

Table of Contents

Chapter 1 Project Background and Purpose and Need	1-1
1.1 Background	1-1
1.1.1 Aggregate, Limestone, Crushed Stone, and FDOT Specifications	1-1
1.1.2 The Limestone Mining Process.....	1-3
1.1.3 The History of Mining in the Lake Belt	1-3
1.1.4 The Market Demand for Aggregate from the Lake Belt.....	1-4
1.2 Project History	1-6
1.3 Project Location.....	1-7
1.4 Project Purpose and Need	1-9
1.5 Agency Goal or Objective For This SEIS	1-10
1.6 Related Environmental Documents.....	1-10
1.7 Decisions to be Made.....	1-14
1.8 Public Involvement	1-14
1.8.1 Scoping and Issues.....	1-15
1.8.2 Public Comments on the <i>Draft Lake Belt SEIS</i>	1-16
1.8.3 Applicants' Proposed Seepage Mitigation Plan Received by the USACE.....	1-18
1.8.4 Public Comments on the Additional Mining Applications Received by the USACE	1-19
1.9 Changes from the <i>Draft Lake Belt seis</i>	1-20
1.9.1 Revised Statement of Overall Purpose and Need	1-20
1.9.2 Incorporation of Two New Alternatives	1-20
1.9.3 Incorporation of Agricultural Cover Type as a Wetland Cover Type	1-21
1.9.4 Expansion of Wood Stork Analysis	1-21
1.9.5 Incorporation of Updated Environmental Data and Other Information	1-21
1.9.6 Addition of Appendix G, "Comment/Response Document"	1-22
1.9.7 Addition of Appendix H, "Applicants' Seepage Mitigation Plan"	1-22
1.9.8 Addition of Appendix I, "Potential Wood Stork Impacts Related to Changes in Short-Hydroperiod Wetlands Within the Lake Belt"	1-22
1.9.9 Addition of Appendix J, "Relevant Sections of the Code of Miami-Dade County, Florida With Respect to Protection of the Northwest Wellfield".....	1-22
1.10 Permits, Licenses, and Entitlements	1-22
Chapter 2 Alternatives	2-1
2.1 Range of Alternatives	2-1
2.1.1 Offsite Alternatives.....	2-2
2.1.1.1 Utilizing Mines Outside of the Lake Belt.....	2-2
2.1.1.2 Development of Offsite Rock Mines to Replace the Lake Belt Mines	2-2
2.1.1.2.1 Using Other Material to Satisfy Construction Needs.....	2-2
2.1.2 Onsite Alternatives	2-2
2.1.2.1 Mining Without Additional Wetland Impacts	2-2
2.1.2.2 Lake Belt Mine Development.....	2-2
2.1.2.3 Mine Development Including Geographic Exclusion Zones	2-2
2.1.3 No Action Alternative.....	2-2
2.2 Alternatives Analysis	2-2
2.2.1 Offsite Alternatives Eliminated From Detailed Evaluation	2-3
2.2.1.1 Use of Mines from Other Regions	2-3
2.2.1.2 Development of New Offsite Rock Mines to Replace the Lake Belt Mines	2-15
2.2.1.3 Using Other Material to Satisfy Construction Needs	2-17
2.2.2 Onsite Alternatives Eliminated From Detailed Evaluation	2-18
2.2.2.1 Mining Without Additional Wetland Impacts Alternatives	2-18
2.2.2.2 60-Day Setback Area Alternatives.....	2-19

	2.2.2.3	Other Onsite Alternatives Eliminated from Detailed Evaluation	2-20
2.2.3		Alternatives to Be Assessed For Environmental Impacts	2-20
	2.2.3.1	Mine Development	2-22
	2.2.3.1.1	Alternative 1 – No Action	2-23
	2.2.3.1.2	Alternative 2 – 2002 USACE-Permitted Mining	2-24
	2.2.3.1.3	Alternative 3 – Applicants’ Preferred Alternative	2-26
	2.2.3.1.4	Alternative 4 – Full Mine-Out Under the Lake Belt Plan	2-28
	2.2.3.2	Mine Development Including Geographic Exclusion Zones Alternatives	2-31
	2.2.3.2.1	Alternative 5 – Exclusion of Mining or Related Activities in the Western Half of the Florida Power and Light Company Transmission Corridor	2-31
	2.2.3.2.2	Alternative 6 – Exclusion of Mining or Related Activities In An Area along the Eastern Border of Everglades National Park	2-34
	2.2.3.2.3	Alternative 7 – Exclusion of Mining or Related Activities Along the Eastern Border of Everglades National Park and in the Western Half of the Florida Power and Light Company Transmission Corridor	2-36
	2.2.3.2.4	Alternative 8 – Exclusion of Mining or Related Activities Along the Eastern Border of Everglades National Park and Along a 1,500-Foot-Wide Strip Along the Eastern Border of the Pennsuco Wetlands	2-38
	2.2.3.2.5	Alternative 9 – Exclusion of Mining or Related Activities Along the Eastern Border of Everglades National Park and Along a 1,000- to 1,500-Foot-Wide Strip Along the Eastern Border of the Pennsuco Wetlands	2-40
2.3		Summary of Potentially Significant Impacts	2-42
	2.3.1	Vegetation, Wetlands, and Habitat Units	2-42
	2.3.2	Wildlife	2-44
	2.3.3	Cultural Resources	2-46
	2.3.4	Geology, Hydrology and Water Quality	2-47
	2.3.5	Socioeconomics and Environmental Justice	2-50
	2.3.6	Remaining Environmental Analyses	2-52

Chapter 3 Affected Environment 3-1

3.1	Vegetation		3-1
	3.1.1	Vegetative Cover Types in the Lake Belt Region	3-3
	3.1.2	Projected Change in Cover Types over Time	3-12
	3.1.3	Comparison of Lake Belt Conditions to Adjacent Urban Areas	3-13
	3.1.4	Listed Plant Species	3-15
3.2		Wetlands	3-15
	3.2.1	Wetlands Delineation	3-16
	3.2.2	Wetlands Functional Assessment	3-17
	3.2.3	Functions and Values of Cover Types in the Lake Belt Region	3-20
3.3		Wildlife	3-22
	3.3.1	Wildlife	3-23
	3.3.2	Threatened and Endangered Species	3-25
	3.3.3	State Species of Special Concern	3-29
3.4		Cultural Resources	3-29
3.5		Topography, Geology, and Soils	3-32
	3.5.1	Topography	3-32
	3.5.2	South Florida Geology	3-33
	3.5.2.1	Lake Belt Area Geology	3-33
	3.5.3	Lake Belt Area Soils	3-37

Table of Contents

3.5.4 Seismicity 3-37

3.6 Hydrology 3-38

3.6.1 Surface Water 3-39

3.6.2 Groundwater Systems 3-41

3.6.2.1 Surficial Aquifer System and Biscayne Aquifer 3-42

3.6.3 Lake Belt Area Hydrology 3-47

3.6.3.1 Northwest Wellfield 3-47

3.6.4 Groundwater Flow Modeling 3-48

3.6.4.1 Application of the Lake Belt Groundwater Flow Model for this SEIS 3-48

3.6.4.2 Model Sections and Baseline Conditions Used in the SEIS Seepage Analysis 3-49

3.7 Water Quality 3-52

3.7.1 Groundwater Quality 3-52

3.7.1.1 Northwest Wellfield Protection Area 3-52

3.7.1.2 Northwest Wellfield Classification 3-58

3.7.1.3 Monitoring Program for the Northwest Wellfield 3-59

3.7.2 Surface-Water Quality 3-76

3.7.3 Additional County Monitoring 3-78

3.8 Meteorology and Air Quality 3-79

3.8.1 Meteorology 3-79

3.8.1.1 Meteorological Conditions 3-80

3.8.1.2 Evapotranspiration 3-82

3.8.2 Air Quality 3-83

3.9 Hazardous and Toxic Wastes 3-86

3.9.1 Hazardous Waste Permits 3-86

3.9.2 Storage Tanks 3-87

3.9.3 Explosives 3-88

3.9.4 Herbicide and Pesticide Use 3-89

3.10 Socioeconomics 3-90

3.10.1 Population 3-90

3.10.2 Economic Output 3-91

3.10.3 Employment and Income 3-92

3.10.4 Housing 3-94

3.10.5 Roads 3-97

3.10.6 Significance of Lake Belt Area Mining 3-97

3.10.6.1 Limestone Mining in the Lake Belt Area 3-97

3.10.6.2 Direct Employment and Earnings 3-101

3.10.6.3 Indirect Employment and Earnings 3-104

3.10.6.4 Total Economic Impact 3-105

3.10.6.5 Property Taxes 3-106

3.10.7 Alternative Sources of Limestone 3-107

3.10.7.1 Florida Ports Summary 3-110

3.11 Aesthetics 3-111

3.12 Noise 3-111

3.13 Recreation 3-114

3.14 Existing Land Use 3-114

3.15 Environmental Justice 3-116

3.15.1 Demographics 3-117

3.15.2 Poverty 3-119

Chapter 4 Environmental Impacts 4-1

4.1 Vegetation 4-1

4.1.1 Potential Vegetation Impacts Under Alternative 1 4-5

4.1.2 Potential Vegetation Impacts Under Alternative 2 4-6

4.1.3	Potential Vegetation Impacts Under Alternative 3	4-7
4.1.4	Potential Vegetation Impacts Under Alternative 4	4-8
4.1.5	Potential Vegetation Impacts Under Alternative 5	4-9
4.1.6	Potential Vegetation Impacts Under Alternative 6	4-11
4.1.7	Potential Vegetation Impacts Under Alternative 7	4-12
4.1.8	Potential Vegetation Impacts Under Alternative 8	4-13
4.1.9	Potential Vegetation Impacts Under Alternative 9	4-15
4.2	Wetlands	4-16
4.2.1	Potential Wetland Impacts Under Alternative 1	4-19
4.2.2	Potential Wetland Impacts Under Alternative 2	4-19
4.2.3	Potential Wetland Impacts Under Alternative 3	4-20
4.2.4	Potential Wetland Impacts Under Alternative 4	4-20
4.2.5	Potential Wetland Impacts Under Alternative 5	4-20
4.2.6	Potential Wetland Impacts Under Alternative 6	4-21
4.2.7	Potential Wetland Impacts Under Alternative 7	4-21
4.2.8	Potential Wetland Impacts Under Alternative 8	4-21
4.2.9	Potential Wetland Impacts Under Alternative 9	4-21
4.3	Wildlife	4-22
4.3.1	Potential Impacts on Wildlife	4-22
4.3.1.1	Threatened and Endangered Species	4-23
4.3.1.2	Species of Special Concern	4-24
4.3.1.3	Wading Birds	4-24
4.3.2	Potential Impacts on Wood Storks	4-28
4.3.3	Evaluation of Alternatives	4-32
4.3.3.1	Potential Impacts on Wood Storks Under Alternative 1	4-33
4.3.3.2	Potential Impacts on Wood Storks Under Alternative 2	4-34
4.3.3.3	Potential Impacts on Wood Storks Under Alternative 3	4-34
4.3.3.4	Potential Impacts on Wood Storks Under Alternative 4	4-35
4.3.3.5	Potential Impacts on Wood Storks Under Alternative 5	4-36
4.3.3.6	Potential Impacts on Wood Storks Under Alternative 6	4-37
4.3.3.7	Potential Impacts on Wood Storks Under Alternative 7	4-37
4.3.3.8	Potential Impacts on Wood Storks Under Alternative 8	4-38
4.3.3.9	Potential Impacts on Wood Storks Under Alternative 9	4-39
4.3.4	Conclusion—Potential Impacts on Wildlife	4-40
4.4	Cultural Resources	4-40
4.4.1	Potential Impacts on Cultural Resources Under Alternative 1	4-41
4.4.2	Potential Impacts on Cultural Resources Under Alternative 2	4-42
4.4.3	Potential Impacts on Cultural Resources Under Alternative 3	4-42
4.4.4	Potential Impacts on Cultural Resources Under Alternative 4	4-42
4.4.5	Potential Impacts on Cultural Resources Under Alternative 5	4-42
4.4.6	Potential Impacts on Cultural Resources Under Alternative 6	4-42
4.4.7	Potential Impacts on Cultural Resources Under Alternative 7	4-42
4.4.8	Potential Impacts on Cultural Resources Under Alternative 8	4-42
4.4.9	Potential Impacts on Cultural Resources Under Alternative 9	4-42
4.5	Topography, Geology, and Soils	4-42
4.5.1	Potential Impacts on Geology Under Alternatives 1 Through 9	4-43
4.5.2	Potential Impacts on Soil Under Alternatives 1 Through 9	4-45
4.5.3	Seismicity	4-45
4.6	Hydrology	4-45
4.6.1	Potential Seepage Impacts Under Alternative 1	4-47
4.6.2	Potential Seepage Impacts Under Alternative 2	4-48
4.6.3	Potential Seepage Impacts Under Alternative 3	4-54
4.6.4	Potential Seepage Impacts Under Alternative 4	4-54
4.6.5	Potential Seepage Impacts Under Alternative 5	4-55
4.6.6	Potential Seepage Impacts Under Alternative 6	4-55
4.6.7	Potential Seepage Impacts Under Alternative 7	4-56
4.6.8	Potential Seepage Impacts Under Alternative 8	4-57

Table of Contents

4.6.9	Potential Seepage Impacts Under Alternative 9	4-57
4.7	Water Quality.....	4-58
4.7.1	Potential Groundwater Quality Impacts Under Alternatives 1 Through 9.....	4-58
4.7.2	Potential Surface-Water-Quality Impacts Under Alternatives 1 Through 9	4-62
4.7.3	Public Safety—Waterborne Pathogens	4-63
4.7.3.1	Potential Increased Risk from the Flow of Pathogens as a Result of Increased Surface-Water Areas Under Alternatives 1 Through 9.....	4-63
4.7.3.2	Potential Increased Risk from the Flow of Pathogens in Groundwater Under Alternatives 1 Through 9.....	4-67
4.7.3.3	Conclusion	4-67
4.8	Air Quality.....	4-68
4.8.1	Potential Air Quality Impacts Under Alternative 1	4-69
4.8.1.1	Air Quality Impacts of Shipping from Sources of Aggregates Within the State of Florida	4-69
4.8.1.2	Air Quality Impacts of Shipping from Sources of Aggregates Outside the State of Florida	4-70
4.8.1.3	Air Quality Impacts of Shipping from Sources of Aggregates Outside the United States	4-71
4.8.2	Potential Air Quality Impacts Under Alternative 2.....	4-71
4.8.3	Potential Air Quality Impacts Under Alternatives 3 through 9.....	4-72
4.9	Hazardous materials and Toxic Waste	4-72
4.9.1	Potential Impacts on Hazardous Materials and Toxic Waste Under Alternative 1	4-73
4.9.2	Potential Impacts on Hazardous Materials and Toxic Waste Under Alternative 2	4-73
4.9.3	Potential Impacts on Hazardous Materials and Toxic Waste Under Alternatives 3 Through 9.....	4-74
4.10	Socioeconomics	4-74
4.10.1	Potential Socioeconomic Impacts Under Alternative 1	4-80
4.10.1.1	Alternative Sources of Aggregates within the State of Florida	4-80
4.10.1.2	Alternative Sources of Aggregates Outside the State of Florida....	4-89
4.10.1.3	Shipping Rock into Florida from Sources Outside the United States	4-92
4.10.1.4	Effect of a Sudden Shutdown of Lake Belt Mining on Florida Industry	4-98
4.10.2	Potential Socioeconomic Impacts Under Alternatives 2 Through 9.....	4-101
4.10.2.1	Potential Socioeconomic Impacts Under Alternative 2.....	4-102
4.10.2.2	Potential Socioeconomic Impacts Under Alternative 3.....	4-104
4.10.2.3	Potential Socioeconomic Impacts Under Alternative 4.....	4-106
4.10.2.4	Potential Socioeconomic Impacts Under Alternative 5.....	4-107
4.10.2.5	Potential Socioeconomic Impacts Under Alternative 6.....	4-109
4.10.2.6	Potential Socioeconomic Impacts Under Alternative 7.....	4-111
4.10.2.7	Potential Socioeconomic Impacts Under Alternative 8.....	4-112
4.10.2.8	Potential Socioeconomic Impacts Under Alternative 9.....	4-114
4.11	Aesthetics.....	4-116
4.11.1	Potential Aesthetic Impacts Under Alternative 1.....	4-116
4.11.2	Potential Aesthetic Impacts Under Alternative 2.....	4-116
4.11.3	Potential Aesthetic Impacts Under Alternative 3.....	4-116
4.11.4	Potential Aesthetic Impacts Under Alternative 4.....	4-117
4.11.5	Potential Aesthetic Impacts Under Alternative 5.....	4-117
4.11.6	Potential Aesthetic Impacts Under Alternative 6.....	4-117
4.11.7	Potential Aesthetic Impacts Under Alternatives 7 through 9	4-117
4.12	Noise	4-117
4.12.1	Potential Noise Impacts Under Alternative 1	4-117

4.12.2	Potential Noise Impacts Under Alternative 2	4-118
4.12.3	Potential Noise Impacts Under Alternatives 3 Through 9	4-118
4.13	Recreation	4-119
4.13.1	Potential Recreation Impacts Under Alternative 1	4-122
4.13.2	Potential Recreation Impacts Under Alternative 2	4-122
4.13.3	Potential Recreation Impacts Under Alternative 3	4-122
4.13.4	Potential Recreation Impacts Under Alternative 4	4-122
4.13.5	Potential Recreation Impacts Under Alternative 5	4-122
4.13.6	Potential Recreation Impacts Under Alternative 6	4-122
4.13.7	Potential Recreation Impacts Under Alternatives 7 through 9.....	4-123
4.14	Land Use	4-123
4.14.1	Potential Land Use Impacts Under Alternative 1	4-123
4.14.2	Potential Land Use Impacts Under Alternative 2	4-123
4.14.3	Potential Land Use Impacts Under Alternative 3	4-124
4.14.4	Potential Land Use Impacts Under Alternative 4	4-124
4.14.5	Potential Land Use Impacts Under Alternatives 5 Through 9.....	4-124
4.15	Environmental Justice	4-124
4.15.1	Potential Impacts on Environmental Justice Under Alternative 1	4-124
4.15.2	Potential Impacts on Environmental Justice Under Alternative 2	4-125
4.15.3	Potential Impacts on Environmental Justice Under Alternatives 3 Through 9.....	4-125
4.16	Cumulative Impacts.....	4-125
4.16.1	Impacts That Would Occur as a Result of the Proposed Actions.....	4-125
4.16.2	Impacts That Have Occurred as a Result of Past Actions.....	4-125
4.16.3	Potential Impacts of Reasonably Foreseeable Future Actions.....	4-125
4.17	Relationship Between Local Short-Term Uses of Man’s Environment and the Maintenance and Enhancement of the Long-Term Productivity.....	4-129
4.18	Irreversible and Irrecoverable Commitment of Resources.....	4-129

Chapter 5 Mitigation Plan..... 5-1

5.1	Current Wetlands Mitigation Activities.....	5-1
5.2	Wetlands-Related Mitigation Needed as a Result of Proposed Mining Activities in the Lake Belt Area	5-5
5.2.2	Mitigation Within the Lake Belt.....	5-6
5.2.2.1	Littoral Shelves	5-6
5.2.2.2	Pennsuco Wetlands Mitigation	5-12
5.2.2.3	Other Potential Mitigation Projects Within the Lake Belt	5-15
5.2.3	Non-Lake Belt Mitigation Projects.....	5-19
5.2.3.1	8.5 Square Mile Area	5-19
5.2.3.2	L-31N Transition Lands (Rocky Glades)	5-22
5.2.3.3	Southern Glades.....	5-23
5.2.3.4	Aerojet Complex	5-24
5.2.3.5	Old Fish Farm	5-25
5.2.4	Mitigation Within Everglades National Park.....	5-26
5.2.4.1	Everglades Mitigation Bank	5-29
5.2.4.2	Additional Projects	5-29
5.2.5	Independent SEIS Evaluation of MDLPA Mitigation Plan.....	5-30
5.2.5.1	Summary of Mitigation Credits.....	5-30
5.3	Mitigation of Seepage Impacts.....	5-31
5.3.1	Mitigation of Seepage Increase	5-31
5.3.2	Mitigation Action and CERP Objectives.....	5-34
5.3.3	Mining Industry’s Proposed Seepage Mitigation Plan	5-34
5.3.3.1	Independent Evaluation of the Mining Industry’s Proposed Seepage Mitigation Plan.....	5-38
5.3.4	Mitigation of Potential Flow of Pathogens in Groundwater.....	5-44
5.3.5	Mitigating Actions for Alternatives 1 Through 9	5-49

5.4	Mitigation of Endangered Species Impacts.....	5-50
5.4.1	Impacts of Mitigation on Wildlife	5-50
5.4.2	Impacts of Mitigation on Wood Storks	5-50
5.4.2.1	Potential Impacts on Wood Storks of Alternative 1 with Mitigation	5-51
5.4.2.2	Potential Impacts on Wood Storks of Alternative 2 with Mitigation	5-51
5.4.2.3	Potential Impacts on Wood Storks of Alternative 3 with Mitigation	5-52
5.4.2.4	Potential Impacts on Wood Storks of Alternative 4 with Mitigation	5-53
5.4.2.5	Potential Impacts on Wood Storks of Alternative 5 with Mitigation	5-54
5.4.2.6	Potential Impacts on Wood Storks of Alternative 6 with Mitigation	5-55
5.4.2.7	Potential Impacts on Wood Storks of Alternative 7 with Mitigation	5-56
5.4.2.8	Potential Impacts on Wood Storks of Alternative 8 with Mitigation	5-57
5.4.2.9	Potential Impacts on Wood Storks of Alternative 9 with Mitigation	5-62
5.4.2.10	Cumulative Mitigation Impacts on the Wood Stork.....	5-62
5.5	Mitigation Plan Funding and Projected Expenditures	5-66
5.6	Potential Permit Requirements.....	5-68
5.6.1	Previous Permit Conditions.....	5-69
5.6.2	New Permit Conditions	5-69
 Chapter 6 Compliance with Environmental Requirements.....		 6-1
6.1	National Environmental Policy Act of 1969	6-1
6.2	Endangered Species Act of 1973.....	6-1
6.3	National Historic Preservation Act of 1966.....	6-2
6.4	Clean Water Act of 1972	6-2
6.5	Clean Air Act of 1972	6-3
6.6	Coastal Zone Management Act of 1972.....	6-3
6.7	Farmland Protection Policy Act of 1981	6-3
6.8	Native American Graves Protection and Repatriation Act of 1990	6-4
6.9	Solid Waste Disposal Act of 1965	6-4
6.10	Executive Order 11988, <i>Floodplain Management</i>	6-4
6.11	Executive Order 11990, <i>Protection of Wetlands</i>	6-4
6.12	Executive Order 12898, <i>Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations</i>	6-5
6.13	Executive Order 13112, <i>Invasive Species</i>	6-5
6.14	Acts and Executive Orders that are not Applicable to this <i>Lake Belt SEIS</i>	6-5
 Chapter 7 Public Involvement Program.....		 7-1
 Chapter 8 References		 8-1
 Chapter 9 List of Preparers.....		 9-1
 Chapter 10 Distribution List.....		 10-1
 Chapter 11 Glossary		 11-1
 Chapter 12 Index		 12-1

List of Figures

Figure 1–1.	Florida Department of Transportation Districts.....	1–5
Figure 1–2.	Lake Belt Area Location	1–7
Figure 1–3.	Lake Belt Outline	1–8
Figure 2–1.	Resource Areas with Significant Limestone Deposits.....	2–4
Figure 2–2.	Revised Lake Belt Boundary	2–22
Figure 2–3.	Alternative 2 Proposed Mining Plan	2–26
Figure 2–4.	Alternative 3 Proposed Mining Plan	2–27
Figure 2–5.	Alternative 4 Proposed Mining Plan	2–29
Figure 2–6.	Alternative 5 Proposed Mining Plan	2–33
Figure 2–7.	Alternative 6 Proposed Mining Plan	2–35
Figure 2–8.	Alternative 7 Proposed Mining Plan	2–37
Figure 2–9.	Alternative 8 Proposed Mining Plan	2–39
Figure 2–10.	Alternative 9 Proposed Mining Plan	2–41
Figure 3–1.	<i>Final Lakebelt PEIS</i> Cover-Type Map for the Lake Belt Area	3–5
Figure 3–2.	Sites Visited in the Lake Belt Area Field Verification Effort.....	3–8
Figure 3–3.	Comparison of Impacts in the Lake Belt Area to an Equivalent Adjacent Area	3–14
Figure 3–4.	Wood Stork Rookeries and Core Foraging Areas (Action Areas).....	3–26
Figure 3–5.	Subsurface Geologic and Hydrogeologic Units in the Lake Belt Area	3–34
Figure 3–6.	Three-Dimensional Conceptual Hydrogeologic Model of the Biscayne Aquifer Lake Belt Study Area.....	3–36
Figure 3–7.	Water Control Structures In and Around the Lake Belt Region.....	3–38
Figure 3–8.	Average Regional Water-Level Data as Measured During May (1990–1999).....	3–40
Figure 3–9.	Transects for Seepage Analysis.....	3–50
Figure 3–10.	<i>Lake Belt SEIS</i> Estimated Travel Time Areas.....	3–57
Figure 3–11.	Northwest Wellfield Monitoring Program	3–60
Figure 3–12.	Benzene Concentrations for Production Wells 1 and 2.....	3–70
Figure 3–13.	Monitoring Well Locations	3–72
Figure 3–14.	Rainfall Gauges Near the Lake Belt Area	3–81
Figure 3–15.	Annual Population Growth Rates of Miami-Dade County, the State of Florida, and the United States	3–91
Figure 3–16.	Unemployment Rates for Miami-Dade County, the State of Florida, and the United States.....	3–93
Figure 3–17.	Monthly Unemployment Rates for Miami-Dade County, the State of Florida, and the United States	3–94
Figure 3–18.	Annual Percentage Increase in the Number of Housing Units in Miami-Dade County and Florida.....	3–95
Figure 3–19.	Approved Housing Permits in Miami-Dade County (January 2006 – December 2008).....	3–96
Figure 3–20.	Approved Housing Permits in Florida (January 2006 – December 2008).....	3–96
Figure 3–21.	Lake Belt and Florida Limestone Production, 2001–2007	3–98
Figure 3–22.	Use of Lake Belt Area Limestone, 2001–2007.....	3–99
Figure 3–23.	Lake Belt Area Rock Used for Concrete Aggregate, 2001–2007.....	3–100
Figure 3–24.	Florida Department of Transportation Districts.....	3–101
Figure 3–25.	Lake Belt Area Cement Output, 2001–2007	3–102
Figure 3–26.	Rock Output from the Lake Belt Area Compared with Florida, Georgia, and Alabama.....	3–107
Figure 3–27.	Lake Belt Area Recreational Opportunities	3–115
Figure 3–28.	Miami-Dade County Demographic Profile	3–118
Figure 3–29.	Broward County Demographic Profile	3–118
Figure 3–30.	Areas Within 5 Miles of the Lake Belt Region with Higher Minority Populations than the County Averages	3–120
Figure 3–31.	Percentage of the Population Living Below the Poverty Level.....	3–121

Figure 3–32.	Areas Within 5 Miles of the Lake Belt Region with Higher Percentages of the Population Living Below the Poverty Level Than the County Averages	3–122
Figure 4–1.	Conceptual Lake Configuration Used for Rock Removal Volume Estimates.....	4–44
Figure 4–2.	Water Level Contours in Model Layer 4 Under Alternative 2 During Dry Season	4–49
Figure 4–3.	Water Level Contours in Model Layer 4 Under Alternative 2 During Wet Season.....	4–50
Figure 4–4.	Flow Velocity in Model Layer 4 Under Alternative 2 During Dry Season	4–51
Figure 4–5.	Flow Velocity in Model Layer 4 Under Alternative 2 During Wet Season	4–52
Figure 4–6.	Head Versus Time Under Alternative 2.....	4–53
Figure 4–7.	Northwest Wellfield Monitoring Program Sites	4–60
Figure 4–8.	<i>Lake Belt SEIS</i> Estimated Travel Time Areas Versus Miami-Dade County’s 60-Day Setback Area	4–66
Figure 4–9.	Florida Population Projection Through 2050	4–75
Figure 4–10.	Miami-Dade County Population Projection Through 2050	4–76
Figure 4–11.	Florida Housing Unit Projection Through 2050	4–77
Figure 4–12.	Miami-Dade County Housing Unit Projection Through 2050	4–78
Figure 4–13.	Projected Real Economic Output of Florida (2007 dollars)	4–79
Figure 4–14.	Resource Areas with Significant Limestone Deposits	4–81
Figure 4–15.	Florida Rail System.....	4–84
Figure 4–16.	Florida Port System	4–92
Figure 4–17.	Proposed Greenway Corridors	4–121
Figure 4–18.	Comprehensive Everglades Restoration Plan Components Map	4–127
Figure 5–1.	Littoral Shelves in the Lake Belt Area	5–10
Figure 5–2.	Melaleuca in the Pennsuco Wetlands	5–13
Figure 5–3.	Treated Wetlands in the Pennsuco Wetlands	5–14
Figure 5–4.	Potential Mitigation Areas in the Lake Belt.....	5–16
Figure 5–5.	Alternative 8 – Additional Exclusion Area Being Considered South of the Miami Canal.....	5–18
Figure 5–6.	Potential Mitigation Sites Outside the Lake Belt Area.....	5–20
Figure 5–7.	8.5 Square Mile Area.....	5–21
Figure 5–8.	Project Boundary for 8.5-Square-Mile-Area (Phase I) Fill Removal Project	5–22
Figure 5–9.	Treatment Locations for Dense and Scattered Exotic Species and Locations of Areas Requiring Scraping	5–23
Figure 5–10.	Southern Glades.....	5–24
Figure 5–11.	The Aerojet Complex.....	5–25
Figure 5–12.	Old Fish Farm	5–26
Figure 5–13.	East Everglades Acquisition Lands	5–27
Figure 5–14.	Pine Island.....	5–28
Figure 5–15.	Old Tamiami Trail Removal West of the L-67 Canal Extension	5–29
Figure 5–16.	Mitigation Plan 1 – Construction of a Proposed Barrier Wall Along the L-30 Canal and the Northwest Wellfield Recharge Canal.....	5–35
Figure 5–17.	Mitigation Plan 2 – Proposed Pumping from a Quarry Lake to the L-30 Canal	5–36
Figure 5–18.	Mitigation Plan 3 – Proposed Dade-Broward Levee Recharge Canal	5–37
Figure 5–19.	Effect of Proposed Pumping from a Quarry Lake to the Dade-Broward Levee Recharge Canal.....	5–44
Figure 5–20.	Fee-Simple Transfers and Conservation Easements near the Northwest Wellfield	5–47
Figure 5–21.	Proposed Surface-Water Monitoring Locations.....	5–74
Figure 5–22.	Location of Proposed Groundwater Monitoring Wells	5–75
Figure 7–1.	Letter of Invitation to Scoping Meeting	7–3
Figure 7–2.	Announcement of <i>Draft Supplemental Environmental Impact Statement on Rock Mining in the Lake Belt Region of Miami-Dade County, Florida</i> Availability	7–4
Figure 7–3.	Public Meeting Announcement.....	7–6
Figure 7–4.	Announcement of Final Supplemental Environmental Impact Statement on Rock Mining in the Lake Belt Region of Miami-Dade County, Florida Availability	7–7

List of Tables

Table 1–1.	Lake Belt Aggregate Products Certified by the Florida Department of Transportation	1–4
Table 1–2.	Limestone Sold from the Lake Belt, 2000–2008	1–5
Table 1–3.	Permits Issued for Limestone Mining in the Lake Belt Area	1–23
Table 2–1.	Products of Star Pit Mine (Bergeron Sand Rock and Aggregate)	2–5
Table 2–2.	Products of Palm Beach Aggregates Mine	2–6
Table 2–3.	Products of Vulcan Materials Fort Pierce Mine	2–6
Table 2–4.	Products of Card Sound Mine	2–6
Table 2–5.	Products of Martin Marietta Material’s Cabbage Grove Mine	2–8
Table 2–6.	Products of ER Jahna Industries’ Cabbage Grove Mines	2–9
Table 2–7.	Products of A Mining Group’s Cabbage Grove Mines	2–9
Table 2–8.	Products of Southern Sand and Stone Mine	2–11
Table 2–9.	Products of CEMEX Alico Mine	2–11
Table 2–10.	Products of Vulcan Materials Corps/Florida Rock Alico Mine	2–12
Table 2–11.	Products of Youngquist Brothers Rock Mine	2–12
Table 2–12.	Products of Preferred Rocks of Corkscrew Mine	2–13
Table 2–13.	Products of CEMEX Brooksville Mine	2–13
Table 2–14.	Products of Vulcan Materials Corps/Florida Rock Brooksville Mine	2–14
Table 2–15.	Changes in Cover Types from April 2002 ROD to <i>Lake Belt SEIS</i> Baseline	2–23
Table 2–16.	Changes in Cover Types Under Alternative 1	2–24
Table 2–17.	Changes in Cover Types Under Alternative 2	2–25
Table 2–18.	Changes in Cover Types Under Alternative 3	2–28
Table 2–19.	Changes in Cover Types Under Alternative 4	2–30
Table 2–20.	Changes in Cover Types Under Alternative 5	2–32
Table 2–21.	Changes in Cover Types Under Alternative 6	2–34
Table 2–22.	Changes in Cover Types Under Alternative 7	2–36
Table 2–23.	Changes in Cover Types Under Alternative 8	2–38
Table 2–24.	Changes in Cover Types Under Alternative 9	2–40
Table 2–25.	Loss of Natural Cover Types and Wetlands Due to Proposed Mining	2–42
Table 2–26.	Loss of Habitat Units by Alternative	2–43
Table 2–27.	Proposed Mitigation Activities and Potential Habitat Units	2–44
Table 2–28.	Potential Impacts on Wood Storks	2–45
Table 2–29.	Potential Impacts on Cultural Resources Sites Within the Lake Belt Area	2–46
Table 2–30.	Volume of Rock Removed by Alternative	2–47
Table 2–31.	Predicted 7-Year Average Seepage Rates by Alternative Without Mitigation	2–48
Table 2–32.	Predicted Seepage Rates with the Proposed Dade-Broward Levee Recharge Canal	2–49
Table 2–33.	Potential Impacts on Hydroperiods Within the Lake Belt Area Without Mitigation	2–49
Table 2–34.	Projected Aggregate Output of the Lake Belt Area by Alternative	2–51
Table 3–1.	The Natural and Man-Altered Cover Types Used to Characterize the Lake Belt Area in this <i>Lake Belt SEIS</i>	3–4
Table 3–2.	Comparison of the <i>Final Lakebelt PEIS</i> , ROD, and this <i>Lake Belt SEIS</i> Natural and Man-Altered Cover-Type Acreages and Percentages of Lake Belt Area Covered	3–7
Table 3–3.	Summary of Results of 2006–2007 Lake Belt Area Cover Type Field Verification Effort	3–10
Table 3–4.	Comparison of Lake Belt Area and Urban Development Land Cover Percentages	3–13
Table 3–5.	Comparison of Functional Scores for Lake Belt Region Cover Types Derived Using Different Methods	3–18
Table 3–6.	Comparison of Functional Scores and Habitat Units for Lake Belt Area Cover Types as Presented in the <i>Final Lakebelt PEIS</i> and the April 2002 ROD	3–19
Table 3–7.	2006 Lake Belt Area Cover Types	3–23
Table 3–8.	Species Observed in the Lake Belt Area	3–24

Table 3–9.	Nesting History of Active Wood Stork Colonies in the Action Area (number of active nesting pairs)	3–27
Table 3–10.	Suitability Factors for Wood Stork Habitat Within the Lake Belt Area.....	3–27
Table 3–11.	Suitable Wood Stork Foraging Habitat Within the Lake Belt Area	3–28
Table 3–12.	Wood Stork Foraging Areas Intersecting the Lake Belt Area.....	3–28
Table 3–13.	Recorded Archeological Sites Within the Lake Belt Region.....	3–31
Table 3–14.	Literature-Derived Values of Hydraulic Conductivity for Biscayne Aquifer.....	3–46
Table 3–15.	Model-Predicted Seepage Rates from Different Sections Along and Within the Lake Belt	3–51
Table 3–16.	Summary of Groundwater Flow Tests in Vicinity of Northwest Wellfield.....	3–53
Table 3–17.	EPA LT-2 Requirements for <i>Cryptosporidium</i> Treatment for Schedule 1 Facilities Providing Filtration	3–59
Table 3–18.	Summary of Groundwater-Quality Parameters for Monitoring Wells	3–61
Table 3–19.	Summary of Surface-Water-Quality Parameters for Lakes.....	3–62
Table 3–20.	Summary of Surface-Water-Quality Parameters for Canals and Standing Water	3–63
Table 3–21.	Lake Belt Area Microscopic Particulate Analysis Summary August 2002–August 2008.....	3–65
Table 3–22.	Well Construction Summary	3–71
Table 3–23.	Summary of Benzene Detections from January 2005 to October 2008.....	3–73
Table 3–24.	Benzene Concentrations in Production Well 1 and Monitoring Well NW-109.....	3–73
Table 3–25.	Summary of County Monitoring Data for Which Results Exceeded the Range of Detections Reported from the Monitoring Data	3–79
Table 3–26.	Rainfall Totals for Measuring Stations Nearest the Lake Belt Area	3–82
Table 3–27.	Ambient Air Quality Standards	3–84
Table 3–28.	Allowable Emissions from Existing Lake Belt Area Cement Plants	3–84
Table 3–29.	Emissions from Ongoing Hauling Operations and Quarry Activities	3–85
Table 3–30.	Facilities in the Lake Belt Area Registered to Generate Hazardous Waste.....	3–86
Table 3–31.	Hazardous Material Volumes in Aboveground Storage Tanks in the Lake Belt Area....	3–87
Table 3–32.	Solid and Liquid Wastes Generated in the Lake Belt Area	3–88
Table 3–33.	Explosives Ingredients.....	3–89
Table 3–34.	Populations of Miami-Dade County and Florida.....	3–90
Table 3–35.	Florida Gross Domestic Product Compared with the United States	3–91
Table 3–36.	Civilian Labor Force and Employment in Miami-Dade County and Florida	3–92
Table 3–37.	Miami-Dade County and Florida Housing Units, 1970–2005	3–95
Table 3–38.	Retail, Industrial, and Office Space	3–97
Table 3–39.	Distribution of Lake Belt Limestone	3–98
Table 3–40.	Lake Belt Area Mining Operations Employment.....	3–102
Table 3–41.	Wages/Salaries and Benefits of Employees Associated with Lake Belt Area Mining Operations	3–103
Table 3–42.	Employment in Cement Plant Operations Associated with Lake Belt Area Mining.....	3–103
Table 3–43.	Wages/Salaries and Benefits of Cement Plant Workers Associated with Lake Belt Area Mining.....	3–103
Table 3–44.	Total Direct Employment Associated with Lake Belt Area Mining.....	3–104
Table 3–45.	Multiplier Effect of Lake Belt Area Mining.....	3–105
Table 3–46.	Estimated Wages/Salaries and Benefits Associated with Lake Belt Area Mining.....	3–106
Table 3–47.	Number of Construction Workers in Potentially Affected Areas of Florida.....	3–106
Table 3–48.	Payment of Real Property Taxes.....	3–107
Table 3–49.	Output and Cost per Ton Within the United States	3–109
Table 3–50.	Output and Cost per Ton for Foreign Suppliers	3–109
Table 3–51.	Rock Imported into Florida by Port from 2005–2007.....	3–110
Table 3–52.	Existing Quarries and Nearby Vibration and Noise-Sensitive Receptors.....	3–112
Table 3–53.	Miami-Dade and Broward County Demographic Profiles as of July 2005	3–117

Table 4-1.	Acres for Each Cover Type in the Total Lake Belt Area for <i>Lake Belt SEIS</i> Baseline Conditions and for Each Alternative Evaluated	4-2
Table 4-2.	Acres for Each Cover Type in the Mining Area of the Lake Belt by Alternative	4-3
Table 4-3.	Summary of Mined Acres, Loss of Habitat Units, and Percentage of Mining Area to Consist of Man-Altered and Lake Cover Types Under Alternatives 1-9, with Comparisons to <i>Lake Belt SEIS</i> Baseline Conditions and Adjacent Urban Lands	4-4
Table 4-4.	Alternative 1 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-6
Table 4-5.	Alternative 2 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-7
Table 4-6.	Alternative 3 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-8
Table 4-7.	Alternative 4 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-9
Table 4-8.	Alternative 5 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-10
Table 4-9.	Alternative 6 Cover-Type Estimates Compared with <i>Lake Belt SEIS</i> Baseline	4-11
Table 4-10.	Alternative 7 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-13
Table 4-11.	Alternative 8 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-14
Table 4-12.	Alternative 9 Cover-Type Estimates Compared with the <i>Lake Belt SEIS</i> Baseline	4-15
Table 4-13.	Comparison of Wetland Impacts Under <i>Lake Belt SEIS</i> Alternatives	4-17
Table 4-14.	Habitat Units by Cover Type Within the Non-Pennsuco Lake Belt Area for the <i>Lake Belt SEIS</i> Baseline Conditions and for Each of the Alternatives Evaluated.....	4-18
Table 4-15.	Comparison of Habitat Unit Impacts Under <i>Lake Belt SEIS</i> Alternatives.....	4-19
Table 4-16.	Impact of Alternatives on Suitable Foraging Habitat for Wading Birds, Without Mitigation	4-25
Table 4-17.	Suitable Wood Stork Foraging Areas Involving the Lake Belt.....	4-26
Table 4-18.	Hydroperiod Allocations for Wetlands Within the Lake Belt Area Under Average Hydrologic Conditions Without Mitigation	4-27
Table 4-19.	Wood Stork Foraging Suitability Weighting Factor for Lake Belt Area Cover Types	4-30
Table 4-20.	Fish Productivity for South Florida Wetland Hydroperiod Classes.....	4-30
Table 4-21.	Fish Biomass Changes by Alternative.....	4-31
Table 4-22.	Wood Stork Suitable Habitat Included in the Lake Belt Groundwater Flow Model by Alternative	4-33
Table 4-23.	Summary of Wood Stork Impacts Under Alternative 1.....	4-33
Table 4-24.	Summary of Wood Stork Impacts Under Alternative 2.....	4-34
Table 4-25.	Summary of Wood Stork Impacts Under Alternative 3.....	4-35
Table 4-26.	Summary of Wood Stork Impacts Under Alternative 4.....	4-36
Table 4-27.	Summary of Wood Stork Impacts Under Alternative 5.....	4-36
Table 4-28.	Summary of Wood Stork Impacts Under Alternative 6.....	4-37
Table 4-29.	Summary of Wood Stork Impacts Under Alternative 7.....	4-38
Table 4-30.	Summary of Wood Stork Impacts Under Alternative 8.....	4-39
Table 4-31.	Summary of Wood Stork Impacts Under Alternative 9.....	4-39
Table 4-32.	Recorded Archeological Sites Potentially Impacted by Mining	4-41
Table 4-33.	Lake Acreage at the End of Each Alternative.....	4-43
Table 4-34.	Volume of Rock Removed Per Alternative	4-45
Table 4-35.	Predicted 7-Year Average Seepage Rates from Different Sections for Multiple Scenarios.....	4-46
Table 4-36.	Predicted Dry Period Average Seepage Rates from Different Sections for Multiple Scenarios.....	4-47
Table 4-37.	Predicted Wet Period Average Seepage Rates from Different Sections for Multiple Scenarios.....	4-47
Table 4-38.	Total Lake Acreage for Alternatives	4-59
Table 4-39.	Comparison of Lake Surface Area Change per Alternative	4-64
Table 4-40.	Estimated Annual Emissions of Hauling by Rail from Locations Within the State of Florida.....	4-70
Table 4-41.	Estimated Annual Emissions of Hauling by Rail from Locations Outside the State of Florida.....	4-70
Table 4-42.	Estimated Annual Emissions of Hauling by Ship from Locations Outside the United States.....	4-71

Table 4-43.	Range of Estimated Annual Emissions from Quarry Operations in the Lake Belt Under Alternative 2.....	4-72
Table 4-44.	Annual Generation Rate of Solid and Liquid Wastes Under Alternative 2	4-74
Table 4-45.	Average Distance Rock Would Need to be Shipped By Rail from Sources Within Florida.....	4-88
Table 4-46.	Transportation Costs Associated with Supplying Peninsular Florida with Rock	4-88
Table 4-47.	Estimated Number of Railcars Needed to Ship Rock from Sources Within Florida.....	4-89
Table 4-48.	Potential Cost of Increasing Rail Infrastructure to Ship Rock from Sources Within Florida.....	4-89
Table 4-49.	Average Distance Rock Would Need to be Shipped by Rail Under the No Action Alternative (Total Shutdown of Mining Activities in the Lake Belt)	4-90
Table 4-50.	Potential Cost of Transporting Rock into Florida from Out of State in 2008	4-90
Table 4-51.	Estimated Number of Railcars Needed to Ship Rock into Florida from Out of State....	4-91
Table 4-52.	Potential Cost of Increasing Rail Infrastructure to Ship Rock into Florida from Out of State	4-91
Table 4-53.	Current and Projected Capacity of Florida Ports.....	4-94
Table 4-54.	Estimated Number of Bulk Cargo Ships Needed to Ship Rock into Florida from Foreign Producers	4-97
Table 4-55.	Potential Cost of Increasing Rail Infrastructure Related to Waterborne Shipment of Rock.....	4-98
Table 4-56.	Potential Job Loss in the Construction Industry Resulting from a Sudden End to Lake Belt Mining	4-99
Table 4-57.	Annual Lost Earnings and Economic Output from a Decrease in Construction.....	4-99
Table 4-58.	Total Economic Impacts Throughout an 8-Year Recovery Period	4-100
Table 4-59.	Projected Mining Output in the Lake Belt Under Alternative 2	4-102
Table 4-60.	Projected Employment in Miami-Dade County Under Alternative 2	4-103
Table 4-61.	Alternative 2 – Projected Direct Economic Output Over the Life of the Alternative	4-103
Table 4-62.	Development of Lake Belt–Specific Economic Output Multiplier	4-103
Table 4-63.	Projected Total Economic Output Under Alternative 2.....	4-104
Table 4-64.	Projected Mining Output in the Lake Belt Area Under Alternative 3	4-104
Table 4-65.	Projected Employment in Miami-Dade County Under Alternative 3	4-105
Table 4-66.	Alternative 3 – Projected Direct Economic Output Over the Life of the Alternative	4-105
Table 4-67.	Projected Total Economic Output Under Alternative 3	4-105
Table 4-68.	Projected Mining Output in the Lake Belt Area Under Alternative 4	4-106
Table 4-69.	Projected Employment in Miami-Dade County Under Alternative 4.....	4-106
Table 4-70.	Alternative 4 – Projected Direct Economic Output Over the Life of the Alternative	4-107
Table 4-71.	Projected Total Economic Output Under Alternative 4.....	4-107
Table 4-72.	Projected Mining Output in the Lake Belt Area Under Alternative 5	4-108
Table 4-73.	Projected Employment in Miami-Dade County Under Alternative 5.....	4-108
Table 4-74.	Alternative 5 – Projected Direct Economic Output Over the Life of the Alternative	4-108
Table 4-75.	Projected Total Economic Output Under Alternative 5.....	4-109
Table 4-76.	Projected Mining Output in the Lake Belt Area Under Alternative 6	4-109
Table 4-77.	Projected Employment in Miami-Dade County Under Alternative 6.....	4-110
Table 4-78.	Alternative 6 – Projected Direct Economic Output Over the Life of the Alternative	4-110
Table 4-79.	Projected Total Economic Output Under Alternative 6.....	4-110
Table 4-80.	Projected Mining Output in the Lake Belt Area Under Alternative 7	4-111
Table 4-81.	Projected Employment in Miami-Dade County Under Alternative 7.....	4-111
Table 4-82.	Alternative 7 – Projected Direct Economic Output Over the Life of the Alternative	4-112
Table 4-83.	Projected Total Economic Output Under Alternative 7.....	4-112
Table 4-84.	Projected Mining Output in the Lake Belt Area Under Alternative 8	4-113
Table 4-85.	Projected Employment in Miami-Dade County Under Alternative 8.....	4-113
Table 4-86.	Alternative 8 – Projected Direct Economic Output Over the Life of the Alternative	4-113
Table 4-87.	Projected Total Economic Output Under Alternative 8	4-114
Table 4-88.	Projected Mining Output in the Lake Belt Area Under Alternative 9	4-114
Table 4-89.	Projected Employment in Miami-Dade County Under Alternative 9.....	4-115
Table 4-90.	Alternative 9 – Projected Direct Economic Output Over the Life of the Alternative	4-115

Table 4–91.	Projected Total Economic Output Under Alternative 9.....	4–115
Table 4–92.	Nearest Vibration and Noise-Sensitive Receptors by Alternative	4–119
Table 4–93.	Predicted 7-Year Average Seepage Rates from Different Sections with the Addition of Proposed Lakes Outside the Lake Belt.....	4–129
Table 5–1.	Lake Belt Mitigation Fee Payments, 2000–2008.....	5–1
Table 5–2.	Mitigation Activities Funded in the Pennsuco Wetlands by the Lake Belt Mitigation Trust Fund	5–3
Table 5–3.	Mitigation Fund Collections and Expenditures, 2000–2008	5–3
Table 5–4.	Wetland Cover Types Converted by Mining Since 2002 as of the 2008 Annual Report.....	5–4
Table 5–5.	Habitat Units Associated with Pennsuco Wetlands Mitigation Activities.....	5–4
Table 5–6.	Summary of Wetland Acreage Impacts and Habitat Unit Loss by Alternative	5–5
Table 5–7.	Mitigation Credits Associated with Activities Proposed to be Taken in the Pennsuco Wetlands.....	5–14
Table 5–8.	Potential Cover-Type Changes Associated with Mitigation In the Area Surrounding the Northwest Wellfield.....	5–15
Table 5–9.	Potential Cover-Type Changes Associated with Mitigation Along Krome Avenue North of the Pennsuco Wetlands.....	5–17
Table 5–10.	Alternative 8 – Potential Cover-Type Changes Associated with Mitigation Along the 1,500-Foot-Wide Exclusion Area East of the Pennsuco Wetlands	5–17
Table 5–11.	Alternative 8 – Potential Cover-Type Changes Associated with Mitigation in an Exclusion Area South of the Miami Canal	5–18
Table 5–12.	Alternative 9 – Potential Cover-Type Changes Associated with Mitigation Along the 1,000- to 1,500-Foot-Wide Exclusion Area East of the Pennsuco Wetlands.....	5–19
Table 5–13.	Mitigation Credits Potentially Available Within the Lake Belt	5–31
Table 5–14.	Estimated Mitigation Credits Outside the Lake Belt after Evaluation of the MDLPA Mitigation Plan	5–32
Table 5–15.	Potential Mitigating Actions to Offset Groundwater Seepage	5–33
Table 5–16.	Predicted 7-Year Average Seepage Rates from Different Sections for Multiple Scenarios.....	5–38
Table 5–17.	Hydroperiod Allocations for Wetlands Within the Lake Belt Area Under Average Hydrologic Conditions with the Proposed Dade-Broward Levee Recharge Canal	5–40
Table 5–18.	Predicted Seepage Rates Into the Miami Canal with the Proposed Dade-Broward Levee Recharge Canal.....	5–41
Table 5–19.	Predicted Seepage Rates Under Different Mitigation Scenarios	5–42
Table 5–20.	Predicted Seepage Rates From the Lake Belt Snapper Creek Extension Canal into the Lake Belt with the Proposed Dade-Broward Levee Recharge Canal	5–43
Table 5–21.	Predicted Seepage to the East Through the Saltwater Intrusion Line Across the Lake Belt Area	5–43
Table 5–22.	Northwest Wellfield Pathogen Mitigation Actions	5–46
Table 5–23.	Summary of Wood Stork Impacts Under Alternative 1 with Mitigation.....	5–51
Table 5–24.	Summary of Wood Stork Impacts Under Alternative 2 with Mitigation.....	5–52
Table 5–25.	Summary of Wood Stork Impacts Under Alternative 3 with Mitigation.....	5–53
Table 5–26.	Summary of Wood Stork Impacts Under Alternative 4 with Mitigation.....	5–54
Table 5–27.	Summary of Wood Stork Impacts Under Alternative 5 with Mitigation.....	5–55
Table 5–28.	Summary of Wood Stork Impacts Under Alternative 6 with Mitigation.....	5–56
Table 5–29.	Summary of Wood Stork Impacts Under Alternative 7 with Mitigation.....	5–57
Table 5–30.	Summary of Wood Stork Impacts Under Alternative 8 with Mitigation – Dade-Broward Levee Recharge Canal with Water Pumped from a Quarry Lake North of the Northwest Wellfield Recharge Canal.....	5–58
Table 5–31.	Summary of Wood Stork Impacts Under Alternative 8 with Mitigation – Dade-Broward Levee Recharge Canal with Water Pumped from a Quarry Lake South of the Northwest Wellfield Recharge Canal.....	5–59
Table 5–32.	Summary of Wood Stork Impacts Under Alternative 8 with Mitigation –Additional Mining Excluded North of the Northwest Wellfield Recharge Canal	5–60

Table of Contents

Table 5-33.	Summary of Wood Stork Impacts Under Alternative 8 with Mitigation –Additional Mining Excluded North of the Northwest Wellfield Recharge Canal and the Dade-Broward Levee Recharge Canal with Water Pumped from a Quarry Lake South of the Northwest Wellfield Recharge Canal.....	5-61
Table 5-34.	Summary of Wood Stork Impacts Under Alternative 9 with Mitigation.....	5-62
Table 5-35.	Summary of Impacts on Wood Storks of Mining Alternatives 1 Through 9 with Mitigation	5-64
Table 5-36.	Estimated Mitigation Fee Collection by Alternative	5-66
Table 5-37.	Projected Costs of Mitigation Activities.....	5-67
Table 5-38.	Special Conditions Included as Part of the 2002 10-Year Mining Permits.....	5-70

List of Acronyms

°C	Celsius
°F	Fahrenheit
² H	deuterium oxide
<i>2006 Annual Report</i>	<i>Lake Belt 2006 Annual Report for the Reporting Period Between February 2005 and March 2006</i>
ACHP	Advisory Council on Historic Preservation
BA	Biological Assessment
BEA	U.S. Bureau of Economic Analysis
BLS	U.S. Bureau of Labor Statistics
BSG	Bulk specific gravity
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Plan
CFR	<i>Code of Federal Regulations</i>
CSX	CSX Transportation
CWA	Clean Water Act
dB	decibels
dBA	decibels A-weighted
DERM	Miami-Dade County Department of Environmental Resources Management
District Court	U.S. District Court for the Southern District of Florida
EAA	Everglades Agricultural Area
EIS	environmental impact statement
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
<i>Final Lakebelt PEIS</i>	<i>Final Programmatic Environmental Impact Statement, Rock Mining – Freshwater Lakebelt Plan, Miami-Dade County, Florida</i>
FLUCCS	Florida Land Use, Cover, and Forms Classification System
FPL	Florida Power and Light Company
F.S.	Florida Statutes
FWS	U.S. Fish and Wildlife Service
GDP	gross domestic product
GIS	geographic information system
GPS	Global Positioning System
GWUDI	groundwater under the direct influence of surface water
HGM	hydrogeomorphic method
LA	Los Angeles
Lake Belt Plan	Miami-Dade County Lake Belt Implementation Plan

<i>Lake Belt SEIS</i>	<i>Supplemental Environmental Impact Statement on Rock Mining in the Lake Belt Region of Miami-Dade County, Florida</i>
LBM	Lattice-Bottzman
LBMC	Lake Belt Mitigation Committee
<i>Lee County DR/GR Report</i>	<i>Prospects for Southeast Lee County: Planning for the Density Reduction/Groundwater Resource Area</i>
log	logarithm
MCL	maximum contaminant level
MDCHPD	Miami-Dade County Historic Preservation Division
MDLPA	Miami-Dade Limestone Products Association
MDOHP	Miami-Dade County Office of Historic Preservation
MDWASD	Miami-Dade Water and Sewer Department
Mitigation Plan	Miami-Dade County Lake Belt Mitigation Plan
MODFLOW	modular three-dimensional finite-difference groundwater flow model
MPA	microscopic particulate analysis
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NWWF	Northwest Wellfield
PEIS	programmatic environmental impact statement
ppb	parts per billion
<i>Products Report</i>	<i>Products from Mines or Terminals in Florida</i>
PSD	Prevention of Significant Deterioration
PW	Production Well
RAP	Reclaimed asphalt pavement
RCA	reclaimed concrete aggregate
RIMS II	Regional Input-Output Modeling System
ROD	Record of Decision
SAS	surficial aquifer system
SEIS	supplemental environmental impact statement
SF ₆	sulfur hexafluoride
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Office
SMA	Square Mile Area
SPCC	Spill Prevention Control and Countermeasure Plan
<i>Strategic Aggregates Study</i>	<i>Strategic Aggregates Study: Sources, Constraints, and Economic Value of Limestone and Sand in Florida</i>

SVOC	semivolatile organic compound
SWTR	Surface Water Treatment Rule
USACE	U.S. Army Corps of Engineers
U.S.C.	<i>United States Code</i>
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VMC	Vulcan Materials Corps
VOC	volatile organic compound
WCA	Water Conservation Area
WPA	wellfield protection area
WRAP	Wetland Rapid Assessment Procedure