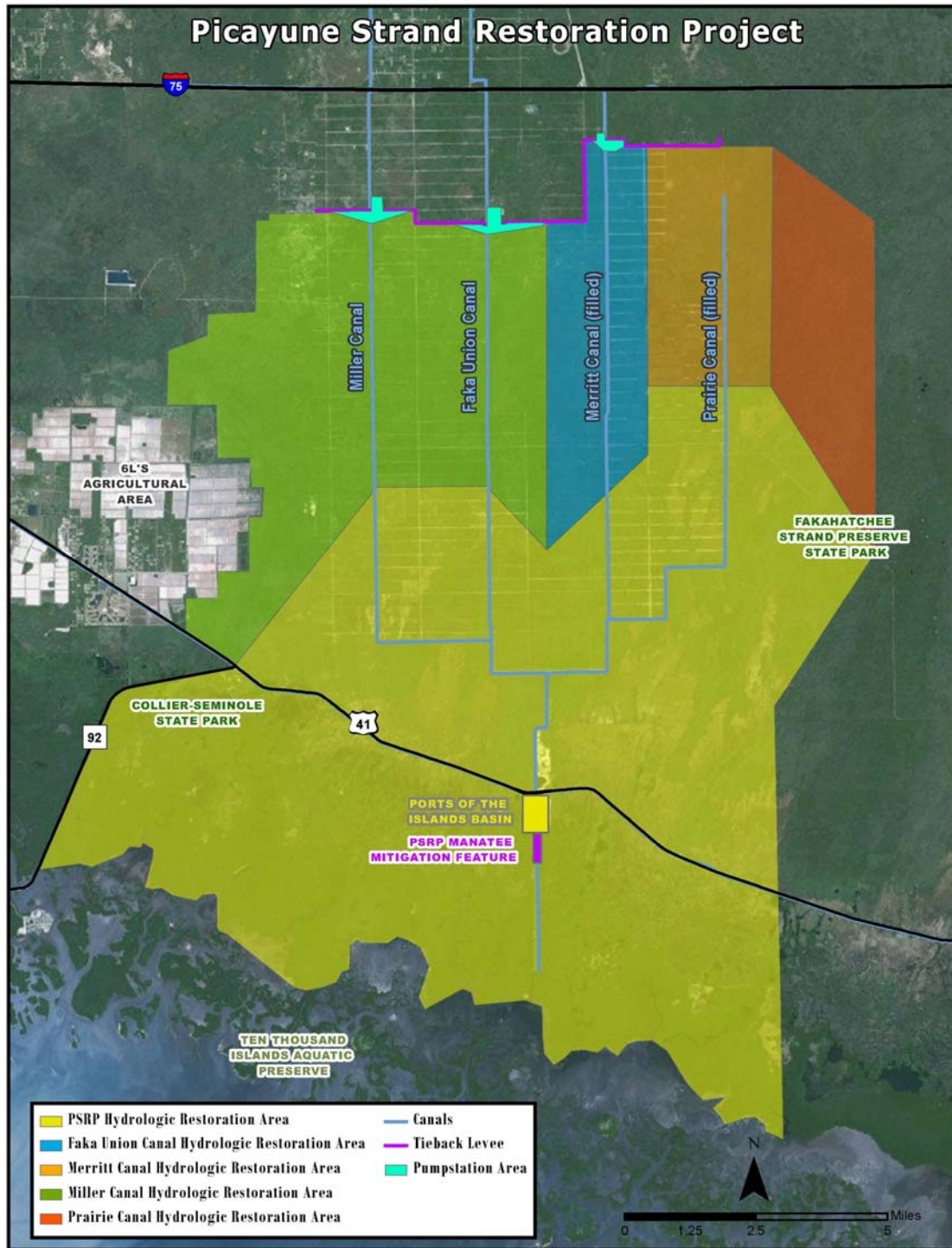


Figure 3-1. Estimated Benefit Areas for each Phase of Canal Plugging

Table 3-1. Average annual benefits with and without the completion of Faka Union and Miller canal plugging

Location	Acres (2004 PIR EIS)	Acres without Miller and Faka Union	Future Without (2004 PIR EIS) (average annual HUs)	Revised Future without (average annual HUs)	HU with Miller and Faka Union (2004 PIR EIS)	Lift with Miller and Faka Union (2004 PIR EIS) (HU-Future Without)	HU without Miller and Faka Union	Lift without Miller and Faka Union (HU-revised Future Without)	Percent of HU Lost	Percent of Benefit (Lift) Lost
Hydrology										
SGGE	59,294	15,376	20,753	5,382	49,807	29,054	12,916	7,534	74%	74%
Fakahatchee	80,161	80,161	69,740	69,740	72,145	2,405	72,145	2,405	0%	0%
Belle Meade	30,061	0	24,951	0	27,055	2,104	0	0	100%	100%
Collier-Seminole	4,339	0	3,645	0	3,948	303	0	0	100%	100%
Panther NWR	24,947	24,947	21,704	21,704	21,953	249	21,953	249	0%	0%
Total	198,802	120,484	140,793	96,826	174,908	34,115	107,014	10,188	39%	70%
Biota										
SGGE	59,294	15,376	35,962	9,226	47,531	11,839	12,301	3,075	74%	74%
Fakahatchee	80,161	80,161	72,357	72,357	75,210	2,853	75,210	2,853	0%	0%
Belle Meade	30,061	0	21,564	0	22,322	758	0	0	100%	100%
Collier-Seminole	4,339	0	3,656	0	3,863	207	0	0	100%	100%
Panther NWR	24,947	24,947	18,993	18,993	19,058	65	19,058	65	0%	0%
Total	198,802	120,484	152,262	100,576	167,984	15,722	106,569	5,993	37%	62%
Estuarine										
Nekton	1260.00	0	34.65	0	539.90	505.25	0	0	100%	100%
Oyster Reef	13.75	0	0.60	0	7.88	7.28	0	0	100%	100%
PROJECT TOTAL					343,440	50,400	213,583	16,181	38%	68%

* Benefits without the completion of the Miller and Faka Union canal plugging were estimated based on information from 24 years of hydrologic studies done to document the extent of direct and indirect drainage effects of the PSRP canals on adjacent lands.

*Average annual benefit calculations were obtained from Tables 6-9, 6-10, 6-15, and 6-16 of the 2004 Final PIR/EIS

This page intentionally left blank

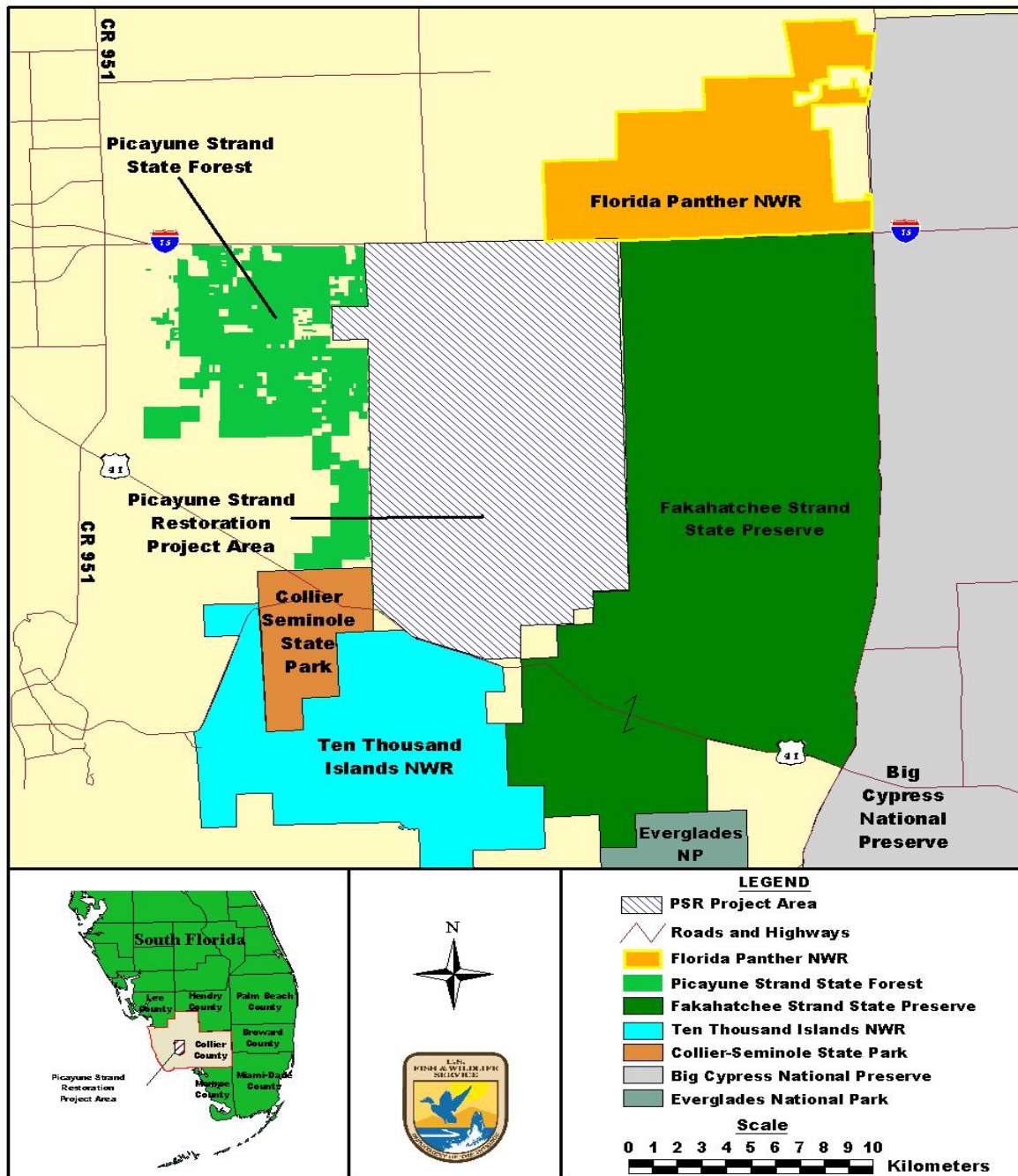


Figure 3-2. Adjacent public lands benefiting from the PSRP restoration.

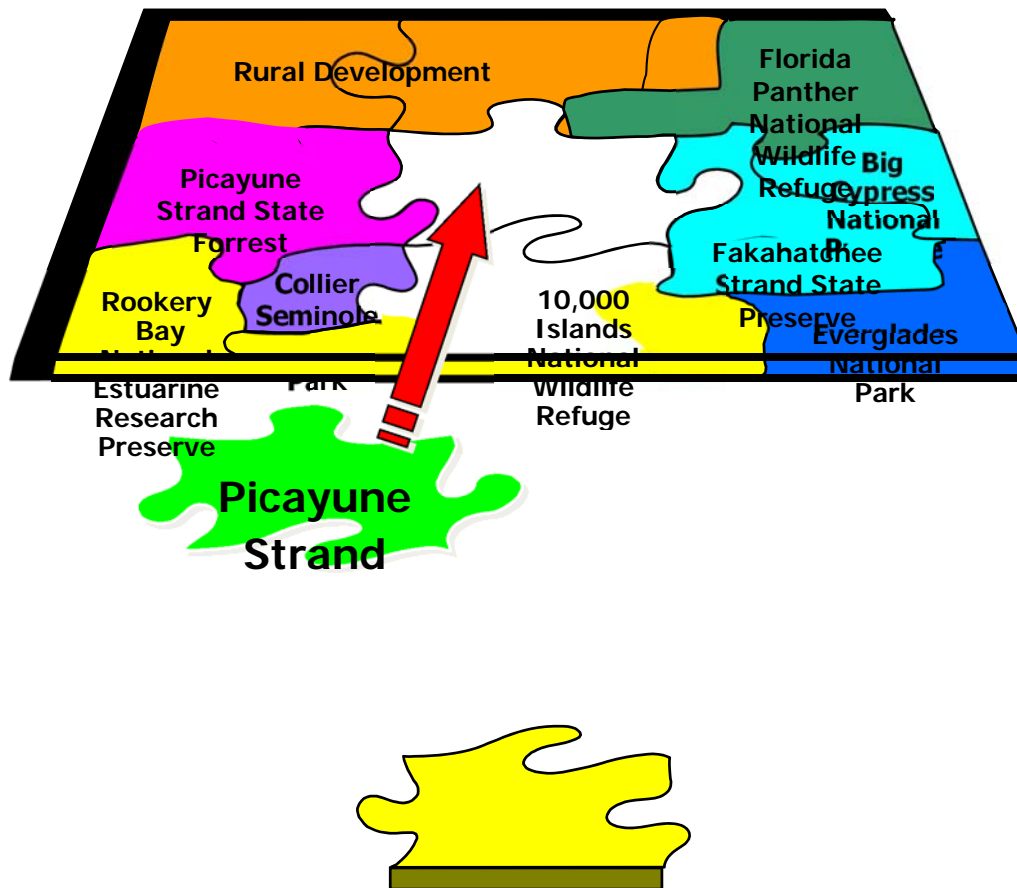


Figure 3-3. Picayune Strand and adjacent publicly owned lands

3.1 COST EFFECTIVENESS OF REMAINING BENEFITS

The environmental benefits of PSRP can be associated with different construction phases. The entire project is designed to work as an integrated system as described in the 2004 Final PIR/EIS. However, as explained in the previous section, the project was split into manageable phases in accordance with funding availability. The project was initiated with a logical phasing sequence assuming it would be completed within the authorized cost. However, design refinements were required resulting in this request for additional funding to enable project completion. Table 3-2 provides a breakdown of the benefits. The environmental benefits and restored acreage can be broadly linked to plugging of each of the three major canals that is part of the three pump station construction phases. Each “phase” corresponds to a given pump station and its associated canal plugging.

Table 3-2. Environmental Benefits (habitat unit lift) by construction phase

Benefit Category	Merritt	Faka Union	Miller
Hydrology	10,188	9,152	14,775
Biota	5,993	3,736	5,993
Estuarine	0	0	513

The Merritt Pump Station has been constructed and Faka Union Pump Station is under construction with anticipated completion in 2015. The benefits associated with the Merritt construction phase will be achieved without additional authorization of construction funds (beyond the current 902 Limit). However, if additional funding is not authorized, the associated features of the Faka Union and Miller Pump stations will not be fully constructed. As a result, full restoration will not be achieved and the environmental benefits associated with those two phases will not be realized. In order to achieve full restoration, the protection features and manatee mitigation component must be completed. In particular, the manatee mitigation feature must be completed before the Faka Union canal can be plugged.. Without the implementation of the Miller and Faka Union canal plugging phases, approximately 70 percent of the hydrologic benefits, 62 percent of the biological benefits, and 100 percent of the estuarine benefits would be lost.

Table 3-2 provides a simple breakdown of the benefits. Table 3-3 provides a simple cost/benefit comparison between the portions of project that are already under construction (including the obligated funds and awarded contracts) vs. the construction features that are associated with the additional funding request.

Table 3-3. Environmental Benefits

Incremental Benefits	HU Lift	Current Cost (2014 dollars)	Cost per HU Lift
Authorized Cost (902 Limit)	16,181	\$505,212,000	\$31,222
Additional Request (above 902 Limit)	37,819	\$112,735,000	\$2,981
Entire Project	50,400	\$617,947,000	\$12,261

Regardless of how the costs and benefits are separated into project phases, the cost per habitat unit lift (HUL) is always lower in the remaining portion of the project than the completed portion:

- \$/HUL for remaining features < \$/HUL for completed features
- \$/HUL for authorized expenditures < \$/HUL for requested authorization
- \$/HUL for final portion < \$/HUL for completed portion

Thus, completing the project is significantly more cost effective than ceasing work and leaving the project incomplete. Without full implementation of all project features, the project will only realize 30 percent of the hydrologic, 38 percent of the biological and zero percent of the estuarine benefits.

From an efficiency perspective, the features to be financed by the additional appropriation request are the efficient dollars to be spent on the project. Therefore, the recommendation of this report is that the authorized total project cost be increased from \$505.2 million to \$617.9 million so that the project can be completed as it was intended in the 2004 Final PIR/EIS.

3.2 BENEFITS ACHIEVED DUE TO IMPLEMENTING PRAIRIE CANAL RESTORATION

The following discussion is a summary of information and evaluations in the Environmental Appendix (Appendix E). The first canal plugged was Prairie Canal, the easternmost canal in PSRP, which did not require a pump station. The upper two miles of Prairie Canal were plugged with adjacent spoil in spring 2004. The lower five miles of the north-south portion of Prairie Canal were plugged in fall 2006, with substantial amounts of additional fill added from fall 2006 through June 2007 as the roads east of Merritt Canal were degraded. Additional degrading of fill along the roads east of Merritt Canal and along Prairie Canal was completed in winter-spring 2012. The logging trams east of Merritt Canal were degraded during winter-spring 2011.

3.2.1 HYDROLOGIC CHANGES

Portions of the PSRP area have already shown significant hydrologic improvement, as indicated by water levels in monitoring wells whose location is shown in Fig. 3-1 (green dots). These wells have been monitored prior to the PSRP project and continue to be monitored. Most observations of early improvements occurred near Prairie Canal and in Fakahatchee Strand immediately to the east of the PSRP. Based on 26 years of monthly water level monitoring documenting the effects of Prairie Canal across Fakahatchee Strand, we now know that the draw-down effects of the SGGE canals can extend 1-1.5 miles from the canal during the wet season and 2-3 miles during the dry season. The SGGE canals are only 2 miles apart. Thus, even though Prairie Canal has been plugged since 2007, lands to the west of the canal are still affected by drainage from Merritt Canal, and lands to the south are still affected by the unfilled East Stair-Step Canal. In addition, the natural main flow-way through project area enters from the north in the vicinity of Merritt Canal, and arcs close to Prairie Canal in the north-south middle of the project area before curving west again to where the Faka Union Canal crosses Tamiami Trail. Thus, when Merritt Canal is plugged, we expect to see additional hydrologic restoration along Prairie Canal, and there will be additional improvement in the southern portion of the area when the East Stair-Step Canal is plugged. While plugging Prairie Canal is providing some benefits to the inland portion of the project area, few if any of these benefits are reaching the estuarine areas

because most of the newly created overland flow is being recaptured by the East-West Stair-Step Canal from which it is routed as point discharge into Faka Union Bay. For this reason we have not attributed any estuarine zone benefits to PSRP restoration to date.

Hydrologic benefits first appeared after the 2006 plugging of Prairie canal, when groundwater wells near Prairie Canal and between Prairie and Merritt canals showed consistently higher levels than near the unplugged Merritt Canal. Restored water levels should more closely resemble wells in adjacent undrained Fakahatchee stand, especially after Merritt Canal is plugged as well. A graphic comparison of water levels through the years in two wells, one at Prairie Canal, and one inside Fakahatchee Strand 2.5 miles away from any canal, showed a dramatic rise in the water level at the Prairie Canal well, beginning in October 2007. Subsequently through 2011 the Prairie Canal well tracked closely with water levels inside Fakahatchee Strand, a natural area.

3.2.2 PLANT COMMUNITY CHANGES

Since most vegetation assemblages inside PSRP are tree-dominated, change in species predominance and mortality of less high water-tolerant species is expected to be relatively slower than hydrologic change. Monitoring of changes reported here is through 2011, four years after plugging parts of Prairie Canal. Various sampling methods were used including belt transects, line-intercepts and quadrats to characterize the canopy, sub-canopy, shrub and herb layers. Details are presented in Appendix E. In the sampled area, hydroperiods have increased since Prairie Canal was plugged, in spite of droughts. However, restoration effects have not yet been observed on growth rates or mortality of wetland trees (should be shown by increased growth) while pine stands showed more rapid growth in restored sites than control plots, a trend that should reverse as restored sites become wetter. Evidently the effects of increased water depth and duration are not yet affecting these plots. The undesired and invasive cabbage palm, has not yet decreased in density even in restored sites, except for some mortality of seedlings and young trees in cypress stands close to Prairie Canal. In general, cabbage palm densities continue to increase throughout the project area, a trend expected to reverse with ongoing hydroperiod restoration. The years between 2006 and 2011 included some extreme drought years, which may be partially responsible for the ongoing cabbage palm density increase. In contrast, wet prairie plots showed low cabbage palm densities. In the shrub layer, increased flooding and longer hydroperiods appear to have caused mortality of the invasive Brazilian pepper. In the ground layer, regarding calculation of a Wetland Affinity Index to indicate similarity of experimental plots to “natural” control plots, the index increased slightly, but no significant trends could be shown. In summary, time elapsed and the unusual drought periods during the first 4 years probably obscured any significant or widespread changes in vegetation.

Indicator species for restoration of fauna were relative abundance of green and squirrel tree frogs (native species) in comparison to Cuban tree frogs (invasive). This monitoring has not yet begun, but should indicate restoration of more natural habitat.

3.3 MONITORING AND ADAPTIVE MANAGEMENT

The goal of restoring the lands of PSRP below the pump stations is re-establishment, to the maximum extent practicable, of pre-drainage plant and animal communities. This presumes restoration of natural hydrologic and fire regimes and control of nuisance and

exotic plant and animal species. There is some uncertainty regarding restoration of the hydrologic regime related to the extent of the original watershed boundaries, and how they may have been affected by the Golden Gates canal systems. Other hydrologic unknowns relate to operation of control structures on the canals, as well as groundwater withdrawals by large well fields in Northern Golden Gates Estates. It is desirable to better delineate the natural watershed boundaries and current discharges and withdrawals, so that restored flows can be compared to pre-drainage conditions as closely as possible. This would allow adjustment of flows if necessary. Fortunately the PSRP lands are surrounded by natural Federal and State conservation lands encompassing a much larger area than the project area itself, which should favor successful restoration.

3.3.1 MONITORING

The PSRP monitoring plan includes measuring short and long-term responses in major communities on project and adjoining lands, including aquatic and terrestrial, freshwater and estuarine. The monitoring plan was developed by the PDT while the PIR was still in preparation, and was refined as more information became available. Monitoring of hydrology is accomplished through a network of groundwater wells as shown in Fig. 3-1. A multi-agency Monitoring and Assessment Group (MAG) comprised of representatives of USFWS, SFWMD, and the Corps has continued to guide ongoing monitoring. As the PSRP lands are largely forest-covered, access by helicopter or airboat is not feasible as it is in the sawgrass everglades. Monitoring locations were often determined in relation to access points.

As described in Picayune Project Implementation Report (PIR), establishment of a natural fire regime and an exotic vegetation management program, not just hydrologic restoration, are necessary to meet the project targets. As part of the PSRP, the PDT has created a plan for controlling nuisance native and exotic vegetation throughout the project area. The highest priority portions of the nuisance native and exotic vegetation plan have been implemented and are ongoing. Nuisance native and exotic vegetation control outside of the construction footprint is not being conducted at this time. It is expected that hydrologic restoration will be a significant ally in dealing with or at least reducing populations of a number of the problem species. Once the effects of hydrologic restoration are ascertained, a long-term plan for nuisance native and exotic vegetation can be developed for the PSRP.

3.3.2 ADAPTIVE MANAGEMENT

The original PSRP PIR was authorized in 2007 before the Corps guidance required adaptive management plans for ecosystem restoration projects. While an adaptive management plan was not developed at that time, a monitoring plan for restoration performance was included, along with a vegetation management plan to address invasive species management issues that were the primary uncertainty effecting restoration success at the time. New information gained from permit monitoring discussions related to endangered species, from recent PSRP monitoring data of the Prairie Canal backfill, from RECOVER monitoring data of estuarine restoration indicators and from new information gained from the detailed design of the remainder of the project has identified some additional uncertainty and risk related to meeting project restoration goals and objectives. The PSRP Limited Reevaluation Report (LRR) presented an opportunity to develop an Adaptive Management Plan and comply with the new guidance on adaptive management

to identify strategies to address uncertainty by linking project monitoring and success criteria to management options to be implemented if deemed necessary to improve restoration performance.

Prior to development of the adaptive management plan (Appendix E), existing monitoring funded by RECOVER, other agencies, and required for PSRP to undertake for other project purposes, e.g., operating new structures, compliance with water quality permits or biological opinions was reviewed. The monitoring recommended in this adaptive management plan is what is needed beyond the other sources to address key PSRP uncertainties (key questions) identified during the LRR planning that relate to achieving project goals and objectives. Project specific adaptive management activities will be implemented as necessary in coordination with PSRP Monitoring and Assessment Group (MAG), RECOVER (interagency system-wide science team) and partner agency monitoring activities. This adaptive management plan will be updated based on the new knowledge gained and key questions being addressed to ensure the adaptive management options proposed in this Plan are refined to what is needed to improve restoration success. Therefore, items included in this Plan are not guaranteed to be funded as-is, but will be considered again based on actual restoration project performance related to future project components being constructed and operated. Funding decisions regarding adaptive management strategies will be made commensurate with available funding at that time.

The 2004 Final PIR/EIS estimated that the average annual cost for monitoring and adaptive management was \$887,000 over the 50-year life of the project. The average annual cost estimate took into account the cost per year, the different schedule and number of years of monitoring for different resources, and an interest rate to allow comparison of expenditures that are up to 50 years apart (Appendix H, 2004 Final PIR/EIS) (Table 3-4).

Table 3-4. Cost Estimate for Monitoring in 2004 Final PIR/EIS (Table H-13, Appendix H)

	Pre-Construction & Construction Phase (5 years total)		Post-Construction Phase (50 years total)	
Resource	Number of Years	Subtotal	Number of Years	Annual Rate
Oyster Reef Crab	5	\$239,000	10	\$44,825
Nekton	5	\$316,000	10	\$59,250
Benthic Habitat Mapping	1	\$310,000	1	\$270,000
Oysters:				
5 Homologues, 4 Estuaries	5	\$1,500,000	10	\$300,000
Reef Mapping	2	\$10,000	10	\$2,000
Water Quality	5	\$1,406,000	10	\$204,300
Hydrology	5	\$500,000	50	\$100,000
Vegetation	1	\$150,000	50	\$36,000
Onsite Support	5	\$1,150,000	10 (years 1-10)	\$180,000
			40 (years 11-50)	\$100,000
Listed Species	5	\$1,250,000	10	\$250,000
Inland Fish and Wildlife	5	\$600,000	10	\$120,000
Total Cost		\$7,431,000		--

The project monitoring costs were revised in 2009 through negotiations with USFWS (Table 3-5). The total cost estimates for environmental monitoring are shown in Table 3-6.

Table 3-5. PSRP Ecological Response and Water Quality Monitoring Tasks (2012 Transfer Agreement, Appendix 5)

Monitoring Tasks	Revised Estimate (CG plus O&M)	Present thru 2022 (CG)	2023 thru 2050 (O&M)
Vegetation Transects			
PS 1 (Phase 1 road removal)	\$95,000	\$47,500	\$47,500
PS 2 (Phase 2 road removal)	\$83,125	\$35,625	\$47,500
PS 3 (Phase 3 and 4)	\$166,250	\$71,250	\$95,000
<i>Vegetation Subtotal</i>	\$344,375	\$154,375	\$190,000
Aquatic Fauna (inland)			
PS 1 (Phase 1 road removal)	\$308,750	\$308,750	\$0
PS 2 (Phase 2 road removal)	\$308,750	\$247,000	\$61,750
PS 3 (Phase 3 and 4)	\$617,500	\$370,500	\$247,000
<i>Aquatic Subtotal</i>	\$1,235,000	\$926,250	\$308,750
Estuarine Resources			
Benthic Substrate	\$266,800	\$75,600	\$151,200
Oyster Reef	\$282,110	\$169,266	\$112,844
Oyster Reef Mapping	\$25,000	\$10,000	\$15,000
<i>Estuarine Subtotal</i>	\$533,910	\$254,866	\$279,044
T&E Species Monitoring			
Wading Birds & Wood stork	\$1,019,868	\$254,967	\$764,901
Panther	\$2,436,000	\$522,000	\$1,914,000
Manatee	\$750,000	\$300,000	\$450,000
<i>Species Subtotal</i>	\$4,205,868	\$1,076,967	\$3,128,901
Water Quality			
Lab Fees	\$51,582	\$51,582	\$0
Surface Water Samples	\$163,944	\$163,944	\$0
Mosquito Fish	\$92,376	\$92,376	\$0
Bluegill	\$13,266	\$13,266	\$0
<i>Water Quality Subtotal</i>	\$321,168	\$321,168	\$0
Total Cost	\$6,640,321	\$2,733,626	\$3,906,695

Table 3-6. PSRP Tasks Associated with Environmental Compliance, Assessment of Ecological Response and Hydrological Data, and Control of Exotic Plants (2012 Transfer Agreement, Appendix 5)

Environmental Tasks	Total Estimate
Collection of Hydrology & Meteorology Data thru Year 2050	\$5,200,000
Nuisance & Exotic Vegetation Control in Construction Footprint during Construction Phases	\$7,600,000
Ecological Response & Water Quality Monitoring thru Year 2050	\$6,600,000

While the specific details of the Adaptive Management Plan are provided in Appendix E, management options include actions such as adjusting the new pump station flow rates and operational time periods, adjusting weir heights, invasive species control, selective clearing and/or limited seeding planting of vegetation and prescribed fire control options. The cost is estimated at \$6,188,000 currently.

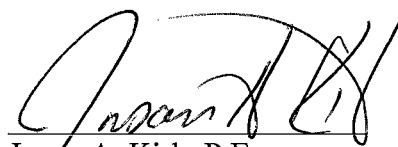
4.0 RECOMMENDATIONS

It is recommended that the total project cost for the Picayune Strand Restoration Project be authorized in order to complete project construction and achieve restoration benefits described in the 2004 Final Project Implementation Report and Environmental Impact Statement (PIR/EIS). The objectives of the project remain the same. A number of design updates have occurred during the detailed design phase that contributed to the increased project cost. A review of the prior plan formulation, evaluation, comparison and selection has been conducted and has demonstrated it is still sufficient. This Limited Reevaluation Report has captured all current and future design changes, as well as cost contingencies for any potential future unknowns to establish a new total project cost. Additionally, the authorized plan is currently under construction. Any reformulation would likely result in unnecessary increased project costs resulting from a re-verification of the current authorized project.

This report also reflects that the construction of the proposed manatee mitigation feature (which is required to comply with the Marine Mammal Protection Act and the Endangered Species Act) does not change the scope or purpose of the project as the component is being proposed to preserve the minimal environmental impacts originally envisioned by the 2004 PIR/EIS. It is therefore recommended that the manatee mitigation feature falls within the Chief of Engineer's discretionary authority for approval.

It is recommended that the Chief of Engineers approve the inclusion of the manatee mitigation feature into the Picayune Strand Restoration Project, and the project to be reauthorized and appropriated at a total project cost of \$617,946,700.

The non-federal Sponsor, the South Florida Water Management District, has reviewed the contents of this report and is in agreement with the recommendations contained herein.



Jason A. Kirk, P.E.
Colonel, U.S. Army
District Commander

5.0 LIST OF PREPARERS

The people who are responsible for contributing to this Limited Reevaluation Report for the PSRP are listed in the table below (Table 5-1). In addition to the individuals listed below, this LRR was reviewed by the supervisory chain of the Environmental Branch and Planning Division of the U.S. Army Corps of Engineers, Jacksonville District.

Table 5-1. Preparers

Name	Role in LRR	Email Address
Adam Borrelli	Cost Estimate	Adam.P.Borrelli@usace.army.mil
Grady Caulk	Archeologist	Grady.H.Caulk@usace.army.mil
George Chartouni	Cost Estimate	George.S.Chartouni@usace.army.mil
Barbara Cintron	Plan Formulation Review	Barbara.B.Cintron@usace.army.mil
Matt Donaldson	Office of Counsel	Matthew.B.Donaldson@usace.army.mil
Angela Dunn	Environmental Review	Angela.E.Dunn@usace.army.mil
Mike Holland	Economics Review	Michael.C.Holland@usace.army.mil
Tamela Kinsey	Environmental Engineer/Water Quality Certification	Tamela.J.Kinsey@usace.army.mil
Tracy Leaser	Cost Estimate Review	Tracy.T.Leaser@usace.army.mil
Eduardo Marin	Engineer/Construction	Eduardo.G.Marin@usace.army.mil
Donald Nelson	Office of Counsel	Donald.G.Nelson@usace.army.mil
Karl Nixon	Real Estate	Karl.J.Nixon@usace.army.mil
Susan Symanski	Office of Counsel Review	Susan.E.Symanski@usace.army.mil
Chris Ralph	Engineering Review	Christopher.D.Ralph@usace.army.mil
Gina Ralph	Environmental Review	Gina.P.Ralph@usace.army.mil
Colin Rawls	Economics	Colin.D.Rawls@usace.army.mil
David Robar	Engineering Review	David.J.Robar@usace.army.mil
Alex Saar	Cost Estimate	Alex.R.Saar@usace.army.mil
Lacy Shaw	Project Manager	Lacy.E.Shaw@usace.army.mil
Janet Starnes	Project Manager	JStarne@SFWMD.gov
Amy Thompson	Biologist	Amy.D.Thompson@usace.army.mil
Rob Tucker	Hydraulics and Hydrology	Robert.C.Tucker@usace.army.mil
Dave Weston	Hydraulics and Hydrology	David.M.Weston@usace.army.mil
Mark Wolff	Plan Formulation	Mark.E.Wolff@usace.army.mil
Mike Wolz	Engineering Review	Michael.W.Wolz@usace.army.mil
Autumn Ziegler	Engineer/Construction	Autumn.N.Ziegler@usace.army.mil

6.0 REFERENCES

- Stith, B., Slone, D., & Reid, J. (2006). *Review and Synthesis of Manatee Data in Everglades National Park*. Gainesville, Florida: USGS Florida Integrated Science Center.
- U.S. Army Corps of Engineers [CORPS]. (2004). *Final Project Implementation Report and Environmental Impact Statement for the Picayune Strand Restoration Project*. Jacksonville, Florida.