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BANANA RIVER

AQUATIC PRESERVE

MANAGEMENT PLAN

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DEPARTMENT OF NATURAL RESOURCES

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

BANANA RIVER AQUATIC PRESERVE MANAGEMENT PLAN

September 1985

Dr. Elton J. Gissendanner
Executive Director
Department of Natural Resources

This plan was prepared by
The Bureau of Environmental Land Management
Division of Recreation and Parks

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Preparation of this management plan was primarily supported by a grant from the U.S. Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, and the Florida Department of Environmental Regulation, the Office of Coastal Management, through the Coastal Zone Management Act of 1972 as amended.

Executive Summary

The Banana River is a shallow lagoon important in this region for its value to recreational and commercial fishing, boating and residential development. The preserve is in a rapidly growing urban area affected by agriculture and residential drainage. Mangrove trees fringe the majority of the shoreline, with scattered residential development. The lagoon is bounded on the west by Merritt Island and on the east by a barrier island. The Banana River Aquatic Preserve is designated and managed as both an urban and wilderness preserve.

The estuary is an important home and nursery area for an extensive array of fish and wildlife. The major problems in the continued health of this area include the construction of drainage systems which have increased the amount of fresh water flow into the estuary, the loss of wetland areas and water quality degradation associated with agricultural drainage and urban runoff. In addition, the presence of causeways has changed the historical flushing and circulation within the lagoon system.

The major objectives of the aquatic preserve management program are to manage the preserve to ensure the maintenance of an essentially natural condition, and to restore and enhance those conditions which are not in a natural condition. Management will also be directed to ensure public recreational opportunities while assuring the continued propagation of fish and wildlife. This task will be guided by the identification and mapping of natural resources and habitats necessary to meet these objectives. An additional management objective is the review and comment on applications for the use of state-owned submerged lands. This will require, in a fully implemented management program, the onsite investigation of these proposed uses by field personnel assigned to the aquatic preserve. The field personnel are critical to the realistic management of this aquatic preserve.

STATE OF FLORIDA

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

R E S O L U T I O N

WHEREAS, the Board of Trustees of the Internal Improvement Trust Fund is charged with the acquisition, administration, management, control, supervision, conservation, protection, and disposition of all lands title to which is vested in the Trustees under Chapter 253, Florida Statutes; and

WHEREAS, Chapter 258, Florida Statutes, directs that state-owned submerged lands within aquatic preserves be set aside forever in their essentially natural or existing condition for the benefit of future generations; and

WHEREAS, the Trustees are charged with the adoption and enforcement of reasonable rules and regulations to carry out the provisions of Sections 258.35 through 258.46, Florida Statutes, regarding the regulation of human activity within the aquatic preserves so as not to unreasonably interfere with lawful and traditional public uses of the preserves;

WHEREAS; Section 16Q-20.13, Florida Administrative Code, mandates the development of management plans for aquatic preserves; and

WHEREAS, the Trustees desire to serve the public by effectively planning, managing and protecting aquatic preserves; and

WHEREAS, the Trustees recognize the importance and benefits of protecting the natural resources and preserving the natural ecosystem of the aquatic preserve in the Banana River area, and

NOW THEREFORE BE IT RESOLVED that the Board of Trustees of the Internal Improvement Trust Fund hereby adopts the Banana River Aquatic Preserve Management Plan; and

BE IT FURTHER RESOLVED that the Trustees designate the Banana River Aquatic Preserve as a "wilderness preserve", wherein the primary management objective will be the maintenance of this ecosystem in an essentially natural state; and

BE IT FURTHER RESOLVED that the Banana River Aquatic Preserve Management Plan shall serve as a fundamental policy guideline for the Trustees and other state and local agencies having jurisdiction relative to maintaining the Banana River Aquatic Preserve system, and shall provide the overall policy direction for the development and implementation of all administrative rules and programs related to the management of state-owned submerged lands within the Banana River Aquatic Preserve; and

BE IT FURTHER RESOLVED THAT the Department of Natural Resources, Division of Recreation and Parks, is hereby designated as agent for the Trustees for purposes of aquatic preserve planning and management.

IN TESTIMONY WHEREOF THE Board of Trustees of the Internal Improvement

Trust Fund have hereunto subscribed their names and have caused the Official Seal of the Board of Trustees of the Internal Improvement Trust Fund to be hereunto affixed in the City of Tallahassee, The Capitol, on this the 17th day of September, A.D., 1985.

Governor

(Seal)

Secretary of State

Commissioner of Education

Attorney General

Commissioner of Agriculture

Comptroller

As and Constituting the State of Florida Board of Trustees of the Internal Improvement Trust Fund

Treasurer

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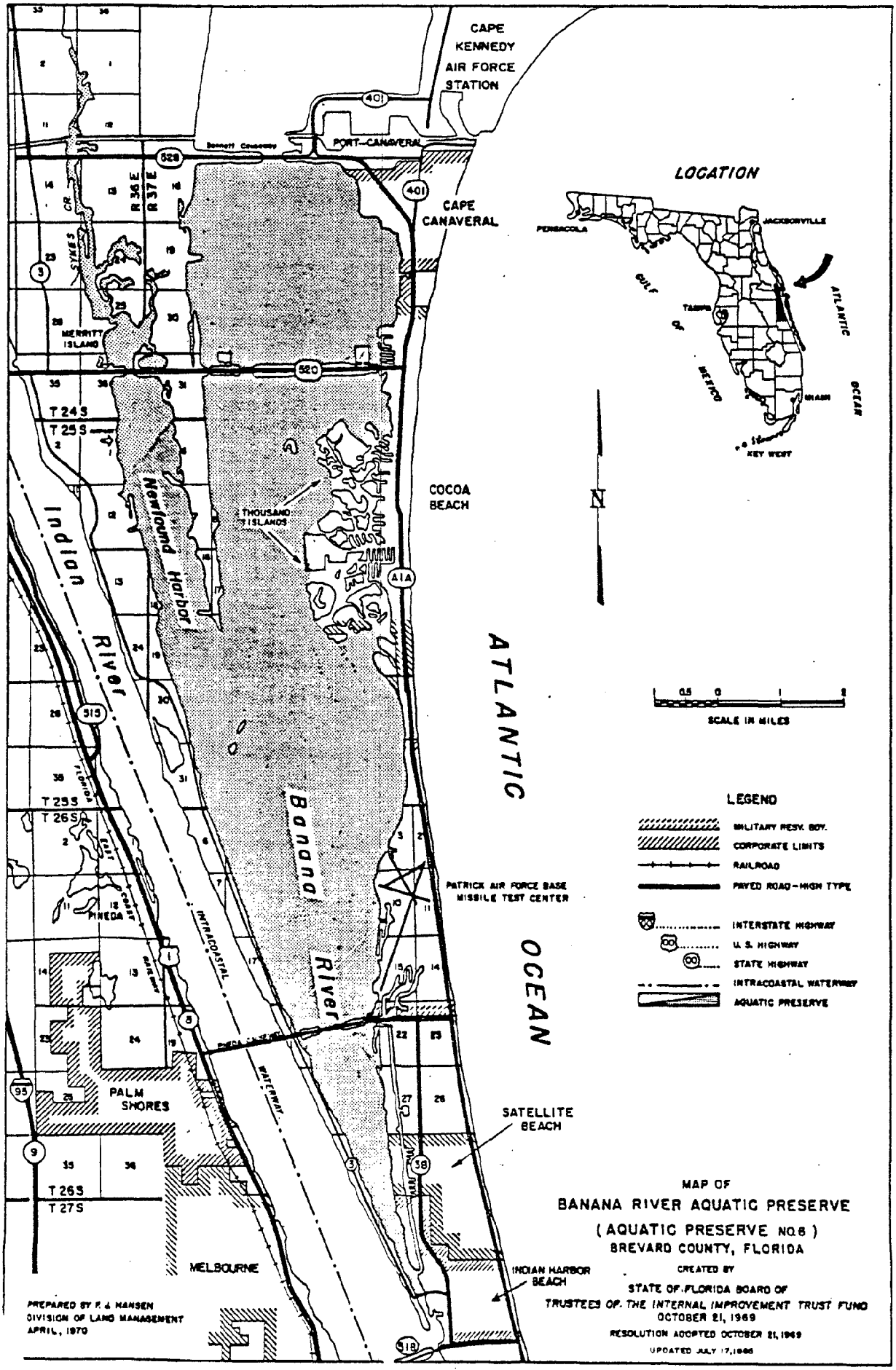
Chapter I

INTRODUCTION

This plan addresses the management of the Banana River Aquatic Preserve which is located in North Central Brevard County (Figure 1). The preserve begins at S.R. 528 (Bennett Causeway), extends almost to the southern tip of Merritt Island, and includes Newfound Harbor and Sykes Creek as far north as Hall Road. The incorporated cities bordering the preserve are Cape Canaveral, Cocoa Beach, Satellite Beach, and Indian Harbor Beach, north to south respectively. In addition, Patrick Air Force Base lies along the Banana River between Cocoa Beach and Satellite Beach. The surface water area of the preserve is approximately 46.4 square miles.

The Banana River system is a relatively shallow body of water with very restricted water exchange with the sea and no significant freshwater inflow. It is therefore classified as a lagoon (Clark, 1983). Merritt Island lies to the west of the preserve, and a barrier island borders the eastern side. Although there are no federally maintained navigation channels found in this area of the Banana River, there are numerous channels maintained by the county, municipalities, and private interests. Several spoil islands (formed by dredge and fill activities for mosquito impoundments) parallel the shoreline and are also found in the middle of the lagoon. The spoil islands and much of the shoreline are lined with mangroves. Marine grassbeds occur in some shallow water areas.

Figure 1


CAPE KENNEDY AIR FORCE STATION
PORT CANAVERAL
CAPE CANAVERAL
COCOA BEACH
MERRITT ISLAND
THOUSAND ISLANDS
Newfound Harbor
Indian River
Banana River
ATLANTIC OCEAN
PATRICK AIR FORCE BASE MISSILE TEST CENTER
PALM SHORES
SATELLITE BEACH
INDIAN HARBOR BEACH
MELBOURNE
INTRACOASTAL WATERWAY
LOCATION
PENSACOLA
JACKSONVILLE
TAMPA
MIAMI
KEY WEST
GULF OF MEXICO
ATLANTIC OCEAN
SCALE IN MILES
LEGEND
MILITARY RESV. BDY.
CORPORATE LIMITS
RAILROAD
PAVED ROAD-HIGH TYPE
INTERSTATE HIGHWAY
U. S. HIGHWAY
STATE HIGHWAY
INTRACOASTAL WATERWAY
AQUATIC PRESERVE
MAP OF
BANANA RIVER AQUATIC PRESERVE
(AQUATIC PRESERVE NO.8)
BREVARD COUNTY, FLORIDA
CREATED BY
STATE OF FLORIDA BOARD OF
TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
OCTOBER 21, 1969
RESOLUTION ADOPTED OCTOBER 21, 1969
UPDATED JULY 17, 1985
PREPARED BY F. J. HANSEN
DIVISION OF LAND MANAGEMENT
APRIL, 1970

The climate in East Central Florida is humid subtropical, with an average annual rainfall of approximately 50 inches. The average at Patrick Air Force Base is only 46 inches (Doehring, personal communication). The majority of this rainfall occurs between June and October.

The Banana River Aquatic Preserve will be a combination preserve with both urban and wilderness type preserve sections. The wilderness section will include the western shoreline from Mathers Bridge on the south, to the State Highway 520 Bridge on the north, inclusive of Newfound Harbor. An additional section will include Sykes Creek between Bennett Causeway and Hall Road. The wilderness section on the eastern shoreline will extend from Mathers Bridge on the south, north to Pineda Causeway. The remainder of the preserve to the north will be an urban type preserve. The management emphasis in the urban areas will be aimed at restoring the natural condition of the resources as much as possible. The wilderness preserve area will be managed to emphasize maintenance and enhancement of existing conditions. As more site specific information becomes available, essentially natural conditions shall be identified and resources in disturbed areas restored, where possible. This plan advocates a multiple use approach to management due to the extensive and diverse uses within the preserve. These uses include boating, fishing, and swimming.

The onsite staff resources necessary for the management program are identified in Chapter XIII(G) Funding and Staffing needs. The program, as described, will fill the minimum need for active management in the preserve and should provide the framework for future management needs. The administrative support

for this management program will be provided by the Division of Recreation and Parks' Bureau of Environmental Land Management (BELM) in Tallahassee, known as the "central office". Field personnel will also be supported by the local Florida Park Service, Division of Marine Resources and other local BELM staff, when available.

The Resource Description section will identify resource and habitat types or communities that are the major components of the Banana River natural environment as it exists today. Background data, journals, books, maps and all other materials used to produce and support this plan are identified in the Bibliography or Appendices. The Resource Protection Area mapping is described in Chapter V(C) and will also be maintained separately in the Appendices.

Initially, development of the resource inventory will be heavily dependent on LANDSAT satellite imagery, DOT aerial photography, and existing scientific and other literature. As the program proceeds and on-site managers are present, the experience and additional resource information will likely result in modifications to the program and plan, which are both designed to accommodate such changes or at least identify areas needing improvements. Interaction with local research entities (e.g., FIT and others) will also aid in obtaining valuable data.

This plan is divided into chapters according to their management application. Chapter II cites the authorities upon which this management program and plan are built. Chapter III (Major Program Policy Directives) highlights the major

policy areas that are within this plan. Chapter IV presents a brief resource description and references the appendices which contain more detailed information on the resources.

Chapter V presents the management objectives of both the on-site managers, who actually work in the preserve, and the administrative staff in Tallahassee.

Chapter VI addresses how this plan will interface with local, regional, state, and federal agencies and programs; as well as its relevance to non-government organizations, interest groups, and individuals.

Chapters VII through IX address the various uses, from public to private to commercial. Chapters X and XI address the use of the aquatic preserve management plan.

Chapter XII is an internal management improvement section identifying problems and needs in the progressive improvement of this aquatic preserve management plan.

This plan was written by the Department of Natural Resources (DNR), Division of Recreation and Parks, Bureau of Environmental Land Management staff. Funding for the plan was by a coastal management grant (CM-106) through the U.S. Department of Commerce's National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management, and the Florida Department of Environmental Regulation (DER), Office of Coastal Management.

Chapter II

MANAGEMENT AUTHORITY

The primary management authorities available to the staff for implementing management directives affecting aquatic preserves are found in Chapters 258 and 253, Florida Statutes (F.S.). These authorities clearly establish the proprietary management overview role of the Governor and Cabinet, sitting as the Board of Trustees of the Internal Improvement Trust Fund and are variously referred to as the "Trustees" or the "Board". Furthermore, all management responsibilities assigned to the Trustees by this plan may be fulfilled directly by the Governor and Cabinet or indirectly via staff or agents of the Trustees, pursuant to delegations of authority, management agreements, or other legal mechanisms. All subsequent references to the Board or Trustees should be presumed to potentially include staff and designated agents, in addition to the Governor and Cabinet. The staff of the Bureau of Environmental Land Management (BELM) (acting as "agents" for the Trustees) is able to review all requests for uses of, or directly affecting, state-owned sovereignty submerged lands within aquatic preserves. The review and subsequent staff comments are primarily designed to evaluate the environmental consequences of any proposed use of state-owned submerged land. The review is conducted within the confines of the criteria contained in the "maintenance" provisions for aquatic preserves in Chapter 258, F.S.

Formal review comments are provided to the Department of Natural Resources (DNR), Division of State Lands by the Bureau of Environmental Land Management for inclusion in the comments and recommendations accompanying agenda items for Trustees consideration. This mechanism allows the Trustees, sitting as owners of the land, to evaluate public interest and project merits within the context of environmental impact upon the preserve.

BACKGROUND

In many respects, the authorities supporting aquatic preserve planning and management are the cumulative result of the public's awareness of the importance of Florida's environment . The establishment of the present system of aquatic preserves is a direct outgrowth of public concern with dredge and fill activities rampant in the late 1960's.

The Banana River Aquatic Preserve was adopted by resolution by the Trustees on June 3, 1970. The boundary line of Figure 1 represents the gross boundary of the aquatic preserve. The actual preserve includes those sovereignty submerged lands located waterward of the mean high water and ordinary high water line within this boundary area.

In 1967, the Florida Legislature passed the Randall Act (Chapter 67-393, Laws of Florida), which set up procedures regulating previously unrestricted dredge and fill activities on state-owned submerged lands. That same year the legislature also provided statutory authority (Section 253.03, F.S.) for the Trustees to exercise proprietary control over state-owned lands. In 1967,

this governmental focus on protecting Florida's productive estuaries from the impacts of development led to the establishment of a moratorium by the Governor and Cabinet on the sale of submerged lands to private interests. In that same year, this action was followed by the creation of an Interagency Advisory Committee on submerged lands management. In late 1968, that Committee issued a report recommending the establishment of a series of aquatic preserves. Twenty-six separate waterbodies were addressed in the original recommendation.

Also in 1968, the Florida Constitution was revised, declaring in Article II, Section 7, the State's policy of conserving and protecting the natural resources and scenic beauty of the state. That constitutional provision also established the authority for the Legislature to enact measures for the abatement of air and water pollution.

It was not until October 21, 1969 that the Governor and Cabinet acted upon the recommendations of the Interagency Advisory Committee and adopted, by resolution, 18 of the waterbodies as aquatic preserves. Other preserves were similarly adopted at various times through 1971.

Prior to the October 1969 action by the Governor and Cabinet, the Legislature had created the Boca Ciega Aquatic Preserve. Subsequent Legislative action in 1972, 1973 and 1974, created the Pinellas County, Lake Jackson and Biscayne Bay Aquatic Preserves, respectively.

In 1975, the Legislature established a Florida Aquatic Preserve Act (Codified

in Chapter 258, F.S.), thereby bringing all existing preserves under a standardized set of maintenance criteria. Additional acts were passed subsequent to the 1975 action, such as the addition of the Cockroach Bay Aquatic Preserve in 1976 and the Gasparilla Sound-Charlotte Harbor Aquatic Preserve to the system in 1978.

The Charlotte Harbor Aquatic Preserve Management Plan, approved by the Trustees on May 18, 1983 was the first management plan for an aquatic preserve. The following aquatic preserves have approved plans: Estero Bay - September 6, 1983; North Fork/St. Lucie - May 22, 1984; Loxahatchee River/Lake Worth Creek - June 12, 1984, and Indian River Lagoon - January 22, 1985.

In June 1985, the Legislature passed State Bill 762, which expanded the boundaries of the Banana River, Malabar to Vero Beach, Loxahatchee River-Lake Worth Creek, Wekiva River, and Rookery Bay Aquatic Preserves; and created Guana River Marsh and Big Bend Seagrasses Aquatic Preserves.

The State Lands Management Plan, adopted on March 17, 1981, by the Trustees, contains specific policies. The Plan also establishes policies concerning spoil islands, submerged land leases, "Outstanding Native Florida Landscapes", unique natural features, submerged grassbeds, archaeological and historical resources, and endangered species. All of these issues provide management guidance to the aquatic preserve program.

ADMINISTRATIVE RULES

Chapters 16Q-21 and 16Q-20, Florida Administrative Code (F.A.C.), are two administrative rules directly applicable to the DNR's/Trustee's actions regarding allowable uses of submerged lands, in general, and aquatic preserves specifically. Chapter 16Q-21, F.A.C. controls activities conducted on sovereignty submerged lands, and is predicated upon the provisions of Sections 258.03 and 253.12, F.S. The stated intent of this administrative rule is:

"(1) To aid in fulfilling the trust and fiduciary responsibilities of the Board of Trustees of the Internal Improvement Trust Fund for the administration, management and disposition of sovereignty lands;

(2) To insure maximum benefit and use of sovereignty lands for all the citizens of Florida;

(3) To manage, protect, and enhance sovereignty lands so that the public may continue to enjoy traditional uses including, but not limited to, navigation, fishing, and swimming;

(4) To manage and provide maximum protection for all sovereignty lands, especially those important to public drinking water supply, shellfish harvesting, public recreation, and fish and wildlife propagation and management;

(5) To insure that all public and private activities on sovereignty lands which generate revenues or exclude traditional public uses provide just compensation for such privileges; and,

(6) To aid in the implementation of the State Lands Management Plan."

Chapter 16Q-20, F.A.C. addresses the aquatic preserves and derives its authority from Sections 258.35, 258.36, 258.37, and 258.38, F.S. The intent of this rule is contained in Section 16Q-20.01, F.A.C., which states:

"(1) All sovereignty lands within a preserve shall be managed primarily for the maintenance of essentially natural conditions, the propagation of fish and wildlife, and public recreation, including hunting and fishing where deemed appropriate by the board and the managing agency.

(2) The aquatic preserves which are described in Section 258.39, 258.391, and 258.392 and 258.393 F.S., Chapter 85-345 Laws of Florida and in Section 16Q-20.02, F.A.C., were established for the purpose of being preserved in an essentially natural or existing condition so that their aesthetic, biological and scientific values may endure for the enjoyment of future generations.

(3) The preserves shall be administered and manag accordance with the following goals:

(a) Preserve, protect, and enhance these exc areas of sovereignty submerged lands by reasonable regulation of human activity the preserves through the development an implementation of a comprehensive manage program;

(b) To protect and enhance the waters of the preserves so that the public may continu enjoy the traditional recreational uses those waters such as swimming, boating, fishing;

(c) To coordinate with federal, state, and l management programs, which are compatibl the intent of the Legislature in creatin the preserves;

(d) To use applicable federal, state, and lo management programs, which are compatibl the intent and provisions of the act anc rules, to assist in managing the preserv

(e) To encourage the protection, enhancement or restoration of the biological, aesthetic, or scientific values of the preserves, including but not limited to the modification of existing manmade conditions toward their natural condition, and discourage activities which would degrade the aesthetic, biological, or scientific values, or the quality, or utility of a preserve, when reviewing applications, or when developing and implementing management plans for the preserve;

(f) To preserve, promote, and utilize indigenous life forms and habitats, including but not limited to: sponges, soft coral, hard corals, submerged grasses, mangroves, salt water marshes, fresh water marshes, mud flats, estuarine, aquatic and marine reptiles, game and nongame fish species, estuarine, aquatic and marine invertebrates, estuarine, aquatic and marine mammals, birds, shellfish and mollusks;

(g) To acquire additional title interests in lands wherever such acquisitions would serve to protect or enhance the biological, aesthetic, or scientific values of the preserves.

(h) To maintain those beneficial hydrologic and biologic functions, the benefits of which accrue to the public at large."

OTHER MANAGEMENT AUTHORITIES

Other Department of Natural Resources management authorities applicable to aquatic preserves include fisheries and marine mammal management and protection, and beach and shore preservation programs outlined in Chapters 370 and 161, F.S., respectively. Land acquisition programs conducted under the Environmentally Endangered Lands authorities of Chapter 259, F.S. or the Conservation and Recreation Lands Program authorized by 253, F.S., will enhance the protection of the natural resources within the aquatic preserves.

Chapter 403, F.S., is an important adjunct to Chapter's 253 and 258, F.S. This governs, in part, the State's regulatory programs affecting water quality and biological resources. The Department of Environmental Regulation (DER), through a permitting and certification process, administers this program. Section 253.77, F.S., as amended by the Warren S. Henderson Wetlands Protection Act of 1984, requires that any person requesting use of state-owned land shall have approval of the proposed use from the Trustees before commencing the activity. An interagency agreement between DNR and DER provides an avenue for staff comments on potential environmental impacts of projects in aquatic preserves through the DER permitting process. Additionally, the DER has designated, by administrative rule, a series of waterbodies with stringent use criteria called "Outstanding Florida Waters" (OFW). The inclusion of all aquatic preserve waters within this classification greatly enhances the protective provisions of Chapter 258, F.S. As the designated "306" Coastal Zone Management Agency, the DER also provides a source of funding for data collection and planning in areas such as the Indian River area, as well as

being the state agency responsible for implementing the "federal consistency" provisions of the federal Coastal Zone Management Act.

The DER's administrative rules of primary significance to the aquatic preserve management program include Chapters 17-3, 17-4 and 17-12, F.A.C. Both rules are based upon the authorities contained in Chapter 403, F.S. Chapter 17-3, F.A.C. addresses water quality standards and establishes the category of "Outstanding Florida Waters", while Chapters 17-4 and 17-12, F.A.C. address permit requirements.

In December, 1982 a Memorandum of Understanding (MOU) between the DER, DNR, and the U.S. Army Corps of Engineers (COE) was executed. This MOU clearly establishes a process whereby the proprietary concerns of the Trustees, stated in Chapter 253, F.S. can be integrated into the DER/COE joint permit processing system.

Other opportunities for environmental review and input into activities potentially affecting aquatic preserves are afforded by the Department of Community Affairs (DCA), and the Department of State, Division of Archives, History, and Records Management (DAHRM). The Executive Office of the Governor also provides a mechanism for public input into federal projects via the State clearinghouse process.

The DCA is statutorily responsible for administering the "Development of Regional Impact" (DRI). The DRI program, authorized by Section 380.06, F.S. was established by the Legislature to provide a review and monitoring

procedure for those development projects potentially affecting more than one county.

Chapter 267, F.S. establishes the state policy regarding preservation and management of Florida's archaeological and historical resources. This responsibility is legislatively assigned to the DAHRM, which holds title to those cultural resources located on state-owned lands. This also applies to sovereignty submerged lands, including aquatic preserves.

The Department of Health and Rehabilitative Services, under their public mandate, administers two programs directly affecting the aquatic preserve management program. These programs are (1) septic tank regulation, usually administered by county health departments and (2) arthropod (mosquito) control programs, usually implemented through local mosquito control districts. Each of these programs holds the potential for creating significant impacts upon the aquatic preserve. Establishment of close working relationships between the aquatic preserve staff and the Department of Health and Rehabilitative Services will be a necessary element of the aquatic preserve management program.

Each of the above referenced programs may provide an effective means of protecting aquatic preserves and their ecologically sensitive resources. Appendix A contains a compendium of the appropriate statutes and administrative rules.

Chapter III

MAJOR PROGRAM POLICY DIRECTIVES

This plan contains a number of management policy issues that are discussed either generally or definitively. This section highlights those major policy areas that comprise the basic thrust of this management effort. Adoption of these policies will provide specific staff direction for implementing the day-to-day aquatic preserve management program. Major program policy directives are:

(A) Manage all submerged lands within the aquatic preserve to ensure the maintenance of essentially natural conditions to ensure the propagation of fish and wildlife, and public recreation opportunities.

(B) Prohibit the disturbance of archaeological and historical sites within the aquatic preserve, unless prior authorization has been obtained from the Trustees and DAHRM, and such disturbance is part of an approved research design or authorized project.

(C) Develop a resource inventory and map natural habitat types within the aquatic preserve, with an emphasis on those habitat types utilized by threatened and/or endangered species.

(D) Protect and, where possible, enhance threatened and endangered species habitat within the aquatic preserve.

(E) Prohibit development activities within the aquatic preserve that adversely impact upon grassbeds and other valuable submerged habitat, unless a prior determination has been made by the Board of overriding public importance with no reasonable alternatives, and adequate mitigation measures are included.

(F) Prohibit the trimming and/or removal of mangroves and other natural shoreline vegetation within the aquatic preserve, except when necessitated by the pursuit of legally authorized projects and local Mangrove Protection Ordinances.

(G) Provide research and educational opportunities for scientists and other interested researchers within the framework of a planned research program in the aquatic preserve.

(H) Acquire, where feasible, privately owned submerged lands located within the boundaries of the aquatic preserve pursuant to the authorities contained in Section 253.02(4), F.S.

(I) Prohibit the drilling of oil and gas wells, the mining of minerals, and dredging for the primary purpose of obtaining upland fill within the aquatic preserve.

(J) Prohibit non-water dependent uses of submerged lands within the aquatic preserve except in those cases where the Board has determined that the project is overwhelmingly in the public interest and no reasonable alternatives exist. This prohibition shall include floating residential units, as defined in Section 125.0106(2), F.S.

(K) Prohibit storage of toxic, radioactive, or other hazardous materials within the aquatic preserve.

(L) Prohibit mosquito control practices within the aquatic preserve that require habitat modification or manipulation (i.e. diking, ditching) unless there are no reasonable alternatives and failure to conduct such practices would result in a threat to public health.

(M) Limit pesticide and biocide use within the aquatic preserve to those that are approved by the Environmental Protection Agency (EPA) for wetland and aquatic application.

(N) Prohibit the construction of new deep water ports within the aquatic preserve boundaries.

(O) Insure that artificial reef construction does not adversely impact environmentally fragile areas within the aquatic preserve and that the construction will maintain the essentially natural condition while enhancing the quality and utility of the preserve.

(P) Manage state-owned spoil islands within the aquatic preserve as bird rookeries and wildlife habitat areas.

(Q) Encourage public utilization of the aquatic preserve, consistent with the continued maintenance of its natural values and functions.

(R) Develop a well coordinated aquatic preserve management mechanism that recognizes and utilizes local government programs and authorities.

(S) Require, through the efforts of DER and the water management districts, the maintenance of the naturally high water quality of the estuary and ensure the natural seasonal flow fluctuations of freshwater into the estuary.

(T) Formally recognize and designate the Banana River Aquatic Preserve as an urban and wilderness preserve as delineated in Figure.

(U) Apply the management criteria contained in the adopted Banana River Aquatic Preserve Management Plan to all subsequent legislative additions of land to the aquatic preserve.

(V) Encourage the assistance of federal, state, and local government agencies in implementing the aquatic preserve management plans, especially in the areas of protection of natural and cultural resources and the enforcement of applicable resource laws and ordinances.

(W) Marinas shall not be located in Class 1 or 2 Resource Protection Areas.

(X) Identify and document any problems caused by fishing activities and report them to the Marine Fisheries Commission. Enforce any rule adopted by the Marine Fisheries Commission and approved by the Governor and Cabinet.

Chapter IV

RESOURCE DESCRIPTION

The combination of subtropical climate, lagoon configuration and vegetation make the Banana River system biologically productive. Fishing, boating and residential development on the lagoon's eastern shore are important economic values of the Banana River. The eastern shore was dredged and filled for mosquito control and is now used for residential housing developments. The relatively pristine western shore of the lagoon is also rapidly being developed. Spoil islands within the lagoon have provided nesting sites for the endangered brown pelican and other colonial nesting birds. Development of some of these islands has resulted in the destruction of valuable wildlife habitat. Seagrass beds, on the shallow bottoms of the lagoon, offer valuable habitat for associated fauna and contribute to the productivity of the lagoon system.

The Preserve provides a variety of habitats that support an extensive array of fish and wildlife (Appendix C). Major problems in the continued health of this area are the sewage effluents entering the Banana River system, the agricultural drainage and urban runoff that adversely affect the water quality, and causeways that restrict natural circulation and flushing.

Detailed information on the resources, such as species lists, water quality information, archaeological and historical site information, life histories, geological background, supporting maps, and cultural resource information are located in Appendices C and D.

The resource information presented in this chapter is intended to be a general description of the major management functions and resources of the area surrounding the lagoon system.

A. Geological Features and Landforms.

The East Central Coast of Florida is characterized by a relatively straight shoreline and linear barrier islands which extend almost the entire length of the peninsula. The Banana River is situated between the beach barrier island to the east and Merritt Island, a relic barrier island, to the west. The Atlantic Coastal Ridge lies to the west of the lagoon on the mainland and parallels the Atlantic Ocean coastline. This low ridge diverts rainfall towards the Indian and Banana Rivers and consists of relatively permeable sandy soil. These features and other landforms along the coast reflect several sea level changes that occurred during the Quaternary (Kofoed, 1963).

In the late Pleistocene (125,000 years before present (B.P.) sea level was higher than it is today and covered the present barrier island as an offshore sand bar formed on the shallow shelf. Only the central highlands of Florida were above water.

Between 6,000 and 30,000 years B.P., sea level retreated and exposed the lagoon bottom to air. Deposition of sediments through wind and freshwater transport partially filled the lagoon until the last great ice sheets melted. The subsequent rise in sea level inundated the lagoon and created the brackish water environment of today.

The long, narrow barrier island acts as the first line of defense of Merritt Island and the mainland against storm surges. Historically, narrow points of the barrier islands have been breached during storms.

The temporary shallow inlets that formed, later closed due to siltation. Man's intervention through dredging and stabilization of the Cape Canaveral locks (the only connection with the Atlantic Ocean), has allowed saline water to mix with fresh water, creating the lagoon environment that is found today. Because the locks are the only connection between the river and the ocean, the aquatic preserve is microtidal and generally calm.

B. Community Associations.

The plant communities of the Banana River are a major factor in the continued health and productivity of the natural systems of the preserve. This section will also reference some of the major animal species associated with these plant communities. Three major community associations recognized in the preserve are mangrove forests, marine grassbeds, drift algae and salt marsh. Each community is presented separately although in reality these communities

are sometimes mixed or overlap. Final subsections address the animal life and endangered species within the aquatic preserves.

1. Mangroves. Three species of mangrove trees represent the dominant vegetational association on the low energy shorelines along the Banana River. The mangroves range from twelve to thirty feet in height. The mangrove fringe forest rarely exceeds 100 feet in width.

The three species of mangroves occurring here are the red mangrove (Rhizophora mangle), both in and near the water at low tide level; black mangrove (Avicennia germinans) generally inland of, but sometimes mixed with reds; and the white mangrove (Laguncularia racemosa) generally upland of, but also mixed with blacks. Buttonwood (Conocarpus erecta) is not a true mangrove but is an important species in the transition zone on the upland edge of mangrove ecosystems (Tomlinson, 1980). It often occurs upland of and mixed with whites. These mangrove association species generally indicate areas of frequent (red mangrove) to infrequent (white mangrove) saline inundation.

There are many variations of the mangrove community within the area. The major variation occurs in the fringe mangrove forest which borders the shorelines of the undeveloped barrier island. All species can appear in this fringe forest, both in distinct zones and mixed as described above. There are also overwash mangrove areas where the mangroves are standing in water and there is little or no associated upland. This variation is generally dominated by red mangroves (Odum et al., 1982). There are a few other

variations that appear in more inland areas (i.e., natural drainage channels) which may have a wide variety of mangrove species mixture, including scrub or dwarf forms.

The mangrove species have various root structures, such as prop roots (red mangroves) and pneumatophores (the aerating root spikes of the black mangroves) and extensive underground root mats which capture and stabilize sediments in the estuarine waters and function as an erosion control buffer in other areas. These root networks recycle nutrients and minerals from fallen mangrove leaves and the anaerobic soil substrate by returning them to the lagoon as detritus. The critical importance of this mangrove detritus as a source of estuarine productivity has been well documented in Florida, and the intertidal community is the principal contributor to this process. Nearly all the finfish and shellfish resources of the Banana River are, to some degree, dependent on this nutrient base (Fernald et al., 1982). The entire community also functions to buffer the uplands from storm tides and winds, and acts as a storage area for those waters.

The variety in species type and distribution indicates that mangroves can adapt to many situations, but they are susceptible to both natural and man-induced disturbances. The natural disturbances can come from freezing temperatures, hurricanes, or changes in sea level. Hurricane damage, although not experienced in the recent past, is a potential threat to these communities.

Man's more subtle influence on the mangrove communities is not as fully understood as the natural forces that cause the direct removal or killing of the trees. The effects of changing the upland drainage patterns, both by bulkhead placement and drainage canals, need much more study.

Protection of the extensive mangrove communities in the preserve will be a major task of this plan's management activities. The policies and practices of this management are addressed in Chapter V, Section B.

Other vegetation associated with the mangrove communities includes: salt grass (Distichlis spicata); cordgrass (Spartina spp.); glasswort (Salicornia spp.); sea purslane (Sesuvium portulacastrum); saltwort (Batis maritima); and sea ox-eye (Borrichia frutescens).

The tree canopies and root tangles provide habitat for a wide variety of invertebrates, fishes, amphibians, reptiles, mammals and birds (Table I).

2. Marine Grassbeds. Marine grasses are submerged flowering plants which stabilize sediments, entrap silt, recycle nutrients, provide shelter, habitat and substrate for animals and other plant forms, provide important nursery grounds for many vertebrates and invertebrates in addition to shellfish, and are important direct food sources (Odum, 1974; Wood et al., 1969). The grassbeds are very productive, possibly the most productive habitat within the Banana River. They are important not only for their productivity but also for the important animal life associated with the community. These beds serve as

Table I

ANIMAL LIFE ASSOCIATED WITH THE MANGROVE COMMUNITY

Mammals
- marsh rabbit
- rice rat
- raccoon
- bobcat

Birds
- yellow-crowned night heron
- brown pelican
- double-crested cormorant
- anhinga
- wood ibis
- white ibis
- great blue heron
- little blue heron
- green heron
- Louisiana heron
- black-crowned night heron
- snowy egret
- great egret
- cattle egret
- reddish egret
- blue-gray gnatcatcher
- red-winged blackbird
- cardinal
- pileated woodpecker
- belted kingfisher
- prairie warbler

Reptiles
- diamondback terrapin

Fishes
- tarpon
- snook
- gray snapper
- rainwater killifish
- gobies
- sailfin molly
- striped mojarra
- grouper and sea bass
- permit
- redfin needlefish
- herring
- striped anchovy

Table I (continued)

Fishes (continued)
- ladyfish
- roughtail stingray
- bull shark
- lemon shark

Invertebrates
- mangrove tree crab
- fiddler crab
- blue crab
- oysters
- shrimp
- snails
- mosquitoes

Sources: Barile, D.D. Coastal Zone Protection element for the Palm Bay, Florida Comprehensive Plan. Center for Coastal Zone Research, FIT. Melbourne, FL. 1978.

Fernald, et al. The Sebastian Inlet-Ft. Pierce Inlet Barrier Islands. A Profile of Natural Communities, Development Trends, and Resource Management Guidelines. 1982.

Gilmore, et al. Fishes of Indian River Lagoon and Adjacent Waters, Florida. 1981.

U.S. Fish and Wildlife Service. Atlantic Coast Ecological Inventory Map. U.S. Government Printing Office, Washington, D.C. 1980.

a food source for the endangered manatee (Trichechus manatus), important nursery areas for juvenile forms of shellfish, and as substrate for many epiphytic algae species eaten by invertebrates which are in turn eaten by the fishes (Fernald et al., 1982)

The two most commonly found marine grasses in the Preserve are manatee grass (Syringodium filiforme) and Cuban shoal grass (Halodule wrightii), with the latter being the most abundant. Scattered patches of (Halophila engelmanii) are also present and widgeon grass (Ruppia maritima) can be found along some shoreline areas (Day, personal communication). The more dense areas of grassbeds in the lagoon are usually in shallow water with a fairly constant salinity. These shallow areas are prime fish habitat and are vulnerable to damage by boating activities. Boat propellers may cut channels in the grassbeds, creating long-term damage to the community. The marine grassbeds are also sensitive to turbidity and, as a result, are vulnerable to dredging activities (Fernald et al., 1982).

Marine grassbeds are a primary vegetation community and will be used as a key indicator in measuring the natural condition of the aquatic preserve. Seagrass coverage and diversity appear to vary seasonally, yearly and possibly in longer cycles. Protection of marine grassbeds will be a major consideration in the field and administrative review of use proposals (See Appendix D).

The invertebrate fauna associated with these grassbeds can be rich and diverse, depending on the specific area. More data is needed on the animal life associated with marine grassbeds (See Table II).

Table II

ANIMAL LIFE FOUND IN MARINE GRASSBED AREAS OR GENERALLY ASSOCIATED WITH THIS COMMUNITY

Mammals
- bottle-nosed dolphin
- manatee

Birds
- brown pelican
- double-crested cormorant
- osprey
- least tern
- belted kingfisher
- bald eagle
- great blue heron
- Louisiana heron
- great egret
- reddish egret
- white ibis
- roseate spoonbill
- common loon
- horned grebe
- magnificent frigatebird
- pintail
- green-winged teal
- blue-winged teal
- American widgeon
- northern shoveler
- lesser scaup
- ruddy duck
- red-breasted merganser
- herring gull
- American coot
- Forster's tern
- royal tern
- Caspian tern
- laughing gull
- black skimmer
- ring-billed gull
- black-bellied plover
- willet

Reptiles
- diamondback terrapin

Fishes
- Atlantic stingray
- cownose ray

Table II (continued)

Fishes (continued)

- sea catfish
- gulf killifish
- rainwater killifish
- sheepshead
- sailfin molly
- snook
- gray snapper
- striped mullet
- white mullet
- lemon shark
- bullshark
- ladyfish
- scaled sardine
- striped anchovy
- gulf pipefish
- pigfish
- silver jenny
- mojarra
- spotted seatrout
- southern kingfish
- black drum
- red drum
- pin fish
- mosquito fish
- great barracuda
- spot
- silver perch
- permit
- leatherjacket
- tidewater silverside
- lined sole
- crevalle jack
- chain pipefish
- gulf pipefish
- Irish pompano
- bay whiff
- code goby
- clown goby
- darter goby
- bighead searobin
- gulf flounder
- southern puffer
- striped burrfish
- gafftopsail catfish
- Atlantic thread herring
- yellowfin menhaden
- Atlantic menhaden

Table II (continued)

Invertebrates
- Pink shrimp
- stone crab
- spiny lobster
- blue crab

Sources: Fernald, et al. The Sebastian Inlet-Ft. Pierce Inlet Barrier Island. A Profile of Natural Communities, Development Trends, and Resource Management Guidelines. 1982.

Gilmore, et al. Fishes of Indian River Lagoon and Adjacent Waters, Florida. 1981.

Atlantic Coast Ecological Inventory. 1980.

Palm Bay Coastal Zone Protection Element. 1978.

3. Drift Algae Drift algae are important associated components of the marine grassbed system in the Banana River. There are some 60 species of red, brown and green algae that are either interspersed with or grow on marine grasses. These algae begin as attached forms on the grass blades and eventually break loose to drift. These floating algal mats become substrata for numerous invertebrates, associated algae and fish. The drift algae communities may provide better refuge for many organisms than marine grasses. These communities occur throughout the lagoon (Virnstein and Howard, in press) of the Indian River, and although there have not been any specific studies done in the Banana River, drift algae are certain to exist (Nelson, personal communication).

4. Green Algae. A little studied component of the grassbed community is the green algae, Caulerpa prolifera. In shallow areas, these algae grow in scattered patches with the marine grasses. As depth and turbidity increase however, there is a virtual monoculture of Caulerpa. (Willard, pers. comm.) . The comparative importance of these algae beds to adjacent marine grassbeds and information on historical trends of Caulerpa prolifera distribution are needed.

5. Saltmarsh. Historically, this habitat was commonly converted to mosquito impoundments and only a small percentage of the original acreage remains open to water exchange today. In the Banana River area, saltmarshes are generally forced out by the more dominant mangroves. The saltmarsh grasses grow in transitional areas between mangroves, freshwater marshes and saltbarren areas. Some of these transitional areas are also at elevations (i.e., landward of the

mean high water line) that technically may put them outside the aquatic preserve boundary (unless the uplands are state-owned).

The species within this community are smooth cordgrass (Spartina alterniflora), saltwort (Batis maritima), glasswort (Salicornia virginica), salt grass (Distichlis spicata) and sea ox-eye (Borrichia frutescens).

This community can also have mangroves, cabbage palms, and exotics mixed in with the vegetation. The type of vegetation present varies with the degree of tidal inundation, the influence of other vegetation, the amount of disturbance by ditching and diking, and the amount of freshwater drainage from the uplands. The saltmarsh grass community recycles nutrients, contributes to productivity, and provides shelter and habitat to a variety of animal life (see Table III).

6. Mosquito Impoundments. Numerous mosquito impoundments have been developed by diking and impounding high saltmarsh habitats adjacent to the Banana River. By manipulating water levels within these impoundments, prime mosquito habitat can be flooded to prevent mosquitoes from depositing eggs in tidal areas.

The impounding and flooding have changed the vegetation, wildlife types and diversity. The impoundments also restrict and, in some cases, prohibit nutrient flow and fishery interaction within the Banana River lagoon. However, these impacts can be mitigated by opening the impoundments to lagoonal flow during months when mosquito control is not needed. There is now a wide variation in management practices for mosquito impoundments.

Table III

ANIMAL LIFE COMMONLY ASSOCIATED WITH SALTMARSH GRASS COMMUNITIES

Mammals
- marsh rabbit
- hispid cotton rat
- raccoon

Reptiles
- diamondback terrapin
- garter snake

Fishes
- bay anchovy
- rainwater killifish
- gulf killifish
- sheepshead minnow
- mosquitofish
- striped mullet

Birds
- osprey
- nighthawk
- chuck-will's-widow
- purple martin
- great blue heron
- green heron
- great egret
- snowy egret
- Louisiana heron
- least sandpiper
- spotted sandpiper
- black-necked stilt
- ring-billed gull
- laughing gull
- black tern
- red knot
- tree swallow
- barn swallow
- common yellowthroat
- sharp-tailed sparrow
- red-winged blackbird

Invertebrates
- fiddler crab
- periwinkle snails
- polychaetes
- nematodes

Sources: Fernald, et al. The Sebastian Inlet-Ft. Pierce Inlet Barrier Island. A Profile of Natural Communities, Development Trends, and Resource Management Guidelines. 1982.

Gilmore, et al. Fishes of Indian River Lagoon and Adjacent Waters, Florida. 1981.

A Subcommittee on Mosquito Impoundments was established under the Governor's Working Group for Mosquito Control to help foster improved management techniques and to benefit environmental and mosquito control concerns.

7. Animal Life. The animal life associated with the Banana River area is historically as diverse as the vegetation. However, mosquito impoundments, dredge and fill projects, and causeway, road and bridge construction have modified much of the original habitat. These manmade modifications have caused a variety of changes to the animal life of the lagoon.

The Banana River Aquatic Preserve serves as a valuable recreational fishing area and as a nursery area for fish commercially caught in the Atlantic Ocean. Other species not directly important to commercial fishing but necessary to its ultimate food chain also depend on this estuary. The lagoon also provides a refuge for animal species visiting this area during migrations, for daily feeding purposes and during times of environmental stress (i.e., drought, storms, development activities). These visitors include the manatee and many bird species.

Fresh and saltwater fish species and other animal species lists and information can be found in Appendix C.

8. Endangered Species. The combination of the subtropical climate, diverse vegetation and habitats, and waterbodies in the Banana River Aquatic Preserve helps to sustain many species of endangered animals. In Brevard County, the

grassbeds in the shallow areas of the Banana River and Sykes Creek are important manatee aggregation areas in the summer. Unfortunately, these areas are also popular with recreational boaters and the resultant collisions are responsible for high manatee mortalities. As identified by Kinnaird (1983), the Cocoa Beach Recreation Complex (CBRC), grassbeds on the west bank opposite Patrick Air Force Base, grassbeds north of the CBRC, and the Kiwanis Island Recreation Area (Sykes Creek) are four such areas.

During fall and spring migrations, manatees are more likely to be hit by deep-draft, wide beam vessels in shallow or restricted channels such as the Intracoastal Waterway and barge canal. Slow speed zones, warning signs and other management guidelines should be used to guarantee manatee health and safety (see Chapter V-2d).

Table IV provides a list of other endangered animals known to occur within this preserve.

C. Archaeological and Historical Sites.

A synthesis of the prehistory of the Florida coastline including the Banana River area was conducted by Levy et al. (1984). Their research indicated that evidence of Paleo-Indian occupation in the area was probably obscured by rising sea levels that inundated possible sites. By 6,500 B.C. however, there is evidence that the area received sporadic visitation by Indians, their migrations being influenced by seasonal shellfish abundance. It wasn't until

Table IV

SPECIES OF THE BANANA RIVER AREA

WHICH ARE CLASSIFIED AS ENDANGERED, THREATENED, OR OF SPECIAL CONCERN

ENDANGERED

Reptiles

Atlantic green turtle	(Chelonia mydas mydas)
Atlantic Ridley turtle	(Lepidochelys kempii)
Leatherback turtle	(Dermochelys coriacea)
Atlantic salt marsh snake	(Nerodia fasciata taeniata)

Birds

Wood stork	(Mycteria americana)
Peregrine falcon	(Falco peregrinus)

Mammals

West Indian manatee	(Trichechus manatus)

THREATENED

Reptiles

Atlantic loggerhead turtle	(Caretta caretta caretta)

Birds

Eastern brown pelican	(Pelecanus occidentalis carolinensis)
Bald eagle	(Haliaeetus leucocephalus)
American kestrel	(Falco sparverius paulus)
Roseate tern	(Sterna dougallii)
Least tern	(Sterna albifrons)

Table IV (continued)

SPECIES OF SPECIAL CONCERN

Fishes

Common snook	(Centropomus undecimalis)
Rivulus	(Rivulus marmoratus)

Reptiles

American alligator	(Alligator mississippiensis)

Birds

Little blue heron	(Florida caerulea)
Snowy egret	(Egretta thula)
Louisiana heron	(Hydranassa tricolor)
Reddish egret	(Egretta rufescens)
Roseate spoonbill	(Ajaia ajaja)
American oystercatcher	(Haematopus palliatus)

Adapted from: Fernald, et al. The Sebastian Inlet-Ft. Pierce Inlet Barrier Island: A Profile of Natural Communities, Development Trends, and Resource Management Guidelines. 1982.

Florida Game and Fresh Water Fish Commission. Official lists of Endangered and Potentially Endangered Fauna in Florida. October, 1984.

A.D. 100 that Indian settlement in the area rapidly expanded. At that time there were some mound burials (restricted to individuals of high status) and shell middens that were composed almost exclusively of oyster shells.

Settlement was heaviest during A.D 800 to 1513, the latter being the point of first European contact. The Ais Indians, a tribe of the Timucuans, occupied this part of the Florida coast. Ponce de Leon is usually credited with being the first European visitor to the area, although there is some speculation that Spanish slave hunters may have arrived first and alienated the natives, a possible explanation for the poor reception received by Ponce de Leon. At that time, the Ais are estimated to have numbered between 600-1500, but during the late seventeenth century through the first half of the eighteenth century, the population was decimated by diseases and incursion from northern Indian groups (primarily Creek and Cherokee).

The Ais consumed local fish and shellfish and palmetto berries, coco plums, cabbage palm and sea grapes. They moved their encampments and villages seasonally to avoid flooding and stinging insects. Many Spanish and French ships wrecked off the coast and the Indians often recovered valuables from these sites.

Several archaeological sites exist in the Banana River area. Encampments are marked by middens (accumulations of shells and tools used in cleaning oysters and clams), while villages are identified by the presence of both burial mounds and middens (Rouse, 1981). Five shell middens were found on Merritt Island, four of which were destroyed through the removal of shells for road

construction. Six mounds are located near Cape Canaveral, and one mound and two middens near Indian Harbor Beach. Two middens are located in the Brantley area, and one in Tropic, where a number of fragmentary human bones were found. (Rouse, 1981; DAHRM, 1985).

During the Seminole Wars (1835-1842) the threat of Indian attacks restricted settlement along the Banana River (Brevard County Comprehensive Plan, 1981). The "Armed Occupation Act of 1842" gave 160 acres to any settler who could hold the land for seven years, marking the real beginnings of development in Brevard County. In March 1844, Brevard County was established by the Florida Territorial Council. By 1845, the Ais were no longer in existence as a tribe.

Historically, the Spanish and French have had numerous shipwrecks on the East Central Coast of Florida, thus giving it the title of "Treasure Coast".

The Spanish also left another treasure; oranges. Spanish law required all Spanish settlements to plant orange seeds, the precursors of today's orange groves (Kjerulff, 1972).

D. Water Resources.

Water is the one resource that most directly affects the Preserve's habitability and healthiness for the plants and animals naturally adapted to living in the Banana River area. The drainage basin of the Banana River has many residential canals along its western border between S.R. 528 and S.R. 520 and within the cities of Cape Canaveral, Cocoa Beach and Satellite Beach, there

are over fifty manmade canals. These canals represent artificial, unvegetated underwater areas which have historically experienced poor water quality and associated problems (Down, 1978).

The basic characteristics of the Banana River's water resources vary in response to daily, seasonal, and long term forces associated with the climate. In addition, water circulation patterns in the lagoon have been altered by the construction of causeways and mosquito impoundments. The Canaveral Locks were created in 1965 by the U.S. Army Corps of Engineers. This cut is the only connection between the Banana River and the Atlantic Ocean. These locks lie just north of the preserve's boundary, while the connecting barge canal (between the Banana and Indian Rivers) crosses Sykes Creek within the aquatic preserve. Lands created by dredge and fill have destroyed valuable wetland areas, and increased amounts of surface water runoff and drainage have altered salinity patterns and pollution loadings.

Eight major sewage treatment plants are located within close proximity of the Banana River Aquatic Preserve. Six plants have secondary treatment of sewage effluent and discharge into Class III waters of the Banana River. The following plants are listed by design capacity and average flow, respectively: South Patrick Plant - 2 million gallons per day (MGD) and 1.2 MGD; Cocoa Beach Plant - 6 MGD and 2.8 MGD; Cape Canaveral City - 1.8 MGD and 845,000 gallons per day. Patrick Air Force Base has 2 plants - one with 1 MGD and 825,000 gallons per day, and the Capehart Plant with 1 MGD and 500,000 gallons per day. And finally, Central Avenue-500,000 gallons per day and 275,000-290,000 gallons per day. In addition, two plants have tertiary treatment-Fortenberry

Road Plant with 1.4 mgd and 900,000 gallons per day and Carlton Grove with 1.5 mgd and 1.0 mgd. A ninth plant, located above the aquatic preserve boundary, is the Kennedy Air Force Station Plant with a 640,000 gallons per day capacity and a 250,000 gallons per day average flow.

This area has the second highest concentration of septic tanks in the state. In spite of the fact that most of the septic tanks are twenty to thirty years old, no known problems are associated with them.

In spite of the aforementioned problems, the Banana River is still a relatively productive system, when compared to more populated areas in southern Florida and on the west coast of Florida. However, the growth experienced in past decades is beginning to take its toll on the resources and the magnitude of current development has reached a level where water quality considerations are critical.

E. Cultural.

The U.S. Census population for Brevard County was 272,959 in 1980 and 298,111 in 1982, representing a 9.2 percent increase (East Central Florida Regional Planning Council, 1984). The current Merritt Island population projections indicate that a 17.2 percent increase is likely; from 32,514 in 1980 to 38,100 in 1985, while projections for the North Beaches area indicate a 16.0 percent increase from 18,617 to 21,600 for the same period. It is predicted that Patrick Air Force Base will show a 9.0 percent change in population from 2,843 in 1980 to 3,100 in 1985 (Brevard County Planning Department, 1984). Clearly,

population growth in the Banana River area increases the potential for environmental degradation and adverse impacts on water resources and wildlife. There are presently no Developments of Regional Impact (DRI's) within the preserve's boundary, however future DRI's may occur (East Central Florida Regional Planning Council).

Chapter V

RESOURCE MANAGEMENT

A. Introduction

The main objective of the resource management plan in the aquatic preserve is to protect the resources of the aquatic preserve for the benefit of future generations (Section 258.35, F.S.). This part of the management plan addresses the policies and procedures which both onsite and administrative personnel will pursue. The onsite management will involve DNR's field personnel assigned to the aquatic preserve. The administrative management will involve Division of Recreation and Parks' personnel (both in the field and in Tallahassee) and Division of State Lands' personnel, cooperating in the review of applications for use of state-owned lands and related activities surrounding the preserve. These personnel will be interacting with various government and non-government entities, interest groups, and individuals.

B. Onsite Management Objectives

The onsite management objectives are reflected in the activities that the field personnel become involved in (i.e., observation, research, public interaction, emergency responses, etc.) to protect and enhance the resources within the aquatic preserve. Other activities, such as the interaction with

other government and non-government entities, are covered in more detail in Chapter VI (Management Implementation Network). The field personnel's duties are, with respect to management of the various uses of the aquatic preserve, addressed in more detail in Chapters VII through XI. The field personnel will generally be involved in all management activities concerning the Banana River System.

1. Plant Communities

The communities of aquatic and wetland plants within the Preserve perform five major functions vital to the health and productivity of the estuarine system:

a. they tend to stabilize geologic features in the face of dynamic forces (i.e., currents, tides, winds, and waves), which often act in concert to both erode and deposit;

b. they create, from recycled nutrients and solar energy, the organic material that fuels the estuarine food web which supports the area's fisheries, endangered species, migratory waterfowl, colonial waterbird nesting colonies, raptors, marine mammals, and marine and estuarine invertebrates;

c. they provide protected fisheries habitat for spawning and juvenile development, many of which are of economic importance to the commercial fisheries;

d. they provide roosting and nesting habitat for water birds; and,

e. they physically buffer surrounding waters from contaminated and channelized runoff from uplands within the watershed and, in some cases, buffer the uplands from storm waves and winds.

The management objectives for plant communities will be to maintain and enhance these functions. Because these plant communities are critically important to the well-being of the Preserve, a program to work toward the protection and restoration of those communities now damaged or destroyed by human activities should be developed.

Management Policy

a. Field Familiarization and Documentation. Field personnel will become familiar with the plant species and communities present in the aquatic preserve, and locations of their occurrences.

b. Literature Familiarization. Field personnel will assemble a working library of existing pertinent literature concerning the species and communities present in the aquatic preserve. Staff will become familiar with the ranges, life histories, ecological requirements, productivity, importance

to water quality, contribution to landform stabilization, wildlife habitat provision, fisheries habitat provision, and fisheries food production of the plant communities within the aquatic preserves.

c. Preparation of Guidelines for Management of Endangered Species. Field personnel, based on their field observations and literature reviews, will develop maps (using 7.5 minute quadrangles) showing the locations of threatened and endangered plant species within the aquatic preserve. A set of management guidelines for each species, outlining the habitat requirements and the methods to sustain and/or restore these habitats will be developed. Field personnel, in the course of documenting the occurrence of threatened and endangered animals, will develop maps showing the locations and types of plant communities used by these animals for nesting, roosting, feeding, resting, spawning, etc. Literature information and personal observations will then be used to develop guidelines for maintaining (or restoring if necessary) the "critical habitat" required by each species. Special consideration and priority should be given to the manatee habitats of the Banana River as there are currently no designated manatee sanctuaries in the area.

d. Monitoring of Plant Communities for Natural Changes. Field personnel will become familiar with the use of aerial photography and LANDSAT imagery, for the study and monitoring of plant communities (historically and at present time) and will use this remote sensing in conjunction with field observations to monitor and document natural changes such as:

1. freeze damage to, and recovery of, mangrove communities:
2. wind and wave damage to mangrove communities from storms and hurricanes;
3. accretion-related seaward extension of mangrove communities;
4. erosion-related landward retraction of mangrove communities;
5. depositional burying of marine grassbed communities;
6. invasions of exotic plant species and revegetation by native species after exotic plant removal projects;
7. pathogen damage to and recovery of plant communities.

e. Identification of Areas and Communities in Need of Restoration. Field personnel will, as time permits, systematically survey the aquatic preserve to determine the location, nature, and extent of environmental damages from human activities and assess the possibility of restoring each of the sites according to whether the site is publicly or privately owned, and the cost and effort required.

f. Protection of Plant Communities. Field personnel shall protect the plant communities from the various uses of sovereign lands within the aquatic preserve according to the following guidelines.

1. Field personnel in their biological reports shall not recommend for approval any proposed use for sovereignty submerged lands when the plant communities in the proposed use area appear to be jeopardized.

i. Pruning of mangroves shall only be permitted for access from the mean high water line to a dock or pier. The destructive clearing of mangroves in sovereignty lands shall be strictly prohibited.

ii. Marine grassbed communities shall not be removed or shaded to such an extent as to cause the death of a significant area of the community. They shall not be subjected to unacceptable turbidity, decreased light penetration, propeller or net damage.

2. Field personnel shall be notified of applications for uses of submerged lands within the aquatic preserve by the Bureau of Environmental Land Management central office. No applications will be approved within Class 1 and 2 Resource Protection areas (see section B(6) of this chapter) without a thorough review by the field personnel. The field personnel will inspect the site, assess the potential impacts to the plant communities, and then convey their recommendations to the central office as required.

3. Field personnel will initiate various educational programs and supplement existing educational programs designed to increase public awareness of the damage that recreational, private and commercial uses (i.e., propeller damage) can inflict on marine grassbed communities. Education programs can also be coordinated with other federal, state or local groups (i.e., Florida Sea Grant, school boards etc.)

4. Field personnel will develop an exotic plant control and removal plan after monitoring the rate and extent of invasion by exotic species, such as Brazilian pepper, Australian pine, and melaleuca.

5. In cooperation with the East Central Florida Regional Planning Council, field personnel will familiarize themselves with the results of a study under the Coastal Energy Impact Program, in assessing the potential impacts of an oil tanker spill or drilling rig accident on the natural resources of the Banana River system.

g. Restoration of Plant Communities. Field personnel will consult with professionals in the wetlands restoration/revegetation field to determine the advisability of using healthy beds of marine grasses as a stock source to restore damaged grassbeds. They will develop guidelines for restoring marine grassbeds in the aquatic preserve.

Field personnel will identify easily accessible mangrove communities within the aquatic preserve where a high density of mangrove seedlings could serve as a nursery stock source for transplanting to restoration sites. Field personnel will consult with professionals in the wetlands restoration/revegetation field concerning proven procedures for transplanting and nurturing mangroves, and will develop guidelines for restoring mangrove communities in the aquatic preserve.

In the event that plant restoration is required as the result of a permit application with DER, or as a result of any other process, the field personnel will be responsible for monitoring the restoration activity. This might include advising the individuals involved in the actual restoration work on the best techniques under the available restoration guidelines. The field personnel will monitor the success of the restoration project after the work is completed.

h. Identification of Research Needs. Field personnel will identify research needs concerning plant communities within the aquatic preserve with special emphasis given to data needs that would increase the capability of field personnel to manage plant communities under environmental stress, and to determine threshold tolerances for plant community health and diversity in relation to degraded environmental conditions.

i. Coordination with Other Researchers. Field personnel will become familiar with research projects being conducted within the aquatic preserve by state and federal agency biologists and non-government researchers. Water quality research issues, as they effect plant communities, should also be closely followed. This familiarization should lead to a better understanding of both agencies' personnel and a better awareness of the data findings and uses. The research liaison will also be addressed in Chapter X (Scientific Research).

2. ANIMAL LIFE

The richness of the animal life of the Banana River area is important to the

designation of the aquatic preserve. The fish, shrimp, and crabs within the aquatic preserve, both in the estuary and offshore, are valuable resources on which recreational and commercial fisheries depend. Undisturbed wetlands are excellent habitat for many types of wildlife. These wildlife include an extensive list of endangered species, migratory waterfowl, colonial waterbirds, invertebrates and vertebrates.

The management objective for animal life within the aquatic preserve will be the protection through preservation of habitats and living conditions in the most natural condition possible.

MANAGEMENT POLICY

a. Field Familiarization and Documentation. Field personnel will become familiar with the major animal species in each habitat in the aquatic preserve. This identification process will include the location, number, season of sighting, weather conditions and any other factors which may be necessary to build a working knowledge of the species, and their interaction and occurrence in the aquatic preserve.

b. Literature Familiarization. The field personnel will assemble a working library of existing literature concerning the major animal species and communities within the aquatic preserve. The field personnel will become familiar with life histories, ecological requirements, position in the community, habitat and other factors necessary for sound management.

c. Preparation of Guidelines for the Management of the Endangered Species Within the Aquatic Preserve. The field personnel will become familiar with the guidelines of the Florida Game and Fresh Water Fish Commission, U. S. Fish and Wildlife Service, Department of Natural Resources' Division of Marine Resources, National Marine Fisheries Service and any other applicable agencies and non-government organizations involved in the management of endangered species. These guidelines will be used in conjunction with the field familiarization, documentation, and mapping to develop management guidelines for each endangered species within the aquatic preserve. Special guidelines shall be developed and implemented for the management of areas within the aquatic preserve that are identified as critical habitat for endangered species.

d. Manatee Management. When applications for use of submerged lands within the preserve or adjacent upland activities will affect a manatee sanctuary or manatees known to use an area (see Chap. IV-B7), field personnel will notify the State Manatee Coordinator. These applications or activities will require the coordinator's authorization and approval before they can be recommended by BELM. Field personnel will also work with the coordinator in the practice and procedures of the following activities.

i. Monitor the preserve for manatee activities and maintain a manatee sighting map for the preserve. This mapping will take special note of large seasonal aggregations. A manatee reporting and data collection system will be established and

will make use of other government personnel and private individuals where possible.

ii. Identify and map shallow water and narrow areas where manatee boat/barge collisions are more likely.

iii. Identify any other areas for additional manatee sanctuaries and special channel marking and slow speed zones.

iv. Applications for use of submerged lands will be reviewed for design and operation that are least dangerous and disruptive to manatees. Approved uses within manatee use areas should require manatee caution signs and any other requirements that will guarantee manatee health and safety.

v. The creation of new marinas and multiple slip residential docking facilities should be prohibited in manatee sanctuaries and severely limited in identified manatee use areas.

vi. The creation of canals and basins within or contiguous to manatee sanctuaries shall be prohibited.

vii. Assist local governments in the incorporation of manatee issues into their marina siting elements.

viii. Schedule and monitor activities within manatee use areas during seasons of lowest use.

ix. Assist in public awareness education efforts.

e. Monitoring Changes in Animal Populations. Field personnel will study and monitor changes in animal species that are caused by natural phenomena, such as:

i. freezes;

ii. storms and hurricanes;

iii. changes in habitat due to changes in plant types; and

iv. Changes in habitat due to water quality changes; and

v. geologic or hydrologic changes including erosion, estuarine current flow changes, and any other physical changes.

f. Protection of Animal Life From Human Uses of the Aquatic Preserve. Field personnel, during the process of resource impact analysis in the review of use applications in or affecting the preserve, shall consider the protection of animal species. The review shall also consider the potential effects of the proposed use on the plant communities as they function as habitat for the animal life and uses that may cause a disturbance in the natural activities and functions of the animal life (e.g., air pollution, excessive noise or bright lights affecting a bird rookery). The field personnel should be notified of any proposed activities (e.g., seismic testing, mammal capture by permit) within the aquatic preserve that might affect the well-being of animal life and should be involved in planning the activity so as to cause the least amount of stress on animal life.

g. Identification of Research Needs. The field personnel in the course of their duties shall identify research needs required to improve the management of animal life in the aquatic preserve. This identification process is more fully described in Chapter XII (Identified Program Needs).

h. Coordination with Other Researchers. Field Personnel will become familiar with research projects conducted within the aquatic preserve by state and federal agency biologists and non-government researchers. This familiarization should lead to a better understanding of both agencies' personnel and a better awareness of the data findings and uses. The research liaison will also be addressed in Chapter X (Scientific Research).

3. GEOLOGIC FEATURES

The management of geologic features will require that the field personnel become aware of the natural geologic features and the changes, both human and natural, which affect these features within the aquatic preserve to better enable a review of applications for state-owned land uses that might affect these features. These geologic features will include inlets, islands, shoals, shorelines, embayments, and channels. The overall objective of the management of these features is to allow the naturally dynamic system to operate without man's influence or interference. Active management in this area shall include the review of proposed uses that might affect the geologic features within the aquatic preserve. The majority of these reviews will probably concern bulkheads, bridges and channels as they might affect state-owned lands. The objective in the placement of bulkheads on lands upland of the aquatic preserve shall be that the natural contour and drainage be altered to the least amount practicable. The use of rip rap with mangrove or other suitable native plantings would be preferable to bulkheads within the preserve. Bulkheads are not allowed within the preserve, except as stated in Sections 258.42(2), and 258.44 F.S. and in accordance with the management objectives of the preserve.

Existing bridges and causeways within the Banana River have resulted in losses of grassbeds and mangroves. Future proposed bridge locations will be reviewed in light of these potential impacts. Causeways restrict natural flushing and create unnatural circulation patterns.

Maintenance dredging of existing channels should also be carefully studied to remove conditions that require perennial maintenance and environmental disturbances. New channels also have the potential to adversely impact the aquatic preserves, with varying influences in each preserve, depending on channel location.

The field personnel shall also be involved in the review of project proposals submitted to other agencies, such as the U.S. Army Corps of Engineers, Department of Environmental Regulation, Department of Transportation, or Water Management Districts, and shall formally review and comment on any permit application that impacts the aquatic preserve. These projects shall be reviewed jointly with those agencies' personnel whenever possible. The field personnel will review these projects on behalf of the aquatic preserve and its resources.

4. ARCHAEOLOGICAL AND HISTORICAL SITES

Archaeological and historical sites have several characteristics which must be recognized in a resource management program.

i. They are a finite and non-renewable resource.

ii. Each site is unique because individually it represents the tangible remains of events which occurred at a specific time and place.

iii. While these sites uniquely reflect localized events, these events and the origin of particular sites are related to conditions and events in other times and places. They also preserve traces of past biotic communities, climate, and other elements of the environment that may be of interest to other scientific disciplines.

iv. These sites, particularly archaeological sites, are very fragile because their significance is derived not only from the individual artifacts within them, but especially from the spatial arrangement of those artifacts in both horizontal and vertical planes.

Administering Agency.

The management of the archaeological and historical sites is authorized and administered by the Division of Archives, History and Records Management (DAHRM) in the Florida Department of State. The management authority for this area of management is presented in Chapter II (Management Authority).

Management Policy

The management policy presented here is one of conservation, as recommended by the DAHRM and subject to that agency's changes. Their policy is as follows:

1. The field personnel and all other agencies planning activities within the aquatic preserve shall coordinate closely with DAHRM in order to prevent any unauthorized disturbance of archaeological and historical sites that may exist on the affected tract. DAHRM is vested with the title to archaeological and historical resources abandoned on state lands and is responsible for administration and protection of such resources (Section 267.061(1)(b), F.S.). It is illegal to destroy or otherwise alter sites on state lands without a permit from DAHRM (Section 267.13, F.S.). Therefore, agencies planning activities should coordinate their plans with DAHRM at a sufficiently early stage to preclude inadvertent damage or destruction to these resources.

2. The nature of these sites' fragility and vulnerability to looting and other destructive forces requires that the location of these sites not be widely known, if the location is known at all. In many instances DAHRM will have knowledge of the known and expected site distribution in an area. Special field surveys for unknown areas may be required by DAHRM to identify potential endangerment of a proposed activity to these archaeological and historical sites. This will be especially necessary in the case of activities contemplating ground disturbance over large areas.

3. In the case of known sites, activities that are expected to alter or damage these sites shall alter their management or development plans as necessary, or make special provisions so as not to disturb or

damage such sites prior to professionally acceptable and authorized mitigation.

4. If in the course of a management activity, or as a result of development or the permitting of dredge/fill activities, it is determined that valuable historic or archaeological sites will be damaged or destroyed, DAHRM reserves the right to require salvage measures to mitigate the destructive impact of such activities on such sites (Section 267.061(1)(b), F.S.). Such salvage measures shall be accomplished before DAHRM would grant permission for site destruction.

5. Excavation of archaeological sites in the near future is discouraged. Archaeological sites within the aquatic preserve should be left undisturbed for the present, with particular attention devoted to preventing site looting by "treasure hunters".

6. Field personnel will note suspected sites for future surveys by DAHRM. Cooperation with other agencies in this activity is also encouraged by DAHRM. The DAHRM will help inform the field personnel about the characteristics and appearance of these sites.

7. Any discovery of instances of looting or unauthorized destruction of these sites will be reported to the DAHRM so that appropriate action may be initiated. The Florida Marine Patrol and other enforcement personnel of DNR shall provide enforcement assistance to DAHRM and make arrests or investigate cases of looting or other unauthorized destruction of archaeological sites. The field personnel will follow

the above management policy and become familiar with the personnel involved with this task in DAHRM and their procedures for identifying suspected sites.

5. WATER RESOURCES

Responsible management of water resources for the protection of human health and recreational enjoyment of aquatic preserve waters, as well as for the protection and enhancement of the preserve's plant and animal communities is, without a doubt, the most critical aspect of aquatic preserve management. Research to understand how human activity can alter or detrimentally affect the dynamic characteristics of the preserve's various habitats can be approached confidently after monitoring data has been used to model the effects of naturally occurring variations on the same habitat. Only a single toxic substance may be necessary to initiate irreparable ecological damage and change in the water resources of the aquatic preserve estuarine ecosystem.

Management Policy

The successful management of the water resources of the aquatic preserve depends heavily on other government agencies (i.e., DER and the Water Management District) charged with regulating water quality and quantity. The objective of the water resources management shall be to maintain the naturally high water quality and to ensure the natural seasonal fluctuations of fresh water into the estuary. Sources of water resources data include state and

federal agencies, colleges, universities, scientific foundations and private consultants working in the Banana River area. These various entities have interests at many different levels and areas within the riverine system. The aquatic preserve management program will manage the water resources through coordination with these various entities. The field personnel will not conduct water sampling, but through the review of these data from other entities and from their own field observations, they will be able to identify water resource problems in the aquatic preserve. Efforts will be made to ensure consistency in project design and sampling techniques so that data from various studies can be used for integrated analysis.

a. Familiarization with the Jurisdiction, Personnel, and Monitoring Programs of Government Agencies and Other Entities. Field personnel will become thoroughly familiar with the jurisdiction, personnel and monitoring programs of other agencies, institutions and corporations involved in studying, monitoring, regulating and managing water resources within the aquatic preserve and the drainage basins which provide fresh water to this preserve. Those agencies known to be working or having potential activities affecting the preserve are listed below; others may be added as they are identified.

1. Florida Department of Environmental Regulation
2. Brevard County Health Department
3. Brevard County Environmental Services
4. St. Johns Water Management District
5. U. S. Geological Survey
6. U. S. Fish and Wildlife Service

7. East Central Florida Regional Planning Council
8. East Central Florida Marine Resources Council
9. Florida Game and Fresh Water Fish Commission
10. Florida Department of Natural Resources Marine Research Laboratory
11. Florida Department of Natural Resources Shellfish Sanitation Section
12. University of Florida
13. Florida Institute of Technology
14. University of Central Florida
15. U. S. Environmental Protection Agency
16. Florida Power and Light Company
17. Florida Inland Navigation District
18. Harbor Branch Foundation
19. Florida Oceanographic Society
20. Canaveral Port Authority.

b. Monitoring of Water Resources by Cooperative Data Collection and Review. Field personnel will: 1. promote coordination among involved agencies in planning monitoring programs and in evaluating monitoring data; and 2. monitor water resources within the preserve by reviewing the data collected and compiled by those agencies as it applies to the aquatic preserve and its resources.

c. Review of Permit and Lease Application for Aquatic Preserve Uses and Watershed Activities that would affect the Preserve Water Resources. Field personnel will review sovereign land lease applications, development of regional impact reviews, and DER/COE permit applications in cooperation with

other agencies as necessary, and as outlined in Chapter V (C) for their potential impact on the water resources of the aquatic preserve.

d. Familiarization with and Monitoring of Activities and Users which Regularly Contribute Pollutants to Preserve Waters. Field personnel will become familiar with the activities and users which regularly or potentially contribute pollutants to the waters of the aquatic preserve. This monitoring will be accomplished directly by field observations and indirectly by review of other entities' water resources data. Field personnel will encourage and coordinate with other agencies involved with water resources monitoring to consider more detailed field monitoring in areas of the preserve where the incidence of polluting activities is found to be high.

These activities will also be applicable to Chapter X (Scientific Research), and the coordination through Chapter VI (Management Implementation Network). The field personnel's onsite presence will be complemented by their reliance on other agencies and entities for data and regulation. The field personnel will have the ability to visually monitor water resource crises and phenomena as they occur and when they affect other resources.

6. CUMULATIVE IMPACT ANALYSIS

Cumulative Impacts are the sum total of major and minor changes or effects upon a natural system. Taken singularly these effects may not constitute a notable change in the condition of the natural system, but as these single changes or uses accumulate, their combined impact may result in a substantive environmental disturbance or degradation of the natural system.

The review of proposed uses in the aquatic preserve from the perspective of cumulative impact analysis requires a thorough knowledge of the natural system and the various interactions and dynamics within that system. This aquatic preserve management program will initiate development of a cumulative impact analysis program. The evaluation of cumulative impacts shall include the following criteria from Chapter 16Q-20 F.A.C.:

"(1) The number and extent of similar human actions within the preserve which have previously affected or are likely to affect the preserve, whether considered by the Department under its current authority or which existed prior to or since the enactment of the Act; and,

(2) The similar activities within the preserve which are currently under consideration by the department; and

(3) Direct and indirect effects upon the preserve and adjacent preserve, if applicable, which may reasonably be expected to result from the activity; and

(4) The extent to which the activity is consistent with management plans for the preserve, when developed; and

(5) The extent to which the activity is permissible within the preserve in accordance with comprehensive plans adopted by affected local governments, pursuant to Section 163.3161, F.S., and other applicable plans adopted by local, state and federal governmental agencies.

(6) The extent to which the loss of beneficial hydrologic and biologic functions would adversely impact the quality or utility of the preserve; and

(7) The extent to which mitigation measures may compensate for adverse impacts."

The availability of onsite reserve staff who are familiar with the distinctive characteristics of this system, coupled with their ability to access LANDSAT imagery and mapping, and other data sources, is the key to development of a successful cumulative impact analysis program. As cumulative impacts are identified for specific areas and/or resources, they will become an integral part of the project analysis and decision-making process.

7. MANAGEMENT OF ENCROACHMENTS

The management of encroachments in the preserve will concern the unauthorized placement of structures, unauthorized dredging or filling, or other illegal uses in the aquatic preserve. These encroachments might also include illegal activities associated with an approved use (e.g., extension of a dock, construction of boat houses, extension of an approved channel).

The management policy for the field personnel, after identification of a suspected illegal encroachment, will involve a reporting procedure and the monitoring of the remedial action. After a field identification of suspected encroachments, field personnel will notify the central office to verify the

title of the property and research the possibility of the use being an approved activity. Due to the extensive areas involved in the aquatic preserve, this will be a progressive activity depending on the field personnel's eventual familiarization with the preserve and the approved uses. The potential for unauthorized activities in such an extensive area may possibly require some type of mapping and recording system to assist the field personnel in their monitoring.

The management action for verified illegal encroachment will be developed by the agencies specifically involved (i.e., DNR, DER). The field personnel will assist, as necessary, with field evaluations or other support activities. The final action will be monitored by the field personnel, at the direction of the Trustees to the central office. The procedures followed in these applications will be decided on a case by case basis.

C. RESOURCE MAPPING AND RESOURCE PROTECTION AREAS

The efficient description and location of resources within such a large area requires the use of remote sensing techniques. This work will be done in conjunction with DNR's Marine Research Laboratory's Assessment of Fishery Habitat Loss Study in the Banana River Area. Marine Research Laboratory personnel have developed resource and habitat identification mapping through the use of LANDSAT (satellite) imagery and aerial photography.

The vegetation and land use mapping done in this study will become the basis

for the development of a Resource Protection Area management system in the aquatic preserves. This mapping system will identify and classify various resources within the aquatic preserves that require protection by the management program. This mapping system will also give acreage totals for each land use and vegetation classification in the preserves. The vegetation portion of the mapping will be augmented over time by wildlife and fisheries information (endangered species, bird rookeries, etc.), archaeological and historical site information and other resource factors deemed crucial to the continued health and viability of the aquatic preserves.

The onsite managers will supplement this mapping with the above information to develop and update a Resource Protection Area (RPA) mapping program. The RPA mapping system is based on three levels of resource classification. The Class 1 level will contain resources of the highest quality. Uses proposed for these areas will receive the most rigorous review. The Class 1 level will include the following: marine grassbeds; mangrove swamp; saltwater marsh; oyster bars; archaeological and historical sites (upland and submerged); endangered species habitat; colonial waterbird nesting sites; and other appropriate factors.

The Class 2 areas will be defined as those areas containing the resources of Class 1, but in a transitional condition compared to Class 1. These resources will either be building toward Class 1 status or declining to Class 3 status. Class 2 areas will require careful field review as to the specific area's sensitivity to each proposed use. In some respects, these areas may be as sensitive or more sensitive to disturbances as Class 1 areas. The resources

of Class 2 will include: marine grassbeds; mangroves in scrub condition or colonizing new lands; saltwater marsh colonizing new lands; and other resources of Class 1 type that fit in the Class 2 condition.

Class 3 areas will be characterized by the general absence of the attributes of the above two classes. Class 3 areas may have small localized Class 1 or 2 areas within them. Class 3 will generally have deep water areas or areas with no significant vegetation or wildlife attributes. Nearshore and bottom areas significantly modified by man will be designated Class 3.

These RPA maps will require periodic revisions as the onsite managers learn more about the resource's reactions to man's uses. Scientific research and other data additions may also require modification of this system. Natural changes will also require modification of this classification system. Periodic checking by LANDSAT satellite imagery will become useful for remote sensing monitoring as its use is more fully developed.

The RPA maps will become a planning tool for both onsite and central office staff. More detailed field review will still be required to supplement this information on a case by case basis, as necessary.

The initial development, as well as periodic review, will require the support and assistance of the many other resource regulating and managing agencies, as well as local and regional government entities. Support will also be requested from the colleges, universities, foundations and other interest groups and individuals.

The RPA mapping will use the USGS 7.5 minute quadrangle map format for vegetation and these maps, after public notice and opportunity for public review and comment, will be placed in Appendix D of the aquatic preserve management plan in Appendix D. It is recognized that mapping at this scale may not adequately define small areas which do not qualify for the RPA class level assigned to a general area.

D. ADMINISTRATIVE MANAGEMENT OBJECTIVES

This section of the chapter addresses the role of the central office, in the aquatic preserve management planning and implementation process. The central office's role is generally interpreted within the context of coordinating activities with the field personnel. This coordination linkage is important to many program aspects, including project review and evaluation, local contact initiation, administrative rule development, contractual services and conflict resolution, not to mention the routine support (payroll, operating expenses, etc.) usually extended by the central office to the onsite managers. All program activities identified within this context are designed to protect and enhance the environmental, educational, scientific, and aesthetic qualities of the natural systems of the aquatic preserve.

1. Objectives

Specifically, the following administrative objectives are an essential part of the aquatic preserve management program.

a. To ensure a comprehensive, coordinated review and evaluation of proposed activities potentially affecting the environmental integrity of the aquatic preserve.

b. To serve as the link between aquatic preserve field personnel and state agencies and programs which originate in Tallahassee.

c. To serve as the primary staff in the development of administrative rule additions, deletions, and revisions.

d. To serve as the administrative staff for contractual agreements and services.

e. To establish and maintain a conflict resolution process.

f. To review all existing and past activities as to their affect on the environmental integrity of the aquatic preserve.

2. Project Review and Evaluation

A major element in the administration of an aquatic preserve management system is the establishment of a thorough project review process. It is the program intent that the central office staff review all proposed activities requiring the use of state-owned lands within the preserve.

Sections 258.42 through 258.44, F.S., establish the legal context within which all proposed uses of the aquatic preserve must be evaluated.

Essentially, these sections require that projects be basically water dependent or water-enhanced, not contrary to the lawful and traditional uses of the preserve, and not infringing upon the traditional riparian rights of the upland property owner.

The primary mechanism through which proposed uses are reviewed is accomplished by participation in the state lands management process as established by Chapter 253, F.S., and modified by Chapter 258, F.S. The central office was administratively designated, on October 4, 1982, as an agent of the Trustees, for the purposes of evaluating the environmental consequences of proposed uses of state-owned lands within aquatic preserves.

In conducting the environmental evaluations, the central office staff will rely heavily upon the most current, readily available data such as Department of Transportation (DOT) aerial photography, LANDSAT imagery, DER biological reports, and other data resources (see Appendices C and D). If a proposed activity is legally consistent with the maintenance criteria outlined in Section 258.42 F.S. and Chapter 16Q-20, F.A.C., and is generally of negligible environmental concern, then the project review will likely be conducted in its entirety by the central office staff, utilizing the generalized environmental data.

The field personnel will be requested to conduct a more detailed environmental assessment of the project if the central office staff, during the course of the preliminary application review, determines that the requested use of state-owned lands may have a significant effect upon the environmental integrity of the preserve. Copies of all applications received will be provided to the field personnel for project monitoring and assessment of the possible cumulative impacts.

Field personnel will be encouraged to establish direct communication links

with the various regulatory and management agencies for purposes of obtaining advance notification of projects potentially affecting the preserve. All environmental review and assessments, however, will be channeled through the central office unless other arrangements have been previously cleared with the central office.

While the State Lands Management Program authorized by Chapters 253 and 258, F.S. and Chapters 16Q-20 and 16Q-21, F.A.C. is expected to be the primary management implementation vehicle for the aquatic preserve, it is by no means the only vehicle. Section 253.77, F.S., as amended, and the December, 1982 Memorandum of Understanding between the COE, DER and DNR provide direct access to DER's permitting process for DNR. The Development of Regional Impact (DRI) and other regional or state level review processes represent other implementation mechanisms. The basic review approach and the evaluation relationship between the field personnel and the central office staff will be the same as the case involving the State Lands Management program.

One aspect of the aquatic preserve review and evaluation program is the identification of proposed activities that are either generally or specifically prohibited. Immediately upon review of such project applications, the central office staff will notify the Division of State Lands (or other program managers) that the proposed activity is legally unapprovable for the stated reasons. For those proposals which are subject to denial due to their adverse environmental impacts, even though the activity may be permissible, Section 258.42, F.S., specifically provides that:

"(1) No further sale, lease, or transfer of sovereignty submerged lands shall be approved or consummated by the trustees except when such sale, lease, or transfer is in the public interest.

(2) The trustees shall not approve the waterward relocation or setting of bulkhead lines waterward of the line of mean high water within the preserve except when public road and bridge construction projects have no reasonable alternative and it is shown to be not contrary to the public interest.

(3) (a) No further dredging or filling of submerged lands shall be approved by the trustees except the following activities may be authorized pursuant to a permit:

1. Such minimum dredging and spoiling as may be authorized for public navigation projects.

2. Such minimum dredging and spoiling as may be authorized for creation and maintenance of marinas, piers, and docks and their attendant navigation channels.

3. Such other alteration of physical conditions as may, in the opinion of the trustees, be necessary to enhance the quality or utility of the preserve or the public health generally.

4. Such other maintenance dredging as may be required for existing navigation channels.

5. Such restoration of land as authorized by s. 253.124(8).

6. Such reasonable improvements as may be necessary for public utility installation or expansion.

7. Installation and maintenance of oil and gas transportation facilities, provided such facilities are properly marked with marine aids to navigation as prescribed by federal law.

(b) There shall, in no case, be any dredging seaward of a bulkhead line for the sole or primary purpose of providing fill for any area landward of a bulkhead line.

(c) There shall be no drilling of gas or oil wells. However, this will not prohibit the state from leasing the oil and gas rights and permitting drilling from outside the preserve to explore for oil and gas if approved by the board.

(d) There shall be no excavation of minerals, except the dredging of dead oyster shells as approved by the Department of Natural Resources.

(e) There shall be no erection of structures within the preserve, except:

1. Private docks for reasonable ingress or egress of riparian owners;
2. Commercial docking facilities shown to be consistent with the use or management criteria of the preserve; and
3. Structures for shore protection, approved navigational aids, or public utility crossings authorized under subsection (3)(a).

(f) No wastes or effluents shall be discharged into the preserve which substantially inhibit the accomplishment of the purposes of this act.

(g) No nonpermitted wastes or effluents shall be directly discharged into the preserve which substantially inhibit the accomplishment of the purposes of this act."

Generally, applicants desirous of appealing staff recommendations will have to follow those appellate procedures outlined in the appropriate authorizing statutes. In the case where applications requesting the use of state-owned lands are denied, three appellate procedures are available to the applicant. Depending upon the type of application submitted, an applicant may:

a. Ask the Governor and Cabinet to overturn an application decision rendered by the Executive Director of Department of the Natural Resources (or his designee) under a delegation of authority;

b. Request an Administrative Hearing under the procedures outlined in Chapter 120, F.S.; or

c. Appeal the action of the Board of Trustees of the Internal Improvement Trust Fund to the District Court of Appeals.

3. Liaison Between Field Personnel and Other Interested Parties

One of the most important aspects of the field personnel's job is to establish a mutually beneficial communication link with pertinent interest groups. The central office staff will assist in initially identifying and contacting governmental bodies, special interest groups and interested individuals requiring aquatic preserve program coordination.

When requested by the onsite managers, the central office staff will assist in arranging for specialized management expertise not generally available locally. This may include, for example, such things as arranging for DAHRM to conduct a detailed cultural resource assessment for certain areas of the the preserve.

Chapter VI

MANAGEMENT IMPLEMENTATION NETWORK

This chapter of the management plan will address the various relationships of aquatic preserve management to the different government agencies and programs, non-government entities, interest groups, and individuals within the aquatic preserve area. The activities of both field personnel and central office staff as they relate to these other organizations will be presented.

A. FEDERAL

Many federal agencies have property interests, land and wildlife management programs, research activities, construction activities, and regulation programs existing or potentially existing within the aquatic preserves. The objective of the aquatic preserve management program will be to complement the various activities wherever possible. The field personnel will assist those federal agencies in areas where they have common goals. The field personnel and central office staff will also review the federal activities as to their effect on the objectives of the aquatic preserve management. This review shall be coordinated through the DER's Office of Coastal Management for the purposes of enforcing the provisions of the Federal Coastal Zone Management Act of 1972, as amended.

1. United States Fish and Wildlife Service. The aquatic preserve program will be involved in the review of proposed preserve uses in conjunction with the Fish and Wildlife's Division of Ecological Services in Vero Beach. This division reviews dredge and fill requests and other federal level permitting under the Fish and Wildlife Coordination Act.

Another management program in which the field personnel could possibly interact with the Fish and Wildlife Service is the protection and recovery of endangered species and bird rookeries within the aquatic preserve. Field personnel will become involved in using available recovery techniques for this purpose, as necessary.

2. U.S. Army Corps of Engineers. The U.S. Corps of Engineers (COE) is charged with providing technical guidance and planning assistance for the Nation's water resources development. The COE also provides supervision and direction to many engineering works such as harbors, waterways and many other types of structures. Their major responsibility, as it applies to the aquatic preserve, is the protection of navigable waters, pollution abatement and maintaining water quality and the enhancement of fish and wildlife.

The COE activities in the Banana River include their involvement with the DER in the dredge and fill permitting process, technical oversight of channel, inlet and canal maintenance, and evaluating requests for new channels, canals and other such public works projects. The field personnel will become familiar with the various programs, policies and procedures as they apply to the aquatic preserve.

The field personnel and central office staff will also review activities proposed by the COE for conformance to the objectives of the aquatic preserve management plan. This involvement should begin in the early stages of project planning in order to facilitate the best protection of the aquatic preserve possible.

3. U.S. Geological Survey. The U.S. Geological Survey (USGS) under the Department of the Interior has the responsibility to perform surveys, investigations, and research pertaining to topography, geology, and the mineral and water resources of the United States. USGS also publishes and disseminates data relative to those preceding activities. In the past the USGS has conducted many studies on various resources in the region.

The field personnel and central office staff will become familiar with these studies and the data results as they apply to their management activities.

4. U.S. Environmental Protection Agency. The U.S. Environmental Protection Agency (EPA), in cooperation with state and local governments, is the federal agency responsible for the control and abatement of environmental pollution. The six areas of pollution within which the EPA is concerned are air, water, solid waste, noise, radiation and toxic substances. The DER is the state agency responsible for handling most of these programs on a state level in lieu of a federal program. Within the aquatic preserve, the field personnel will assist the EPA in planning field activities in which they may be involved and where there are common goals.

5. U.S. Coast Guard. The U.S. Coast Guard is the federal agency involved in boating safety, including search and rescue when necessary. The Coast Guard is also charged with the permitting of structures which affect navigation and boating safety. These structures include bridges, causeways, aerial utilities and other structures which may be in conflict with navigational uses. The field personnel, in conjunction with the central office staff, will also review projects which the Coast Guard may be evaluating for permits.

6. National Marine Fisheries Service. The National Marine Fisheries Service (NMFS) under the U.S. Department of Commerce is active in the Indian River area in recording commercial fish landings. The NMFS also has enforcement officers in the area checking for illegal fishery activities. The field personnel will work with these personnel whenever they have common goals within the aquatic preserve.

B. STATE

Many state agencies have programs which affect the resource or regulate activities within the aquatic preserve. There are also other DNR programs that are within or affect the Banana River Aquatic Preserve. This section will describe the interactions and relationships of these various agency programs and how they relate to aquatic preserve management.

1. Department of Environmental Regulation. The Department of Environmental Regulation (DER) holds principle responsibility for air and water quality

regulation. To this end, DER through its permitting process (DER 17-3, 17-4, and 17-12, F.A.C.), permits dredge and fill activities and dock, boat ramp, sea wall and other forms of construction where applicable. Permitting for dredge and fill, specifically, is initiated in a three way permit review process in conjunction with the U.S. Army Corps of Engineers (COE) and the DNR. The overall importance of each type of permitting activity and its positive effect on water quality makes DER of primary importance to implementation of the aquatic preserve program.

The DER also regulates other forms of pollution, such as air, noise, wastewater and hazardous waste, each of which may be important in the future to the preserve.

DER also oversees designated Outstanding Florida Waters (OFW). The standards for maintaining water quality within an OFW are more stringent than those otherwise considered in other Class III designated waters (waters for recreation, and management and propagation of fish and wildlife). The Banana River is designated as an OFW and such status complements the goals of the aquatic preserve management plan.

The field personnel will become familiar with the water quality, dredge and fill, and other regulatory programs that are important to the aquatic preserve. The field personnel should develop a close working relationship with DER staff and become familiar with DER field activities and programs that are in common with the objectives of the aquatic preserve management program. The field personnel should open the most efficient line of communication with

the local offices to receive the permit applications from DER as soon as possible to improve the response time within the review process.

The DER, Office of Coastal Management is charged with coordinating activities related to coastal management in the state and reviewing federal actions for consistency with the State Coastal Management Program, Section 380.20, F.S. The central office staff will maintain a close relationship with the Office of Coastal Management for assistance in the review of federal actions, data and research needs, and other program support.

2. Department of Community Affairs. The Department of Community Affairs (DCA) is responsible for reviewing Developments of Regional Impact (DRI). DRI's are major developments that have impacts on a scale which is greater than county level and require a regional review from neighboring local governments and state agencies. Both the central office staff and field personnel of the aquatic preserve program will be involved in reviewing DRI's. The field personnel should receive notice of a DRI through the central office staff and will proceed with the field review. The central office staff will coordinate the field review findings and work with the other state agencies in Tallahassee in the review of the DRI.

3. Department of Natural Resources. The aquatic preserve management program is associated with several other Department of Natural Resource (DNR) programs in the Banana River area.

DNR's Marine Research Laboratory in St. Petersburg, under the Division of

Marine Resources, has several programs and projects within the Banana River which will benefit the aquatic preserve program. The Marine Lab is presently studying fishery habitat loss in the Banana River. The Resource Protection Area mapping, which will be used in the management of the aquatic preserve, will be created as a product of that fishery habitat loss study. The data from this project, when it is completed, will be incorporated into this management plan. The Marine Lab staff are also involved in a manatee protection program. The field personnel will become familiar with these studies and programs, and will consult the Marine Lab for their data needs whenever possible.

The Division of Marine Resources also handles the permitting for the collection of certain marine species and use of certain chemicals. The field and central office staff will become familiar with this permitting process and request notification of these permits within the aquatic preserve.

The Marine Patrol, under DNR's Division of Law Enforcement, also operates in the Banana River and is located in Titusville. The field personnel will become familiar with their programs and operation, and will call on the Marine Patrol for law enforcement support as required.

The Division of State Lands within the DNR is charged with overseeing uses, sales, leases or transfers of state-owned lands. The aquatic preserve staff will interact with State Lands in all transactions concerning submerged lands within the aquatic preserve. These would include the potential acquisition of privately titled submerged lands or contiguous uplands important to the

integrity of the preserve. This relationship is more fully described in Chapter V(C).

The Division of Resource Management, through the Bureau of Geology and Aquatic Plant Research and Development, is responsible for various programs potentially affecting the aquatic preserve. Staff will establish communication links with this Division to ensure that adequate consideration is given to potential impacts upon the preserve that may result from the conduct of their various programs.

The Division of Recreation and Parks, in addition to the work related to aquatic preserves by BELM and The Florida Park Service, is also involved in the management of State parks and recreation areas nearby. The aquatic preserve program will work closely with these programs as they relate to aquatic preserve management objectives.

4. Marine Fisheries Commission. (MFC) The MFC was established as a rule-making authority pursuant to Section 370.027, F.S. The seven members are appointed by the Governor and are delegated full rulemaking authority over marine life (subject to approval by the Governor and Cabinet) with the exception of endangered species. This authority covers the following areas: a) gear specifications, b) prohibited gear, c) bag limits, d) closed areas, h) quality control codes, i) seasons, and j) special consideration related to eggbearing females and oyster and clam relaying. The field personnel and central office staff will become familiar with and enforce the rules of the MFC.

The MFC is also instructed to make annual recommendations to the Governor and Cabinet regarding marine fisheries research priorities. The field and central office staff will use these recommendations to direct research efforts within the aquatic preserve.

5. Florida Game and Fresh Water Fish Commission. (GFWFC) The GFWFC administers the Endangered Species Program in Florida. Several species listed by the state as either rare, threatened, or endangered reside in the Banana River area. Many of these species, including mammals, birds and reptiles live in or periodically use the aquatic preserve. The GFWFC will play a strong role in assisting in the preservation of these species, and will work closely with the field personnel and central office staff in developing program needs in this area.

The GFWFC's Environmental Services office in Vero Beach sends biologists into the Banana River area to review projects which may have potential impacts on local fish and wildlife habitat as necessary. The central office will use the GFWFC's assistance in their review process, when possible, and in developing fish and wildlife management for the aquatic preserve.

The GFWFC has enforcement officers working in this area. The field personnel will interact with these officers where there are common goals.

6. Department of Transportation. (DOT) The DOT has an office in Pineda and the field personnel and the central office will work with the resident engineer on anticipated projects having possible impacts on the aquatic

preserve and their major tributaries. The field personnel and administrative staff will review any major highway or bridge projects that may be proposed in the future.

7. Department of State. The Division of Archives, History and Records Management (DAHRM) in the Department of State will have a close working relationship with the field personnel and central office staff in the protection of archaeological and historical sites. The field personnel will be directed by DAHRM, through the central office, in any activities or management policy needs for these sites.

8. Health and Rehabilitative Services. (HRS) The HRS provides many services to the public. Of interest to the Aquatic Preserve Program are the HRS programs of septic tank regulation and locally implemented mosquito control. Both the central office staff and field personnel will establish communication and coordination linkages with HRS and their locally conducted programs of septic tank regulation and mosquito control. Although mosquito control serves a useful public function, the effects of pesticides (adulticides and larvacides) in the waters of the preserve are a primary concern. The central office staff will become involved in future meetings and management programs developed by the Governor's Working Group on mosquito control. Subsequent policy recommendations coming out of this group will be evaluated for applicability to the ongoing aquatic preserve management program.

C. REGIONAL

The regional level of the management implementation network as it applies to the Banana River Aquatic Preserve will include the St. Johns River Water Management District and the East Central Florida Regional Planning Council. These organizations have activities that are broader than the local government, but are on a smaller scale than the state level.

1. Water Management District. The district boundaries of the St. Johns River Water Management District include Brevard County. The water management district administers permitting programs for the local consumable use of water, storm water discharges, and drainage projects. This includes the withdrawal and use of water from rivers, streams, and wells. The types of water uses they permit in the Banana River area include irrigation and public water supply. The field personnel will become familiar with the review and permitting procedures as they might apply to water supply in this basin. The water management district is also involved in various studies on water supply and management, and other related research that may be of use to aquatic preserve management.

2. East Central Florida Regional Planning Council. The East Central Florida Regional Planning Council (ECFRPC) serves as a regional planning body for the local government of Brevard County, as well as five other east central Florida counties. Among its duties, the ECFRPC:

a. aids local governments with planning expertise;

b. is the regional representative for the Development of Regional Impact (DRI) review process;

c. serves as a regional clearinghouse for state and federal projects and programs; and

d. conveys information from the local governments to the state and federal levels.

The field personnel will become familiar with the various projects, programs, and data sources that the ECFRPC has within its administration that may effect or prove useful to the aquatic preserve program.

The DRI review of projects which affect the aquatic preserve will be reviewed by the central office staff, with the field personnel's field review, when necessary. DRI's for large marinas, large subdivisions on the uplands above the preserve, and commercial or industrial developments will require a field review by the field personnel as to their effect on the aquatic preserve.

D. Local Governments and Special Districts.

This section will address the relationship of the aquatic preserve management program to the various local government agencies, special districts and their programs. The local governments include Brevard County and the incorporated cities that surround the aquatic preserve. The following cities border this lagoon area: Cape Canaveral, Cocoa Beach, Satellite Beach, and Indian Harbor Beach. The various special districts (drainage, inlet and mosquito control) and their relationship to aquatic preserve management, are also presented.

The field personnel will be the local liaison for the aquatic preserve to these local government entities to assist them in modifying their policies and practices to conform to the objectives of the aquatic preserve's management plan, and to exchange information and expertise for mutual benefits.

1. Relationship to local management plans. All local governments are required by the Local Government Comprehensive Planning Act (LGCPA) of 1975 (Section 163.3161, F.S.) to have a comprehensive management plan to ensure long-range plans for the orderly and balanced growth for the cities and counties. The comprehensive plans guide local zoning policies and practices toward a future as set out in the plan. No development is permitted that does not conform to the local government's comprehensive plan.

The aim of the aquatic preserve, with respect to these local government comprehensive plans, is to have their plans be consistent with the aquatic preserve management plans. The field personnel will become familiar with the above plans and how they support or are in conflict with the objectives of aquatic preserve management. The field personnel will assist local planning officials in having their plans meet these objectives. It is hoped that local governments will join in the spirit of aquatic preserve management and be willing to work for these changes.

2. Relation to local development codes. The local zoning and development codes (e.g., building codes) provide the major local regulation that defines what an owner can do on a particular parcel of property. The zoning prescribes the allowable uses and the intensity of those uses. Certain uses

along an aquatic preserve can potentially have a profound effect on a preserve.

This section will operate in conjunction with the preceding section on local management plans. The field personnel will become familiar with the local zoning, development codes and their potential effects on the nearby aquatic preserve. The field personnel will assist local planning and zoning officials in identifying areas where changes in zoning would better conform to the objectives of the aquatic preserve management. The field personnel might also offer to assist local planning and zoning officials in the review of proposed subdivisions upland of the preserve.

3. Suggested policies and practices in support of Aquatic Preserve Management. This section will address any other policy or practice not covered in the two preceding sections. These policies and practices might include local government mangrove ordinances; recreation problems where a park is in or near an aquatic preserve, or any other problem as it might relate to local governments. The field personnel will offer assistance or information to local officials or will coordinate with other agencies to help solve these problems as they occur. The field personnel will work with county personnel on enforcement of local ordinances. The field personnel will also comment, through the central office, on any local practice that is identified as endangering the well-being of the aquatic preserve.

4. Special Districts (Drainage and Mosquito Control). The special districts are taxing districts established to correct drainage and mosquito control

problems. There are no drainage districts in Brevard County affecting the Banana River Aquatic Preserve. Brevard County has a mosquito control district.

These districts may not have an official comprehensive management plan, but they do have management policies and program statements that are similar to such a plan. The field personnel will become familiar with these policies and the activities of these districts and will monitor their effect on the aquatic preserve. For example, the field personnel might recommend identifying areas that should not receive mosquito spraying or other alternative management because of remoteness to inhabited areas and possible, but unnecessary damage to the resources of the aquatic preserve; or drainage districts might be asked not to use certain types of herbicides or to use them only at certain times of the year.

E. Other Entities

This section will apply to the numerous entities that have an interest in the aquatic preserve but are non-governmental agencies. This will include, but not be limited to, the environmental interest groups (i.e., Audubon Society, Sierra Club), the scientific organizations (i.e., Marine Resources Council of East Central Florida, Harbor Branch Foundation), the fishing and sports interest groups (i.e., Florida League of Anglers, Organized Fishermen of Florida), the universities that may have research activities in the preserve (i.e., Florida Institute of Technology, University of Miami, University of Florida,) and any other interest groups or individuals. The relationship of

these entities to aquatic preserve management might include the coordination of activities, such as scientific research, environmental education, management of rookeries or other natural areas, or numerous other possible activities. A worthwhile aquatic preserve management process will depend on the continued support and help of these interest groups in all of the aquatic preserves. The field personnel will be active in communicating the aquatic preserve management process and activities to the various groups and consulting with them for their help in their areas of expertise.

Chapter VII

PUBLIC USES

This chapter addresses the public use of the aquatic preserve. The public in this case shall refer to the general public or those persons without riparian rights. The "Florida Aquatic Preserve Act of 1975" (Section 258.35, F.S.) allows for the lawful and traditional public uses of the aquatic preserve, such as sport fishing, boating and swimming (as adapted from Section 258.43(1), F.S.). These and other traditional uses that do not involve a commercial intent or the use of a riparian right to place a structure in the preserve, and do not degrade or otherwise destroy the preserve will be considered public uses. This section will be further divided into consumptive and non-consumptive uses as applicable to each resource.

A. Consumptive Uses.

Consumptive uses involves the removal of resources from the preserve. These uses include fishing, hunting, shellfishing, and other related activities. They also include the unintentional removal of resources by propeller damage to grassbeds. The management of these uses (see Chapter V. Resource Management, Section B: Onsite Management Objectives) will include the observation and monitoring of the effects of these uses on

the resources. The field personnel will periodically assess the impacts through the use of the Marine Research Laboratory's LANDSAT capabilities for identifying habitat losses or disturbances in the Banana River area plus any other studies or data sources that might become available. This management will also include the protection of the resources from unlawful or excess practices of these uses. The legality of these uses will be controlled by existing applicable state laws and local ordinances.

These consumptive uses will also be monitored for their effect on other resources (e.g., bird rookeries, marine grassbeds, archaeological and historical sites). The field personnel will also be sensitive to additional enforcement needs (i.e., the need for additional enforcement staff during nesting seasons).

Field personnel will, for example, become familiar with and will enforce rules adopted by the Marine Fisheries Commission. These will include regulations on fishing gear, bag and size limits, closed areas, seasons, etc.

B. Non-consumptive Uses.

These uses are those which do not generally remove resources from the preserve. Examples of these uses include swimming, diving, boating, bird-watching, and other related activities. Although boating and diving are usually considered as non-consumptive uses, they can become consumptive when boat operators carelessly place anchors in grass beds or

navigate into waters that are too shallow for their boats.

The management practices involved with these uses will be the same as those previously described under Section A., except that these uses are not generally controlled by law. The guiding principle in these cases will be whether or not the activity causes a disruption of the preserves' resources (e.g., destroys marine grassbeds, disturbs rookeries). Only in the event of these disruptions will the field personnel become involved. Some of these uses may possibly be involved in environmental educational (Chapter XI) programs.

Chapter VIII

PRIVATE NON-COMMERCIAL USES

This section will apply to those private, non-commercial uses which are associated with riparian land ownership. The management of the aquatic preserve recognizes the traditional riparian rights of upland property owners. The right of ingress, egress, boating, swimming, fishing and other incidental uses of sovereignty lands, historically has allowed for the placement of certain structures, such as docks, within the preserve. The right to make any preemptive use of sovereign lands is a qualified one and can only be exercised with the prior consent of the Board after a finding that such uses will not impair public uses, or destroy or damage areas of environmental significance. The review of proposed activities will require the interaction of the Resource Protection Area mapping with administrative and possible field review and later monitoring by field personnel as projected by Chapter V., Section B.

Private non-commercial uses shall be designed to avoid critical Resource Protection Areas (Class 1 and 2) and shall be designed to reduce the use's impact to the preserve in general. Individual applications for these private non-commercial uses shall be reviewed by the applicable Resource Protection Area Map and criteria. In addition, private dock proposals will be reviewed by the criteria described in Section 16Q-20.04(5) F.A.C. of the revised Aquatic Preserve Rule.

Bulkheads should be placed, when allowed, in such a way as to be the least destructive and disruptive to the vegetation and other resource factors in each area. Approved uses which do disrupt or destroy resources on state-owned lands will require mitigation. This mitigation will include restoration by the applicant or other remedy which will compensate for the loss of the affected resource to the aquatic preserve.

Dredging within the aquatic preserve shall be held to a minimum. Dredging proposals shall be reviewed according to the procedures in Chapter V depending on the proposed activities location within the RPA. Proposals within Class 1 areas (Chapter V (B)[6]) will be scrutinized to the maximum extent in order to find the best practicable method of development and location if that use is acceptable in that particular area of the preserve. The mitigation of lost or disturbed resources shall be required. There shall be no dredging allowed in Class 1 or 2 areas or in nearby areas if it will adversely impact these areas.

The location of proposed multiple docking facilities, such as for condominium developments, shall be based on the marina siting criteria described in Section 16Q-20.04(5)F.A.C. of the revised General Aquatic Preserve Rule.

Authorization of such facilities will be conditioned upon receipt of documentation evidencing the subordination of the riparian rights of ingress and egress for the remainder of the applicant's shoreline for the life of the proposed docking facility.

Non-residential docking facilities (commercial) are addressed in Chapter IX. The use of seaplanes within this preserve is seen as a non-traditional use.

Applications for seaplane use within the preserve will be reviewed on a case by case basis. These uses will only be recommended where such use will not affect resource protection areas or natural values of the preserve, not effect endangered species habitat, can be utilized in a safe manner, and will not preempt traditional uses within the proposed use area.

Chapter IX

COMMERCIAL USES

This section addresses the variety of traditional and non-traditional (i.e., new uses in this area) commercial uses which might occur within the aquatic preserve. Among the traditional uses in the Banana River area are utility crossings, marinas and yacht clubs, commercial fishing, and other types of boats (e.g., sportfishing, diving) for hire. Non-traditional uses in this area include power plants, oil and gas transportation facilities, and other such commercial uses.

A. TRADITIONAL COMMERCIAL USES.

1. Utility Crossings. There are at present time both aerial and underwater utility crossings in the aquatic preserve. Future proposals should be designed so the preserve is crossed by the least destructive method in the least vulnerable areas according to the RPA maps (see Chapter V[C]). Increased or additional use of any existing utility crossings is preferable, if their condition at the time of the proposal is acceptable. The field personnel should eventually develop a utility crossing plan for all areas with anticipated utility crossing needs to allow for advance planning, for placement of these crossings in the best environmental location possible. The

utility crossing plans, when completed, will become a part of this plan. Crossings should be limited to open water areas to minimize disturbance to marine grassbeds, mangroves or other critical habitat areas and should not interfere with traditional public uses.

2. Commercial Fishing. The management of the aquatic preserve shall not include the direct management of commercial fishing activities. Field personnel will monitor these activities and assess their affects on the preserve only in conjunction with the Division of Marine Resources, the Florida Marine Patrol and the Marine Fisheries Commission, and as part of a cooperative effort with that division. The field personnel will also notify the requisite authority in the event of illegal activities (Chapter 370, F. S. or by special act). The field personnel, along with other agencies and divisions' programs and studies, will monitor fishing activities within the aquatic preserve. Monitoring will concentrate on boat access into certain areas, prevention of marine grassbed destruction and other needs of the aquatic preserve as they are associated with commercial fishing activities. After problems associated with commerical fishing activities are identified and documented, the findings will be presented to the Marine Fisheries Commission. It is the authority of the Commission and the Florida Legislature to regulate commerical fishing within the aquatic preserve.

3. Marinas. The locating of marinas and their related uses will be a major concern of the Banana River Aquatic Preserve management. Marinas represent a use with many potential impacts on the preserve's resources. The siting policy of Section 16Q-20.04(5) F.A.C. of the revised General Aquatic

Preserve Rule shall be used for siting marinas in the aquatic preserve.

4. Deep Water Port Facilities. The only port of this type within the Banana River Lagoon is the Port of Canaveral which is located to the north of the aquatic preserve. Although activities within this port facility are outside the preserve, they will affect the preserve. New activities and maintenance work will be reviewed as to their effect on the preserve. New port facilities within the preserve boundary shall be prohibited.

5. Other Docking. Any other type of commercial docking, not mentioned in the preceding sections, will follow the marina siting policy as stated in Section 16Q-20.04(5) F.A.C. of the revised General Aquatic Preserve Rule.

B. Non-traditional Commercial Uses

1. Power Plants. Power plants have the potential for causing major changes in the air quality, water quality, and plant and animal life of the aquatic preserve. For these reasons, power plants are incompatible with the purposes of this aquatic preserve. The location of proposed power plants upstream of a preserve should also be evaluated as to the effects on the downstream preserve.

2. Aquaculture. The Banana River area could potentially have proposals for aquacultural development in the future. These uses may include floating structures or other new techniques now being used in aquaculture. The location and type of impacts to the resources will require careful examination. If there is not sufficient data available for a valid evaluation, a

small scale test of the use might be possible in a selected area.

3. Other Uses. Any other use that qualifies as a commercial use of state-owned submerged lands not mentioned above will require a review for its anticipated impact on the aquatic preserve and the best location for the activity compatible to the resource protection areas within each preserve.

Chapter X

SCIENTIFIC RESEARCH

The field personnel attached to the Banana River Aquatic Preserve should serve as the area coordinators of scientific research in the preserves. Scientific research, and any other type of research or testing within the aquatic preserve, should require the clearance of both the field personnel and the central office staff before these activities can proceed. Certain activities could be detrimental to the resources of the preserve and should be carefully reviewed before allowing them to occur. Factors including location, species procedures, and time of year, should be carefully reviewed for the possible disturbance or effect of the research on the other resources of the aquatic preserve. The field personnel will be aware of the possibility of working with other government agencies, colleges, universities, research foundations and government programs to fill the data needs of the aquatic preserve (see Chapter V and XII). The field personnel will assist in the selection of possible test sites and other research needs within the preserve.

CHAPTER XI

ENVIRONMENTAL EDUCATION

The aquatic preserve should be used to enhance environmental educational programs at every opportunity. The goal of maintaining the aquatic preserve for the benefit of future generations can begin to be realized through the use of aquatic preserves for environmental education. Through education, the people of Brevard County can acquire a knowledge of the natural systems and an appreciation for the aquatic preserve program. Such appreciation helps to ensure the future protection and support of the aquatic preserve.

The field personnel will, through their normal activities in the aquatic preserve, select good examples of habitats and resources within these aquatic environments for use during educational group tours. This might include the development of environmental educational boat or canoe tours through the preserves. Other educational activities might also include prepared presentations for specific interest or user groups such as sport (boating, diving, fishing, etc.) civic and conservation groups and the development of a brochure outlining the major points of management within the preserve. These brochures could then be circulated to the various user groups.

The field personnel should also prepare programs on the value of management activities of the aquatic preserve for presentation to interested groups of all ages. Educating the public about aquatic preserve management is the key to the success and future of the preserve.

Chapter XII

IDENTIFIED PROGRAM NEEDS

This chapter of the management plan will address the various internal program needs that are expected to be identified during management activities. Meeting these needs will correct or generally relieve some stress on the preserve or the personnel involved in the management of the aquatic preserve. These needs may, in some cases, require legislative or administrative rule changes or acquisition of critical areas by the state. The need to identify problem areas and adjust the management plan in a manner that will positively address these problems and management needs is an essential element of any good management program. Both field personnel and central office staff will continually monitor the management plan implementation process and specifically identify observed program needs and problems. The areas to be considered include, but are not limited to:

A. acquisition of additional property,

B. boundary problems,

C. legislative needs,

D. administrative rule changes,

E. data needs,

F. resource protection capabilities, and

G. funding and staffing needs.

Staff will annually develop an implementation status report that will contain a summary of identified management needs and suggested measures to be taken in meeting these needs.

A. Acquisition of Additional Property

There are areas both within and upland of the aquatic preserve that are in public ownership under the jurisdiction of various local, state and federal agencies. Many of these lands contain important resources, such as bird rookeries, archaeological or historical sites, endangered species habitat, and freshwater source wetlands, as well as other wetlands. The protection of these areas is necessary to the wilderness preserve designation areas. Formal management agreements, memoranda of understanding, etc., that will ensure the compatible management of these areas will be developed. Other areas within or adjacent to the preserve that are in private ownership should be closely examined to determine the advisability of bringing them into public ownership. The acquisition of these lands might act as a buffer to critical resources, prevent development of sensitive areas, allow the restoration of areas adversely affected by previous development or allow removal of disrupting uses within a preserve. The field personnel, during normal management activities, should be aware of significant upland areas and sovereign land conveyances which, if developed, would compromise the integrity of the aquatic preserve. The field personnel will keep a running record of these areas and will prioritize these areas for possible public acquisition.

B. Boundary Problems and Systems Insufficiencies

The boundaries of the aquatic preserve are often artificial delineations of the natural systems within and surrounding the preserves. A variety of scientific studies are presently being conducted both within and outside of the preserve boundaries, and their results could conceivably suggest a change in these boundaries. These changes may include the extension of the present boundaries in some areas or the exclusion of other areas. The field personnel, in their normal management activities, will be sensitive to the possible need for boundary modifications. Potential boundary changes and acquisition projects might include areas upstream of the present boundary in the streams flowing into the preserves, previously conveyed sovereign lands, or other areas not presently within the preserve. Any boundary change will require legislative approval. Additional areas that may be considered for inclusion might include the northern portion of Newfound Harbor and Sykes Creek and the Thousand Islands area.

C. Legislative Needs

Management needs could conceivably involve changes in the legislation pertaining to aquatic preserve or changes in the other statutes upon which aquatic preserve management is based. These changes may include boundary realignments or the strengthening of certain management authorities.

D. Administrative Rule Changes

Administrative rules are statements addressing the organization, procedures and practices used in the implementation of aquatic preserve management plans and policies. This process includes identifying problems within the Department of Natural Resources, as well as other agencies, that affect the management of the preserve.

E. Data (Information) Needs

The field personnel and central office staff will note data needs and promote research or other means to fulfill them. Data needs in the near future could possibly be supplied by such ongoing projects as the U.S. Geological Survey's and St. Johns Water Management District's studies, Department of Environmental Regulation water quality monitoring or by the research of other agencies. The field personnel will be aware of data needs as they interact with the various levels of government and with other entities. These data needs might include additional mapping, ownership information, water quality data or any other data. The major suppliers of data will probably be other public agencies that are conducting programs in and around the preserve. Other potential sources of data are the colleges and universities that have, in the past, conducted research projects in the area.

F. Resource Protection and Enforcement Capabilities

In addition to field personnel, the protection of the preserve's resources depends on the Florida Marine Patrol's enforcement authority. These protection needs might also require additional enforcement support from local government or other state agencies. The need for additional manpower, authority, equipment or vehicles for this task will be identified.

The field personnel will become familiar with the staff capabilities of both the Department of Natural Resources and the other agencies with enforcement responsibilities in the preserve. Annually, staff should fully assess the effectiveness of the protective and enforcement capabilities of these combined agencies.

G. Funding and Staffing Needs

The present aquatic preserve management program has been minimally implemented with funds from a variety of sources and programs. The writing of this management plan was funded through a grant from the U. S. Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, and through the "Coastal Zone Management Act of 1972", as amended. This grant will end in 1984.

In order for the management program proposed in this plan to function and succeed, the program must have its own funding and staffing. The workload

required by this program is too much for an interim staff from other agencies to handle in addition to their other obligations. Funding and staffing needs are critically important to the success of the aquatic preserve program.

The management of Banana River Aquatic Preserve would be integrated into the management program and needs of other BELM management programs in the area. This preserve's management would be combined with two other aquatic preserves in Brevard County (Indian River-Malabar to Vero Beach and Mosquito Lagoon). A proposed budget given these needs has been estimated at $150,000 for staff, equipment, office and expenses for the first year. The proposed staff would include two biologists and one ranger.

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BANANA RIVER AQUATIC PRESERVE

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CONTENTS OF APPENDICES

Appendix A. Management Authorities

All laws, rules, memoranda of understanding, and other directives mentioned or related to in the Plan.

Appendix B. References

Pertinent References; basis for formulation of Plan USGS Bibliography

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National Wetland Inventory Maps

Shellfish Atlas for Brevard County

CZM Maps--Brevard County

Navigation Charts

DOT County Maps--Brevard County

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