1. PROJECT PURPOSE AND NEED

1.1. PROJECT AUTHORITY

1.1.1. INITIAL AUTHORIZATION.

The Upper St. Johns River basin is part of the overall project for Central and Southern Florida which was first authorized by the Flood Control Act of 1948 approved 30 June 1948 (Public Law 858, 80 Congress, 2nd Session)+ That authorization included most of the works in the southern third of the state, but did not include any works in the Upper St. Johns River Basin. Remaining works of the Comprehensive Plan for Flood Control and other purposes for Central and Southern Florida, including all works in the Upper St. Johns River Basin, were authorized by the Flood Control Act approved 3 September 1954 (Public Law 780, 83rd Congress, 2nd Session) and are presented in House Document 643, 80th Congress, 2nd Session.

1.1.2. PREVIOUS NEPA DOCUMENTATION

The Corps completed Part III, Upper St. Johns River Basin and Related Areas; Supplement 2 General Design Memorandum, Upper St. Johns River Basin Addendum III with Draft Environmental Impact Statement in 1986. The Final Environmental Impact Statement (FEIS) was filed with United States Environmental Protection Agency (EPA) and a Notice of Availability (NOA) was published in the Federal Register on January 3, 1986. The Record of Decision (ROD) was signed on September 4, 1986.

1.2. PROJECT LOCATION

The Upper St. Johns River Basin Project is located near the coast in southeast Florida. Project features considered by this document are located in Brevard County between highway U.S. 192 and the Indian River County line (see figure 1, project location and plan view).

1.3. PROJECT HISTORY

The flood control plan for the Upper St. Johns River Basin was authorized by the Flood Control Act of September 1954. Project design changes occurred in 1957, 1962, and 1969. Construction of the flood control project was started in 1966 but halted in 1972 pending preparation of a more comprehensive Environmental Impact Statement. In 1974, the State of Florida withdrew its support of the project over environmental concerns, and construction of the project was halted

indefinitely. State passage of the Water Resources Development Act of 1972 resulted in the creation of the St. Johns River Water Management District (SJRWMD), which assumed responsibility for water management in the project area in January 1977. In 1978, the SJRWMD rejected the concepts of the original project and initiated development of a new conceptual flood control plan for the Upper St. Johns River Basin. This plan was completed in 1980 and submitted to the U.S. Army Corps of Engineers (Corps) for technical review. Numerous technical discussions between the Corps and the SJRWMD occurred between 1980 and 1984. The Corps was asked to undertake a design review of the final plan in 1983. In June 1985, Part III, Upper St. Johns River Basin and Related Areas; Supplement 2, General Design Memorandum, Upper St. Johns River Basin Addendum III with Draft Environmental Impact Statement (GDM) recommended Federal Actions that should be taken with regard to both the constructed, and unconstructed portions of the newly authorized plan. The Corps of Engineers Chief of Engineers approved this plan in 1986 and construction of the revised Upper Basin Project was resumed in 1988. Currently all project features south of the Fellsmere Grade are complete and construction is progressing on the eastern boundary of the project between the Fellsmere Grade and highway US192 (L-74N).

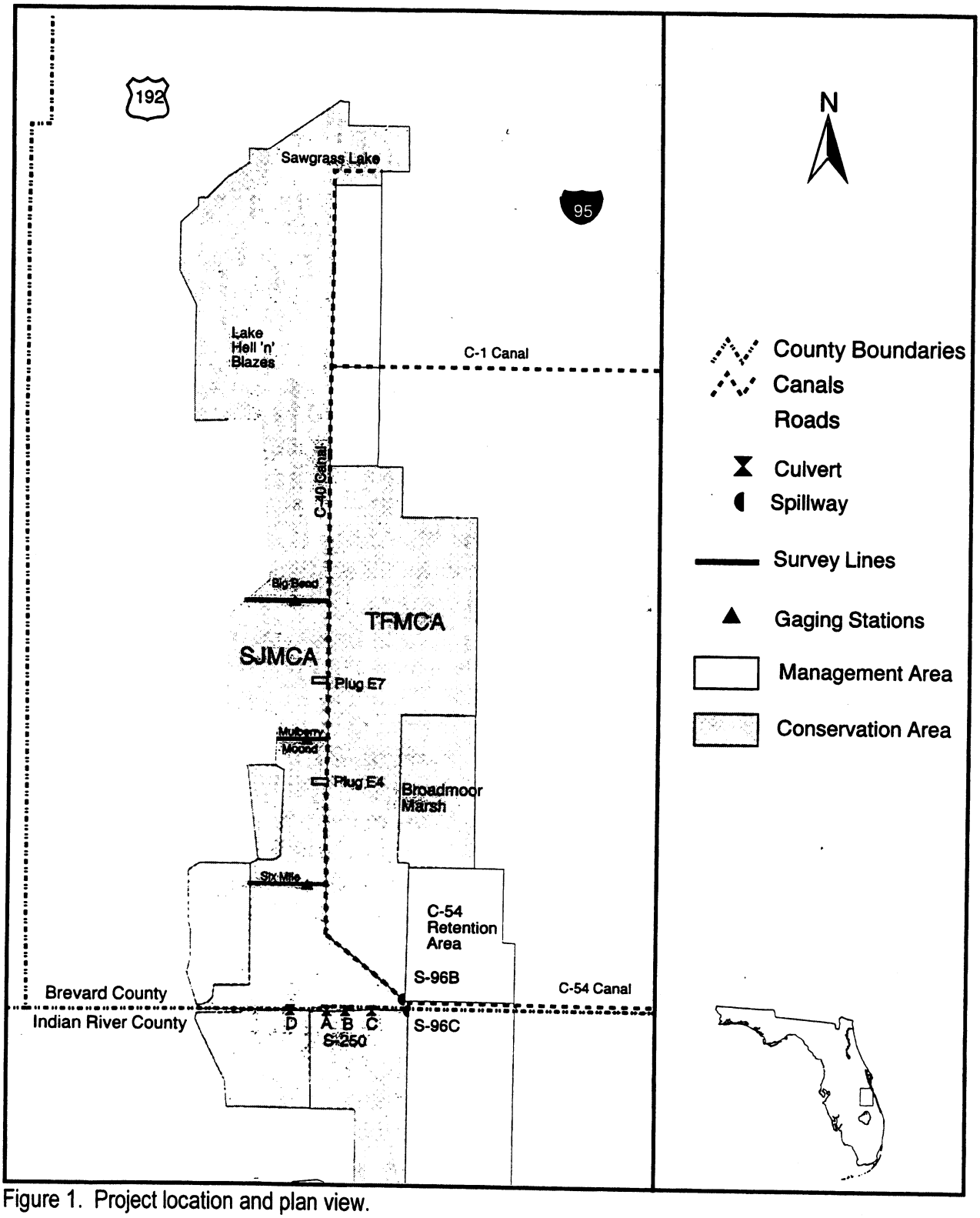

Figure 1. Project location and plan view.

1.4. PROJECT NEED OR OPPORTUNITY

In the 1985 GDM, the Three Forks Marsh Conservation Area (TFMCA) was included under the section describing plan components north of the Fellsmere Grade. It was not considered as a separate management unit of the USJRBP. Under the selected alternative in the GDM, approximately 10,000 acres of former floodplain located immediately north of the Fellsmere Grade would be connected to the existing marsh by a series of gaps in the levee that separates the two areas (Figure 2). Further, plugs constructed in the main drainage canal (Canal C-40) would divert water through these gaps and help prolong flooding of the remaining natural marsh.

The GDM recognized that even with the canal plugs and an increase in in-flows brought about by the project, the selected plan would drastically lower water levels on the natural marsh located immediately downstream of the Fellsmere Grade (Figure 2). This decline in water levels was attributed to the large water storage capacity provided by the reconnected floodplain. This storage capacity was augmented by the fact oxidation and loss of organic soils resulting from drainage had caused ground elevations in the former floodplain to decline several feet from pre-drainage levels (subsidence). Although details were not presented, the GDM also acknowledged that hydrologic modeling had indicated that to maintain an acceptable hydrologic regime in the remaining natural marshes just north of the Fellsmere Grade, these marshes would have to be segregated from the reconnected floodplain during low-flow conditions (Brooks and Lowe 1984). Segregating the areas during low-flow conditions however, would result in ponded storage in the northern portion of the reconnected floodplain. To allow for potential drawdown of the impounded area, culvert Structure S-257 was included in the GDM design. Several different approaches for segregating the reconnected floodplain from the remaining marshes during low-flow conditions are discussed in Brooks and Lowe (1984).

After publication of the draft GDM in 1985, the SJRWMD continued hydrologic modeling efforts to attempt to create a project design for the area north of the Fellsmere Grade that optimized environmental benefits while continuing to meet flood control constraints. The major environmental goal of this effort was to create a design that assured appropriate flooding of the entire natural marsh during low-flow conditions. Subsequently, the area of the floodplain to be reconnected was named the Three Forks Marsh Conservation Area (TFMCA), while the remaining natural marsh was named the St. Johns Marsh Conservation Area (SJMCA).

During this period other modifications to original project design also occurred. In January 1989 the St. Johns River Water Management District Governing Board approved realignment of the eastern project levee (Levee L-74N) to include an additional 2,469 acres of former floodplain that had been purchased to the east of the original project. The purpose of this addition was to increase floodwater storage capacity and to enhance environmental benefits of the project. The Corps of Engineers approved the revised alignment of levee L-74N to include this area by letter to the SJRWMD dated 23 May 1989 (Appendix A).

In November 1991 the SJRWMD sent to the Corps for review a conceptual design for the TFMCA that included a levee (Levee L-74NA) completely separating the TFMCA and the SJMCA. Inflows to the TFMCA would occur over a 500-ft weir located shortly downstream from Structures S-96B and S-96C (Appendix A). Outflow from the TFMCA would occur over a 1,500-ft weir located downstream near the Three Forks Run of the river (River Mile 273) and through Structure S-257. The plan recommended the capacity of S-257 be increased to 200 cfs. For the first time, specific environmental goals were established for the TFMCA. These goals recognized the ecological value of operating the TFMCA as a single hydrologic unit. The environmental goals attempted to maximize restored marsh acreage, but also established minimum water level requirements for protecting the aquatic community expected to develop in the deeper, more permanently flooded areas. A primary concern was that water levels not fall to a level at which fish kills could be expected to occur on a frequent basis. This design, under which 50% of the total combined discharge from the St. Johns Water Management Area (SJWMA) and the Blue Cypress Marsh Conservation Area (BCMCA) would be diverted from the SJMCA into the TFMCA, became known as the 50/50 split alternative. This alternative was the preferred alternative proposed by the SJRWMD to the Corps until 1996.

In the mid 1990's, information from the Everglades began to be published that indicated that naturally low-nutrient wetlands, such as those found in the USJRBP, are extremely sensitive to nutrient inputs. Recognizing that projected nutrient loading rates from the St. Johns Water Management Area could adversely affect remaining downstream wetlands, the SJRWMD began to investigate ways to divert more of the discharge from S-96B into the open-water area of the TFMCA. The basis for this was that deeper open water environments could assimilate larger nutrient loads than wetlands without detrimental effects because of more thorough mixing in an open water environment and lower biological sensitivity to increased phosphorous. Using both hydrologic and water quality modeling, new alternatives for the TFMCA were considered.

On October 5 1995, the SJRWMD sent to the Corps a new conceptual design for the TFMCA that separated the discharges from S-96B and S-96C to allow S-96B to discharge directly into the TFMCA. To facilitate discharge from S-96B, the design also included a flow-way to route S-96B discharges to the deeper water areas of the TFMCA. Under this alternative, all environmental hydrologic criteria and water quality goals established for both the SJMCA and the TFMCA were met. In May 1996, the SJRWMD Governing Board approved this new alternative as the recommended alternative for the TFMCA. The Governing Board also approved a conceptual surface water management plan for the Water Control District of South Brevard County in order to improve the condition of storm water discharges into the Indian River Lagoon. The conceptual plan included an additional realignment of L-74N to form the Sawgrass Lakes Water Management Area. The alignment change resulted in the removal of approximately 640 acres of the original TFMCA for inclusion in the C-1 Retention Area. These recommended modifications were sent to the CORPS on May 23, 1996.

Although the SJRWMD Governing Board had selected a design that separated S-96B and S-96C as the Preferred Alternative, detailed hydrologic modeling of various operational schemes for the TFMCA out-flow structures continued. On August 5 1997, the SJRWMD sent to the Corps for review hydrologic results of a plan that called for the outflow weir to have a reduced length of 600 ft along with a lower crest elevation of 20.0ft NGVD. To meet environmental objectives, S-257 discharged down to 18.0ft NGVD when water levels were below the crest of the weir. In September 1998, the SJRWMD modified this design by increasing the weir crest height to 21.0ft NGVD and stopping S-257 discharges at 18.5ft NGVD. In the fall of 1998 additional modeling incorporated new topographic survey information for both the TFMCA and the SJMCA and a new Preferred Alternative incorporating this updated information was completed in February 1999. In August 2001, the Preferred Alternative for the TFMCA was again modified to fulfill a request by the CORPS to lower the outflow weir crest back to 20.0 ft NGVD to protect existing project levees from water depths and durations that exceeded design conditions and, to account for the transfer of an additional loss of 320 acres of the TFMCA to the C-1 Detention Area. This additional acreage was needed to maximize flood control benefits of the C-1 Project and, to reduce peak stages during major storm events south of Malabar Road in the western portion of the Melbourne Tilman Water Control District.

In accordance with the National Environmental Policy Act, this document provides an Environmental Impact Statement describing and assessing recommended project modifications from the 1985 General Design Memorandum including an analysis of the alternatives considered.

1.5. AGENCY GOAL OR OBJECTIVE

1.5.1. OBJECTIVES

The objectives of the proposed project modifications are to preserve and enhance floodplain and aquatic habitats, provide and/or protect conveyance of water discharged downstream through Structures S-96B and S-96C, decrease the probability of significant freshwater discharges to the Indian River Lagoon and improve water quality.

1.5.2. PROPOSED ACTION

To meet environmental and water control objectives simultaneously, a number of structural modifications were considered. The proposed action, or Preferred Alternative, consists of separating discharges from S-96B and S-96C so that S-96B discharges directly into the TFMCA while S-96C continues to discharge directly into the SJMCA (Figure 3). This will eliminate the need to create either several gaps or one major weir structure in the C-40 levee to divert floodwaters into the TFMCA. The TFMCA will operate as a single unit. An existing channel downstream of S-96B in the TFMCA will be improved to provide a conveyance channel from the structure. This channel will be separated from the TFMCA marsh by a low berm to reduce potential negative water quality impacts to the wetlands. Unregulated outflows from the TFMCA to the SJMCA will occur over a 600-ft weir with a crest elevation at 20 ft NGVD located near River Mile 273 (Figure 3). Structure S-257 will be enlarged to consist of two 60-inch culverts. When water levels in the TFMCA are below the crest height of the weir, S-257 will remain fully open until water levels fall to 19.0 ft NGVD or below. Discharges through S-257 will then be reduced 20% per day for five days until the structure is closed. S-257 will be closed when water is being discharged over the top of the weir. To provide low flow augmentation for Lake Washington, 30 cfs will be released through S-257 whenever water levels in the TFMCA are greater than 14.0 ft NGVD and water levels in Lake Washington is below 13.5ft NGVD and discharges into the lake under US 192 at less than 30 cfs.

Two canal plugs with operable gate structures capable of discharging up to 100 cfs each will be constructed in the C-40 Canal in the SJMCA. Canal Plugs will be located at the current plug locations E-4 and E-7 (Figure 3). Culverts in both canal plugs will be fully opened during the dry season months of April, May and June. Culverts would be closed during the other 9 months of the year.

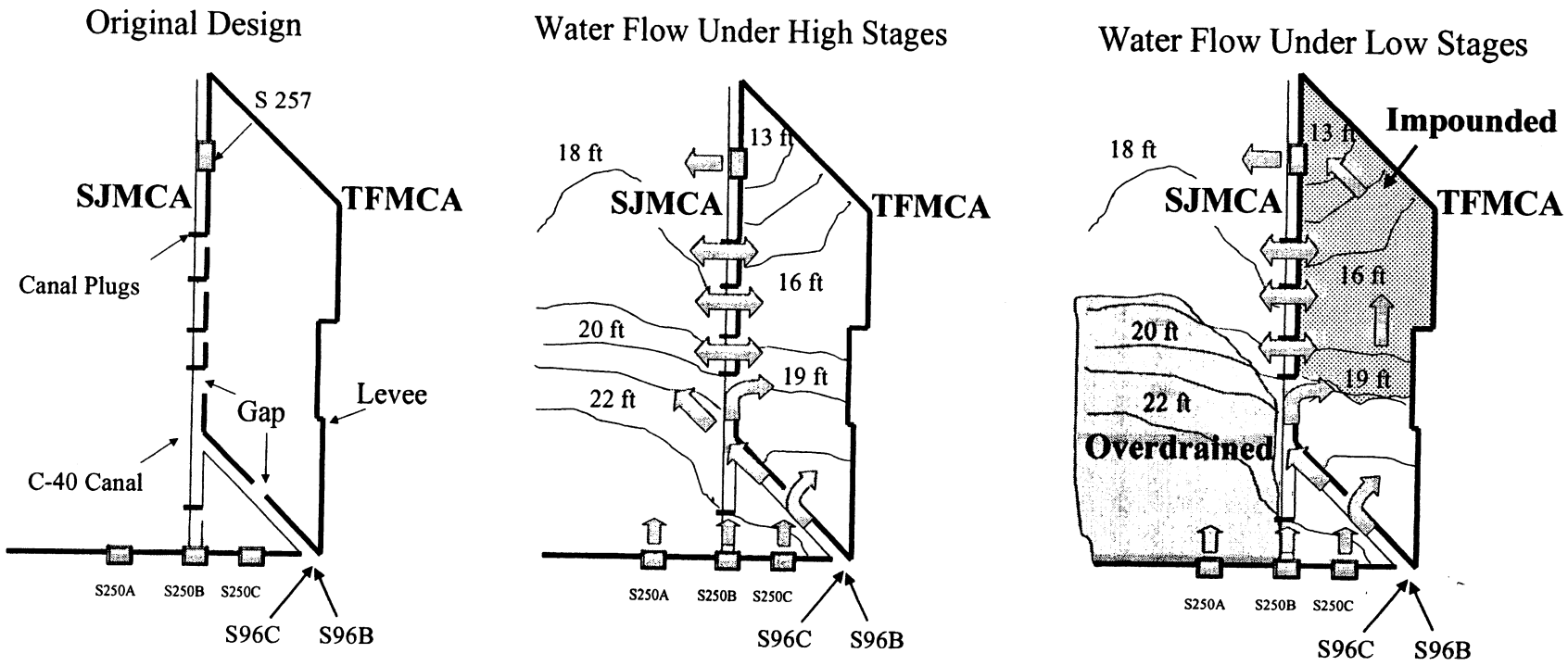

Figure 2. Schematic diagram of the original TFMCA design outlined in the GDM. Under high discharge conditions (e.g. when water stages exceed 22ft NGVD), water levels would equalize between the TFMCA and the SJMCA. However, under low discharge conditions (e.g. water stages fall below 20ft NGVD), water would drain to the east toward the lower ground elevations in the TFMCA. This diversion of all water to the east would cause prolonged overdrainage of the upstream reaches of the SJMCA. In addition, under this design the lower areas of the TFMCA would still be permanently impounded.

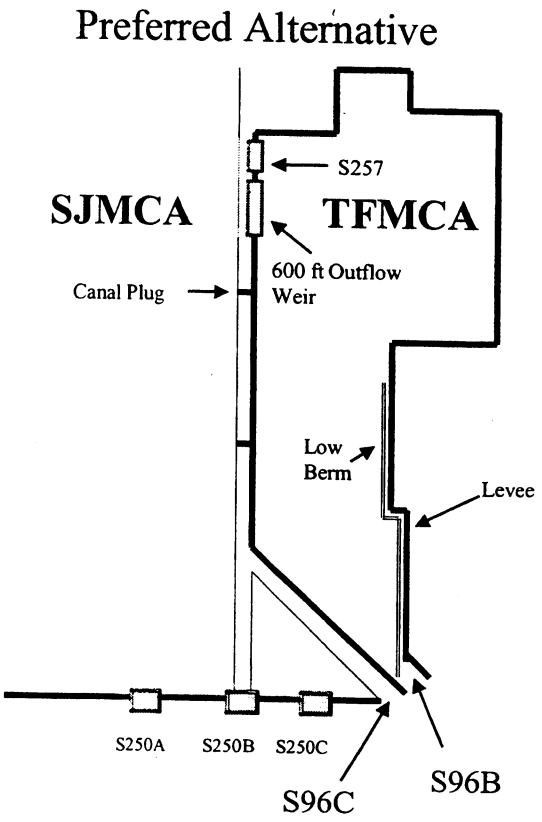

Figure 3. The Preferred Alternative.

1.6. RELATED ENVIRONMENTAL DOCUMENTS

The following is a list of related environmental documents:

a. Upper St. Johns River Basin Surface Water Management Plan, Volume 2. St. Johns River Water Management District, Palatka FL. 500 pp.
b. U. S. EPA clean lakes program, Phase I diagnostic-feasibility study of the upper St. Johns River chain of lakes. Volume I: Diagnostic study. Technical Publication SJ84-15, St. Johns River Water Management District, Palatka FL. 118 pp.
c. U. S. EPA clean lakes program, Phase I diagnostic-feasibility study of the upper St. Johns River chain of lakes. Volume II: Feasibility study. Technical Publication SJ84-15, St. Johns River Water Management District, Palatka FL. 72pp.

d. Central and Southern Florida Project for Flood Control and Other Purposes Part III, Upper St. Johns River Basin and Related Areas; Supplement 2, General Design Memorandum, Upper St. Johns River Basin Addendum III with Draft Environmental Impact Statement. U. S. Army Corps of Engineers, Jacksonville District. June 1985.
e. Preliminary water control manual central and southern project for flood control and other purposes Upper St. Johns River Basin. U.S. Army Corps of Engineers, Jacksonville District. September 1991.
f. Interim environmental water management plan for the Upper St. Johns River Basin Project. St. Johns River Water Management District, Palatka FL. 1996 54pp.

1.7. DECISIONS TO BE MADE

This Environmental Impact Statement will evaluate whether to modify Upper St. Johns River basin project features north of the Fellsmere Grade to provide enhanced flood control capabilities while protecting and enhancing the natural resources of the basin and, if so, to evaluate alternatives considered to accomplish that goal.

1.8. SCOPING AND ISSUES

A letter dated 22 February 1999 initiated scoping for the proposed project modification. A Notice of Intent (NOI) to prepare a Draft Environmental Impact Statement appeared in the Federal Register on October 18, 1999. Copies of the scoping letter and the NOI were distributed to the appropriate Federal, State and local agencies, appropriate city and county officials, and other parties known to be interested in the project. Copies of the scoping letter, NOI, the list of addressees used for distribution, and letters of response are included in Appendix C Pertinent Correspondence.

1.8.1. ISSUES EVALUATED IN DETAIL

The following issues were identified during scoping and by the preparers of this Environmental Impact Statement to be relevant to the proposed action and appropriate for detailed evaluation:

a) Flood Control and Water Conveyance Issues
b) Hydrology impacts to existing and projected biological communities
c) Water Quality
d) Impacts to the Indian River lagoon
e) Threatened and endangered species
f) Fish and Wildlife Coordination Act

1.8.2. IMPACT MEASUREMENT

The following provides the means and rationale for measurement and comparison of impacts of the proposed action and alternatives.

1.8.2.1. Flood Control and Water Conveyance

Structures S-96B and S96-C are the two major outlet structures for the St. Johns Water Management Area (SJWMA) and the Blue Cypress Marsh Conservation Area (BCMCA), respectively (Figure 1). The design Standard Project Flood (SPF) discharge capacities of these two structures are 1,000 cfs and 1,500 cfs, respectively (Table 1). Currently, because of the constricted downstream channel, flood control discharges from S-96B and S-96C are severely restricted. Because of this restriction, flood control discharges from the two structures often have to be staggered between them to bring both the SJWMA and the BCWMA down to regulation schedule simultaneously. Figure 4 shows an example from the summer of 1994 when flood control discharges through S-96C created reverse flow conditions at S-96B. As a result, flood control discharges through S-96B could not be made even though water levels in the SJWMA were above the flood control regulation schedule.

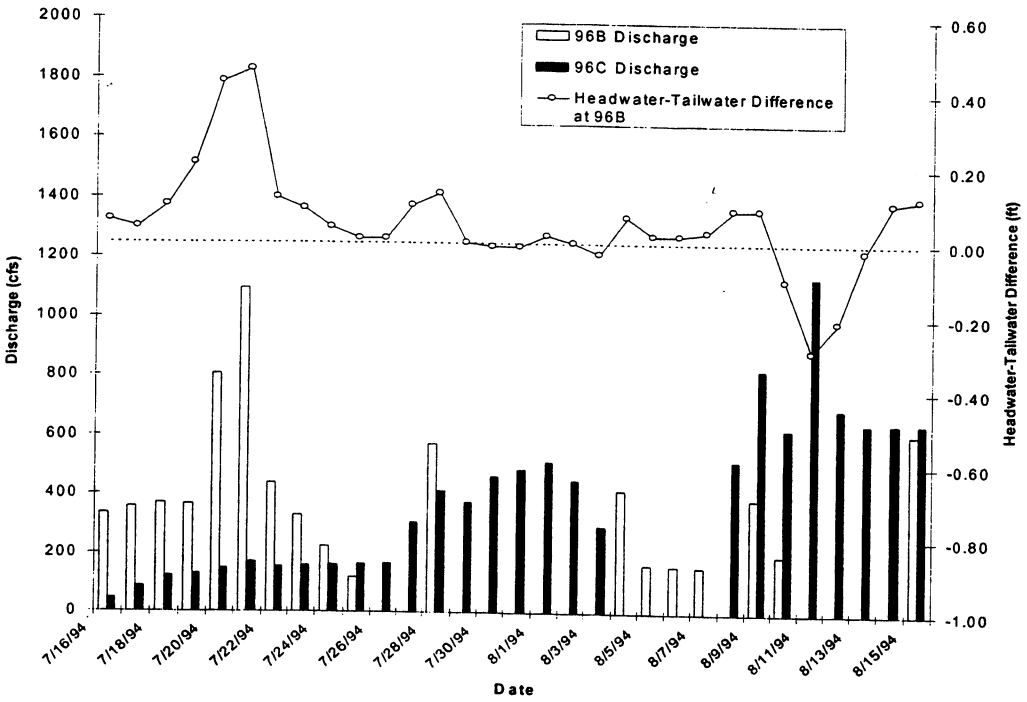

Figure 4. Discharges from structures S-96B and S-96C during July - August 1994 versus the headwater-tailwater difference at S-96B. Upstream water levels exceeded flood control regulation schedules at both structures. When the headwater-tailwater difference at S-96B is negative, such as occurred on August 12, conditions exist for reverse flow at S-96B and flood control discharges through this structure cannot be made. Consequently, because of this tailwater effect, discharges have to be staggered between S-96B and S-96 to maintain upstream flood control levels.

In the 1985 GDM, plans for several gaps in the levee separating the TFMCA and the SJMCA immediately downstream of the structures would have provided the required conveyance and lowered tailwater conditions. In subsequent proposed project modifications a 500-ft weir replaced these gaps. The current plan to divert S-96B directly into the TFMCA will eliminate the need for either downstream gaps or a weir. It is also likely that other channel improvements such as the creation of a getaway channel downstream would further improve tailwater conditions.

Impacts to the flood control and water conveyance aspects of the Upper Basin Project of various alternatives can be predicted based on a hydrologic routing model. By comparing upstream and downstream stages predicted from model, the impacts of the alternatives can be evaluated. It is our goal to select an alternative that provides maximum flood control and water conveyance benefits to the basin. Maximum water conveyance benefits include facilitating discharges from S-96B and S-96C so that both structures can be opened simultaneously to bring water levels in the SJWMA and BCMCA down to their respective flood control elevations without having to continuously stagger discharges.

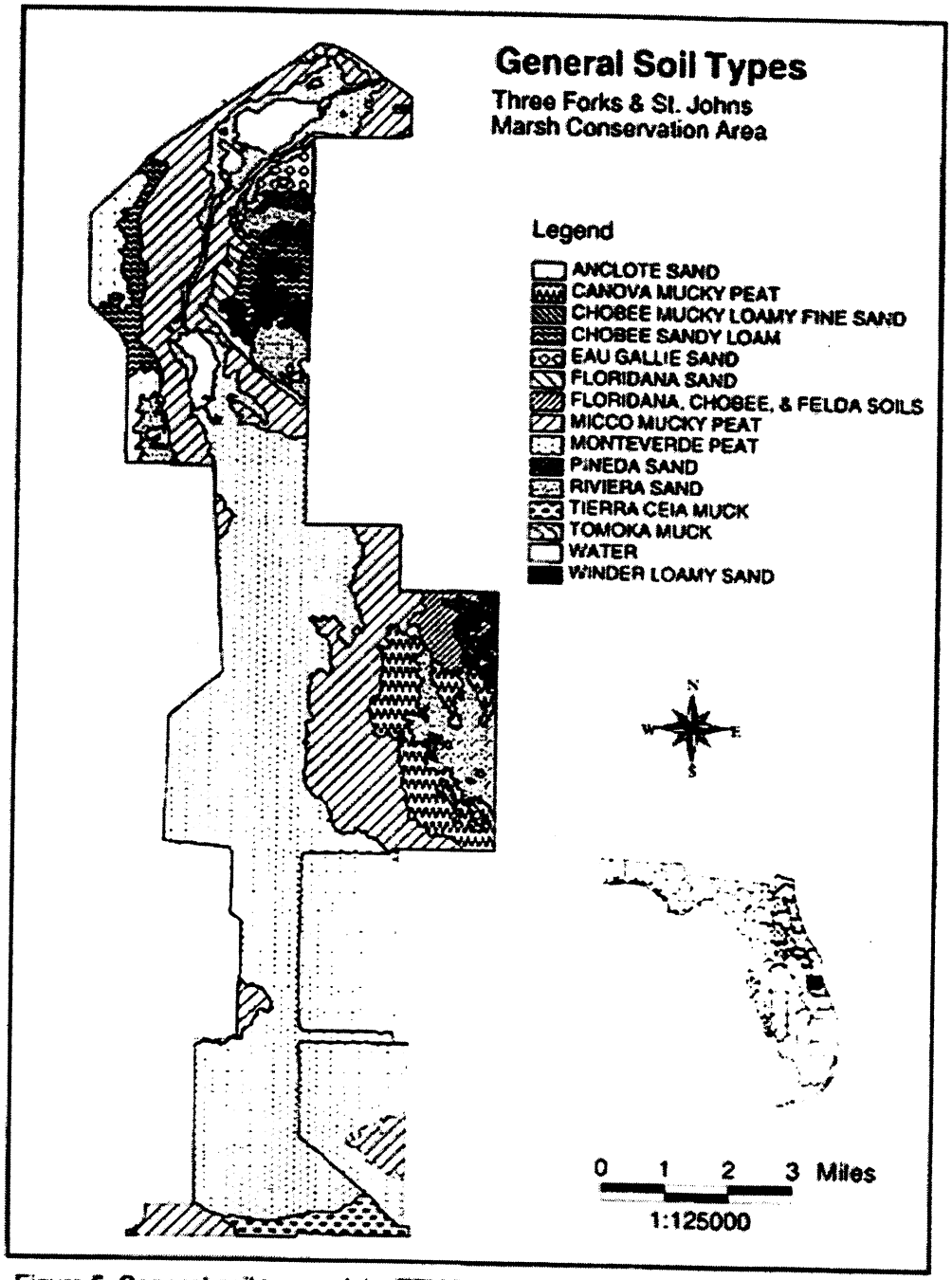

Figure 5. General soil types of the TFMCA and SJMCA. 13

Table 1. Designed Standard Project Flood (SPF) conditions for structures S-96B and S-96C.

	S-96B	S-96C
SPF DISCHARGE, CFS	1,000	1,500
HEADWATER, FT. NGVD	25.1	25.2
TAILWATER, FT. NGVD	24.7	24.6

1.8.2.2. Hydrology Impacts to Biological Communities

Impacts to existing biological communities in TFMCA and SJMCA under the alternatives were predicted based upon an analysis of water level statistics derived from hydrologic modeling. Water level statistics used in this analysis were mean

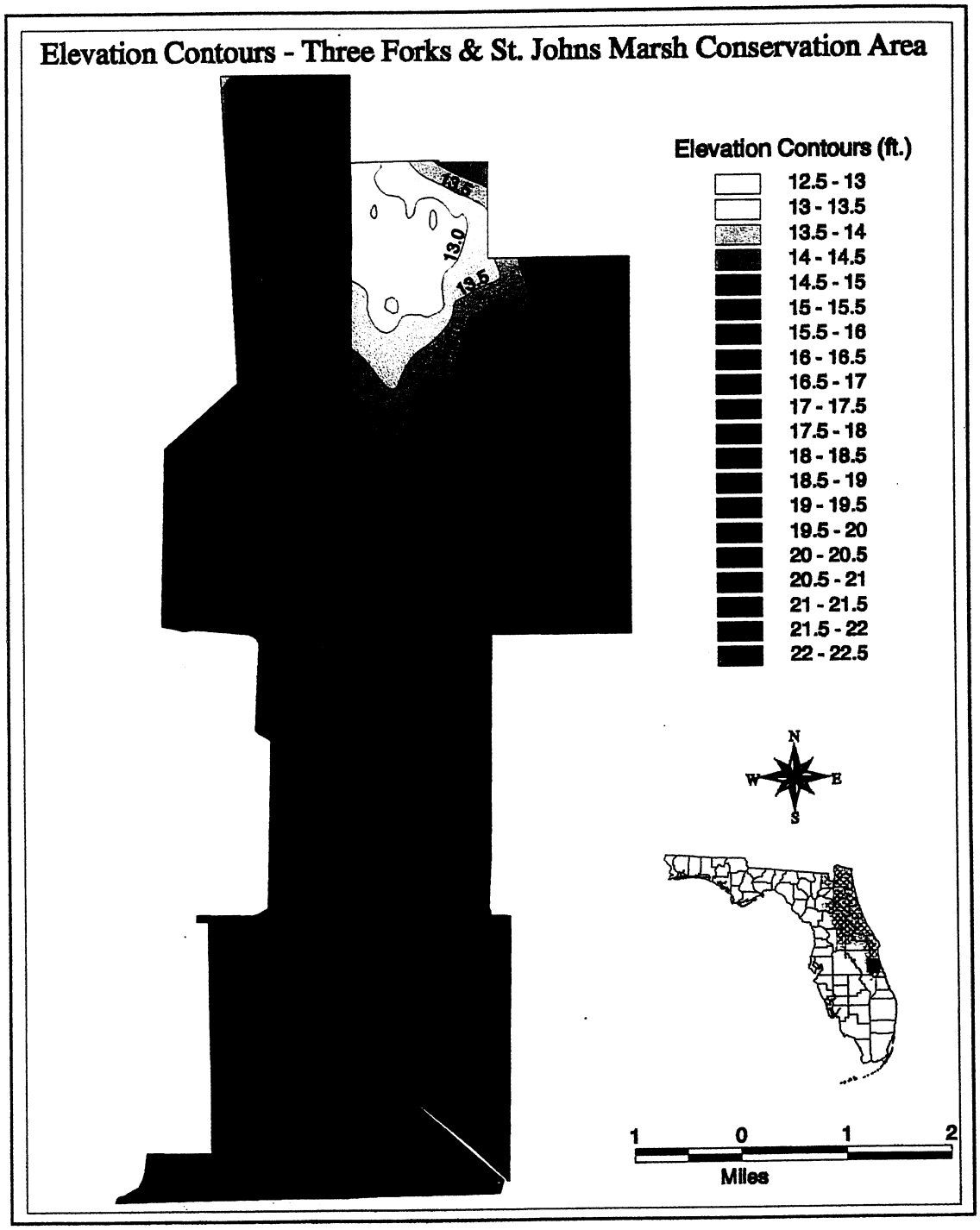

Figure 6. Topographic map of the project area.

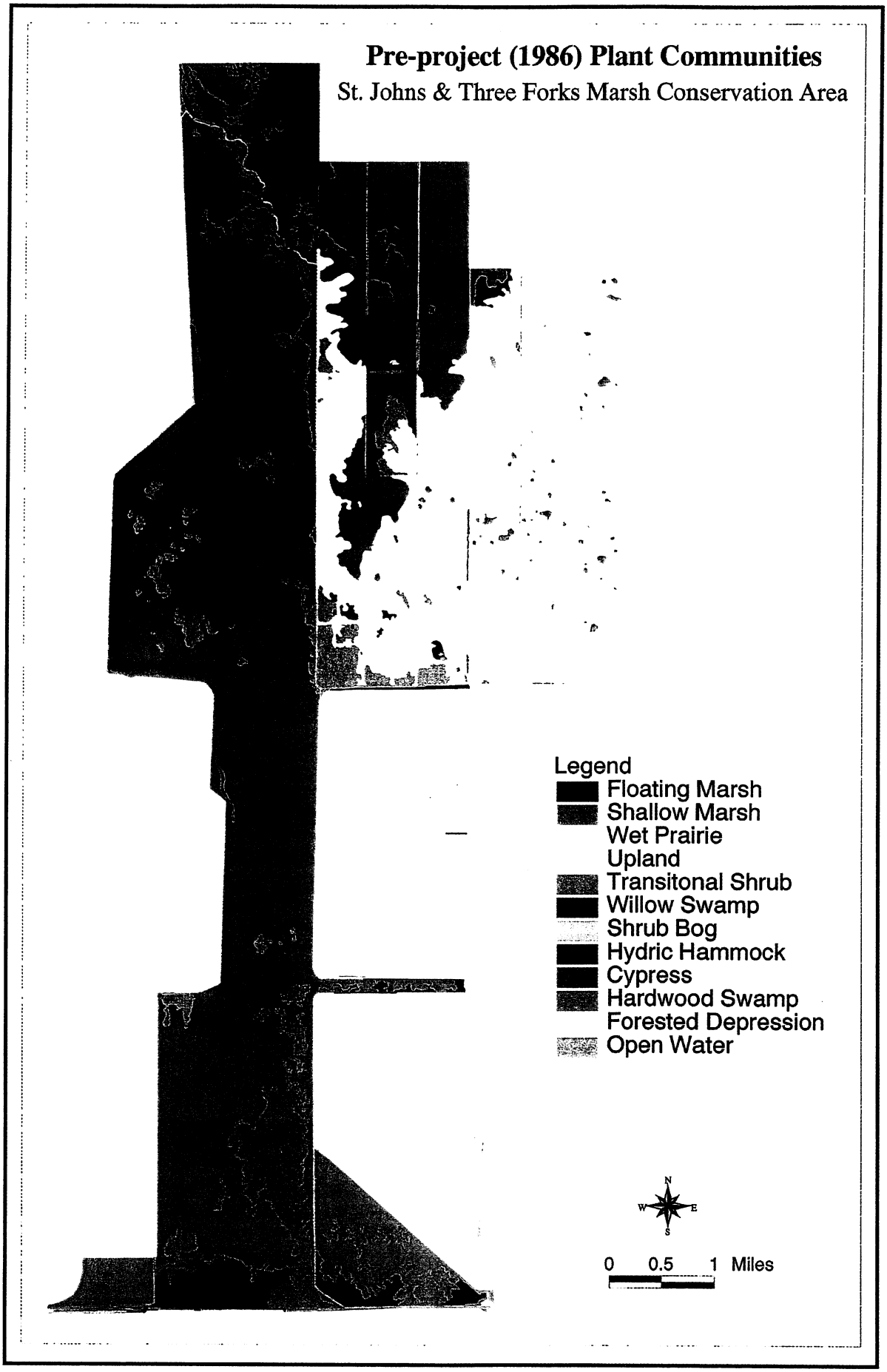

Figure 7. Plant community map generated from 1986, 1:24,000 scale aerial photographs.

depth, inundation frequency, maximum depths, minimum depths, magnitude of water-level fluctuation, timing of water level fluctuation, and water level recession rates (Miller et. al 1996). The environmental goal of this project is to re-create the maximum acreage of functional aquatic habitat in TFMCA, while restoring all the aspects of a natural hydrologic regime to SJMCA

Recognizing that loss of organic soils to oxidation in the TFMCA will result in the creation of a significant acreage of deep-water habitat upon flooding, criteria were also developed to protect the sport fishery that is expected to develop in this area. Both design and operation plans attempt to reach a balance in TFMCA between prevention of frequent extreme low-water events that could cause fish kills, and the need for low water to establish and maintain emergent wetlands.

1.8.2.3. Water Quality

Phosphorous concentration is the primary water quality variable of concern. One goal of this project is to meet or exceed Class I water quality standards for the discharge of phosphorous as established by the Florida Department of Environmental Protection. These standards specify that nutrient releases into Class I water bodies must be at level such that they will not cause an "imbalance to native aquatic flora and fauna". Historically, wetlands have been viewed as valuable for nutrient removal because they have a high nutrient assimilative capacity. Recent studies, however, have demonstrated that natural low-nutrient marshes, such as those found in the Upper Basin, are extremely sensitive to increased nutrient levels. Responses include vegetation species shifts such as cattail proliferation (Urban 1993; Debusk et. al 1994; Davis 1994), changes in algal species composition and production (Browder et al. 1994; McCormick et al. 1996), and decreases in benthic macroinvertebrate abundance diversity (Davis 1994). Nutrient inputs to a wetland have the largest impact near the input site and nutrient effects decrease with increasing distance from this point (Kadlec 1985; Lowe and Keenan 1997). In lakes, however, nutrient inputs are mixed throughout the entire lake and the effects are widespread and generalized. The difference in mixing between lakes and wetlands means that identical nutrient loadings in a lake and a wetland may have very different effects. This difference in mixing between lakes and wetlands, along with a realization of the greater nutrient sensitivity of our natural remaining wetlands, directed our approach for improving water quality in the Upper Basin. Wetlands in the Upper St. Johns River Basin should not be degraded to improve downstream water quality if other opportunities to meet the water quality goals are available. Specifically, large deep-water areas can assimilate larger nutrient loads than wetlands without detrimental effects. To evaluate the impacts of the various alternatives on water quality, we used two different modeling approaches dependent upon whether or not discharge to the TFMCA was predominately to wetlands, or, to a

significant acreage of deep-water. For the discharge to wetlands, water quality and its impacts was modeled using a first-order decay, plug-flow model to describe a pattern of decrease in the phosphorous concentration of inflows as a function of time (Lowe and Keenan 1997). For modeling the impacts on deeper-water areas, a time-dependent Vollenweider model (Reckhow and Chapra 1983) was used. Our goal was to accept a design that would achieve the needed nutrient goals for TFMCA and the downstream river lakes without causing detrimental loading effects to either wetland areas of TFMCA and SJMCA, or the deep-water areas of TFMCA.

1.8.2.4. Impacts to the Indian River Lagoon

Large freshwater discharges to the Indian River Lagoon through the C-54 Canal may increase turbidity and alter salinity regimes resulting in adverse impacts to oyster beds, clam-flats, and sea grasses (Estevez and Marshall 1993). A primary environmental goal of the USJRBP has been to minimize these freshwater releases. Impacts to the Indian River Lagoon of the various alternatives considered here are evaluated only as to whether or not they affect the ability of the USJRBP to meet discharge goals down the C-54 Canal as established in the original GDM.

1.8.2.5. Other Impacts

Bases for impact measurement and comparison are stated more specifically in Section 4.0 on ENVIRONMENTAL EFFECTS and other sections of this document and appendices.

1.8.3. ISSUES ELIMINATED FROM DETAIL ANALYSIS

No other issued were specifically identified for elimination.

1.9. PERMITS, LICENSES, AND ENTITLEMENTS

The sponsor, St. Johns River Water Management District is responsible for obtaining any local, Federal, or State permits, as well as any real estate easements and rights of way required for this project.

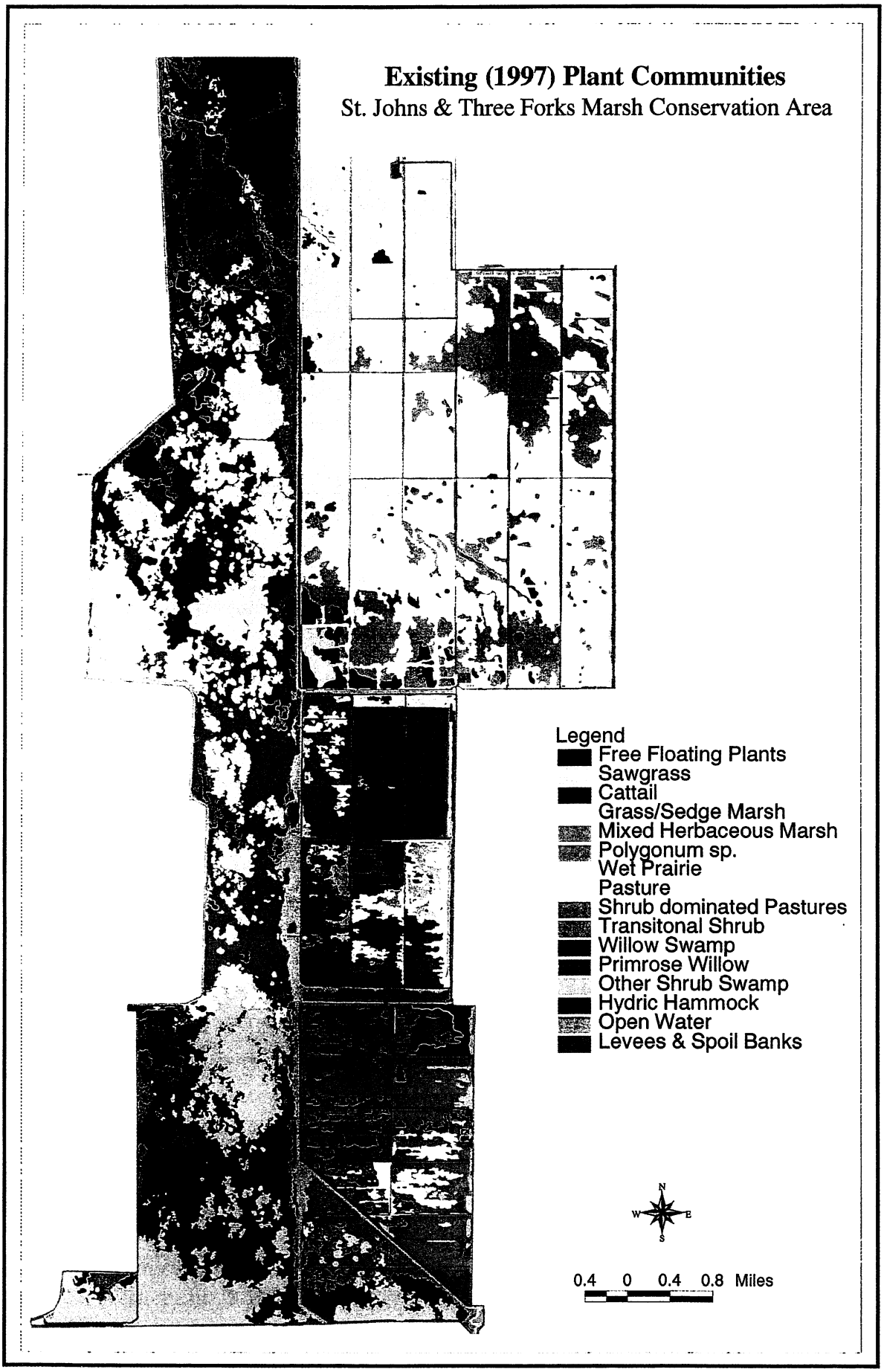

Figure 8. Plant community map generated from 1997, 1:24,000 scale aerial photographs.