INDIAN RIVER

MALABAR TO VERO BEACH

AQUATIC PRESERVE MANAGEMENT PLAN

JANUARY 21, 1986

Department of Natural Resources

INDIAN RIVER - MALABAR TO VERO BEACH AQUATIC PRESERVE MANAGEMENT PLAN

JANUARY 21, 1986

Elton J. Gissendanner
Executive Director
Department of Natural Resources

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

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 Indian River--Malabar to Vero Beach Aquatic Preserve is part of the Indian River Lagoon; a shallow lagoonal estuary. The lagoon is bounded on the east by a barrier island and on the west by the mainland. Sebastian Inlet is the only opening to the ocean in this area. The preserve supports important commercial fisheries, especially the hard clam and oyster industries and is important for recreational activities as well.

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 major drainage networks that have increased the fresh water flow into the estuary, the loss of wetland areas and water quality degradation associated with agricultural drainage and urban runoff. Additionally, the Intracoastal Waterway and the maintenance of Sebastian Inlet have 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

RESOLUTION

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 160-20.13, 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 Indian River Malabar to Vero Beach area, and

NOW THEREFORE BE IT RESOLVED that the Board of Trustees of the Internal Improvement Trust Fund hereby adopts the Indian River Malabar to Vero Beach Aquatic Preserve Management Plan; and

BE IT FURTHER RESOLVED that the primary management objective of the Indian River Malabar to Vero Beach will be the maintenance of this ecosystem in an essentially natural state; and

BE IT FURTHER RESOLVED that the Indian River Malabar to Vero Beach 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 Indian River Malabar to Vero Beach 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 Indian River Malabar to Vero Beach 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 21 day of January, A.D., 1986.

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

APPROVED AS TO FORM & LEGALITY

DEPARTMENT ATTORNEY

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Chapter I

INTRODUCTION

This plan addresses the management of the Indian River - Malabar to Vero Beach Aquatic Preserve, located in Brevard and Indian River Counties (Figures 1 and 2). Palm Bay, Malabar, Vero Beach, Orchid, Vero Beach and Indian River Shores are incorporated cities which lie along the preserve boundary. The unincorporated cities include Floridana Beach, Melbourne Shores, Grant, Micco, Wabasso, Roseland, and Gifford. The surface water area of the preserve is approximately 43.4 square miles.

The preserve is part of the Indian River Lagoon which is a relatively shallow estuary with very restricted water exchange with the sea. Historically, there was no significant freshwater inflow (Clark, 1983). In the 1920's, much of the marsh within the Upper St. John's River floodplain was "reclaimed" for agricultural production. Canals were built to provide for drainage to tidal waters (Clapp and Wilkening, 1984). Increased development has increased the amount and quality of freshwater inflow into the Indian River from these canals and from Turkey, Goat, Kid, Trout and Sebastian Creeks. Salinities range from 20-26 parts per thousand (ppt.) near Malabar, to 30-36 ppt. at Sebastian. The mainland lies to the west of the preserve, with barrier islands bordering the eastern side. The Intracoastal Waterway extends the entire length of the aquatic preserve. Approximately 55 spoil islands were

Figure 1

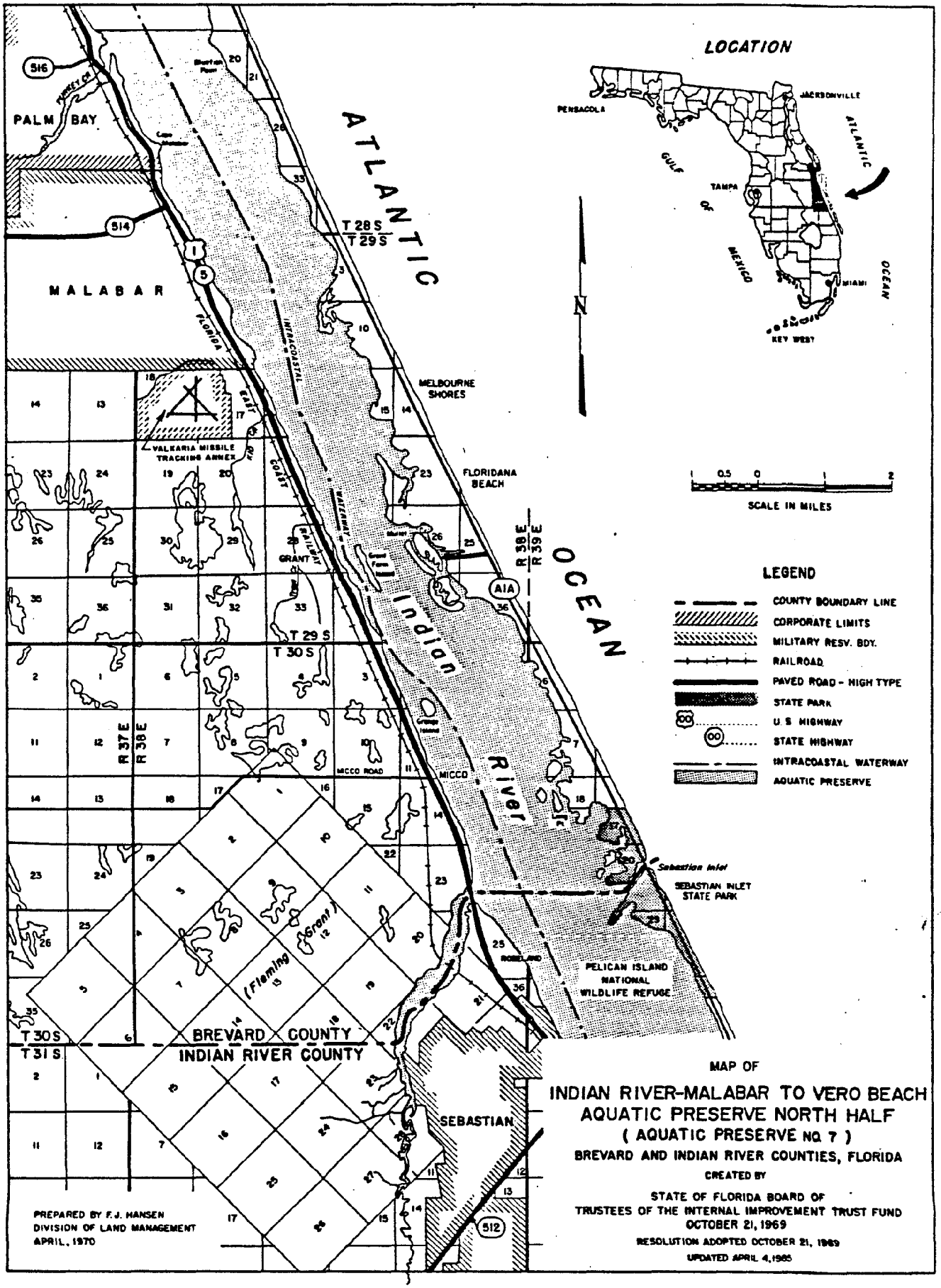
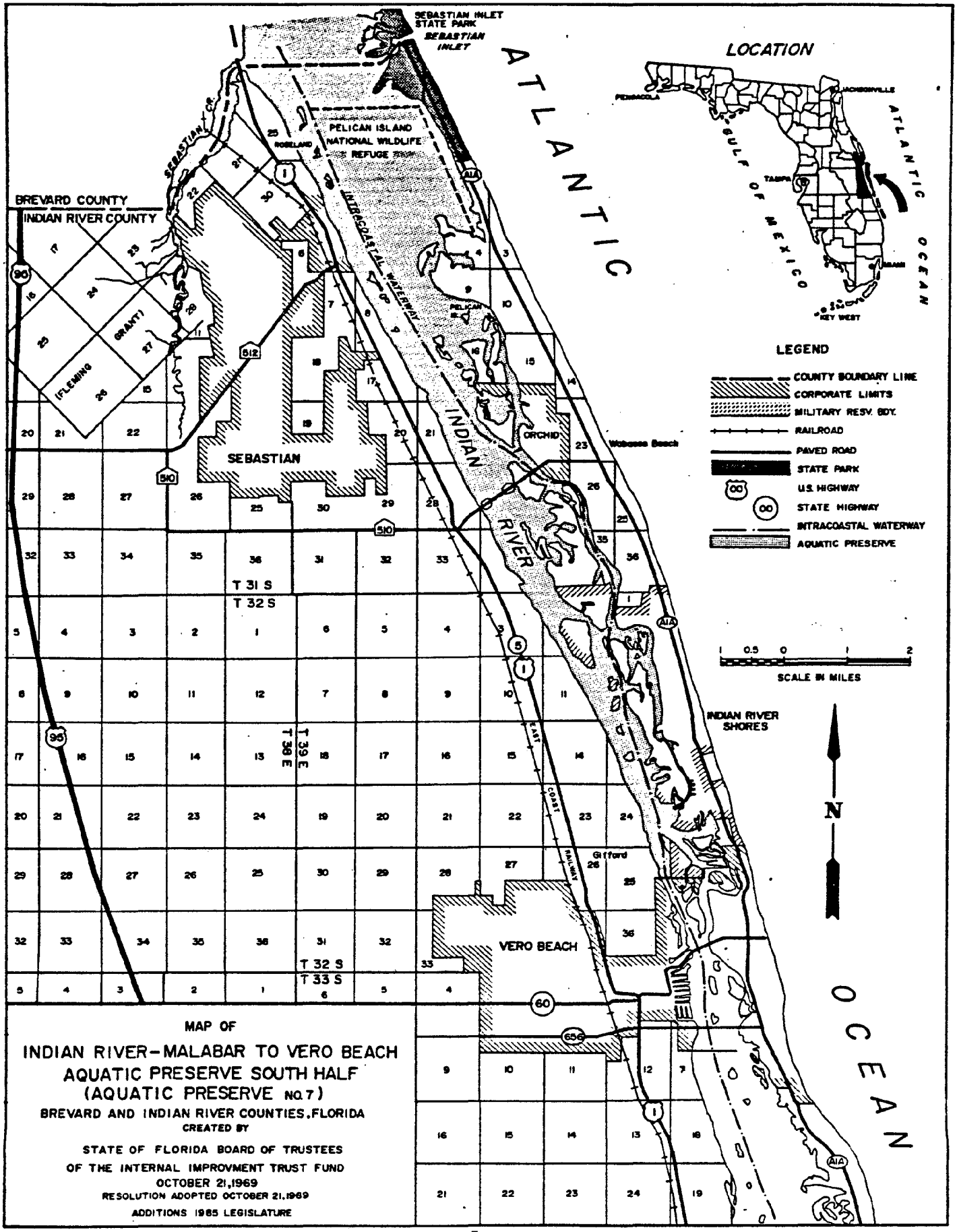

LOCATION
PENSACOLA
JACKSONVILLE
ATLANTIC
GULF OF MEXICO
TAMPA
MIAMI
OCEAN
KEY WEST
N
SCALE IN MILES
LEGEND
COUNTY BOUNDARY LINE
CORPORATE LIMITS
MILITARY RESV. BDY.
RAILROAD
PAVED ROAD - HIGH TYPE
STATE PARK
U.S HIGHWAY
STATE HIGHWAY
INTRACOASTAL WATERWAY
AQUATIC PRESERVE
ATLANTIC OCEAN
Indian River
PALM BAY
MALABAR
MELBOURNE SHORES
FLORIDANA BEACH
VALKARIA MISSILE TRACKING ANNEX
GRANT
MICCO
MICCO ROAD
SEBASTIAN INLET STATE PARK
PELICAN ISLAND NATIONAL WILDLIFE REFUGE
SEBASTIAN
BREVARD COUNTY
INDIAN RIVER COUNTY
T 28 S
T 29 S
T 30 S
T 31 S
R 37 E
R 38 E
R 39 E
MAP OF
INDIAN RIVER-MALABAR TO VERO BEACH
AQUATIC PRESERVE NORTH HALF
(AQUATIC PRESERVE NO 7)
BREVARD AND INDIAN RIVER COUNTIES, FLORIDA
CREATED BY
STATE OF FLORIDA BOARD OF
TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
OCTOBER 21, 1969
RESOLUTION ADOPTED OCTOBER 21, 1969
UPDATED APRIL 4, 1985
PREPARED BY F.J. HANSEN
DIVISION OF LAND MANAGEMENT
APRIL, 1970

Figure 2



MAP OF

INDIAN RIVER–MALABAR TO VERO BEACH
AQUATIC PRESERVE SOUTH HALF
(AQUATIC PRESERVE NO. 7)

BREVARD AND INDIAN RIVER COUNTIES, FLORIDA

CREATED BY

STATE OF FLORIDA BOARD OF TRUSTEES
OF THE INTERNAL IMPROVMENT TRUST FUND
OCTOBER 21, 1969

RESOLUTION ADOPTED OCTOBER 21, 1969

ADDITIONS 1985 LEGISLATURE

originally created from this dredged material but, over time, many of these islands have eroded to shoals.

This environmentally sensitive and unique preserve, harbors seagrass beds which stabilize bottom sediments, and provides shelter and food for adult, juvenile, and larval vertebrates and invertebrates. Mangrove trees fringe the shoreline of the barrier island and, to a lesser extent, the mainland and perimeters of the spoil islands. Saltmarsh grasses, oyster bars, drift algae, and tidal flats are also intricate parts of this very dynamic and productive lagoonal system.

The climate in East Central Florida is humid subtropical, with an average annual rainfall of approximately 50 inches. The rainy season occurs from June to October (Doehring, personal communication).

The Indian River-Malabar to Vero Beach Aquatic Preserve maps, in Figures 1 and 2, represent the gross boundaries of the aquatic preserve. The actual preserve includes those sovereignty submerged lands located waterward of the mean high water line within this boundary area. This aquatic preserve will be managed to emphasize maintenance and enhancement of the existing conditions. As more site specific information becomes available, essentially natural conditions shall be identified and resources in disturbed areas restored to that condition where possible.

Due to the current limitation of onsite staff resources, the management program in these aquatic preserves will be restricted in the scope of

operations. However, the program will fill the minimum need for active management in the preserve and should provide the framework for future program growth. 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 support will be through the Florida Park Service, Division of Marine Resources and the BELM staff, when available.

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 improvement.

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 for scientific research and environmental education, respectively.

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.

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 Senate 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, 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 managed in accordance with the following goals:

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

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

(c) To coordinate with federal, state, and local agencies to aid in carrying out the intent of the Legislature in creating the preserves;

(d) To use applicable federal, state, and local management programs, which are compatible with the intent and provisions of the act and these rules, to assist in managing the preserves;

(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 and 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. These 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 and dredge and fill activities, respectively.

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 preserves. 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 preserves 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 and maintain 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, water management districts, and mosquito control districts for the maintenance of the naturally high water quality of the estuary, to ensure the natural seasonal flow fluctuations of freshwater into the estuary and the greatest interaction possible of mosquito impoundment with the Indian River Lagoon.

(T) Evaluate the various habitat types and resources as representative conditions for restoration models. Develop a system plan for habitat restoration and work in conjunction with other agencies in its application.

(U) Apply the management criteria contained in the adopted Indian River-Malabar to Vero Beach 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.

(Y) Insure that aquatic preserve management plans are consistent with all other state and local planning processes and completed plans that may impact aquatic preserves.

(Z) Recognize that successful shellfish culture and harvesting efforts in the aquatic preserve are dependent upon pollution prevention and abatement programs and careful comprehensive planning.

Chapter IV

RESOURCE DESCRIPTION

The Indian River Lagoon System is a dynamic, lagoonal estuary important in this region for its value to recreational and commercial fishing, boating and prime residential development. The lagoon supports one of the richest and most productive aquatic faunas within the continental United States. No other estuary has revealed such a large variety of plants and animals and greater concentration of rare and endangered organisms (Gilmore, in prep.). Over 400 species of fish, 260 species of molluscs and 479 species of shrimp and crabs are associated with this aquatic system. Hard clams have replaced oysters as the most important commercial shellfish in Brevard County. The most productive area lies between Cape Malabar and Micco and approximately 200 fishing boats have been observed there (Department of Natural Resources, 1984). This area's attributes attract many visitors and new residents every year and as a result, development is increasing along the Indian River and surrounding tracts of land.

The lagoonal estuary provides important habitat and nursery ground for an extensive array of fish and wildlife (Appendix C). The major problems in the continued health of the lagoon are the large amounts of fresh water released by several man-made drainage systems, mosquito impoundments restricting nutrient flow, and water quality problems associated with agricultural

drainage and urban runoff. Qualitative evaluation of the aquatic preserve resources has been hampered by a lack of data on the exact effects of the above problems.

Detailed information on the resources (e.g., species lists, water quality information, archaeological and historical site information, life histories, geological background, supporting maps, and cultural resource information) is located in Appendices C and D. The resource information presented in this chapter is intended to be generally descriptive of the major management functions and resources of the area surrounding the preserve.

A. Geological Features and Landforms.

The East Central Coast of Florida is characterized by its relatively straight shoreline, and linear barrier islands which extend almost the entire length of the Florida peninsula. The Atlantic Coastal Ridge lies to the west of the lagoon on the mainland and is parallel to the Atlantic Ocean coastline. This low ridge diverts rainfall towards the Indian River lagoon, and consists of relatively permeable sandy soil. These features and other landforms along the coast reflect several sea level changes that occurred since the beginning of the Quaternary Period (Kofoed, 1963).

In the late Pleistocene (125,000 years before present (B.P.)) sea level was higher than 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. The entire Indian River lagoon was covered, but the depth was

shallow enough to permit growth and deposition of sea shells. The resulting littoral formation known as Anastasia underlies the Indian River (Rouse, 1981).

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 fresh water 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 chain of barrier islands acts as the first line of defense of the mainland against storm surges. Historically, narrow points of the barrier islands have been breached during storms. The temporary shallow inlets which formed, later closed due to siltation. Man's intervention through dredging and stabilization of Sebastian Inlet (the only connection with the Atlantic Ocean in this aquatic preserve), has allowed saline water to mix with fresh water, creating the lagoon environment that is found today. Because Sebastian Inlet is the only connection between the lagoon and the ocean in this area, the aquatic preserve is microtidal and generally protected from coastal storms.

B. Community Associations.

The plant communities of the Indian River lagoon basin are a major factor in the continued health and productivity of the natural systems in the preserve. This section will also reference some of the major animal species associated with these plant communities. The major community associations recognized in

the preserves are mangrove forests, marine grassbeds, drift algae, saltmarsh, oyster bars, tidal flats and spoil islands. 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 preserve.

1. Mangroves. The four species of mangrove trees in the Indian River Lagoon represent the dominant vegetational association. The mangroves range from twelve to thirty feet in height and generally inhabit the low energy shorelines of the estuarine system.

The four species of mangroves occurring here are the red mangrove (Rhizophora mangle) which is dominant, both in and near the water at low tide level; black mangrove (Avicennia germinans) generally inland of, but sometimes mixed with reds; white mangrove (Laguncularia racemosa) generally upland of, but also mixed with blacks; and buttonwood (Conocarpus erecta) 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 is the fringe mangrove which occurs along the shorelines of the embankments, river, creeks and other waterways. All four species can appear in this variation, both in zones and mixed as described above. There are also areas of overwash where the mangroves are standing in water with little or no associated uplands. This variation is generally dominated by red mangroves (Odum et al., 1982). The mangrove species have various root structures, i.e., prop roots 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 the fallen mangrove leaves and anaerobic soil substrate by returning them to the estuary as detritus. This is the primary basis of the estuary's food chain and productivity (Heald and Odum, 1970). The mangrove canopy and root tangle also provide valuable habitat for many marine and estuarine organisms (Savage, 1972). The entire community also functions to buffer the uplands from storm tides and winds, and acts as a storage area for those waters.

The mangrove community types and various locations indicate that they 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, new pass formations or changes in sea level. Hurricane damage, although not experienced in the recent past, is a potential threat to these communities. Man induced disturbances in this area include mosquito impoundments that changed the mangrove diversity and detrital contribution to the lagoon. A Division of Marine Resources Fishery Habitat Loss Study found that 75 percent of the Indian River Lagoon's mangroves are now within mosquito impoundments. Other disturbances include dredge and fill activities that destroyed mangrove areas, and erosion and other forces that may be attributed to man.

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 pattern, both by bulkhead placement, shoreline modification and drainage canals, need much more

study. The placement of extensive bulkheading along waterways has destroyed or preempted mangrove growth in some areas.

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); smooth cordgrass (Spartina alterniflora); glasswort (Salicornia spp.); sea purslane (Sesuvium portulacastrum); saltwort (Batis maritima); sea ox-eye (Borrichia frutescens), and sea lavender (Limonium cardinianum).

The tree canopies and root tangles provide habitat for various animals. These community types are utilized by 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 estuary. These beds serve as a food source for the endangered manatee (Trichechus manatus), important nursery areas for juvenile forms of fish and shellfish, and as substrate for many epiphytic algae species eaten by invertebrates which are in turn eaten by the fishes. Many commercially

Table I

ANIMAL LIFE ASSOCIATED WITH THE MANGROVE COMMUNITY

Mammals

marsh rabbit
bobcat
raccoon
rice rat

Birds

brown pelican
double-crested cormorant
anhinga
white ibis
great blue heron
little blue heron
green backed heron (green heron)
tri-colored heron (Louisiana heron)
black-crowned night heron
yellow-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

Table I (continued)

Fishes (continued)

redfin needlefish
striped anchovy
ladyfish
roughtail stingray
bull shark
lemon shark

Invertebrates

oysters
shrimp
snails
blue crab
fiddler crab
mangrove tree crab
mosquitoes

Sources: Barile, D.D. Coastal zone protection element for the Palm Bay, FL 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.

important fishes spend at least part of their lives in these grassbeds (Zieman, 1982) (Table II).

The most common marine grass found in this portion of the Indian River lagoon is Cuban shoal grass (Halodule wrightii). The next dominant is manatee grass (Syringodium filiforme). Another marine grass found in the lagoon is widgeon grass (Ruppia maritima) (Thompson, 1976).

Detailed mapping of marine grassbeds are in Appendix D (Resource Protection Area Mapping). Generally, the more expansive areas of grassbeds in the estuarine complex are in shallow water with a fairly constant salinity. These shallow areas are prime fish habitat and are vulnerable to damage by boating activities. The marine grassbeds are sensitive to turbidity and, as a result, are vulnerable to dredge and fill activities.

Within the Indian River-Malabar to Vero Beach area, grassbeds are found mainly along the eastern shoreline, and in scattered patches on the western shoreline (Thompson, 1976). Seagrass coverage and diversity appear to vary seasonally, yearly and possibly in longer cycles. The preliminary findings of a Division of Marine Research Fishery Habitat Loss Study is that approximately 30% of the original grassbed coverage has been lost in the Indian River Lagoon. On a shorter time basis the clamming industry has been regulated to prevent clamming within marine grassbeds, but there has been a concern that the use of clam rakes along the edges of grassbeds is destructive to the bed and can restrict the beds potential growth.

Marine grassbeds are a primary vegetation community and will be used as a key indicator in measuring the natural condition of the aquatic preserve.

Table II

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

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 wigeon
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

Table II (continued)

Fishes

Florida blenny
tarpon
bluntnose stingray
Atlantic stringray
cownose ray
sea catfish
gulf killifish
rainwater killifish
sheepshead
sailfin molly
snook
gray snapper
striped mullet
white mullet
bull shark
lemon shark
ladyfish
scales sardine
striped anchovy
gulf pipefish
pigfish
silver jenny
mojarra
spotted seatrout
southern kingfish
black drum
red drum
pinfish
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
bogjead searphob

Table II (continued)

Fishes (continued)

gulf flounder
southern puffer
striped burrfish
gafftopsail catfish
Atlantic thread herring
yellowfin menhaden
Atlantic menhaden

Invertebrates

Pink shrimp
stone crab
blue crab
spiny lobster
Northern quahog
Southern quahog

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

Department of Natural Resources. Profile of the hard clam industry in Brevard County. Tallahassee, Florida. 1984.

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.

U.S. Fish and Wildlife Service. Atlantic Coast ecological inventory map. U.S. Government Printing Office, Washington, D.C. 1980.

Sea-grass coverage and diversity appear to vary seasonally, yearly and possibly in longer cycles, and this should be taken into consideration. Protection of marine grassbeds will be a major consideration in the field and administrative review of use proposals (See Appendix D).

The invertebrate fauna and algal flora associated with these grassbeds can be rich and diverse, depending on the specific area. Two commercially important clam species, Northern quahog (Mercenaria mercenaria) and the Southern quahog (Mercenaria campechiensis) are often found associated with marine grassbeds and algae (DNR, 1984). There is a need for more data on the effects of intensive clam harvesting on the grassbeds and the shellfish resource itself. This will become increasingly important as mariculture efforts in the area are expanded.

3. Drift Algae. Drift algae are important associated components of the marine grassbed system in the preserve. 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 (Benz et al., 1979; Eiseman and Benz, 1975; Gore et al., 1981; Kulczycki et al., 1981; Virnstein and Howard, in press).

4. Saltmarsh. Historically, this habitat was commonly converted to mosquito impoundments and only a small percentage of the original acreage remains open

to the lagoon today. In this region, this community is 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 the estuarine productivity, and provides shelter and habitat to a variety of animal life (see Table III).

5. Tidal Flats. A tidal flat in the estuarine complex describes a wide variety of habitats that may have sporadic vegetation varying from grassbed, saltmarsh and drift algae communities, to no vascular vegetation at all. There is extensive algal growth in these areas. The tidal flats are used primarily by shore and wading birds as feeding and resting areas (Barnett et al., 1980). These areas are also valuable for invertebrates, including crabs, oysters, and worms.

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

Table III (continued)

Invertebrates

crabs
snails
worms

Source: 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.

Tidal flats, consisting of estuarine beaches, areas waterward of the mangroves, spoil areas, shoal areas, and mud flats, are important to the estuary through their contribution to the algal production. The mollusk, crustacean, and worm communities feed on both the algae and materials from the other plant communities of the estuary. The bird life is dependent on these areas for feeding and some of these flat areas surround colonial nesting sites in the estuarine complex. The ecological role of these various tidal flat areas is not fully understood, but it is known that they are important habitats (Table IV).

6. Oyster Bars. The oyster performs a valuable function in the food web by converting plankton, detritus and possibly dissolved organics into animal protein, which is then available to higher predators (Tabb et al., 1974). The substrate formed by the oyster colonies occurs in areas where there are no other hard substrates. These oyster bars create habitat space that is unique to the lagoon (see Table V). The oysters and the associated animals are utilized by other animals which feed on or around the oyster bars. Oyster bars were once fairly abundant in this preserve, however, their distribution is declining, possibly due to salinity changes. There still remains an active oyster industry in the Grant and Sebastian areas although the more lucrative clamming industry is rapidly replacing it.

7. Deep Water Areas. These areas within the Indian River Lagoon include Sebastian Inlet, channels, rivers, creeks, and other deep water areas. These areas are important to tidal flushing and are necessary for a healthy estuary. The deep waters also allow predator fish access to the lagoon.

Table IV

ANIMAL LIFE COMMONLY ASSOCIATED WITH TIDAL FLATS
OF THE INDIAN RIVER LAGOON

Mammals

raccoon

Birds

brown pelican
white pelican
great blue heron
yellow-crowned night heron
white ibis
American oystercatcher
whimbrel
roseate spoonbill
black-bellied plover
piping plover
semipalmated plover
Wilson's plover
ruddy turnstone
spotted sandpiper
fish crow
black skimmer
Caspian tern
greater yellowlegs
lesser yellowlegs
willet
red knot
least sandpiper
dunlin
western sandpiper
shore-billed dowitcher
black-necked stilt
herring gull
ring-billed gull
laughing gull
Forster's tern
least tern
sandwich tern
sanderling

Table IV (continued)

Invertebrates

crabs
worms
snails

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

Table V

ANIMAL LIFE COMMONLY ASSOCIATED WITH OYSTER BARS

Invertebrates

marine worms
clams
ophiuroids (brittle stars)
snails
barnacles
crabs
shrimp
amphipods
tunicates
bryozoans

Birds

American oystercatcher
dunlin
spotted sandpiper
little blue heron
fish crow
willet
yellow-crowned night heron
ruddy turnstone

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

The bottle-nosed dolphin and manatee are important mammals potentially found in these areas.

8. Spoil Islands. The construction and maintenance of the Intracoastal Waterway channel and Sebastian Inlet resulted in the formation of a chain of spoil islands within the Indian River Lagoon. These islands, formed by the deposition of the dredged material (spoil), usually parallel the channel alignment. These islands have been subjected to erosion and accretion from winds, currents and boat wakes which have modified the original shape and placement of many of the islands.

Vegetation on these islands is generally dominated by exotics, such as Australian Pine and Brazilian pepper. However, the shoreline fringe is generally vegetated with mangroves and other native wetland vegetation, and provides valuable habitat to fish and wildlife, especially bird life.

There are close to 55 spoil islands within the lagoon. The spoil islands were conveyed to the Florida Inland Navigation District (FIND) by the Trustees for the sole purpose of navigational improvement and they have been dedicated to recreation and waterbird roosting and nesting habitat. Many of the islands have been colonized by the brown pelican, white ibis, least tern, snowy egret, and other nesting birds. These islands have not been developed, with the exception of privately-owned Grant Farm Island which has some development on half of the island.

9. Mosquito Impoundments. Numerous mosquito impoundments have been developed by diking and impounding high marsh habitats adjacent to the Indian

River (Bidlingmayer and McCoy, 1978). 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 species diversity. The impoundments also restrict and, in many cases, prohibit the flow of nutrients and fishery interaction within this portion of the Indian River. These impacts can be mitigated by opening the impoundments to tidal access during months when mosquito control is not needed (Clements and Rogers 1964; Provost 1967, 1974, 1976). There is now a wide variation in management practices for mosquito impoundments. A Subcommittee on Mosquito Impoundments was established under the Governor's Working Group for Mosquito Control to help foster improved management techniques, to benefit environmental and mosquito control concerns.

10. Animal Life. The animal life associated with the Indian River Lagoon area is historically as diverse as the vegetation. However, with the encroachment of human activities such as mosquito impoundments, intracoastal waterway, maintained inlets, spoil islands and other dredge and fill projects, causeways and roads, much of the original habitat has been modified. These modifications have caused a variety of changes to the animal life of the preserve.

The preserve serves both as a valuable recreational fishing 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 preserve also provides a refuge for

species visiting this area during migrations, for daily feeding purposes and during times of environmental stress (i.e., drought, storms, development activities). These visiting species include the manatee and many bird species.

11. Endangered Species. The combination of the subtropical climate, diverse vegetation and habitats, and waterbodies in the Indian River-Malabar to Vero Beach Aquatic Preserve has resulted in the survival of many species of endangered animals. Manatees are commonly found in the Indian River-Malabar to Vero Beach Aquatic Preserve. The Turkey Creek Zone is recognized as a protected area under the Florida Manatee Sanctuary Act, Chapter 16N-22.18. Cape Malabar to Castaway Point is a slow speed zone while Turkey Creek is designated as an idle speed zone. Sebastian Creek is presently under study due to the high incidence of manatee in that area. Activities in the Malabar to Vero Beach Aquatic Preserve should be managed to guarantee manatee health and safety (see Chap. V-2d) as the animals move on the Indian River between important aggregation areas such as Turkey Creek. Table VI provides a list of other endangered animals known to occur within this lagoon.

C. Archaeological and Historical Sites.

A synthesis of the prehistory of the Florida coastline applicable to the Malabar to Vero Beach 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.

Table VI

SPECIES OF THE INDIAN RIVER - MALABAR TO SEBASTIAN AQUATIC PRESERVE WHICH ARE CLASSIFIED AS ENDANGERED, THREATENED, OR OF SPECIAL CONCERN

ENDANGERED

Reptiles

Atlantic green turtle	(Chelonia mydas mydas)
Atlantic ridley turtle	(Lepidochelys kempi)
leatherback turtle	(Dermochelys coriacea)
Atlantic saltmarsh water snake	(Nerodia fasciata taeniata)

Birds

peregrine falcon	(Falco peregrinus)
wood stork	(Mycteria americana)

Mammals

manatee	(Trichechus manatus)

THREATENED

Reptiles

Atlantic loggerhead turtle	(Caretta caretta caretta)
eastern indigo snake	(Drymarchon corais couperi)

Birds

brown pelican	(Pelecanus occidentalis)
bald eagle	(Haliaeetus leucocephalus)
American kestrel	(Falco sparverius paulus)
least tern	(Sterna albifrons)
roseate tern	(Sterna dougallii)

SPECIES OF SPECIAL CONCERN

Fishes

common snook	(Centropomus undecimalis)

Table VI (continued)

Reptiles	
American alligator	(Alligator mississippiensis)
Birds	
little blue heron	(Florida caerulea)
snowy egret	(Egretta thula)
Louisiana heron	(Hydranassa tricolor)
reddish egret	(Dichromanassa rufescens)
roseate spoonbill	(Ajaia ajaja)

Sources: 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. Endangered and Potentially Endangered Fauna and Flora in Florida. October, 1984.

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

U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants. 1984.

It wasn't until 100 A.D. 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 800 A.D. 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 population 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 Malabar to Vero Beach 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). Two archaeological sites are located in Malabar, and one is just south of the town of Grant. Several shell heaps are located near Micco, a shell midden on the south bank of Sebastian

Creek near Roseland, two middens near Melbourne shores, and numerous middens and shell heaps located just south of Sebastian Inlet and on several other sites throughout the study area (Rouse, 1981; DAHRM, 1985).

During the Seminole Wars (1835-1842), the threat of Indian attacks restricted settlement along the Indian River (Brevard County Comprehensive Plan, 1981). However, 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 have had numerous ship wrecks on the East Central Coast of Florida, thus giving it the title of "Treasure Coast". They 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 whose characteristics most directly affect the lagoon's habitability and the health of the plants and animals naturally adapted to living there. The natural drainage basin of the Indian River Lagoon has been modified over the years by agricultural drainage canals and residential development. There are four canal systems influencing the Malabar to Vero Beach area.

The Sottile Canal (Sebastian Drainage District), the Fellsmere Main Canal (Fellsmere Water Control District) and the C-54 Canal (constructed as part of a Federal Flood Control Project) directly affect the aquatic preserve (Clapp and Wilkening, 1984). In addition, the Melbourne-Tillman Water Control District, built in the 1920's, discharges drainage from 200 miles of canals into Turkey Creek via C-1. The volume of water discharged influences the water quality found within the aquatic preserve.

As a result of increased urbanization, the flow from these canal systems has become significant and will continue to increase as development continues. The urbanization also adds residential source water quality problems (septic tanks, stormwater runoff) to those from agricultural sources. The agricultural drainage systems, designed to facilitate rapid drainage, permit agricultural and urban water quality problems to overburden the Indian River Lagoon.

There are no sewage treatment plants within the Malabar to Vero Beach Aquatic Preserve, but five plants, located north of the boundary, potentially affect water quality in the preserve. Three of the plants discharge into Turkey Creek. The plants, their design capacities and their average daily flows are as follows: General Development Utilities Plant, 2 million gallons per day (MGD) and 1.2 MGD; and the two Harris Corporation Plants-150,000 GPD and 65,000 GPD; 700,000 GPD and 1.2 MGD. As of January 1, 1987, all plants discharging into Turkey Creek will go to deep well injection systems that have already been permitted by DER. A fourth facility, the South Beaches Plant, located on the beach, has a design capacity of 3 MGD and an average daily flow of 2.3 MGD. The fifth facility, the West Melbourne Plant, 1.25 MGD design and operating at 670,000 gallons per day, discharges into Crane Creek.

Wastewater treatment along the aquatic preserve in Indian River County is characterized by small plants from subdivisions, trailer parks, motels and other developments. These plants represent a range of treatment levels and methods. The County has recently become more concerned with discharge into the Indian River and is inspecting the plants to see that they comply with standards.

Within the next three to five years, Indian River County will be building several sub-regional sewage treatment plants to meet the demands of its growing population. At least one of these plants will be located on the Indian River and may discharge treated sewage into mosquito impoundments. These plans will be reviewed for their anticipated impact on the aquatic preserve.

The basic characteristics of the Indian River Lagoon's water resources vary in response to daily, seasonal, and long term forces associated with climatological factors. Added to this are the artificial conditions created by large releases of freshwater from the manmade drainage canals, and the water quality problems associated with agricultural and urban runoff. Some of the water quality problems in the lagoon include high coliform counts and high levels of nitrates attributed to the sewage treatment plant effluent and septic tanks located adjacent to the aquatic preserve area (Brevard County, 1979).

Water circulation patterns in the lagoon have been altered by the construction of mosquito impoundments, which prevent free water exchange between large acreages of wetlands adjacent to the Indian River Lagoon. Dredge and fill activities (i.e. maintenance of Sebastian Inlet and the Intracoastal Waterway) destroy valuable wetland areas and temporarily increase turbidity. Other

problems associated with man's activities include altered salinity patterns and pollution loadings resulting from the increased amounts and peak flows of surface runoff and drainage.

Although the Indian River-Malabar to Vero Beach Aquatic Preserve does have some water quality problems, as mentioned above, it is still a relatively productive system, when compared to waters of the Indian River Lagoon Aquatic Preserves to the south. However, the growth this area is now experiencing is beginning to take its toll on the resources, and strategies must be developed to maintain or enhance water quality.

E. Cultural.

This section addresses the human influence and development of this area, as it affects the aquatic preserve. The U.S. Census population for Brevard County was 230,006 in 1970 and 272,959 in 1980, representing an 18.7 percent increase (Terhune, 1984). The change in population for the South Beaches (census tract 661.02) is expected to be 62.3 percent; from 2,073 in 1980 to 3,365 in 1985. For the South Mainland (census tract 652.03) a 44.1 percent change from 5,857 to 8,439 is expected for the same period (Brevard County Planning Department, 1984). The U.S. Census population for Indian River County was 35,992 in 1970 and 59,896 in 1980, a 66.4 percent increase (Terhune, 1984). The percentage changes in population from 1980 to 1983 for Indian River Shores, Orchid, Sebastian, and Vero Beach are 20.6, 21.1, 63.8 and 3.2, respectively. This graphically indicates that the population increases associated with residential development in the immediate area are quite significant. These

growth pressures on the Indian River Lagoon system increase the potential for environmental degradation and deleterious effects on water resources and wildlife.

The proposed Grand Harbor Development of Regional Impact (DRI), located on the Indian River between Winter Beach and Vero Beach, covers 677 acres and includes 3,000 residential units, a resort hotel, golf course, tennis club, marina and commercial area. Large developments have been proposed for areas adjacent to the preserve, (e.g., Aquarina and Mullet Creek). The Brevard County Land Use Plan for South Beaches includes the construction of two causeways within the preserve. These causeways and other large developments could have a significant impact on the aquatic preserve.

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 preserves for the benefit of future generations (Section 258.35, F.S.). The management of the Indian River--Malabar to Vero Beach Aquatic Preserve will be directed toward the maintenance of the existing or essential natural conditions. 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 Indian 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 of the state and the nation;

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

e. they physically buffer estuarine and riverine waters from contaminated and channelized runoff from uplands within the estuarine 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.

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 the 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 grassbeds 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; and

8. disturbance or destruction of marine grassbeds by clam harvesting methods.

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 site 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 of 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 minimum 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 grassbeds 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 undertaken 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 and Treasure Coast 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 Indian River Lagoon.

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. The restoration of mangrove communities has developed with proven planting techniques and habitat development. The restoration of marine grassbeds has not developed to the same level of proficiency at this time within the Indian River Lagoon.

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 may include advising the individuals involved in the 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 affect 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 Indian 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. Large areas of 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, Marine Fisheries Commission, 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, 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. The significance of a threat by such proposed facilities shall be established by the State Manatee Coordinator.

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;

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.

The field personnel will also work with Division of Marine Resources in research and monitoring various fishing techniques that may be destructive to habitat resources and nontarget 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 other sections of the Indian River have resulted in losses of grassbeds and mangroves. Proposals for bridge and causeway construction within the preserve 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 chronic 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, the Department of Transportation or the 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 to little 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 sites shall alter their management or development plans as necessary, or make 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 from non-government agencies, are dependent on or may be found among colleges, universities, scientific foundations and private consultants working in the Indian River

area. These various entities have interests at many different levels and areas within the riverine and estuarine 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. Indian River County Health Department
5. St. Johns Water Management District
6. U. S. Geological Survey
7. U. S. Fish and Wildlife Service

8. East Central Florida Regional Planning Council
9. East Central Florida Marine Resources Council
10. Treasure Coast Regional Planning Council
11. Florida Game and Fresh Water Fish Commission
12. Florida Department of Natural Resources Marine Research Laboratory
13. University of Florida
14. Florida Institute of Technology
15. University of Central Florida
16. U. S. Environmental Protection Agency
17. Florida Power and Light Company
18. Florida Inland Navigation District
19. Harbor Branch Foundation
20. Sebastian Inlet Authority
21. Fellsmere Water Control District
22. Department of Natural Resources-Shellfish Sanitation Section

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 monitoring activities will also include the monitoring of freshwater releases into the preserves and their effect on the environment.

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 Indian River Lagoon. Marine Research Laboratory personnel have developed resource and habitat indentification 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 one or more of 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. 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. Army 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 Malabar to Sebastian area 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 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 resources or regulate activities within the aquatic preserve. There are also other DNR programs that are within or affect the Indian River--Malabar to Vero Beach 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) is responsible for regulating air and water quality and, in some cases, water quantity (through the water management district) within the Indian River. The DER is also the local contact for the initiation of dredge and fill applications in conjunction with the COE and DNR. With respect to water quality and dredge and fill regulation, the DER is possibly one of the

most important agencies to the management of the aquatic preserve. The water quality of the preserve is the most important factor to the health of the estuarine complex, and dredge and fill activities are one of the most potentially destructive activities within the preserve. The DER also regulates other forms of pollution, such as air, noise, wastewater and hazardous waste, which may be important in the future to the preserve.

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) and for designating Areas of Critical State Concern (ACSC). 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.

Hutchinson Island, a barrier island between Sebastian Inlet south to Jupiter Inlet, is presently under review by the DCA. The ACSC staff of DCA completed the Hutchinson Island Resource Planning and Management Plan and it was enacted by the Governor in 1983. This region was identified as a possible ACSC and a Resource Planning and Management Program (RPMP) was established as a preliminary review for this designation.

The ACSC program is intended to protect the areas of the state where unsuitable land development has endangered or may potentially endanger resources of regional or statewide significance. The RPMP evaluates the resources, and the local government's land development practices. After this evaluation is complete, the RPMP committee makes recommendations to the local governments on how their land development practices could be improved to ensure an orderly and well-planned growth that would protect the critical resources. The local governments, counties and cities, are now in the process of making these land development modifications, based on the RPMP recommendations. If these modifications are not made to the RPMP Committee's approval, those areas of local government that are not in conformance could be designated an ACSC or the entire area may be designated an ACSC by the Legislature. Under and ACSC

designation, the local governments are required to notify DCA of any application for a development permit. The entire land development process will require the state's oversight until that local government modifies its land development practices to conform to the ACSC requirements. The recommendations of the Hutchinson Island Resource Planning and Management Committee as they apply to the aquatic preserves have been included into this plan.

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

DNR's Marine Research Laboratory in St. Petersburg, under the Division of Marine Resources, has several programs and projects within this area which will benefit the aquatic preserve program. The Marine Lab is presently studying fishery habitat losses in the Indian River area. The Resource Protection Area mapping, which will be used in the management of these aquatic preserves, was 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 manatee protection programs and the lab is the headquarters of the State Manatee Coordinator. 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 Indian River. 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 rulemaking 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) size limits, e) species that may not be sold, f) protected species, g) closed areas, h) quality control codes, i) seasons, and j) special considerations 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's Environmental Services office in Vero Beach sends biologists into the preserve 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.

The GFWFC is also the state coordinator of the Endangered Species in Florida. The field personnel and central office staff will work with GFWFC personnel in developing program needs in this area.

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. 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) 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. Additionally, 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 Indian River--Malabar to Vero Beach Aquatic Preserve will include the St. Johns River Water Management District, the East Central Florida and the Treasure Coast Regional Planning Councils, and the Florida Inland Navigation District. 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 St. Johns River Water Management District includes Brevard and Indian River Counties. The water management district administers permitting programs for the local consumable use of water, storm water discharges, and dredge and fill type activities. This includes the withdrawal and use of water from rivers, streams, and wells. The types of water uses they permit in the preserve 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. Regional Planning Councils. The East Central Florida Regional Planning Council (ECFRPC) serves as a regional planning body for the local governments

of Brevard County, while the Treasure Coast Regional Planning Council (TCRPC) serves Indian River County. Other east central Florida counties are served by these regional planning councils, as well. Among their duties, the ECFRPC and TCRPC:

a. aid local governments with planning expertise;

b. are the regional representatives for the Development of Regional Impact (DRI) review process;

c. serve as regional clearinghouses for state and federal projects and programs; and

d. convey 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 and TCRPC have within their administration that may affect or prove useful to the aquatic preserve program.

The DRI review of projects which affect the aquatic preserves 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.

3. Florida Inland Navigation District (FIND). The FIND is a multi-county district sponsor of the Intracoastal Waterway from Duval County south to Dade County. FIND is also responsible for providing and maintaining spoil areas (spoil islands) to the Corps of Engineers for the dredging and maintenance of the Waterway. FIND presently holds title to channel and spoil easements throughout the Indian River area. Field personnel and the central office will work closely with the FIND in the review of future dredging proposals.

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 are the incorporated cities and counties that surround the aquatic preserve. The Indian River--Malabar to Vero Beach Aquatic Preserve includes Brevard and Indian River Counties. Palm Bay, Malabar, Sebastian, Orchid, Vero Beach and Indian River Shores are incorporated cities bordering the lagoon. 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. The local governments are required by the Local Government Comprehensive Planning Act of 1975 (LGCPA),

(Section 163.3161, F.S.) to have a comprehensive management plan with elements relating to the different governmental functions (i.e., housing, physical facilities, conservation, land use, and coastal zone protection). These plans, in effect, are long-range plans for the orderly and balanced development of the city or county. 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 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. The field personnel and central office staff will assist these officials in the preparation of their Marina Element, as required in Chapter IX. 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 problems as they 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 ordinances such as a Mangrove Protection Ordinance. 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, Inlet and Mosquito Control). The special districts are taxing districts established to correct drainage and mosquito control problems. There are three drainage districts that directly affect the preserve; the Melbourne-Tillman and the Fellsmere Water Control Districts, and the Sebastian Drainage District. Brevard and Indian River Counties each have

a mosquito control district and the Sebastian Inlet is maintained by the Sebastian Inlet 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 and Native Plant Society), the scientific organizations, 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, University of Central 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 involve 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 habitat losses or disturbances in the Indian

River--Malabar to Vero Beach 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. 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.

Consumptive uses will also be monitored for their effect on other resources (e.g., bird rookeries, marine grassbeds, oyster bars, 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).

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. 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 or manatee areas). 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 derived from riparian rights (e.g., docks, piers). The management of the aquatic preserve recognizes the rightful and traditional uses of those near-shore sovereignty lands lying adjacent to upland property. This right of ingress, egress, boating, swimming, fishing, and other incidental uses of sovereignty lands normally allows for the placement of certain structures, such as docks, within the preserve. This right, however, can only be exercised with the prior consent of the Board, and does not include approval of activities that destroy or damage areas of environmental significance. The review of these 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 Area (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 General 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. Mitigation should be considered the last resort and the use requiring such mitigation should be of an overwhelming public interest.

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 to this area) commercial uses which might occur within the aquatic preserve. Among the traditional uses in the Indian River--Malabar to Vero Beach area are utility crossings, power plants, marinas and yacht clubs, commercial fishing, and other types of boats (i.e., sportfishing, diving) for hire. Non-traditional uses in this area which have also occurred in other areas of this or other states include 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 clear and 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 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 with respect to the need to manage access of boats in 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 commercial 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 commercial fishing within the aquatic preserve.

3. Marinas. The locating of marinas and their related uses will be a major concern of the Indian River--Malabar to Vero Beach 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 Aquatic Preserve Rule shall be used for siting marinas in the aquatic preserve.

4. 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. 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 the preserve.

2. Aquaculture. There are currently at least 81 shellfish leases in the Indian River--Malabar to Vero Beach Aquatic Preserve (DNR, 1984). The majority of leases were issued for growing oysters but most lease holders are shifting to clam cultivation. Most methods are dependent on transplanting juvenile oysters and clams and allowing them to grow to marketable size. New proposals for aquacultural development will require careful examination of the location and type of impacts to the resources and the preemption of public use. 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. Deep Water Port Facilities. There are no facilities of this type within the Indian River-Malabar to Sebastian Aquatic Preserve at the present time and new port facilities shall be prohibited.

4. 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, they 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.

Chapter X

SCIENTIFIC RESEARCH

The field personnel attached to the Indian River-Malabar to Vero Beach 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 youth of Brevard and Indian River Counties 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 preserves.

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.

C. Legislative Needs

Management needs could conceivably involve changes in the legislation pertaining to aquatic preserves 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, St. John's Water Management District, 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

The protection of the preserve's resources depends on the Florida Marine Patrol, in addition to field personnel. 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 Indian River--Malabar to Vero Beach 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 (Banana River 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.

INDIAN RIVER-MALABAR TO VERO BEACH AQUATIC PRESERVE

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State-Owned Lands Maps

National Wetland Inventory Maps

Gulf Coast Ecological Inventory (1:250,000 scale)

Shellfish Atlas for Brevard and Indian River Counties

CZM Maps--Brevard and Indian River Counties

Navigation Charts

DOT County Maps--Brevard and Indian River Counties

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