

APPENDIX F
MEMORANDUM FOR RECORD: ISSUES ON THE COMBINED
OPERATIONAL PLAN FOR THE MODIFIED WATER DELIVERIES AND
C-111 CANAL PROJECTS RELATED TO
STRUCTURES S-331, S-334, AND S-356

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SUBJECT: ISSUES ON COMBINED OPERATING PLAN FOR MODIFIED WATER DELIVERIES AND C-111 CANAL PROJECTS RELATED TO STRUCTURES 331, 334 AND 356

A. What are the authorized purposes of Structures 331, 334 and 356?

B. Can the authorized Purposes of each of the above structures be modified in the Combined Operating Plan to provide a different purpose for operation of the Central and Southern Florida Project to complement all or different project purposes?

1. Authority and Project Background of the Central and Southern Florida Project

The Central and Southern Florida ("C&SF") Project was initially authorized, in part, by Section 203 of the Flood Control Act of 1948¹. House Document No. 643 (HD 643)² served as the decision document upon which the initial 1948 authorization³ was based. It described the general design, the cost-benefit analysis, and the project purposes for the entire C&SF Project. In the Report of the Chief of Engineers, United States Army, dated February 19, 1948 to HD 643, the following was provided:

5. Development of the comprehensive plan of improvement would afford a high degree of flood protection throughout this area; it would provide for removal of excess waters in wet seasons, and for their control, storage, and use in maintaining water levels during dry periods. Adequate control of water levels is essential for agricultural use of lands in this area and for maintenance of municipal water supplies. The comprehensive plan would benefit in varying degrees over 2,300,000 acres of land, as well as numerous cities and towns. In addition to these primary purposes, the improvements would reduce the dry season intrusion of salt water into lands and water supplies of coastal areas. Its features would produce substantial benefits from the preservation of fish and wildlife resources. Although the navigation benefits are relatively small and incidental when compared with the primary features of flood protection and water control, the proposed channels and control works would afford the basic framework for a system of interlocking navigable waterways throughout central and southern Florida, which would connect at several points with the Intracoastal Waterway. Investigation of the feasibility of correlating additional navigation improvements with the works proposed under this plan is already provided for in reports requested by Congress under other authorizations.⁴

16. I have given careful consideration to the plan presented by the reporting officer; and to the views of the Board of Engineers for Rivers and Harbors. I concur with the Board of Engineers for Rivers and Harbors in recommending modification of the existing Federal project for the Caloosahatchee and Lake Okeechobee drainage areas to provide for further improvement in the interests of flood control, drainage, and related purposes, generally in accordance with the district engineer's comprehensive plan for flood control and other purposes in central and southern Florida, with such modifications thereof as in the discretion of the Secretary of the Army and Chief of Engineers may be advisable, at an estimated cost to the United States of \$171,041,000 for construction and \$749,000 annually for maintenance and operation, subject to the conditions that local interests shall provide all lands, easements and rights-of-way; make a cash contribution of 15 percent

¹ Public Law 80-858, 80th Congress, 2nd Session (P.L. 80-858).

² House Document 643, 80th Congress, 2nd Session (HD 643).

³ Supra note 1.

⁴ Supra note 2 at page 2 of Chief of Engineers Report

*of the estimated construction cost for each part of the work prior to its initiation, except that the total cash contribution for the comprehensive project shall not exceed \$29,152,000; and furnish assurances satisfactory to the Secretary of the Army that they will hold and save the United States free from damages due to the construction and operation of the works and that they will maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of the Army, except the levees, channels, locks, and control works of the St. Lucie Canal, Lake Okeechobee, and Caloosahatchee River and the main spillways of the conservation areas. **Emphasis added**⁵*

In the Report of the District Engineer for the Jacksonville District, the Comprehensive Plan laid out was very clear as to the purposes to be accomplished and left application of those purposes to be refined by the Corps' processes. The reason was that the study was authorized by Congress in 1947 and completed in 1948. The Comprehensive Plan described different areas in south Florida and what the plan would entail and why features would be constructed. However, it also recognized that more detailed studies would be required prior to construction. The plan as described in HD 643 provided information on the features contemplated to be constructed in a pattern from north to south which included cost estimates **(edited out in this opinion)**:

V III. COMPREHENSIVE PLAN

55. General.-The comprehensive plan of improvement which has been developed during the progress of the survey is set forth in the following paragraphs of this section The physical and engineering details are given in appendix D. Certain features which were considered but not included in the proposed plan are also described. In general, the proposed plan of improvement provides those features for flood control and other purposes which are feasible from an engineering standpoint and have economic justification. These works would generally provide full protection from a storm similar to that of 1947. These features, as well as certain items which have been rejected, are described in a general order from north to south by physical subdivisions of the area.

59. East-coast area.-This area consists of the coastal-ridge section and the eastern portions of the Everglades extending from the north Palm Beach County line to the southern tip of Florida.

*(a) Everglades conservation area: (1) The plan would create three interconnected reservoir areas totaling about 1,500 square miles which would occupy portions of Dade, Broward, and Palm Beach Counties. These reservoirs would store the maximum-record rainfall on the conservation area plus the run-offs from the area north of West Palm Beach Canal, the Everglades agricultural area, and some flood discharge from Lake Okeechobee. Impoundment of these waters would prevent their flowing eastward and flooding the developed areas along the coastal ridge. **Maintenance of water in the conservation area would provide water for use on the east-coast agricultural lands when needed, raise the ground-water table and improve water supply for the east-coast communities, ameliorate salt-water intrusion in the east-coast water supply well fields and streams, and benefit fish and wildlife in the Everglades.** The reservoirs would be created by constructing a system of levees from the West Palm Beach Canal southward between the main body of the Everglades and the west edge of the coastal ridge to the Tamiami Trail, westward on that trail to the Collier County line, then northward to tie into the west rim levee of the Everglades agricultural area. Levees along the Hillsboro and North New River Canals would divide the conservation reservoir into three parts, interconnected by spillways through the levees. Gated spillways in the Tamiami Trail levee would permit discharge of excess water from the conservation area onto the low-lying areas to the south, and thence to the lower end of the peninsula. The part*

⁵ Id. Note 2 at page 5 of Chief of Engineers Report

of the east coast protection levee which forms the eastern boundary of the conservation area is the major feature for protection of the east coast. [Emphasis added]

(2) ...

(b) Palm Beach County: (1) The planned improvements in Palm Beach County serve various purposes. Flood relief and water control for the Hungryland and Loxahatchee sloughs would be provided by constructing a canal to the coast with a control structure near its outlet. Flood discharge from Lake Mangonia would be diverted by a canal to Lake Worth. Water control for the Lake Osborne area would be provided by a control at the outlet of the channel at the West Palm Beach Canal, and by a short canal from Lake Osborne to Lake Worth with a control structure at its outlet to prevent salt-water intrusion. Lake Ida would be benefited similarly by a short canal and control structure. Construction of spillways in the conservation levees at the West Palm Beach and Hillsboro Canals would provide water to the entire area when needed during drought periods.

(2) ...

(c) Broward County: (1) The plan for improvements in Broward County provides for flood relief, water control, and alleviation of salt-water intrusion. These would be secured by improving and extending the existing Cypress Creek, Middle River, Plantation Road, and Hollywood Canals, and by placing control structures in those canals. Culverts and spillways in the levees to the west would bring water from the conservation reservoirs to this area by way of Cypress Creek, Middle River, Plantation Road, North New River, and Dania Cut-off Canals for use during dry seasons and for preventing saltwater intrusion.

(2) ...

(d) Davie agricultural area: (1) The plan would provide for flood protection and water control for an area of approximately 105 square miles of developed and potentially productive agricultural land west of Dania along the South New River Canal. Flood protection would be provided by constructing and improving levees around the area; these would be connected to the Broward County conservation area levee on the west. Water control would be provided by improving the South New River Canal and constructing a pumping station at the conservation area levee. The pump would discharge excess water to the conservation area or draw therefrom for use during dry periods. A culvert in the canal at State Road No.7 would permit flow for water supply and salt-water control in the Dania Cut-off Canal and along the coast.

(2) ...

(e) Dade County: (1) The plan of improvements for Dade County would provide for flood control and protection, water control, and alleviation of salt-water encroachment. These benefits would be secured by improving the channels, and constructing control structures at the outlets of the following existing canals: Miami (in part) Snake Creek Coral Gables; Comfort Biscayne Snapper Creek; Tamiami Little River Black Creek. Culverts at the head of Snake Creek, Miami, and Tamiami Canals would provide for the flow of water from the Everglades conservation reservoirs into the area for use during dry seasons. The levee (some 74 miles long) surrounding the agricultural lands of the Perrine-Homestead area would protect against flood waters from the Everglades and against ocean tides driven by hurricanes from the south and east. Salt barrier-type spillways and culverts, 13 in all, in the east and south walls of this levee would control the discharge from the canals and prevent salt-water intrusion. (EMPHASIS ADDED)

(2) ...⁶

Additionally, the District Engineer's report provided the following:

69. Additional benefits

(d) Salinity control: It is recognized that control of salinity is one of the urgent problems to be met by the comprehensive plan of improvement. No attempt has been made to evaluate the extensive benefits claimed by local interests by virtue of excluding salt water from existing canals and by maintaining higher ground-water

⁶ HD 643, pages 38 through 44.

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tables, thereby restricting salt-water intrusion. These benefits are real and extensive as indicated by the proposed construction of a lock and dam for salinity control in Miami River by local interests at an estimated cost of \$700,000; the continued drilling of Miami water-supply wells further inland from the east coast resulting in long expensive pipe lines; and the creation of water-conservation areas by Dade, Broward, and Palm Beach Counties. Benefits due to prevention of damages due to salt-water inundation in the Homestead-Perrine area are included under flood-control benefits.

(e) Water supply: Establishment and operation of conservation areas in the Everglades would aid materially in recharging underground fresh-water reservoirs of the east-coast area, thereby maintaining and improving present water supplies of cities and towns of that area. While this is a real benefit anticipated from the development, it has not yet been evaluated in monetary terms because of the extended and costly surveys which would be necessary to establish the full extent of this beneficial effect. In addition, the more complete control of Lake Okeechobee contemplated under the comprehensive plan makes it adaptable to future development as a water supply for east-coast cities in the event of large population increases.⁷

Section 203 of the Flood Control Act of 1948, authorized the first phase of the Comprehensive Plan and provided the following:

CENTRAL AND SOUTHERN FLORIDA-The project for Caloosahatchee River and Lake Okeechobee drainage areas, Florida, authorized by the River and Harbor Act of July 3, 1930, as amended, is hereby modified and expanded to include the first phase of the comprehensive plan for flood control and other purposes in central and southern Florida as recommended by the Chief of Engineers in House Document Numbered 643, Eightieth Congress, subject to the conditions of local cooperation prescribed therein, and there is hereby authorized to be appropriated the sum of \$16,300,000 for partial accomplishment of said plan.⁸

Because Section 203 of the Flood Control Act of 1948⁹ authorized the plan as recommended by the Chief of Engineers in HD 643, the plan could be modified at the discretion of the Secretary of the Army and Chief of Engineers, as set forth in HD 643.

The remaining works of the C&SF Project were largely authorized by Section 203 of the Flood Control Act of 1954¹⁰. Additionally, the 1954 authorization contained explicit language recognizing that project modifications may be necessary at the "...with such modifications thereof as the Congress may hereafter authorize, or as in the discretion of the Chief of Engineers may be advisable."

The Flood Control Act of 1962¹¹ authorized the South Dade County, Florida "...substantially in accordance with the recommendations of the Secretary of the Army and the Chief of Engineers in Senate Document Numbered 138, Eighty-seventh Congress..."

Senate Document Numbered 138, Eighty-seventh Congress laid out a Plan of Improvement that included the following:

⁷ Id. at pages 50.

⁸ *Supra* note 1.

⁹ *Supra* note 1.

¹⁰ Public Law 83-780, 83rd Congress, 2nd Session.

¹¹ Public Law 87-874, 87th Congress,

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26. The Plan of Improvement-a. General.- The plan of improvement provides for gravity drainage of the area by a primary system of 12 canals. Secondary canals to carry the runoff to the primary system would be provided independently by local interests as their complete responsibility. As stated before, Levee 31 and its control structures through the levee are authorized works not part of the recommendations in this report. The plan of Improvement would perform the following functions:

(1) Remove the 40-percent standard project flood runoff from the entire 206-square-mile effective drainage area ... The effective area excludes some 21 square miles at the extreme southerly zone of the area.

(2) Reduce the depth and duration of floods of greater magnitude than the 40-percent standard project flood. The remainder would be flooded infrequently to comparatively shallow depths.

(3) Prevent overdrainage of the area north of Florida City and northwest of United States Highway 1 by maintaining optimum water levels in the canals, insofar as possible, and controlling discharge within permissible limits.¹²

The Corps was later directed by Congress to consider other aspects or purposes of the C&SF Project and prepared House Document 369 (HD 369), 90TH Congress, 2nd session, July 30, 1968, Water Resources for Central and Southern Florida was prepared. HD 369 was prepared "...with particular reference to provision of works to improve the supply, distribution, and conservation of water resources in central and southern Florida, including the Lake Okeechobee agricultural area, Everglades National Park, and other related areas."¹³ The recommendations of the Board of Engineers (followed and recommended by the Chief of Engineers) were "...that the authorized Federal project for Central and Southern Florida be modified for the purposes of conservation and conveyance of additional water supplies for Everglades National Park, for expanding agricultural and urban needs, and for recreation and other allied purposes, ..."14. "This study (HD 369) is concerned with all water resource needs of the entire central and southern Florida area exclusive of the Upper St. Johns River Basin. The problem is one of making the best use of all available water in the study area, in the interests of all users, including agricultural and urban interests and the Everglades National Park. This requires maximum feasible conservation of water through added storage capacity, recovery of excess water which would otherwise run off to tidewater, and adequate conveyance and distribution systems. The District Engineer finds that the authorized project will not meet the water resource needs of the study area after about 1976. Improvement is required if the project is to continue to function satisfactorily after that date, in view of the continuing rapid development of the area. The plan developed would improve the water resources in the area served by Lake Okeechobee, in the lower east coast, and in Everglades National Park."¹⁵

The recommended plan in HD 369 for the Everglades National Park are is discussed in Section VII.
COMPREHENSIVE PLAN OF IMPROVEMENT:

100. Plan.--The recommended plan is shown on plate 1. Details of the plan are in appendix F and general features are described below.

¹² Senate Document Numbered 138, Eighty-seventh Congress, pages 28 to 30.

¹³ HD 369, Chief of Engineers Report, paragraph 1, page 1.

¹⁴ Id., paragraph 15. Recommendations, page 9.

¹⁵ Id., Report of the District Engineer, Syllabus

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d. Conveyance channels.--The plan of improvement proposes new channel and structural improvements for delivery of water to the park and east coast. Several improvements considered as authorized under existing project authority are in the plan but their estimated cost is charged against the existing project. Canal 302 would be constructed in Water Conservation Area No. 2A under existing project authority to provide improved water conveyance of 3,300 c.f.s. through the heavy vegetation. This canal is needed for better flood control regulation and would also improve transfer of backpumped water for water supply. Facilities are needed at the north end of the park for better conveyance of water southward by the four S-12 spillway structures in Levee 29 at the south end of Water Conservation Area No. 3A. A plan is proposed under existing project authority for a new Canal 306 running generally parallel to Levee 29 and connecting the S-12 structures at their downstream ends. The exact alignment would be determined in more detailed studies so as to accommodate then-existing development along the south side of Tamiami Trail. From the east end of Canal 306 the existing Levee 67 Extension and Levee 70 borrow canals would be improved to convey water southward about 12 miles. At the west end of Canal 306 a Levee 28 Extension would be provided to convey water south about 12 miles along the west park boundary.

e. Conveyance canals to Dade County and Everglades National Park.--These canals would improve distribution of water into the park, particularly under low-flow conditions. The continuation of Levee 28 Extension would provide for delivery to the park area west of Shark River Slough; the continuation of Levee 67 Extension canal and the auxiliary pumping station, to the junction with the authorized south Dade canal system, would convey water to Taylor Slough, to the eastern panhandle area of the park, and to south Dade County. Improvement of Miami Canal in the reach across Water Conservation Area No. 3B would improve deliveries to the remainder of Dade County. Total increased capacity for service to Taylor Slough and panhandle areas of the park and to Dade County is 1,400 c.f.s. at an estimated cost of \$4,919,000.¹⁶

The Board of Engineers in HD 369 stated the following regarding the Park:

10. The Board is especially concerned about the requirements of Everglades National Park since furnishing the means of providing the additional water to the park is a Federal responsibility and about one-half of the costs of the proposed modification are attributable to satisfying park needs. The Board notes the requirement of 315, 000 acre-feet for the park is supported only in very general terms. While it concurs in the views of the reporting officers and the National Park Service that benefits for restoration, preservation, and enhancement of park values are difficult to quantify and are not susceptible to evaluation in monetary terms, the costs of providing the necessary pumping, conveyance, and storage facilities are measurable and should be identified with the park. Therefore, it is the view of the Board that park needs should be stated in such terms as to clearly define the ecological objectives and the amounts of supplemental water needed to meet those objectives.¹⁷

The Chief of Engineers in his Report stated the following:

3. The Board of Engineers for Rivers and Harbors concurs generally in the views of the reporting officers and recommends the improvements subject to local cooperation. However, the Board was especially concerned about the requirements for the park which have been established only in general terms, and believes that research and other studies should be undertaken to clearly define the ecological objectives and the amounts of supplemental water required to meet these objectives. Further I the Board recommends that all Federal agencies having water resources responsibilities in the region initiate as soon as practicable research and study with a view to refining water resource requirements and improving water management techniques. Such results as are achieved prior to initiation of construction of those new features affecting Lake Okeechobee should be

¹⁶ Id., Report of the District Engineer, pages 67 and 68

¹⁷ HD 369, page 7

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*made available to appropriate executive agencies for use in the detailed planning process and other related purposes.*¹⁸

Structure 331 was described in HD 369, but Structures 333 and 334 were not described in HD 369. Nor were they detailed on Plate 1 the Plan of Improvement in HD 369.

The components of HD 369 were authorized in Section 203 of the Flood Control Act of 1968.¹⁹

A review of both the South Dade County project approved in 1962 and the Plan approved in 1968 and the Projects as actually constructed reveal considerable differences. This is because the Chief of Engineers and the Secretary of the Army were given discretion to make modifications to these projects as they deemed necessary. After authorization of the different phases and components of the C&SF project by Congress in the 1948, 1954, 1962 and 1968 Flood Control Acts, the Jacksonville District prepared a series of General Design Memorandum (GDM), which were reviewed and approved by the Chief of Engineers. After approval of a GDM by the Chief of Engineers, the Jacksonville District would then prepare a Design Memorandum or a Detailed Design Memorandum related to particular features set forth in the each of the GDMs. Each of the Design Memorandum (DM) or Detailed Design Memorandum (DDM) prepared were also approved by the Chief of Engineers. The GDM was primarily a functional design document concerned with technical design of the system components in the C&SF project. Each of the DMs or DDMs were the basis of preparation of plans and specifications of individual features of a component set forth in applicable GDMs.

In cases where components of the Comprehensive Plan were proposed to be modified to the extent that the modifications fell outside the discretion of either the Chief of Engineers or the Secretary of the Army or that additions to the C&SF Project were required, reports were submitted to Congress for approval.

The South Dade County project was modified in GDMs:

Central and Southern Florida Project for Flood Control and other Purposes, Part V, Coastal Areas South of St. Lucie Canal, Supplement 30-GDM, Levee 31 and Related Works, November 6, 1959 and
Central and Southern Florida Project for Flood Control and other Purposes, Part V , Coastal Areas South of St. Lucie Canal, Supplement 37--GDM, South Dade County, September 12, 1963

and in Detailed Design Memorandums:

DDM, Canals 102 (Princeton Canal), 102 (N), and Control Structures 165, 194, and 195;
DDM, Canals 103, (Mowry Canal), 103 (N), and 103 (S), and Control Structures 20F, 166, 167, 179, and 196;
DDM, Canal 111, Sections 2 and 3; Canal 111(E); and Control Structures 176, 177, 178; and

¹⁸ HD 369, page 2

¹⁹ Public Law 90-483.

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DDM, Levee 31(N) and Control Structure 173.

The Project contemplated in HD 369 for the supply of water to the Everglades National Park was modified in GDM, Conveyance Canals to Everglades National Park and South Dade County with Detail Design Appendix on Pumping Station 331 and Enlargement of Reaches of Levee 31 (N) Borrow Canal, C-1, and C-103, Part V, Supplement 52, June 1973. The most feasible plan was described as:

D. PROJECT PLAN

16. *Most feasible plan.* The east alignment plan would utilize existing Miami Canal and Levee 30 borrow canal to convey water from Water Conservation Area 3A to Levee 31 North borrow canal and Canal 4. Culvert Structure 24B would be replaced by spillway S-335 and a bypass canal with a culvert (S-337) in Levee 30 would be constructed southwest of existing Structure 31. This would negate the need to enlarge Structure 31 and eliminate a control structure in Miami Canal just east of the intersection of Miami Canal and Levee 30 borrow canal. This latter structure would have been used to prevent flow and loss of water to the coast during water supply conditions. Structure 32A would be relocated approximately one mile northward just south of Miami Canal and north of the intersection of the bypass canal and Levee 30 borrow canal. Levee 29 borrow canal will also obtain water from Water Conservation Area 3A and convey it eastward to the Levee 31 North borrow canal at Tamiami Trail intersection. Spillways S-333 and S-334 will need to be constructed at both the west and east ends of Levee 29 borrow canal in Levees 67A and 30, respectively. Flows will be regulated eastward via Canal 4 and southward via L-31N borrow canal through a bridge at Tamiami Trail by controlling the structure (S-336) in Canal 4 near Levee 30. South of Tamiami Trail, borrow canal of Levee 31(N) would be enlarged to the intersection with Canal 103. Canals 1 and 103 would be enlarged on their western extremes. Structure 194 would require modification. A pumping station at Structure 173 (S-331) would lift the water for southward flow. Water supply to the Taylor Slough area of Everglades National Park will be delivered by a pump (S-332) located at the west side of Levee 31(W) borrow canal. The Eastern Panhandle area of the park would be supplied through the overflow sections in Canal 111 upstream of Structure 197. Shark River Slough water needs will be provided by the existing structures and canals, Structure 12 and Levee 67 Extension. This east alignment plan is the most economically feasible and is also the plan with the strongest support of local interests. This plan also avoids the undesirable aspect of having to construct extremely large canals along the east boundary of the Everglades National Park as considered in the west alignment studies. Plate 1 shows the proposed plan and plates 5 through 17 show the flow distributions and flow profiles.

17. *Departures from authorized plans.* The project document recommended the west alignment and gave alternative consideration to the east alignment. (See Chapter A, paragraph 1.) The project document, Chapter B, paragraph 11, subparagraph b, states that the Dade County water supply demands are greater than those estimated in the survey review report. Letter, 18 May 1971, from Central and Southern Florida Flood Control District shown in Appendix A presents these demands in detail. In order to better utilize capacity of the delivery system to serve the conveyance canals it was necessary to depart from project document plan to best provide the increased quantities of water needed. The departures include the need for the Levee 29 link, pumping stations at Structure 173 and Taylor Slough, excavation in Canals 1 and 103, modification to Structure 194 and larger conveyance canal sections.²⁰

Appendix A of General Design Memo, Conveyance Canals to Everglades National Park and South Dade County with Detail Design Appendix on Pumping Station 331 and Enlargement of Reaches of Levee 31 (N) Borrow Canal, C-1, and C-103 provides for Pump Station 331 as follows:

B. BASIC CONSIDERATIONS

²⁰ General Design Memo, Conveyance Canals to Everglades National Park and South Dade County with Detail Design Appendix on Pumping Station 331 and Enlargement of Reaches of Levee 31 (N) Borrow Canal, C-1, and C-103.provides for Pump Station 331- pages 11 and 12

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4. *Location.* The work proposed in this appendix is located in Dade County, Florida, just west of State Road 27 and generally lies in a north-south direction. Plate 1 of the main report shows the location of the proposed work relative to the remainder of the project.

5. *Proposed plan.* The proposals of this appendix are a part of the plan presented in the main report. The northern reach of the proposed enlargement of Levee 31(N) borrow canal would transfer additional flow to Canal 1 and furnish adequate water to Pumping Station 331 for transfer to the lower borrow canal reaches. These enlarged reaches would continue the pumped flows to Canals 102 and 103 and to the remainder of the canal system, that leads southward furnishing additional flow to the Everglades National Park.²¹

GDM "Levee 29, Section 3, Borrow Canal Enlargement, Pumping Station 332, and Control Structures 194(mod), 333, 334, 335, 336, and 338, Part V, Supplement 55, date December 1974" details were provided for S-333 and S-334 as well as other improvements.

A. INTRODUCTION

1. *Authorization.* The project for Central and Southern Florida was originally authorized by the Flood Control Act of 30 June 1948 (Public Law 858, 80th Congress, 2nd Session). Specifically, the project features covered in this report were authorized by the Flood Control Act of 13 August 1968 (Public Law 90-483, 90th Congress, 2nd Session).

The Monetary Authorization Act of 1970 (Public Law 91-282), Section 2, authorized funds for construction of specific improvements for the delivery of water from the Central and Southern Florida project to the Everglades National Park.

2. *Scope and purpose.* This report supplements Part V, Supplement 52, and presents detail designs and costs for a conveyance canal, pumping station, and six control structures that are part of a plan to increase flows to Everglades National Park and South Dade County.²²

B. BASIC CONSIDERATIONS

4. *Location.* The features presented in this report would be located on the lower tip of Florida just north and east of the Everglades National Park.

5. *Proposed plan.* The plan would provide for the enlargement and extension of existing Levee 29 Borrow Canal, construction of Pumping Station 332, modifications of existing Control Structure 194, and construction of Control Structures 333, 334, 335, 336, and 338. The work would be part of the approved distribution plan to convey water from storage in Water Conservation Area No. 3A to Dade County and the Everglades National Park a total of 524 square miles of benefited area. The areas are described in detail in the general design memorandum, Part V, Supplement 52.²³

(b) *Type of structures.* Control Structures 333, 334, and 335 would be gated, trapezoidal, weir-type, spillways. Structure 333 would control the supply of water to Levee 29 Borrow Canal. Structures 334 and 335 would maintain water control in Levee 29 and Levee 30 Borrow Canals, respectively.²⁴

Public Law 101-229, December 13, 1989, Everglades National Park Protection and Expansion Act of 1989, "An Act, to modify the boundaries of the Everglades National Park and to provide for the protection of lands, waters, and natural resources within the park, and for other purposes." Related to the Park and the C-111 Project areas provided as follows:

²¹ Id., Appendix A, page A-1

²² General Design Memorandum entitled "Levee 29, Section 3, Borrow Canal Enlargement, Pumping Station 332, and Control Structures 194(mod), 333, 334, 335, 336, and 338, page 1

²³ Id., page 2

²⁴ Id., page 4

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SEC. 104. <<NOTE: 16 USC 410r-8>> MODIFICATION OF CERTAIN WATER PROJECTS.

(a) IMPROVED WATER DELIVERIES. -- (1) Upon completion of a final report by the Chief of the Army Corps of Engineers, the Secretary of the Army, in consultation with the Secretary, is authorized and directed to construct modifications to the Central and Southern Florida Project to improve water deliveries into the park and shall, to the extent practicable, take steps to restore the natural hydrological conditions within the park.

(2) Such modifications shall be based upon the findings of the Secretary's experimental program authorized in section 1302 of the 1984 Supplemental Appropriations Act (97 Stat. 1292) and generally as set forth in a General Design Memorandum to be prepared by the Jacksonville District entitled "Modified Water Deliveries to Everglades National Park". The Draft of such Memorandum and the Final Memorandum, as prepared by the Jacksonville District, shall be submitted as promptly as practicable to the Committee on Energy and Natural Resources and the Committee on Environment and Public Works of the United States Senate and the Committee on Interior and Insular Affairs and the Committee on Public Works and Transportation of the United States House of Representatives.

(3) Construction of project modifications authorized in this subsection and flood protection systems authorized in subsections (c) and (d) are justified by the environmental benefits to be derived by the Everglades ecosystem in general and by the park in particular and shall not require further economic justification.

(4) Nothing in this section shall be construed to limit the operation of project facilities to achieve their design objectives, as set forth in the Congressional authorization and any modifications thereof.

(b) DETERMINATION OF ADVERSE EFFECT. -- (1) Upon completion of the Final Memorandum referred to in subsection (a), the Secretary of the Army, in consultation with the South Florida Water Management District, shall make a determination as to whether the residential area within the East Everglades known as the "Eight and One-Half Square Mile Area" or adjacent agricultural areas, all as generally depicted on the map referred to in subsection 102(a), will be adversely affected by project modifications authorized in subsection (a).

[**1950] (2) In determining whether adjacent agricultural areas will be adversely affected, the Secretary of the Army shall consider the impact of any flood protection system proposed to be implemented pursuant to subsection (c) on such agricultural areas.

(c) FLOOD PROTECTION; EIGHT AND ONE-HALF SQUARE MILE AREA. -- If the Secretary of the Army makes a determination pursuant to subsection that the "Eight and One-Half Square Mile Area" will be adversely affected, the Secretary of the Army is authorized and directed to construct a flood protection system for that portion of presently developed land within such area.

(d) FLOOD PROTECTION; ADJACENT AGRICULTURAL AREA. -- (1) If the Secretary of the Army determines pursuant to subsection (b) that an adjacent agricultural area will be adversely affected, the Secretary of the Army is authorized and directed to construct a flood protection system for such area. Such determination shall be based on a finding by the Secretary of the Army that:

(A) the adverse effect will be attributable solely to a project modification authorized in subsection (a) or to a flood protection system implemented pursuant to subsection (c), or both; and

(B) such modification or flood protection system will result in a substantial reduction in the economic utility of such area based on its present agricultural use.

(2) No project modification authorized in subsection (a) which the Secretary of the Army determines will cause an adverse effect pursuant to subsection (b) shall be made operational until the Secretary of the Army has implemented measures to prevent such adverse effect on the adjacent agricultural area: Provided, That the Secretary of the Army or the South Florida Water Management District may operate the modification to the extent that the Secretary of the Army determines that such operation will not adversely affect the adjacent agricultural area: Provided further, That any preventive measure shall be implemented in a manner that presents the least prospect of harm to the natural resources of the park.

(3) Any flood protection system implemented by the Secretary of the Army pursuant to this subsection shall be required only to provide for flood protection for present agricultural uses within such adjacent agricultural area.

(4) The acquisition of land authorized in section 102 shall not be considered a project modification.

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(e) PERIODIC REVIEW. -- (1) Not later than 18 months after the completion of the project modifications authorized in subsection (a), and periodically thereafter, the Secretary of the Army shall review the determination of adverse effect for adjacent agricultural areas.

(2) In conducting such review, the Secretary of the Army shall consult with all affected parties, including, but not limited to, the Secretary, the South Florida Water Management District and agricultural users within adjacent agricultural areas.

(3) If, on the basis of such review, the Secretary of the Army determines that an adjacent agricultural area has been, or will be adversely affected, the Secretary of the Army is authorized and directed, in accordance with the provisions of subsection (d), to construct a flood protection system for such area: Provided, That the provisions of subsection (d)(2) shall be applicable only to the extent that the Secretary, in consultation with the Secretary of the Army, determines that the park will not be adversely affected.

*[**1951] (4) The provisions of this subsection shall only be applicable if the Secretary of the Army has previously made a determination that such adjacent agricultural area will not be adversely affected.*

(f) CURRENT CANAL OPERATING LEVELS. -- Nothing in this section shall be construed to require or prohibit the Secretary of the Army or the South Florida Water Management District from maintaining the water level within any project canal below the maximum authorized operating level as of the date of enactment of this Act.

(g) NO LIMITATION ON OTHER CLAIMS. -- If the Secretary of the Army makes a determination of no adverse effect pursuant to subsection (b), such determination shall not be considered as a limitation or prohibition against any available legal remedy which may otherwise be available.

(h) COORDINATION. -- The Secretary and the Secretary of the Army shall coordinate the construction program authorized under this section and the land acquisition program authorized in section 102 in such a manner as will permit both to proceed concurrently and as will avoid unreasonable interference with property interests prior to the acquisition of such interests by the Secretary under section 102.

(j) PROTECTION OF NATURAL VALUES. -- The Secretary of the Army is directed in analysis, design and engineering associated with the development of a general design memorandum for works and operations in the "C-111 basin" area of the East Everglades, to take all measures which are feasible and consistent with the purposes of the project to protect natural values associated with Everglades National Park. Upon completion of a general design memorandum for the area, the Secretary shall prepare and transmit a report to the Committee on Energy and Natural Resources and the Committee on Environment and Public Works of the United States Senate and the Committee on Interior and Insular Affairs and the Committee on Public Works and Transportation of the United States House of Representatives on the status of the natural resources of the C-111 basin and functionally related lands.

As a result of Public Law 101-229, two documents were prepared by the Corps of Engineers.

The first was General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, June 1992. The Syllabus described the recommended plan as follows:

The recommended plan was selected on the basis of expected environmental benefits derived from a modified water delivery schedule. A Rain-Driven Water Delivery Alternative was selected as the recommended plan. This alternative would replace the minimum delivery schedule authorized in Public Law 91-282 and would involve structural modifications to the Central and Southern Florida Project. The water control plan will be refined and further coordinated during the design and construction period. With the proposed project, water deliveries to the Everglades National Park would fluctuate based upon local hydro-meteorologic conditions.

The recommended plan involves the construction of three gated culvert structures (S-345A, B and C), three gated concrete headwall structures (S-349A, B, and C), and two spillway structures (S-355A and B). Also, the plan considers relocation of Structure 334, raising a portion of the Tamiami Trail (US 41), and degrading the existing Levee 67 Extension and filling the borrow canal. The recommended plan includes flood mitigation in the

residential area through construction of two pump stations (S-356 and S-357) and a double levee and a canal around the western and northern reaches of the residential area. In addition, an airboat camp, and two Miccosukee Indian Camps will be raised to prevent flood damages from occurring due to implementation of the project. In accordance with P.L. 101-229, the project's impact on the adjacent agricultural area of the East Everglades would be monitored.²⁵

The Features of the Recommended Plan were:

J. FEATURES OF RECOMMENDED PLAN

67. Description. The recommended plan consists of a Rain-Driven Water Delivery schedule and several structural modifications to the C&SF project. The proposed schedule would provide a more natural delivery that would closely simulate historic seasonal flows. The proposed modifications will allow a greater degree of operational flexibility for future water deliveries to ENP than the minimum delivery schedule prescribed by PL 91-282. The proposed modifications will allow an array of operating criteria from the Basic Rain Driven to the Modified Rain-Driven and other rain-driven operating features. Water Conservation Area No. 3B would become an integral part of the delivery system, and timing, volume, and location of water deliveries would be modified through implementation of the proposed structural modifications. Integration of WCA No. 3B and expansion of ENP would accomplish one of the major objectives of the proposed project, which is restoration of historic flow patterns across the full width of Shark River Slough. Re-establishment of the historic flow-way would be the initial step to restoration of the ENP ecosystem. Timing and volumes, the other two major objectives, would be accomplished through evaluation of a continued iterative process similar to the currently authorized Experimental Program. An important aspect for restoring historic volumes to NESRS is the acquisition of lands in the area by the Department of the Interior. Without a timely land acquisition, water deliveries to NESRS would be curtailed, and would be similar in volume to the experimental program. The restoration process of ENP also would be delayed.

The iterative process will include hydrologic modeling and coordination to develop an acceptable water control plan. The process will be conducted concurrently with detailed engineering and design studies and construction of the project's structural features. The operational studies will consist of hydrologic modeling, coordination of modeling results, and environmental evaluations. This process will include re-initiation of endangered species consultation and preparation of a supplement to the Environmental Impact Statement (EIS) or an Environmental Assessment and Finding of No Significant Impact (FONSI) as appropriate.

If an acceptable operational strategy has not been developed at the end of the iterative process, the Modified Rain-Driven Operational strategy addressed in this report will be the water control plan implemented when construction of the structural features is complete. Regardless of which water control plan is initially adopted, review and adjustment of project operations will continue as experience and additional assessment of data reveal potential for improvement. (EMPHASIS ADDED).

The proposed structural modifications include S-345A, Band C; S-349A, Band C; S-355A and B; S-334 modification, removal of L-67 Extension and borrow canal filling; and a levee and canal system for flood mitigation in the developed East Everglades area. The levee and canal system includes two pumping stations, S-356 and S-357. The recommended plan would provide a system of water deliveries to ENP across the full width of the historic Shark River Slough flow way. Flow rates from the delivery system would fluctuate based upon local hydrometeorologic conditions. WCA No. 3B would be restored directly with WCA No. 3A, the East Everglades, and ENP. There would be no adverse impacts to adjacent developed areas as a result of the recommended plan. The proposed plan of improvements are shown on Plate 17. A summary of total estimated first costs to implement the proposed modifications within this section are shown on Table 18.

²⁵ General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, June 1992, pages i and ii.

a. Water Deliveries to ENP. A rain-driven delivery formula would be used to compute weekly rates of flow for discharges to ENP. The timing and rate of water deliveries would be composed of a rainfall-response component and a WCA No. 3A regulatory component. The sum of these two components would be the computed flow for delivery to Shark River Slough. The rainfall-response component would be computed using weekly total rainfall excess depths for the current week and nine previous weeks. The regulatory component would be based on the three station average in WCA No. 3A and would maintain the flood control capabilities in the area. Computed Shark River Slough water deliveries would be split between the S-12 and the S-355 structures supplemented by S-333, when necessary. The existing S-333 spillway would play an important role in supplementing S-355 discharges during the wet season and in transferring water supply during the dry season. The goal of the proposed delivery system would be for 55 percent of the total to be discharged through the S-355 spillways whenever possible, and the remaining 45 percent to be delivered at S-12. This ratio may revised if necessary when more data becomes available. The rainfall response and the regulatory components are described below.

(1) Rainfall-Response Component. Future refinement of the rainfall response component would be initiated by any of the parties to an agreement between the SFWMD, ENP, and the Corps.

(2) WCA No. 3A Regulatory Component. When the water level in WCA No. 3A rises above Zone E (see Plate 16), a supplemental regulatory component would be added to the rainfall response component. The regulatory component would be computed by multiplying the distance (in feet) the WCA No. 3A water level is above Zone E by 2,500 cfs.

(3) Structure Operations. Operations of specific structures would be prescribed by the proposed WCA No. 3A regulation schedule and the description of initial operations for rain-driven water deliveries described in Plate 16 and Figure 10, respectively. (EMPHASIS ADDED)

68. Structures. Structural design and analysis of all structural features of this project will be in accordance with appropriate Corps of Engineers guidance and criteria. The design memoranda (to be prepared in the future) containing results of the detailed structural analysis will cite all relevant structural design criteria and guidance.²⁶

The modifications to the S-334 structure are included in the description of the recommended plan:

d. S-334 and Tamiami Trail Modifications. S-334 is an existing one-bay (29-foot bay width), reinforced concrete, U-shaped, trapezoidal weir-type, gated spillway. The spillway is located in Levee 29 borrow canal approximately 1,500 feet west of the junction with Levee 30 borrow canal. The protection elevation of the existing spillway is 14.0 feet, NGVD. It is proposed to raise the protection elevation to 17.4 feet, NGVD. This will increase the headwater elevation during an SPF condition to El. 14.5 from El. 8.5. The SPF tailwater elevation will remain at El. 5.0. The net head differential at S-334 will, therefore, increase from 3.5 feet to 9.5 feet. It is proposed that S-334 be replaced with a new spillway structure which will tie Levee 30 and Levee 31N together providing protection at the same elevation. It is not considered feasible to modify the existing structure to withstand the additional hydrostatic forces of this magnitude. The proposed spillway is shown on Plate 21. It would be necessary to raise the elevation of U.S. 41 from 10.6 to 17.4 for a short distance and ramp up to and down from that elevation to existing road grade. A tie-back levee from U.S. 41 to Levee 31N would also be required. During construction, the existing structure would be closed down (no discharges made). Should additional water supply downstream of the structure be required during construction, increased discharges could be made through S-335. In order to pass the desired volumes of water through the culverts under Tamiami Trail (U.S. 41), the L-29 borrow canal stages could rise to nearly 10.0 feet, NGVD, occasionally. L-31N will be tied into Tamiami Trail just west of the bridge over the borrow canal, the adjacent section of road will be raised to restore the design grade of 17.4 feet, NGVD, and L-31N will then be tied into L-30 at S-334. The protection elevation of L-29 from S-334 to L-30 would also be raised from 14.0 to 17.4 feet, NGVD.²⁷

²⁶ Id. At pages 59 to 61.

²⁷ Id. Page 63.

Pump station S-356 was also approved in this GDM as part of the recommended plan. This pump station had the purpose of providing flood protection to the 8 ½ Square Mile Area.

71. Pump Stations.

a. S-356. This pump station would have a capacity of 950 cfs to pump excess water from L-31N borrow canal into the L-29 borrow canal. The pump station would be located in parallel with S-334. It would provide a means of controlling additional inflows to L-31N borrow canal caused by increased seepage into the canal and pumping flood waters from the protected residential area in the East Everglades. The structure would consist of a mass and reinforced concrete substructure and a superstructure of concrete block walls and reinforced concrete columns. The pumping station would have three pumping bays each containing an identical axial-flow type vertical-shaft pump. Power to the pumps would be provided by diesel engine through a right angle gear drive. The pumping station would have a three-bay reinforced concrete intake structure. Hydraulic design data for the pump station is given in Table 51. The estimated contract price is given in Tables 34 and 35. The pump would begin discharging water from L-31N borrow canal when the stage rose to 5.5 feet, NGVD. Maximum pumping rate would not be initiated until the stage reached 6.0 feet, NGVD or higher. If there are downstream water supply demands, S-356 would not pump. Use of the pump station to allow vehicular access to the existing recreational area located north of the S-356 intake/discharge canals is proposed.²⁸

It should be noted that pursuant to the authorization contained in the General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, June 1992 as set forth above, if there is no agreement on **acceptable operational strategy has not been developed at the end of the iterative process, the Modified Rain-Driven Operational strategy addressed in this report will be the water control plan implemented when construction of the structural features is complete.**²⁹ The second key point is that this document clearly provides for a supplementary regulatory component for the project and that the operations of the structures would be driven by the proposed WCA No. 3A regulation schedule and the description of initial operations for rain-driven water deliveries.

(1) Rainfall-Response Component. Future refinement of the rainfall response component would be initiated by any of the parties to an agreement between the SFWMD, ENP, and the Corps.

(2) WCA No. 3A Regulatory Component. When the water level in WCA No. 3A rises above Zone E (see Plate 16), a supplemental regulatory component would be added to the rainfall response component. The regulatory component would be computed by multiplying the distance (in feet) the WCA No. 3A water level is above Zone E by 2,500 cfs.

(3) Structure Operations. Operations of specific structures would be prescribed by the proposed WCA No. 3A regulation schedule and the description of initial operations for rain-driven water deliveries described in Plate 16 and Figure 10, respectively. (EMPHASIS ADDED)³⁰

²⁸ Supra page 69.

²⁹ General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, June 1992, page 59.

³⁰ Id. page 61.

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The second document prepared pursuant to Public Law 101-229, December 13, 1989, Everglades National Park Protection and Expansion Act of 1989 was the Final Integrated General Reevaluation Report and Environmental Impact Statement, Canal 111 (C-111), South Dade County, Florida, May 1994 (GRR), authorized in Water Resources Development Act of 1996, Public Law 104-303, October 12, 1996.

As set forth in the Syllabus to the GRR:

...the recommended plan consists of both structural and non-structural modifications to the existing project works within the C-111 basin. Structural components of the plan consist of the construction or modification of nine canals, the construction of a L-31 Tieback levee and S-332D Tieback levee, construction of five pump stations, and replacement of the existing bridge over Taylor Slough within the Park. The plan calls for the removal of existing materials placed along the southerly leg of C-111 with these materials to be used as fill for the L-31 W Tieback levee. Non-structural components of the plan include the acquisition of over 11,866 acres of land, including the Frog Pond and Rocky Glades, and the relocation of approximately four residential structures which are expected to be impacted by project implementation. The recommended plan is expected to restore the natural values of Everglades National Park, and maintain flood protection within the C-111 basin east of L-31N and C-111. The wide aerial extent of the water distribution capability of alternative 6A restores the hydrology in 128 square miles of the Taylor Slough and its headwaters in the Rocky Glades. In addition, the hydroperiod and depths in 1027 square miles of Shark River Slough are beneficially impacted by the higher stages in the Rocky Glades, resulting in a net increase in water volume within Shark River Slough. Restoration of hydrologic conditions which reflect the characteristics of historic water conditions within the study area is expected to provide the framework necessary for natural reestablishment of an ecosystem which existed prior to construction of the basin's flood control project. The recommended plan will provide adequate operational flexibility to incorporate management strategies that will evolve as a result of continued monitoring and studies.

The GRR also discussed the S-331 in Section 2.2.4

Currently, the Corps of Engineers is implementing the Modified Water Deliveries to Everglades National Park plan. The proposed structural features will permit S-331 to return to its design purpose of providing water supply deliveries southward to Everglades National Park. The approved Modified Water Delivery plan provides flood mitigation to the residents of the 8-1/2-square-mile area by the addition of a seepage levee and canal and a pump station to prevent increased flooding in the area. If pending legislation is enacted, the 8 1/2-square-mile area would be acquired and the recommended structural features would not be constructed.

The purpose of S-331 is to function as a component of the conveyance canal system to Everglades National Park. The system is designed to provide supplemental water from Water Conservation Area No. 3A to satisfy peak dry season demands of ENP and south Dade County agricultural users during a 1-in-10 year drought. S-331 is required to lift water to obtain adequate hydraulic head in the L-31N borrow canal to enable the southward conveyance of water. S-331 would be operated as necessary when stages in the downstream conveyance canals recede 1.5 ft. below their design optimums.

However, concerns over increased water deliveries to Northeast Shark River Slough (NESRS) as a part of the Experimental Program prompted a change in the way S-331 is operated. For the Experimental Program, S-331 has been used to provide flood mitigation for the 8-1/2 square mile area. In the flood mitigation mode, discharge is performed in response to the stage at a groundwater monitoring well known as Angels Well. If the stage at Angels Well is below 6.0 ft. discharges through S-173 and, if necessary, S-331 will be made so as to maintain an average headwater of 5.0 ft. If the stage at Angels Well exceeds 6.0 ft., discharge is made to maintain an average headwater stage of 4.5 ft., until Angels Well drops to 5.7 ft., whereupon the S-331

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headwater is allowed to rise to 5.0 ft. During any of these operations, the discharge of S-331 will be limited so as to not to cause downstream structures to exceed their design stages.³¹

The GRR contemplated an optimum operating strategy for this project with the Modified Water Deliveries Project:

7.10 INTEGRATION WITH MODIFIED WATER DELIVERIES TO ENP PROJECT

Operating studies are being performed for the Modified Water Deliveries to ENP Project to identify the optimum operating strategy to benefit hydrologic restoration of Shark River Slough. The physical water management system boundary between this project and the C-111 project features is S-331. The structural features of the Modified Water Deliveries to ENP Project are designed so that, during flood conditions, all excess water that reaches the L-31N borrow canal north of S-331 is returned northward to Northeast Shark River Slough via a new pump station, S-356. This avoids the potential for exacerbating concurrent flood problems in the C-111 basin to the south.

The recommended structural plan presented herein is not designed to discharge additional flood waters from upstream of S-331. Therefore, the structural modifications recommended for the Modified Water Deliveries to ENP Project will still be required to keep these drainage basins separate during a storm event.

During normal (non-flood) periods, however, there is great potential for the structural features of both projects to be operated for mutual benefits. A portion of the water to be returned to Northeast Shark River Slough via S-356 as a part of the Modified Water Deliveries to ENP Project could be discharged southward under some conditions. The average annual discharge at S-356 will be about 72,000 acre-feet (U.S. Army Corps of Engineers 1992). This includes seepage water from Northeast Shark River Slough into the L-31N borrow canal that will occur under non-flood conditions.

A substantial portion of this water would likely be available for supplemental flows to the C-111 basin. Such discharges could be made only when there would be no potential increase in flood risk in the C-111 basin. Operating studies will be combined for both projects, Modified Water Deliveries to ENP and C-111. In this way, benefits derived from the C-111 project could be enhanced by an additional source of potentially substantial volumes of water from upstream. Diverting such discharges southward through gravity flow would benefit the Modified Water Deliveries Project by reducing operating costs associated with pumping at S-356. Operating studies will include an evaluation of the need for, and availability of supplemental water supplies for the C-111 basin.

If the 8.5-square-mile area is acquired as a result of the pending legislation, the seepage levee, seepage collection canal, and pump station currently proposed in the recommended plan for Modified Water Deliveries to ENP would not be constructed. The project would still function as designed. No significant changes in the C-111 recommended plan would be necessary.³²

Both the Modified Water Deliveries Project and the Canal 111 Project have undergone substantial modifications since the above referenced documents were approved and the original projects authorized. However, the premise of each of these documents have remained the same: flood control, water supply for both municipal, agriculture and for the Everglades National Park without adversely impacting the Water Conservation Area 3A and other parts of the system.

Different Water Control Plans have been produced by the Corps, SFWMD and ENP over the years as parts of the two projects were being constructed or completed. Each of these interim plans built on

³¹ Canal 111 GRR pages 2-9 through 2-10

³² Canal 111 GRR pages 7-17 through 7-18

more detailed modeling efforts, information related to previous water control plans, and adverse environmental conditions to the Everglades National Park and Water Conservation Area 3A. Additionally, due to high water events in Water Conservation Area 3A and due to environmental and ecological damages being caused by these high water events, there have been multiple approved emergency deviations from these Interim Water Control Plans.

LAWS, CODE OF FEDERAL REGULATIONS AND CORPS OF ENGINEERS REGULATIONS, POLICY AND GUIDANCE FOR WATER CONTROL PLANS

The Corps together with the SFWMD and the ENP are currently in the process of producing the Combined Operating Plan for the Modified Water Deliveries and Canal 111 Projects. The Corps pursuant to Section 7 of the Flood Control Act of 1944 (33 U.S.C. 709) is directed to prepare such and plan. The CFRs, as well as Corps Engineering Regulations and Engineering Manuals related to Water Control Plans and Manuals are discussed below. Each contain requirements to address deviations from the normal operations.

Title 33 CFR §222.5 Water control management (ER 1110-2-240) prescribes policies and procedures to be followed by the U.S. Army Corps of Engineers in carrying out water control management activities, including establishment of water control plans for Corps and non-Corps projects, as required by Federal laws and directives.

33 CFR §222.5 paragraph (f) provides: *General policies.* (1) Water control plans will be developed for reservoirs, locks and dams, reregulation and major control structures and interrelated systems to conform with objectives and specific provisions of authorizing legislation and applicable Corps of Engineers reports. They will include any applicable authorities established after project construction. The water control plans will be prepared giving appropriate consideration to all applicable Congressional Acts relating to operation of Federal facilities, *i.e.*, Fish and Wildlife Coordination Act (Pub. L. 85-624), Federal Water Project Recreation Act-Uniform Policies (Pub. L. 89-72), National Environmental Policy Act of 1969 (Pub. L. 91-190), and Clean Water Act of 1977 (Pub. L. 95-217). Thorough analysis and testing studies will be made as necessary to establish the optimum water control plans possible within prevailing constraints.

33 CFR §222.5 paragraph (f) (4) states: Development and execution of water control plans will include appropriate consideration for efficient water management in conformance with the emphasis on water conservation as a national priority. The objectives of efficient water control management are to produce beneficial water savings and improvements in the availability and quality of water resulting from project regulation/operation. Balanced resource use through improved regulation should be developed to conserve as much water as possible and maximize all project functions consistent with project/system management. Continuous examination should be made of regulation schedules, possible need for storage reallocation (within existing authority and constraints) and to identify needed changes in normal

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regulation. Emphasis should be placed on evaluating conditions that could require deviation from normal release schedules as part of drought contingency plans (ER 1110-2-1941).

33 CFR §222.5 paragraphs (f) (8) and (9) states:

(8) In carrying out water control activities, Corps of Engineers personnel must recognize and observe the legal responsibility of the National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA), for issuing weather forecasts and flood warnings, including river discharges and stages. River forecasts prepared by the Corps of Engineers in the execution of its responsibilities should not be released to the general public, unless the NWS is willing to make the release or agrees to such dissemination. However, release to interested parties of factual information on current storms or river conditions and properly quoted NWS forecasts is permissible. District offices are encouraged to provide assistance to communities and individuals regarding the impact of forecasted floods. Typical advice would be to provide approximate water surface elevations at locations upstream and downstream of the NWS forecasting stream gages. Announcement of anticipated changes in reservoir release rates as far in advance as possible to the general public is the responsibility of Corps of Engineers water control managers for projects under their jurisdiction.

(9) Water control plans will be developed in concert with all basin interests which are or could be impacted by or have an influence on project regulation. Close coordination will be maintained with all appropriate international, Federal, State, regional and local agencies in the development and execution of water control plans. Effective public information programs will be developed and maintained so as to inform and educate the public regarding Corps of Engineers water control management activities.

33 CFR §222.5 paragraph (i) *Water control manuals for US Army Corps of Engineers projects.* (5) Each water control manual will contain a section on special regulations to be conducted during emergency situations, including droughts. Preplanned operations and coordination are essential to effective relief or assistance.

33 CFR §222.5 paragraph (j) *Policies and requirements for preparing regulations for non-Corps projects.*

(2) Water control plans will be developed and processed as soon as possible for applicable projects already completed and being operated by other entities, including projects built by the Corps of Engineers and turned over to others for operation.

33 CFR §222.5 paragraph (j) (10) All 33 CFR 208.11 regulations shall contain provisions authorizing the operating agency to temporarily deviate from the regulations in the event that it is necessary for emergency reasons to protect the safety of the dam, to avoid health hazards, and to alleviate other critical situations.

EM 1110-2-3600 10 October 2017, U.S. Army Corps of Engineers, ENGINEERING AND DESIGN, Management of Water Control Systems section 3.2 provides:

3.2. Principles and Objectives.

3.2.1. General.

3.2.1.1. The Corps is required to develop water control plans and may provide those plans to a non-Federal sponsor responsible for a project's O&M. The principal guidelines used to schedule project water management activities are discussed in this chapter. A water control plan:

a. Addresses the water management needs and methods required to meet congressionally authorized project purposes through water management operating criteria (e.g., regulation schedule or guide curve, minimum flow, optimum water level range, desirable discharge, drought contingency plan).

- 1. Considers all water management objectives (functional, environmental, social, and aesthetic) and various techniques, organizations, systems, and facilities involved in the water management of a Corps water resources project.*
- 2. Addresses reasonably foreseeable conditions and may include procedures to respond to hydrometeorological events in a timely manner or to avoid anticipated detrimental impacts.*
- 3. Outlines the process to deviate from normal operation.**

Section 3.2.5. Integrating Congressionally Authorized Project Purposes.

3.2.5.1. A water control plan contains operating criteria to meet congressionally authorized project purposes with flexibility to allow for adaptation to actual conditions. This requires an understanding of the extent of the authorized project purposes as defined in the planning studies and subsequent authorizing legislation, an identification and definition of constraints, a familiarity with design information, and the gathering of pertinent information. See Chapter 6 for information on techniques. The preparation of a water control plan also includes information from Federal, state, local, tribal, and other stakeholders, as appropriate, that may be affected by or may affect Corps water management activities.

3.2.5.2. Information presented in the previous paragraph allows for the identification of problems, opportunities, and capabilities for a project and existing non-project infrastructure necessary to develop a water control plan. For projects that have a non-Federal sponsor or are non-Corps projects, the process should include collaboration with the associated entities. The water control plan typically outlines the quantity, timing, and duration of water releases or storage associated with a project.

3.2.5.3. For a project with multiple authorized purposes, the water control plan may balance tradeoffs across multiple needs, since managing for one project purpose can affect the delivery of benefits for other purposes. For example, risk management for threatened or endangered species or public health and safety may be managed with a flexible operating plan that recommends allowable quantity, timing, and duration of water releases or storage for a project.

3.2.5.4. Once alternatives are identified, an iterative approach may be undertaken to predict and analyze the results and associated benefits and impacts. Chapter 6 includes related material. The impacts of preliminary operating criteria may require a request for input from Federal, state, local, and tribal organizations, other stakeholders, and the general public and a consideration of any responses. Responses may reflect existing constraints that become interrelated and typically evolve under specific circumstances such as physical, legal, political, social, and major conflicts between authorized project purposes.

3.2.6. Integrating Public Laws. In addition to the original congressionally authorized project purposes, Corps water resources projects are often subject to public laws enacted after the original authorization. Integrating post-project public laws into a water control plan typically involves a process similar to that discussed above for congressionally authorized project purposes.

3.7.3. New Water Management Objectives.

3.7.3.1. Water management goals now include environmental and social aspects of project regulation in addition to the basic public safety and economic functions for which water resources projects were originally authorized and constructed. The water management goals conform to relevant public laws that were enacted after the authorization of most existing water resources projects. The public laws require inclusion of certain aspects of environmental, fish and wildlife, and recreational uses in the management projects, or improvement of the environment of the rivers downstream through project regulation. The specific uses are determined from river basin investigations and are incorporated into the water control plan.

3.7.3.2. Re-evaluations of the water management criteria to meet authorized project purposes should be conducted, as necessary. Significant changes in policy procedures or other conditions may occur between the planning or design studies and the preparation of a detailed water control plan. Such changes should prompt implementation of a study program in connection with the development of water management operating criteria to refine the regulation through the use of additional basic data, authorized purpose requirements, and systems analysis techniques that became available subsequent to the planning and design studies.

CHAPTER 7 Real-Time Water Management

7.1. Basic Considerations. Corps offices have the responsibility to manage projects under Corps jurisdiction. Water management at Corps water resources projects is conducted in real-time, over the short-term, and in a way that addresses anticipated long-range effects. The water manager uses iterative, adaptive, real-time management of water resources projects to achieve congressionally authorized project purposes. Water managers must make informed real-time decisions based on observed conditions and on an understanding of location-specific cause and effect relationships. Water managers should revisit these decisions regularly to incorporate the latest information available. Experience with these decision processes helps develop abilities that are applicable to both short-term and long-term water management. Daily real-time water management prepares the water manager to make sound decisions during non-routine conditions such as floods.

7.1.1. Integration of Generalized Operating Criteria, System Analysis, and Water Management Activity Scheduling.

7.1.1.1. Chapter 3 discussed the methods used in developing regulation schedules and operating criteria for project or system water management as documented in the water control manual. These criteria represent the commitment to an assured water management plan based on congressionally authorized project purposes, environmental policy, project infrastructure considerations, operational constraints, state and local stakeholder agreements, and overall public health and safety. Consideration should be given to historic factors that could lead to reduced detrimental impacts or that could provide additional benefits to project purposes. The operating criteria are documented through such items as: seasonal guide curves, optimum water level range, downstream control points, drought contingency plans, and deviations from normal regulation.

7.1.1.2. Special situations or unanticipated conditions may arise during water management activities. These conditions may require that a certain degree of flexibility be maintained in the water control plan to adapt operating criteria. Any decision to deviate from the approved water control plan must follow the process outlined in ER 1110-2-240, Water Control Management.

CHAPTER 9, Preparation of Water Management Documents

9.3. Water Control Plans.

9.3.1. General. The water control plan guides water release decisions for a project. As outlined in ER 1110-2-8156, the water control plan is contained in Chapter 7 of the water control manual. An interim water control plan is required for the construction phase of a project; a preliminary water control plan is required once full-scale operations begin and before the approved water control plan is authorized; and an approved water control plan is required within 1 year after operation begins. If operations are desired outside the flexibility the plan provides then a deviation may be requested.

9.3.6. Approved Water Control Plans.

9.3.6.1. A final approved water control plan for Type III projects or a water control manual in final form for a Type III or IV project, as appropriate, should be prepared within 1 year after the project is placed in operation. The water control plan should be prepared using the outline in Exhibit A for Type III projects, or in ER 1110-2-8156 for Type IV or Type III projects that are part of a water resource system.

9.3.6.2. The initial water control plan and subsequent updates should be developed in close coordination with other agencies, such as local county emergency managers, city representatives, recreational interests, and applicable state departments. Development of the water control plan must also have a public involvement process. Appendix B to this manual contains partial lists of Federal Water Resources Management Laws. The developed plan must be reviewed by the appropriate division and headquarters offices before submission to the division commander or designee for review and approval.

9.3.6.3. IRRMs that require modifications to the Water Control Plan should follow the process outlined in ER 1110-2-1156, Safety of Dams – Policy and Procedures.

9.3.6.4. A deviation request from the approved water control plan must be submitted to the division commander or delegated party per ER 1110-2-240 for review and approval. If deviations are required because of permanent situations, the water control plan should be modified to reflect the necessary change.

ER 1110-2-8156, PREPARATION OF WATER CONTROL MANUALS, CHAPTER 7, Water Control Plan 7-15. Deviation from Normal Regulation. As stated in ER 1110-2-240 (Reference 4a), all water control manuals must contain provisions authorizing the operating agency to deviate from operations prescribed by the project's approved water control plan when necessary to alleviate critical situations or possibly to realize increased benefits during an operation season without significantly affecting the fulfillment of the project's authorized purposes. Deviations generally fall into three categories: Planned deviations, unplanned deviations, and emergency deviations. The deviation process as defined in ER 1110-2-240 (Reference 4a) and applicable MSC deviation regulations must be followed in all cases. The process should be described in this section along with any specific considerations associated with the subject project.

WATER CONTROL MANAGEMENT, ER 1110-2-240 30 May 2016

CHAPTER 1 Introduction

1-1. Purpose.

a. This Engineer Regulation (ER) prescribes policies governing water control management activities as required by Federal Law and directives, including the establishment of water control plans as appropriate, by the U.S. Army Corps of Engineers (USACE) at all USACE-owned and USACE-operated reservoirs, locks, dams, and other water control projects in which storage is operated and managed for authorized purposes such as flood control, navigation, and other uses. This ER also applies to USACE actions in developing water control plans and manuals or in operating non-USACE reservoirs, locks, dams, and other water control projects in which storage is operated and managed for flood control and navigation and subject to USACE direction pursuant to Section 7 of the Flood Control Act of 1944 or other law. This policy may also provide guidance in other cases where water resources infrastructure is similarly operated for flood control or navigation and subject to USACE direction through the establishment of water control or operational plans. Guidance on how to implement the policies contained herein is provided in other guidance documents, principally including but not limited to Engineer Manual (EM) 1110-2-3600, Management of Water Control Systems, as well as other guidance as applicable listed in Appendix A, while remaining subject to further updates in those listed references.

1-6. Scope of this Regulation.

a. This regulation is applicable to reservoir systems as well as single projects; and to both multipurpose and single-purpose projects.

b. The following types of reservoirs, dams, locks, and other water control projects, and systems of such projects, are covered by this regulation:

(1) All USACE-owned and operated reservoirs, locks, dams and other water control projects.

(2) Non-USACE water control projects authorized under legislative and administrative provisions described in paragraph 1-5b above.

(5) Projects constructed by USACE and turned over to other agencies or local interests for operation.

2-2. Objectives of USACE Water Control Management.

a. In general, the goal of water control management is to conform a project's operation to its authorizing legislation, to criteria defined in USACE reports prepared in the planning and design of a particular project or system, and applicable congressional acts relating to the purpose of federal facilities or systems. Water control plans shall be developed to accomplish this objective and any operational changes to the plan shall be done in accordance with any applicable review and approval requirements.

b. In some cases, a reservoir is authorized for a single purpose, and its operation and management is carried out for attainment of that purpose. However, in most cases, a project will be authorized for multiple purposes, and a water control plan will need to strike a balance among the use of water storage for all such purposes, including but not limited to flood risk management, municipal and industrial water supply, navigation, hydroelectric power, low flow augmentation, water quality, fish and wildlife protection, ecosystem management, and recreation. For multipurpose projects, operational priorities among these purposes under particular conditions, such as drought or high water, may need to be defined.

3-2. Water Control Plans.

a. Water control plans are developed to ensure that operations of reservoirs, locks and dams, re-regulation, and major control structures and interrelated systems conform to objectives and specific

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provisions of authorizing legislation and applicable USACE reports, including any applicable authorities established after project construction. For non-USACE projects see Chapter 4 for additional requirements. Water control plans are prepared with appropriate consideration of all federal laws that relate to the operation of federal facilities, as well as the requirements of water control manuals provided in paragraph 3-1 of this regulation and any application regulations. Thorough analysis shall be

b. Water control plans developed for specific projects and reservoir systems will be documented clearly in appropriate water control manuals. Water control manuals include coordinated regulation schedules for project/system regulation and any additional provisions required to collect, analyze, and disseminate data; prepare detailed operating instructions; assure project safety; and carry out regulation of projects in an appropriate manner. ER 1110-2-8156 provides guidance on the required content of water control manuals.

c. The water control plan, including any allocation of storage it describes, shall be designed to achieve all authorized purposes of the particular project, acting separately or in combination with other projects in a system, to the extent practical, in light of applicable law and existing conditions.

d. Water control plans shall be developed in consultation with all basin interests that are impacted or could be impacted by or have an influence on project regulation. Close coordination shall be maintained with all appropriate international, federal, state, regional, and local agencies and stakeholders in the development and execution of water control plans.

e. A water control plan shall define "normal operation". The definition of normal operation should be broad enough to incorporate usual and approved operational flexibility, but not so broad that any operation can be interpreted as normal. See Appendix F for the definition of operation. An operation that is not in accordance with the approved water control plan or manual or operations as prescribed by the approved water control plans or manual constitutes a deviation (see Appendix F).

f. The water control plan shall account for changes in post-project downstream conveyance efficiency and the need for periodic flushing flow releases.

g. Revisions and updates may incorporate upstream and downstream environmental flow objectives when compatible in accordance with authorization and approved purposes. Environmental flow may include both operational and structural modification of USACE facilities to improve the ecological sustainability of riverine systems.

j. Water control plans should be reviewed no less than every 10 years and shall be revised as needed in accordance with this regulation.

(1) The development of water control plans continues as new information becomes available during project implementation. Water control plans will be revised as necessary to conform with changing requirements resulting from developments in the project area and downstream, improvements in technology, improved understanding of ecological response and ecological sustainability, new legislation, reallocation of storage, new regional priorities, changing environmental conditions and other relevant factors. At any time during project implementation, it may be appropriate to revise the water control plan.

(2) To keep water control plans up to date, personnel from the water control office responsible for regulation of each project shall periodically review the plan for each project. These personnel will be professionally qualified in the technical areas involved and familiar with comprehensive project objectives and other factors affecting water control management.

(3) Close coordination with basin interests and stakeholders, as described in d above, is required throughout the water control plan revision process.

(4) Significant, recurrent or prolonged deviations from operations prescribed by an approved water control plan may indicate a need for a formal change to operations prescribed by an approved water control plan. The division commander should evaluate whether revision of the approved water control plan is appropriate in such a case. Deviations that impact the fulfillment of authorized purposes, that occur in three or more consecutive years, or that occur more than three times within a five-year period must be fully coordinated with CECW-CE.

(5) Significant modifications to completed projects may require a feasibility study and authorization by Congress with the associated requirements for compliance with all Federal laws and directives. ER 1165-2-119 contains additional guidance on considerations for modifications to multipurpose projects. Minor changes to authorized storage may require a study in accordance with the Water Supply Act. Additional guidance for projects modifications with respect to dam safety can be found in ER 1110-2-1156. All of these issues should be fully coordinated with the Office of Counsel and CECW-CE.

k. Water control plan development, revisions, and updates shall consider USACE Environmental Principles in accordance with authorization and approved purposes and comply with NEPA, the Endangered Species Act (ESA), and related laws and regulations. Changes to a water control plan that could impact the fulfillment of authorized purposes or could result in operations which do not fall within existing authorities may require a feasibility or reallocation study. Any change to the water control plan requires compliance with applicable environmental requirements to address the extent of impacts and it is incumbent upon the USACE office with responsibility for the project to make that decision on a case by case basis regardless of the magnitude of the change. The review requirements for all water control manuals and plans supported by NEPA or other environmental documentation are addressed in Engineering Circular (EC) 1165-2-214.

3-4. Deviation from the Approved Water Control Plan.

a. All water control manuals shall contain provisions authorizing the operating agency to deviate temporarily from operations prescribed by the project's approved water control plan when necessary to alleviate critical situations or possibly to realize increased benefits during an operation season without significantly affecting the fulfillment of the project's authorized purposes. A risk and uncertainty analysis shall be performed to determine potential consequences of the deviation. These shall be evaluated to determine appropriate course of action. Deviations generally fall into three categories: planned deviations, unplanned deviations, and emergency deviations. Each division with is responsible for establishing guidance as outlined in ER 1110-2-1400 with respect to water control management policy. This could include establishing definitions for minor and major deviations and approval processes. Regardless of the category of deviation it is imperative to adhere to the objectives of water control management as outlined in paragraph 2-2 and the tenets of safe evacuation of impounded water in paragraph 3-3. Any deviations must be consistent with the project authorization and within existing authorities.

h. Significant, recurrent or prolonged deviations from operations prescribed by an approved water control plan may indicate a need for a formal change to operations prescribed by an approved water control plan. The division commander should evaluate whether revision of the approved water control plan is appropriate in such a case. Deviations that impact the fulfillment of authorized purposes, that occur in three or more consecutive years, or that occur more than three times within a five-year period must be fully coordinated with CECW-CE.