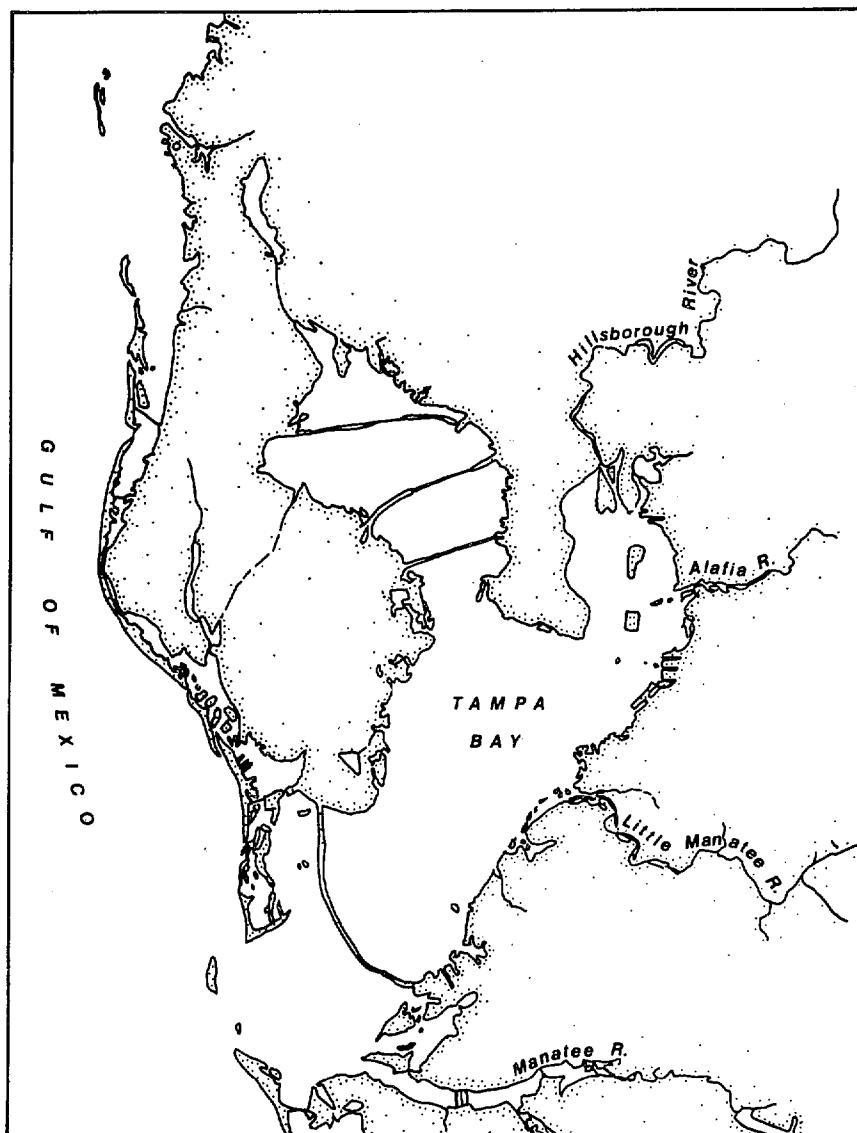


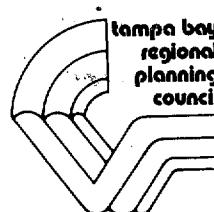
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# The Future of Tampa Bay



A Report to the Florida Legislature and the  
Tampa Bay Regional Planning Council by the  
Tampa Bay Management Study Commission

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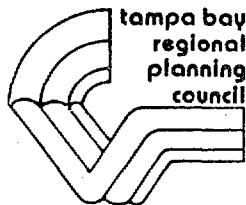
A Report to the Florida Legislature  
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9455 Koger Boulevard, St. Petersburg, FL 33702

Yerard to Vreborg

"Tampa Bay teemed with fish and turtle. Reefs in the mouths of fresh water rivers were said to provide the finest oysters on the continent and sweet little "raccoon" oysters grew thickly on the roots of the mangroves along many shores. Cuban fishing camps dotted the shores with drying racks for fish to be sold in Havana. In 1828 a soldier stationed at the fort reported "the fishing is marvelous." Upon the return of the bi-weekly fishing fleet the catch was laid on the wharf. At the sound of the fish call the mess sergeants and their assistants appeared with handbarrows and carried off as much fish as they needed for their companies; Indians were allowed to help themselves. The remainder was buried to make compost for the officers' garden. "During the winter months schooners from Cuba and New England swarmed the bay for spanish mackerel, groupers and snappers. More than 500,000 fish per day were shipped on these vessels. In Tampa, stone crabs were sold for ten cents a dozen; salted mullet for one cent a piece. A visitor reported that "in the waters of Tampa Bay enormous quantities of fish and turtles may be found... the fish are so numerous that they impede the passage of boats." On Tampa Bay, a fisherman's paradise, no one ever starved."

Excerpted from Tampa Town: 1824-1886: The Cracker Town with a Latin Accent  
by Anthony P. Pizzo. Hurrican House Publisher Inc. Miamia, Florida. 1968.  
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## EXECUTIVE SUMMARY

Tampa Bay is the largest open water estuary in the State of Florida, with over 1.6 million people living in the three counties bordering its shores. This population represents a 45 percent increase since 1970. Once the state's most diverse and productive estuarine system, rapid urban and industrial development have significantly changed the character and ecology of Tampa Bay. For example, recent studies have indicated that 44 percent of the original 25,000 acres of mangrove forests and salt marshes have been destroyed, and 81 percent of the original 76,500 acres of seagrasses have disappeared. This habitat loss has resulted in declining populations of economically important fish and shellfish including a complete collapse of such fisheries as those for scallops and oysters, and major declines for bait shrimp, spotted seatrout and red-drum. Tampa Bay constitutes the central geographic feature most responsible for, both historically and presently, the shipping, industrial development, and aesthetic and recreational values that encompass the overall attractiveness of the region to population influx. However, without proper management, and the maintenance of balance between all public uses, Tampa Bay is threatening to become a major liability rather than the area's main asset.

The Tampa Bay Management Study Commission was created by a special legislative act in 1984 to examine the opportunities for and the constraints against developing a unified, comprehensive management strategy for Tampa Bay. Composed of 20 members representing a wide range of Tampa Bay's business, recreational, environmental, industrial and academic interests, the Commission was granted a one-year mandate to complete the following tasks:

1. Develop a recommended Bay Management Plan and make a formal recommendation to the Tampa Bay Regional Planning Council 30 days prior to the 1985 session of the Florida Legislature.
2. Prepare a preliminary three-to-five year legislative work program to address priority bay management issues in conjunction with ongoing efforts by Congress, the U.S. Fish and Wildlife Service, state agencies, port authorities and other regulatory entities, for submittal prior to the 1985 legislative session.
3. Seek new sources of funding, as well as assist in coordinating existing funded efforts, to implement studies or actions addressing priority bay management issues. Such funding should not be limited to only funding efforts of the Council, but also essential work by other public and private groups.
4. Monitor proposals falling under the review responsibilities of the Council for compliance with the recommended Bay Management Plan.
5. Make specific recommendations to the Council concerning bay management issues that may be identified during the lifetime of the Commission.

The Commission reviewed 42 previously identified priority bay management issues and developed program objectives and recommended solutions for each. Recommendations included local government actions; state agency directives; research studies and monitoring programs; and legislative initiatives, amendments and funding allocations. Overall, a total of \$5,792,000 worth of needed studies, programs and various allocations are proposed, including:

- A \$1,067,000 comprehensive fisheries research, monitoring and regulation program;
- A \$1,000,000 allocation for the completion and refinement of the Tampa Bay wasteload allocation study;
- A \$825,000 comprehensive seagrass monitoring, research and restoration program;
- A \$600,000 allocation for the establishment of a shellfish sanitary survey team in the Tampa Bay area;
- A \$550,000 allocation for permanent management staffing of the three Tampa Bay area Aquatic Preserves;
- A \$500,000 study of toxic contamination in the Tampa Bay estuary;
- A \$400,000 allocation for a regional public education campaign regarding non-point sources and water pollution in Tampa Bay; and
- A \$270,000 allocation for increased compliance monitoring of point source discharges into Tampa Bay.

In addition to major expenditures the Commission recommended a number of other specific actions and general policies regarding Tampa Bay. These recommendations included the following:

- Passage of legislation requiring a saltwater recreational fishing license;
- Passage of legislation consolidating and standardizing all local fishing laws and regulations;
- Passage of legislation requiring existing development to retrofit stormwater discharge facilities when redevelopment occurs;
- A general policy of preventing the dredging or spoiling of any significant areas of previously undisturbed bay bottom;
- Passage of legislation requiring developers to purchase sewage treatment capacity rights; and prohibiting the issuance of an interceptor permit unless the municipality can demonstrate adequate sewage treatment capacity;
- Passage of legislation requiring advanced wastewater treatment of all municipal discharges to Tampa Bay, prior to the completion of the wasteload allocation study;

- Passage of legislation creating an Aquatic Preserve Management Trust Fund derived from submerged land lease fees; and
- Passage of enabling legislation for the creation of a Tampa Bay habitat mitigation bank.

The Commission also recommended the establishment of a coordinating, overview agency within the Tampa Bay Regional Planning Council that would essentially have planning and advisory capacities for other agencies involved in management of the Bay. In the absence of significant strengthening of state and regional planning legislation in the future, it was recommended that a Bay Management Authority, with regulatory powers, be created to more comprehensively manage Tampa Bay.

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## CHAPTER 1

### A. Introduction

Tampa Bay is the largest open water estuary in the State of Florida, with over 1.6 million people living in the three counties bordering its shores. This population represents a 45 percent increase since 1970. Once the state's most diverse and productive estuarine system, rapid urban and industrial development have significantly changed the character and ecology of Tampa Bay. For example, recent studies have indicated that 44 percent of the original 25,000 acres of mangrove forests and salt marshes have been destroyed, and 81 percent of the original 76,500 acres of seagrasses have disappeared. This habitat loss has resulted in declining populations of economically important fish and shellfish including a complete collapse of such fisheries as those for scallops and oysters, and major declines for bait shrimp, spotted seatrout and red-drum.

Now the second largest population center in the State of Florida, this rapid urbanization has, however, transformed the Tampa Bay area into a major economic asset both to the state, and to the nation as a whole. The Port of Tampa has become the nation's seventh largest port in terms of tonnage transported, and is the third largest U.S. port in terms of foreign exports. In addition, over six million tourists are drawn to the bay area's beaches and waters annually. Tampa Bay itself still contributes as a major aesthetic and recreational amenity, supporting a multitude of commercial enterprises including a burgeoning boat building industry, waterfront homes, restaurants, hotels and office buildings; an expanding complex of public and private marinas; and numerous recreational activities.

Nevertheless, over the past few years it has become painfully clear to bay area municipal and county governments that the additions of homes and businesses, and accompanying people, dramatically increase the needs of local governments to provide water, new sewage treatment plants, electrical power plants and highways. Because growth and development rarely pay for themselves in the short-term, local governments will increasingly struggle to finance the needs of a surging population. The subsequent accompanying strain on the environment has been, and will continue to be, well documented in the adverse impacts on the ecology of Tampa Bay.

Tampa Bay constitutes the central geographic feature most responsible for, both historically and presently, the shipping, industrial development, and aesthetic and recreational values that encompass the overall attractiveness of the region to population influx. Without proper management, and the maintenance of balance between all public and private uses, Tampa Bay is threatening to become a major liability rather than the area's main asset.

Currently, the management of Tampa Bay is fragmented amongst a multitude of federal, state and regional regulatory agencies, as well as seventeen local governments bordering the bay (see figure 1.1). Management is accomplished through the uncoordinated implementation of various monitoring, permitting and regulatory programs. However, under the existing management framework, jurisdictions are often overlapping, interests are often conflicting, and no one agency has overview authority for the bay, or manages it as a holistic natural resource. As a result, management of Tampa Bay to date has

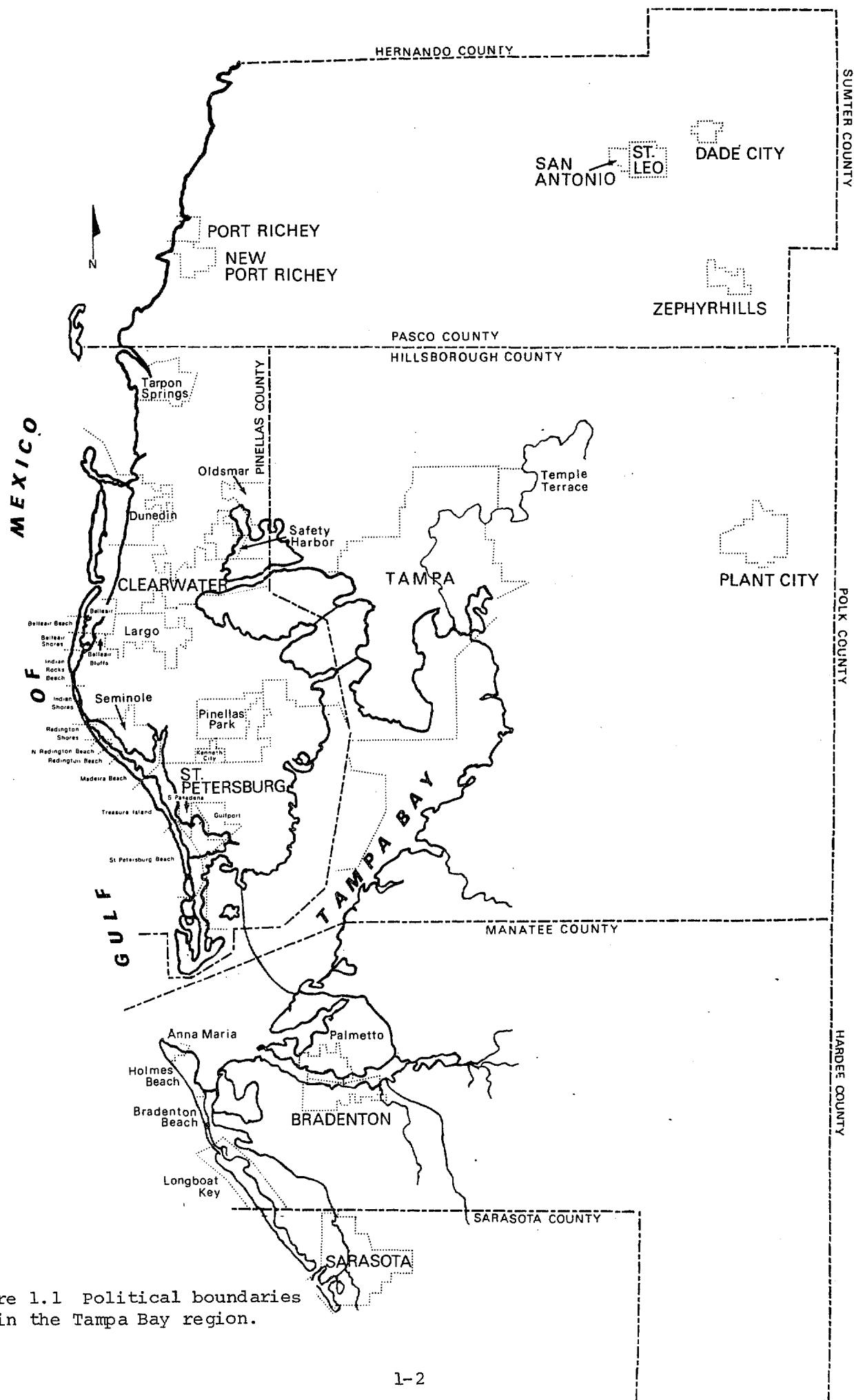


Figure 1.1 Political boundaries within the Tampa Bay region.

been both wasteful and ineffectual. For these reasons the Tampa Bay Management Study Commission was created to examine the opportunities for, and the constraints against, developing a unified, comprehensive management strategy for Tampa Bay.

This document represents the culmination of approximately three years of work by the Commission and its' predecessor committees. It is organized in a manner consistent with the chronological sequence of planning steps taken during this period. For this reason it should be noted that the Commission's major findings and recommendations are found in Chapter 3, whereas relevant background material is found in Chapters 1 and 2.

## B. History of the Tampa Bay Management Study Commission

In 1968 a conference sponsored by the University of South Florida recommended no reduction of present bay bottom area or mean bay dimensions below mean high water, and no modification of present bay bottom except for the maintenance dredging of existing navigation channels. The group also recommended limits to municipal wastewater discharges, as well as the establishment of a baywide management committee (University of South Florida, 1970). No action were taken regarding the first conclusion, but a local act of the Florida Legislature, which was later repealed in 1981, did implement stringent limits on sewage treatment plant effluents.

In response to growing public concern about the environmental degradation of Tampa Bay the Legislature passed a local act in 1970 creating the Tampa Bay Conservation and Development Commission (see appendix A). This Commission was to consist of ten members composed entirely of local legislators and other elected officials. The Commission was empowered to undertake studies to ascertain the public interest in Tampa Bay, and to determine the effects of further dredging and filling on navigation, and fish and wildlife resources in the bay. Unfortunately, the Tampa Bay Conservation and Development Commission never met once.

In 1982 the first symposium on Tampa Bay was held at the University of South Florida. The Tampa Bay Area Scientific Information Symposium (BASIS) lasted four days and involved topical presentations by 50 invited speakers. Major conclusions of the Symposium were that (a) Tampa Bay can and should be comprehended, and managed, as a single ecological system; (b) the bay is remarkably resistant to the environmental challenges; (c) a clear pattern of decline is evident in some measures of ecological condition; and (d) the management needs of Tampa Bay are relatively clear and, if implemented in a comprehensive and baywide basis, would result in tangible improvements to the bay and its usefulness to people.

It was further concluded that, at the present time, state and federal regulatory agencies, local governments surrounding the bay, and an array of industries and user groups often carry out their respective acitivities independently. The effect of bay management by a multitude of overaping and often conflicting interests and jurisdictions had thus contributed to a number environmental and growth management problems in the bay area.

In partial recognition of these problems BASIS organizers suggested that the Tampa Bay Regional Planning Council initiate a comprehensive investigation of Tampa Bay from a variety of viewpoints. On May 10, 1982, a motion was passed by the Council to establish the Tampa Bay Management Study Committee. The Committee was charged with the task of identifying critical bay management problems and evaluating potential solutions for those problems. In December 1982, a grant was received from the Florida Department of Environmental Regulation, through the federal Coastal Zone Management program, to help support committee activities for one year and to develop a management plan for Tampa Bay.

The Tampa Bay Management Study Committee was composed of representatives from local, regional, state and federal agencies, the academic community and commercial, industrial, recreational and environmental interests. Initially, five subcommittees were formed to specifically address

ecological, industrial, institutional, economic and recreational aspects of Tampa Bay. The planning process consisted of five steps: 1) identification of the management boundary, 2) adoption of goals and objectives, 3) identification of major bay management concerns, 4) development of bay management guidelines and 5) identification of existing and potential implementation programs and strategies. In December of 1983 grant funds for this effort expired and the final Tampa Bay Management Study document was published.

Because of the large number and complex nature of the issues affecting Tampa Bay, the Tampa Bay Study Committee could not reach a consensus regarding a recommended strategy to direct a coordinated approach to the management of the bay. As a result, the Committee recommended, and the Council approved, the interim establishment of a 15 to 20 member Tampa Bay Management Steering Committee in October, 1983. The composition of this Committee provided for effective representation from a wide range of Tampa Bay's business, environmental, and industrial interests as well as from the local regulatory agencies having jurisdiction over the bay.

During its' six-month tenure the Steering Committee concentrated primarily on a comprehensive survey and review of all entities having management responsibility for Tampa Bay with the objective of documenting all major jurisdictional gaps and overlaps. As a result of this effort, an existing authorities matrix was developed (see appendix B).

Through the efforts of local legislators and key members of the Tampa Bay Management Steering Committee, a special legislative act was introduced and passed during the 1984 session of the Florida Legislature creating the Tampa Bay Management Study Commission (see appendix A), in recognition of the need for a more credible and structured forum within which to proceed. The Commission was to be composed of essentially the same membership as the Steering Committee, and was to retain many of the members of the predecessor Study Committee as an adjunct Technical Advisory Committee. Appendix C lists all members of the Tampa Bay Management Study Commission and it's Technical Advisory Committee.

The Commission was granted a one-year mandate to complete the following tasks:

1. Develop a recommended Bay Management Plan and make a formal recommendation to the Tampa Bay Regional Planning Council 30 days prior to the 1985 session of the Florida Legislature.
2. Prepare a preliminary three-to-five year legislative work program to address priority bay management issues in conjunction with ongoing efforts by Congress, the U.S. Fish and Wildlife Service, state agencies, port authorities and other regulatory entities, for submittal prior to the 1985 legislative session.
3. Seek new sources of funding, as well as assist in coordinating existing funded efforts, to implement studies or actions addressing priority bay management issues. Such funding was not to be limited to only funding efforts of the Council, but also essential work by other public and private groups.

4. Monitor proposals falling under the review responsibilities of the Council for compliance with the recommended Bay Management Plan.
5. Make specific recommendations to the Council concerning bay management issues that may be identified during the lifetime of the Commission.

In conjunction with these efforts, the Tampa Bay Regional Planning Council procured a second Coastal management grant in October of 1984 to support the activities of the Commission. During its one-year tenure the Commission provided technical commentary and made specific recommendations to the Council regarding two major bay management issues - the Tampa Bay wasteload allocation study, and the proposed deepening of the Alafia River and Big Bend navigation channels (see appendix D).

With the submittal of this document the Tampa Bay Management Study Commission proclaims to have satisfactorily fulfilled all of its mandated tasks. The Commission, however, will remain in formal existence until the end of the 1985 session of the Florida Legislature

### C. Management Boundary

During the planning process a two-fold definition was developed to delineate a proposed management boundary for the Tampa Bay estuarine system. This is because it was unanimously acknowledged that the Tampa Bay estuary could never be comprehensively managed without determining and controlling the impacts of those activities occurring upstream from, or adjacent to, the estuary. Therefore, boundaries for the Tampa Bay estuary, and for a broader Tampa Bay watershed were defined as follows:

#### Tampa Bay Estuary

The Tampa Bay estuary includes a connected group of estuaries and embayments; its seaward limit is arbitrarily given as a line connecting the barrier beaches of Boca Ciega Bay and Anna Maria Sound; its upstream limit is approximately at the transition of shoreline vegetation from tidal to freshwater forms; and its upland limit is that line above which terrestrial land-forms and vegetation occur. The estuary has a total area of about 398 square miles including all intertidal wetlands. Figure 1.2 depicts the defined management boundaries of Tampa Bay proper. Further, the zones of Tampa Bay proper as defined by Lewis and Whitman (1982) are also recognized as the official subdivisions of the bay (see figure 1.3).

#### Tampa Bay Watershed

The Tampa Bay watershed includes the uplands and freshwaters contained within the combined watersheds of all rivers and tributaries which flow to Tampa Bay. The watershed has a total area of about 2200 square miles. Figure 1.2 also depicts the defined management boundaries of the Tampa Bay area.

It should be further noted that these definitions encompass an area that exceeds the area defined in SB-755, the legislation creating the Tampa Bay Management Study Commission (see appendix A). The area defined in SB-755 was provided for prescribing the immediate planning authority of the Commission during its' lifetime.

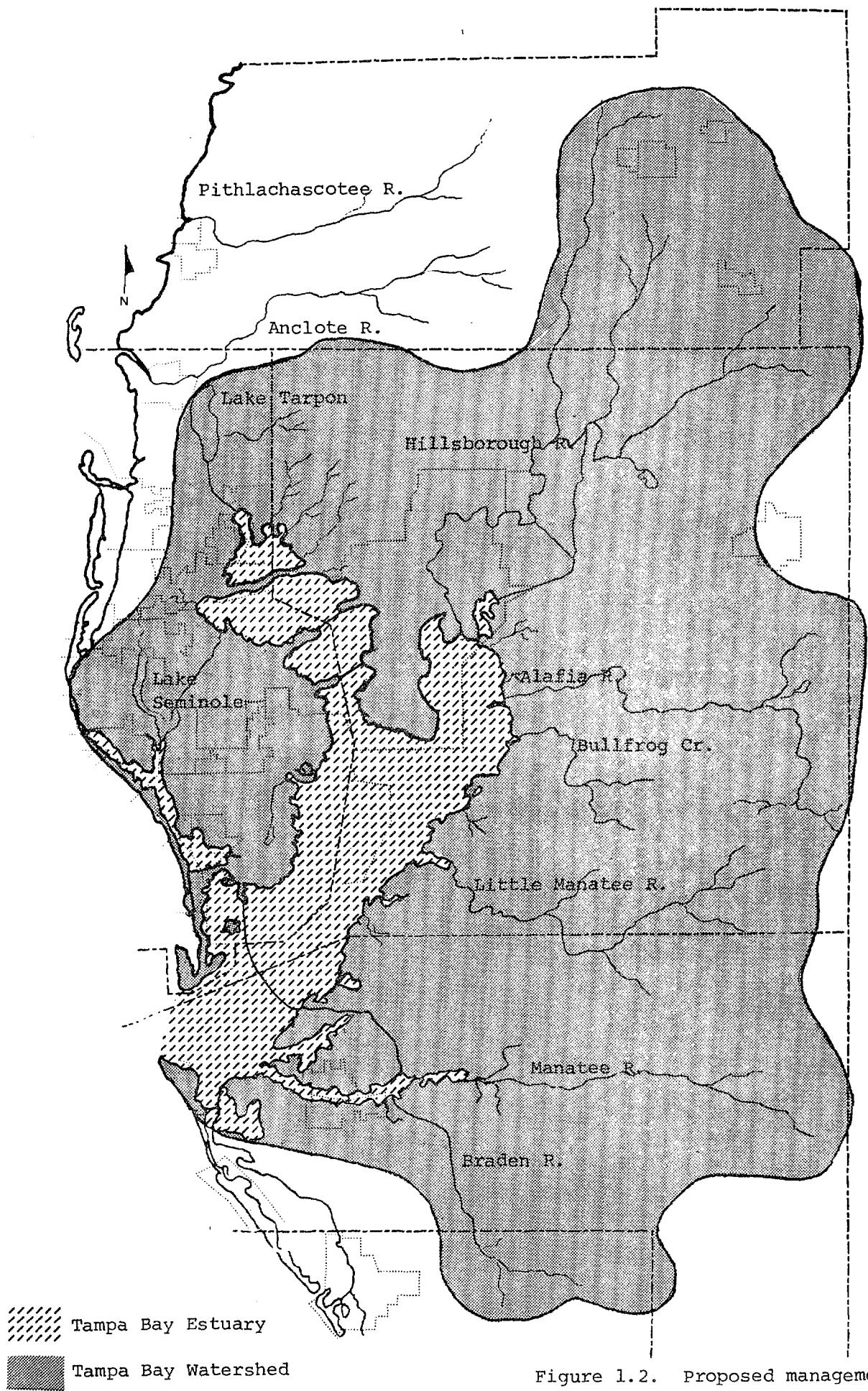


Figure 1.2. Proposed management boundaries of the Tampa Bay study area.

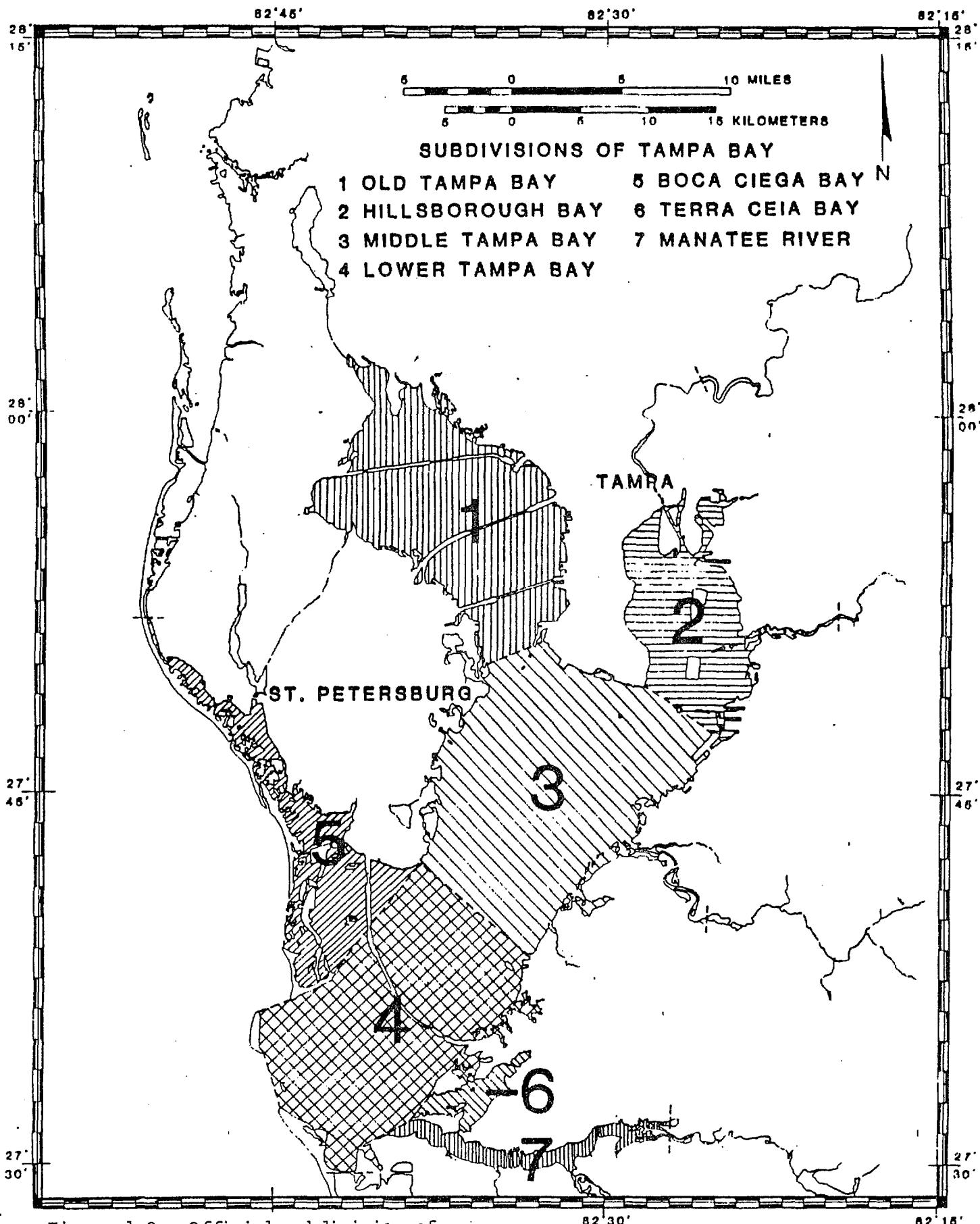


Figure 1.3. Official subdivision of Tampa Bay proper (Lewis and Whitman, 1982).

#### D. Goals and Objectives

In order to initiate the process of formulating goals and objectives, staff summarized goal statements contained in proceedings from conferences and symposia held in Tampa Bay over recent years, and in other publications related to bay management elsewhere in the nation. In December 1984, the Policies/Objectives Subcommittee of the Tampa Bay Management Study Commission approved the revised goal statements developed by the various Subcommittees of the previous Tampa Bay Management Study Committee. In addition, a primary goal statement for the overall program, and a series of objective statements derived from the above referenced sources were also approved. The following represent the adopted goals and objectives of the Tampa Bay Management Study Commission:

Primary Goal - To develop and implement a unified regional management plan for the entire Tampa Bay estuarine system including its tributaries, adjacent wetlands, embayments and contiguous developed shorelands in a manner that will maintain, or enhance where feasible, those physical, chemical, biological, economic and aesthetic qualities that encompass the basic character and potential value of Tampa Bay.

Ecology Goal - To restore and/or maintain Tampa Bay as an estuarine ecosystem in which commonly recognized ranges of scientifically valid parameters in comparable, healthy estuaries are consistently present.

- To avoid irreversible or irretrievable commitments of the Bay's natural resources;
- To provide protection for endangered, threatened or rare species of plants and animals that exist within the waters of Tampa Bay or the adjacent coastal wetlands;
- To optimize the quality and quantity of marine life;

Economy Goal - To quantify the economic value and promote the contribution of those public and private enterprises that provide goods and services to the community, and are dependent upon Tampa Bay as a resource essential for their existence.

- To provide a wide array of water oriented opportunities at the water's edge, consistent with the primary goal;
- To protect the Bay as a great natural and economic resource for the benefit of present and future generations.

Industry Goal - To achieve a balance between the commercial uses of Tampa Bay and the Bay's natural environment for their mutual benefit.

- To promote water transportation and enhance the Bay's contribution to the economic health of the community through marina development and other appropriate measures consistent with the primary goal, and
- To develop the Bay and its shoreline to their highest potential with a minimum of Bay dredging and/or filling.

Recreation Goal - To maximize current and future recreational benefits for the public of Tampa Bay with due concern for the environment.

- To maintain, or enhance where necessary, water quality that permits safe water contact, recreation and propagation of fish and wildlife;
- To enhance physical and visual access thereby increasing the potential for environmentally sound utilization and attractiveness of Tampa Bay for the public at large;

Institutions Goal - To provide a suitable regulatory framework for the implementation of the Tampa Bay Management Study Commission recommendations.

- To address and resolve the jurisdictional issues relating to Tampa Bay in order to provide long-term management capability;
- To seek funding for activities which are necessary to achieve the primary goal;
- To provide continuing monitoring of the Bay in order to assemble an adequate data bases for Bay Management.

## E. Overview of Tampa Bay - A Profile of Change

### Hydrographic Features

Tampa Bay is Florida's largest open water estuary. Tampa Bay proper covers 373 square miles and is wider than 10 miles in places. Including all contiguous wetlands, the total area of the bay is about 398 square miles, and the estimated average volume of the bay is 116 billion cubic feet (Ross et. al., 1984).

Goodwin (1984) computed changes in physical characteristics within subareas of the bay since 1885. The area of Tampa Bay has been reduced by 3.6%, with most (3.0%) occurring before 1972. Hillsborough Bay surface area was reduced by 13.6% due primarily to residential and port-related filling. Lower Tampa Bay has lost 1.9% of its total area, but this figure would be considerably higher if middle and upper Boca Ciega Bay had been considered (Lindall and Trent, 1975). The seemingly low amount of bay area lost to filling occurred mostly along shorelines and shallow areas of high biological productivity. Definitive data on shoreline loss by type are not yet available in Tampa Bay but a preliminary estimate of 44 percent loss in total mangrove and marsh acreage illustrates the relative importance of the lost area (Lewis, 1978). In Charlotte Harbor, Harriss et al. (1983) calculated that during 1945-1982 mangrove and marsh acreage actually increased by 2%, so losses in Tampa Bay have been considerable.

Tampa Bay is a naturally shallow body of water, having an average depth of about 12 feet (Goodwin, 1984), and a maximum natural depth of about 90 feet in Egmont Channel at the mouth of the bay. Approximatley 90% of the bay bottom is less than 22 feet deep (Olson and Morrill, 1955). According to Goodwin (1984) the average depth of Tampa Bay has increased by more than 5% during the past century, with an increase of almost 30% in Hillsborough Bay. Most of the increased relief took place prior to 1972 and is associated with channel dredging and a general rise in sea level.

As an important port of commerce, Tampa Bay is riddled with permanent navigation channels. A total of 42 nautical miles of channels with designed mean low water depths of between 20 and 43 feet are present (Simon, 1974). The main shipping channel was first dredged in the 1880's and is now being deepened and maintained by the Corps of Engineers at a depth of 43 feet, and a width of 400 feet. The channel provides access to Port Manatee, Port Tampa, Port Sutton, the Alafia River, a number of electrical power plants and Tampa Harbor. Figure 1.4 shows the alignment of the major navigation channels in Tampa Bay.

Sediments and bottom features in Tampa Bay are generally uniform in character with the majority of coverage being unconsolidated sediments or soft bottom. Sediments are primarily composed of reworked terrace quartz and nearshore sands as well as biogenic carbonate shell fragments. The mean size of sediment particles increases from the upper to the lower reaches of the bay. Organic sediments and clays are prominent primarily in the upper portions of Hillsborough Bay (Goodell and Gorsline, 1960). Areas of hard or live bottom, including outcrops of rocky relief and oyster bars, occur in the bay but are generally poorly documented.

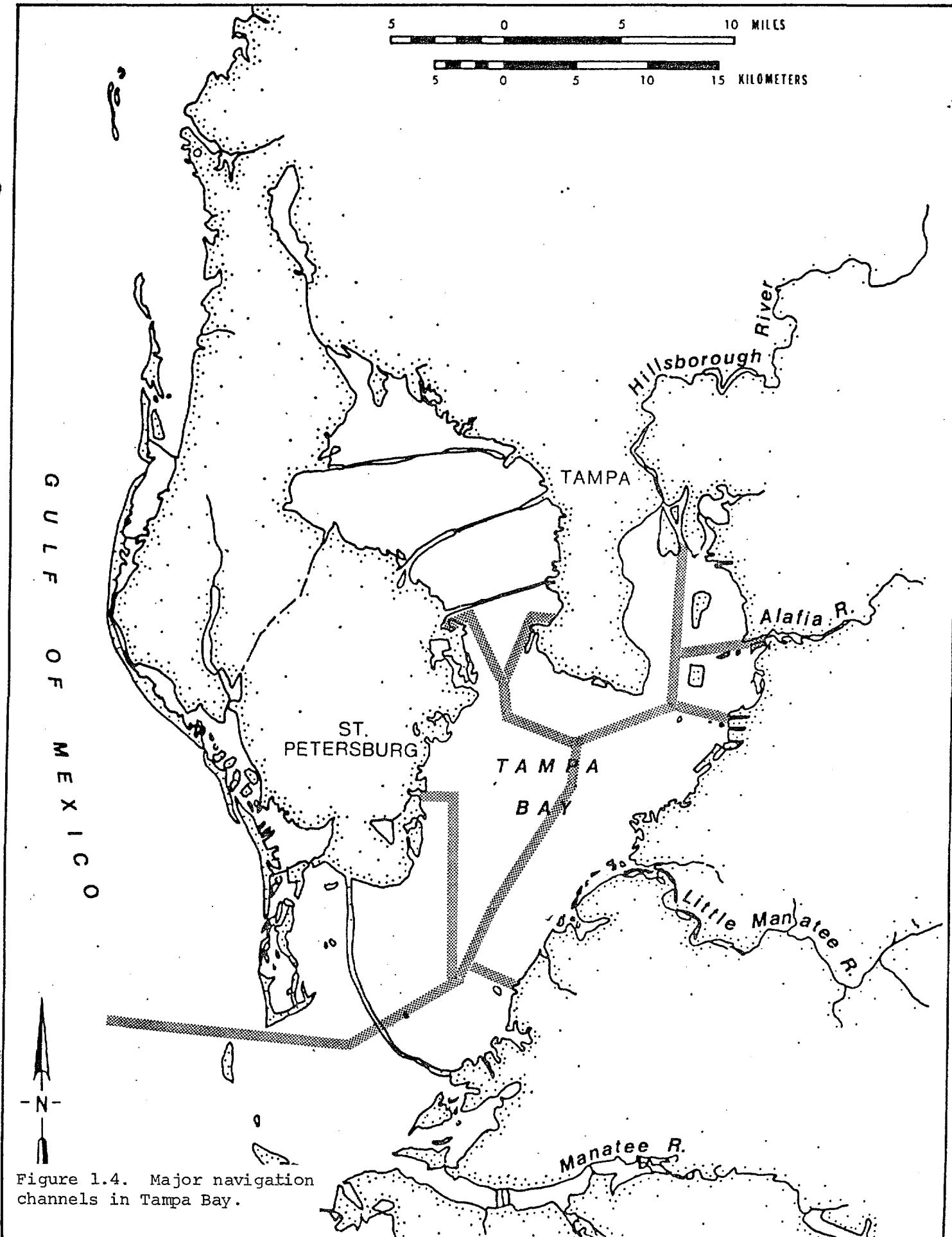


Figure 1.4. Major navigation channels in Tampa Bay.

### Circulation and Flushing

The freshwater drainage basin surrounding Tampa Bay covers an area of about 2,200 square miles (Hutchinson, 1983) and contains four authentic rivers including the Hillsborough, Alafia, Little Manatee and Manatee (see figure 1.2). Another, the Palm River, once drained lands between the Hillsborough and Alafia Rivers but was completely channelized and controlled since 1970, and now is called the Tampa Bypass Canal. The Lake Tarpon outlet to Old Tampa Bay is a significant man-made tributary completed in 1971. The Hillsborough and Manatee (and its tributary, the Braden River) are impounded as municipal reservoirs. The Little Manatee is cropped for power plant cooling water but is otherwise regarded to be in best ecological condition overall. The Alafia is significantly impacted by phosphate mining and processing, and is impounded at places. Numerous lesser tributaries and three major flood control channels also drain into Tampa Bay.

Over 450 billion gallons of freshwater annually flow into Tampa Bay with peak periods of stream flow corresponding to periods of greatest rainfall (summer and fall). Approximately 85 percent of all flows to the bay are represented by the discharges of the four major rivers. Mean annual discharges of the Hillsborough ( $1.53 \times 10^{11}$  gal./yr.) exceed the others (Alafia:  $1.12 \times 10^{11}$  gal./yr.; Manatee:  $6.87 \times 10^{10}$  gal./yr.; Little Manatee:  $5.94 \times 10^{10}$  gal./yr.) (Dooris and Dooris, 1984).

Groundwater discharges to the bay are seasonal and greatest during and after the wet season. The roles of groundwater discharge in bay ecology are poorly understood, but can be postulated as (a) attenuating surface flows and constituent loads; (b) prolonging estuarine conditions along shorelines and in marshes or mangrove forests; and (c) creating favorable refugia and nursery areas for marine life in tidal creeks. Drainage of uplands around the bay has concentrated the different flows of surficial groundwater discharge, routed it to major stormwater outlets, and altered the hydrology and constituent loads of man-made tributaries so that many of the benefits of diffuse flows have probably been lost (Estevez and Lewis, in press).

The tides of Tampa Bay may be classified as mixed - a combination of diurnal and semi-diurnal components. The average tidal range is 1.2 ft., with a range of about 3.5 ft. to 0.2 ft. or less (Corps of Engineers, 1974). The tidal heights are greatly influenced by wind direction and velocity, being elevated by strong winds from the southwest, and reduced by winds from the northeast. The tidal lag from the mouth to the head of the bay is generally on the order of four hours (Simon, 1974).

In general maximum currents exist at the mouth of the bay (in excess of 6.0 ft./sec. on ebb tide; under 3.5 ft./sec. on flood tide) and current velocities decrease markedly moving from the mouth to the head of the bay system, such that in Hillsborough Bay and northern Old Tampa Bay currents of less than 10% of those at the bay mouth are observed (Simon, 1974). The pattern of circulation in the lower portions of the bay has a net counterclockwise circulation, with the floodflow being concentrated toward the eastern side. The major component of the ebb flow, especially from Old

Tampa Bay, is directed towards the western shore. Little circulation is apparent in Hillsborough Bay, which serves as a trap for the effluents entering from both municipal and industrial outfalls, as well as from the Hillsborough River (Simon, 1974).

Ross (1975) demonstrated the existence of tidal gyres in Tampa Bay. Gyres are circular features of tide induced circulation which form when wind and density stratification are absent. The gyres range in diameter from one to over six miles and may significantly retard pollutant dispersion and transport in upper portions of the bay. It is hypothesized that the existence of numerous causeway structures crossing Tampa Bay contributes significantly to the creation of tidal gyres.

Circulation refers to the paths taken by water currents and its constituents due to tidal forces, runoff, wind and other effects. Flushing is the net retention or export of water or waterbourne material after circulation has occurred over a period of time. Both circulation and flushing in estuaries are determined largely by the inflow of freshwater relative to tidal action. Total freshwater inflow to Tampa Bay is about 45  $m^3$  /sec. much less than the average tidal flow at half tide of 25,500  $m^3$  /sec. Thus Tampa Bay may be considered a neutral or mildly positive estuary which, due to bathymetry and low inflows, is vertically well mixed and unstratified with regard to salinity (Dinardi, 1978).

Goodwin (1984) concluded that historic and recent alterations to the physical dimensions of Tampa Bay have been responsible for:

- decreased surface area and tidal prism, especially in Hillsborough Bay;
- increased depth and volume, especially in Hillsborough Bay;
- major (more than 100%) reductions in flood and ebb tide transport caused by causeways and filling of upper Hillsborough Bay;
- major (more than 100%) changes in net circulation in Old Tampa Bay and Hillsborough Bay; and
- increased inland (trapping) and seaward (export) exchange potential for tidally induced flushing.

Overall, the work of Goodwin (1984) underscores three important conclusions, e.g., that physical changes to the bay have caused significant effects in circulation and flushing; that Hillsborough Bay was naturally an area of poor flushing (and was thus the worst place for municipal and industrial waste to have been discharged); and that the continued flow of freshwater to Tampa Bay and especially Hillsborough Bay is essential to maintain flushing, even though the volume is low compared to the average tidal prism. These same conclusions probably apply to Old Tampa Bay as well (Estevez and Lewis, in press).

### Water Quality

Available data on dissolved oxygen levels within the water column range generally between 9.9 and 11.6 mg/l, although greater extremes have been reported. The yearly water column average for Tampa Bay as a whole has been estimated at 5.9 mg/l (Simon, 1974), however, vertical stratification of dissolved oxygen in portions of the bay may be very pronounced, with lowest concentrations occurring near the bottom. Stratification is induced by high oxygen demands of organic sediments, and by accumulations of photosynthetic plankton near the surface which shade deeper waters.

Generally, dissolved oxygen becomes limiting to aquatic vertebrates and macroinvertebrates at levels of about 2.8 mg/l. Although many organisms can withstand temporary exposure to lower dissolved oxygen levels, prolonged exposure can lead to fish kills and mass mortalities of bottom dwelling organisms. Extended periods of low dissolved oxygen and accompanying fish kills have been recorded both within Hillsborough Bay and in blind end canals in Old Tampa Bay and Boca Ciega Bay (Simon, 1974). In documented cases, the low dissolved oxygen levels were associated with pollution point sources releasing oxygen demanding organic materials, or with the resuspension of anaerobic bottom sediments as a result of dredging operations.

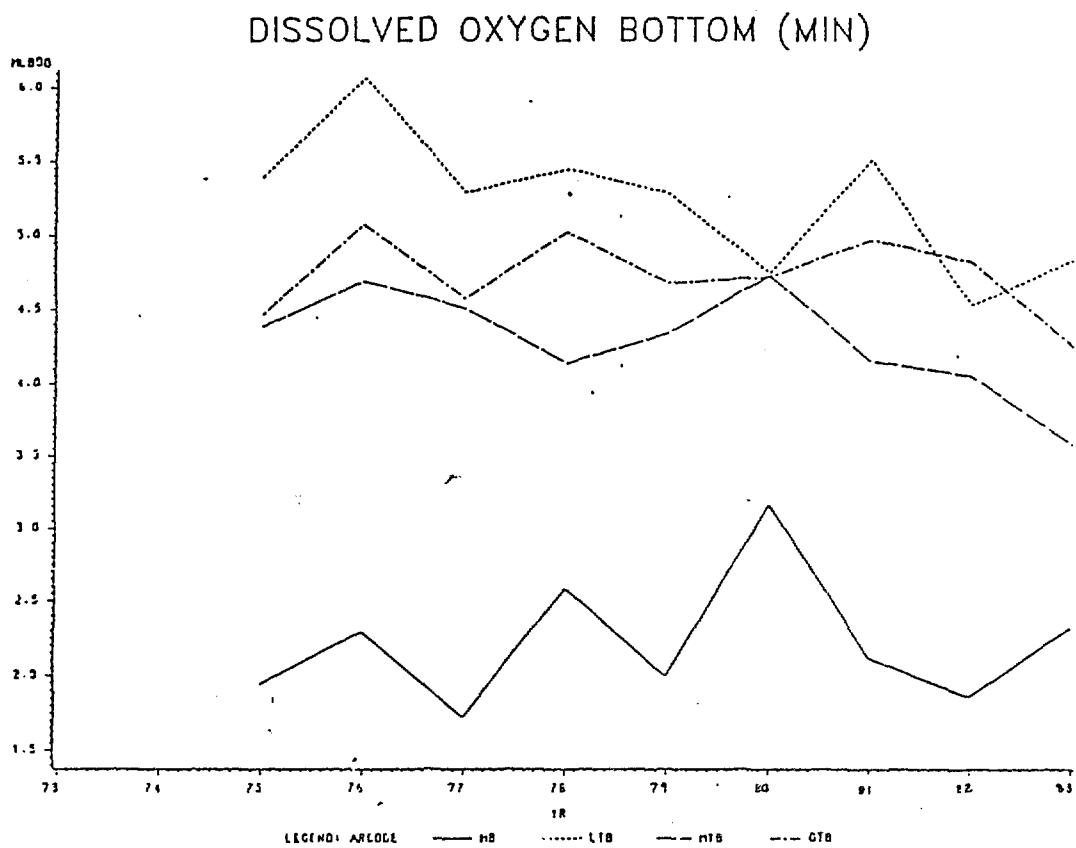
Dissolved oxygen concentrations naturally vary diurnally and seasonally, with bottom levels being highest in January and lowest in June-August. Bottom dissolved oxygen levels in Hillsborough Bay violate existing state standards (4.0 mg/l) 60-90 days each year, and extreme ranges are greater than in other bay sectors. Dissolved oxygen in Old Tampa Bay covaries in range and pattern with other portions of Tampa Bay, but Hillsborough Bay is almost always lower. During the past decade, however, bottom levels have declined significantly while surface levels have increased slightly in bay areas other than Hillsborough Bay. Figure 1.5 depicts average annual and seasonal bottom dissolved oxygen levels in Tampa Bay.

Turbidity is an expression of the optical quality of a water sample to scatter and absorb light rather than transmit light in straight lines. The penetration of light in a water body can be reduced by a number of factors including both organic (e.g. phytoplankton blooms, suspended organic matter) and inorganic (tannic acid, suspended sediments) constituents. Light penetration in estuaries regulates the productivity of phytoplankton and seagrasses.

Several years of monitoring data revealed that the least transparent waters of Tampa Bay regularly occur in Hillsborough Bay and much of Old Tampa Bay, where mean annual light penetration is less than 4.3 feet. Light penetration generally improves in mid and lower Tampa Bay, except along the eastern shore during the spring and summer, and is best near the mouth of the bay where values exceed 9.2 feet (HCEPC, 1984).

In Tampa Bay as a whole, turbidity varies seasonally reaching a peak in the spring and its lowest point during the winter (Palik, 1984). However, the relative importance of factors reducing light penetration differ between the various sectors of the bay. Transparency in lower portions of Tampa Bay is controlled primarily by nonbiogenic or inorganic sources (resuspension of sediments from dredging) while light penetration in

Mean annual dissolved oxygen near the bottom in Tampa Bay.



Mean monthly dissolved oxygen near the bottom in Tampa Bay.

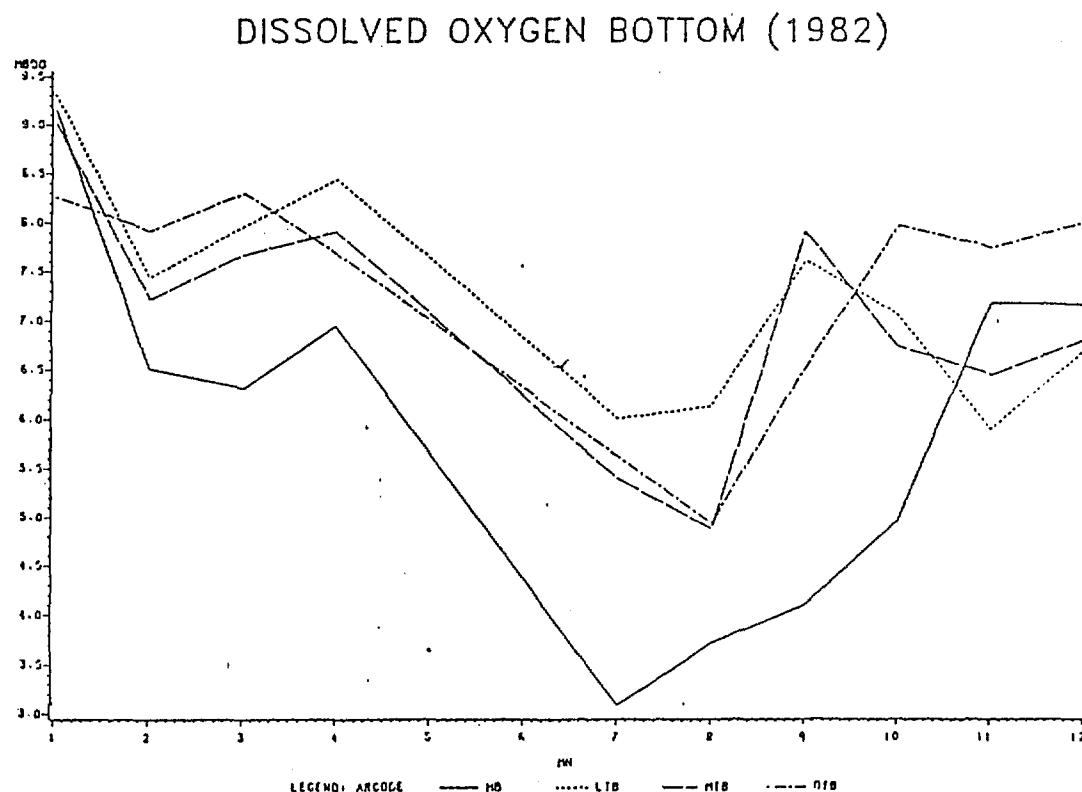


Figure 1.5. Mean annual and seasonal bottom dissolved oxygen trends in Tampa Bay (HCEPC, 1984)

Hillsborough Bay and Old Tampa bay is most significantly reduced by chronic phytoplankton blooms (as chlorophyll a) (Estevez and Lewis, in press). Nevertheless, long-term monitoring data (HCEPC, 1984) appear to indicate an improving baywide trend in effective light penetration following minimum values recorded in 1979 (see figure 1.6).

Nutrients in the water column are required to maintain the growth of aquatic plants. Phosphorous and nitrogen are the nutrients most responsible for causing or limiting excessive plant growth in estuaries. Excessive algal blooms often result in increased turbidity, reduced dissolved oxygen, fish kills and odors. Taken together, these conditions are referred to as eutrophication. Because of the remarkably high concentrations of phosphorous in Tampa Bay, nitrogen is the nutrient considered to most limiting to phytoplankton blooms in the majority of the bay (Fanning and Bell, in press).

Tampa Bay, as a whole, has the highest concentrations of phosphorous of any major estuarine or coastal area studied with Hillsborough Bay having the highest levels followed by upper Tampa Bay, Old Tampa Bay, lower Tampa Bay and Boca Ciega Bay (Fanning and Bell, in press). The primary sources of phosphorous to Hillsborough Bay appear to have been discharges by the phosphate industry. However, recycling of process and non-process wastewater by the industry has resulted in a decline in total phosphorous loadings to the Alafia River over the past decade (Estevez and Lewis, in press). Following progressive enrichment up until the early 1970s (Simon, 1974), phosphorous concentrations have also been declining baywide since about 1973 (Fanning and Bell, in press). Figure 1.7 shows baywide phosphate trends between 1972 and 1981.

Nitrogen occurs in seawater simply as a dissolved gas or as a complex organic molecule, and is thus difficult to measure. Organic nitrogen is the principle nitrogen source for both plants and animals and can occur in high amounts in municipal effluent. Both Simon (1974) and McClelland (1984) identified municipal sewage treatment plants as the primary sources of organic nitrogen in Tampa Bay, however, non-point sources and tributary loads are also significant. The Manatee and Alafia Rivers contribute nearly the same organic nitrogen,  $5.5 \times 10^5$  lbs/yr., followed by the Hillsborough River at  $4.4 \times 10^5$  lbs/yr. (Dooris and Dooris, in press). High levels of organic nitrogen in the Manatee River have been caused by the Bradenton sewage treatment plant and pulp effluent from a citrus processing plant (DeGrove, 1984).

Past nitrogen levels in Hillsborough Bay were greater than seen in other estuaries (FWPCA, 1969) but inorganic nitrogen for the bay as a whole is only slightly higher than reported elsewhere (Fanning and Bell, in press). However, ammonia is more abundant relative to other inorganic forms, than for many other estuaries. In addition, McClelland (1984) has indicated that the sediments of Tampa Bay represent a major nitrogen reservoir, probably as a result of years of discharging primary treated effluent into the bay. Measurements of nutrient flux rates and sediment oxygen demand in Tampa Bay sediments are amongst the highest ever recorded. Although trends in nitrogen levels are difficult to determine, recent modeling efforts have indicated that the nitrogen reservoir in the sediments will continue to exacerbate water quality problems in Tampa Bay for years to come (McClelland, 1984).

## EFFECTIVE LIGHT PENETRATION

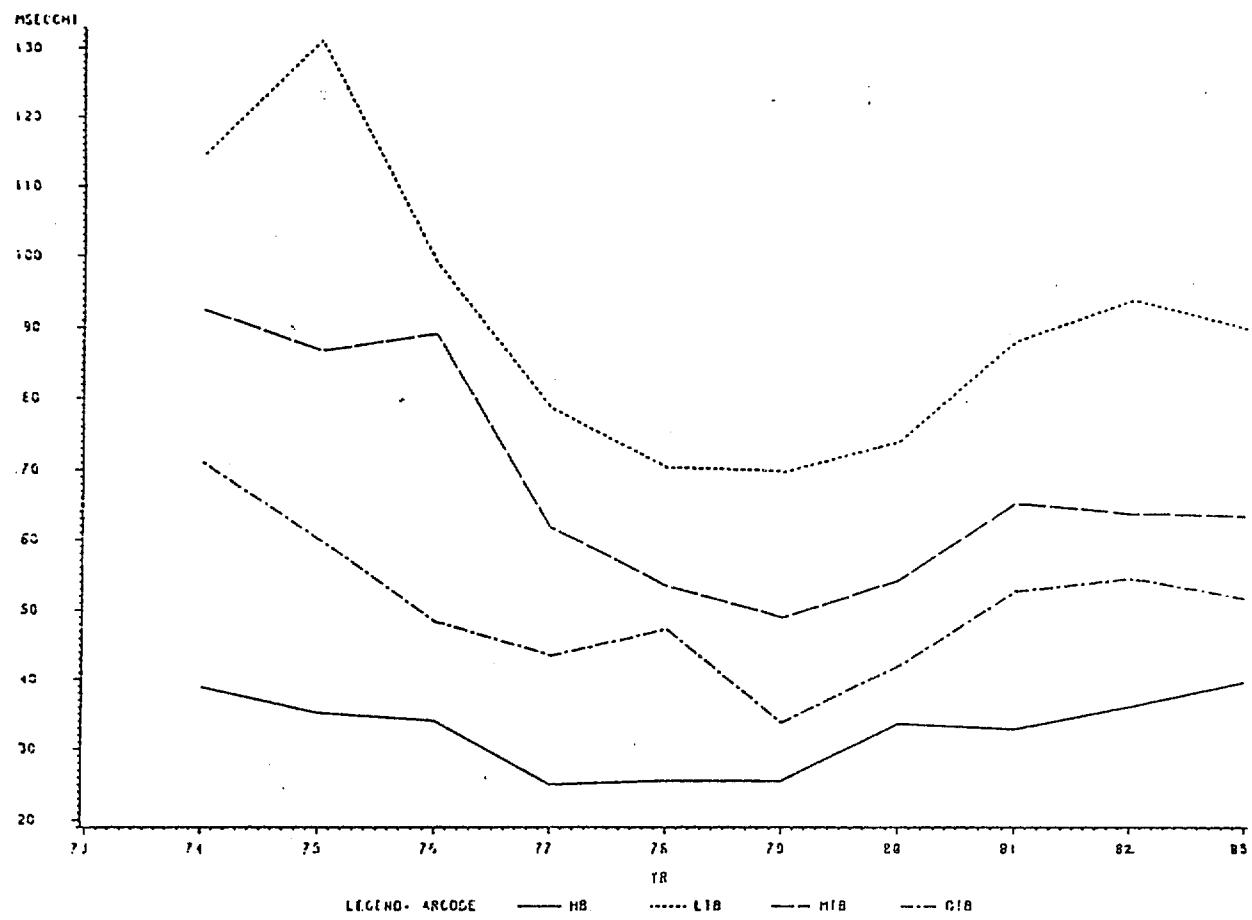


Figure 1.6. Mean annual effective light penetration trends in Tampa Bay (HCEPC, 1984).

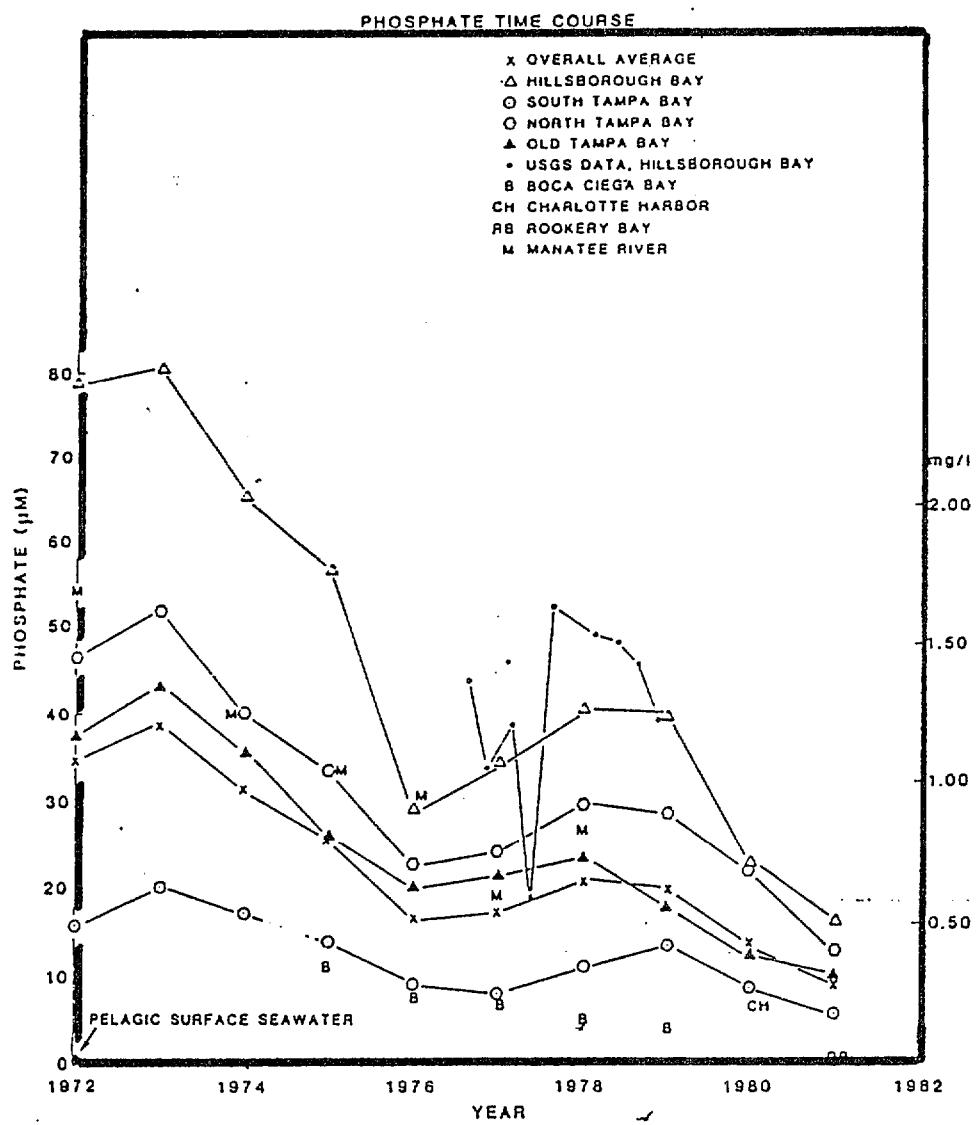


Figure 1.7. Mean annual phosphate trends in Tampa Bay (Fanning and Bell, in press).

In summary, general water quality is good to excellent in much of lower and middle Tampa Bay, declining in Old Tampa Bay and undesirable in Hillsborough Bay (Estevez and Lewis, in press). In addition, the following qualifying points apply:

- that Tampa Bay is not grossly "polluted", certainly not beyond the point of rehabilitation;
- that parts of the bay are "cleaner" than others for natural as well as cultural reasons;
- that levels of some pollutants in the bay have been declining over the past decade, while others have increased; and
- that the overall "quality" of bay zones is the same whether judged by ecological or human use criteria.

#### Fisheries

According to Taylor (1973), the recorded diversity and abundance of macroinvertebrate marine life in the Tampa Bay estuary is not exceeded by any other estuary between Chesapeake Bay and the Laguna Madre of Texas. The richness of Tampa Bay marine life has been attributed to the geographic position of the estuary between temperate and subtropical waters (Simon, 1974). As a result of the Bay's location, winter water temperatures rarely fall to levels which could kill tropical organisms and summer water temperatures are moderate enough to be tolerated by many of the temperate species. Another contributing factor to the diversity and abundance of Tampa Bay marine life is that salinity is typically in the range 25-35 ppt over most of the estuary, without the wide fluctuations and significant vertical stratification that characterize many other estuaries. As a result of the stability of the salinity regime, many ocean species can coexist with typical estuarine species.

The productivity of Tampa Bay, in terms of commercially valuable macroinvertebrates, has declined dramatically in recent decades due to man's influence on the Bay. Oysters once flourished in the shallow sections of the Tampa Bay system, particularly Hillsborough Bay (Giovanelli, 1981). In the late 1800s, annual oyster meat yields were on the order to 500,000 lbs. Between 1902 and 1962 there was a gradual decline in oyster yields which was attributed to factors such as water pollution and dredging. There was apparently some increase in yields in Old Tampa Bay by 1964, but the baywide yields never reached the levels achieved early in this century.

As an indication of the economic impacts of the shellfishing decline over the years, the Tampa NURP (1984) program has reported that the now non-existent shellfishing industry of Hillsborough Bay was valued at \$1.5 million as of 1969. A 1974 survey of benthic invertebrates in Tampa Bay indicated that upper Hillsborough Bay exhibited the lowest densities and diversity of benthic invertebrate communities (Texas Instruments, Inc., 1978), giving further evidence of man-induced alterations that caused the decline of shellfishing operations within Hillsborough Bay.

Commercially or recreationally valuable macroinvertebrates within the Tampa Bay estuary include the following: pink shrimp, stone crab, blue crab, oyster, bay scallop, southern quahog, sunray venus clam, and squid (Texas Instruments, Inc., 1978). Currently, the most valuable fishery is the pink shrimp.

The Tampa Bay estuary and contiguous coastal waters serve as home, feeding ground, and/or nursery for more than 270 species of resident and migrant fish. Approximately 80 fish species are found in at least one life stage within the Tampa Bay estuary, with about 25 of these species considered to be commercially important. Of special concern are spotted seatrout and red drum which constitute the bulk of the recreational finfish landings in Tampa Bay. Available statistics indicate that these species, both of which spend most of their lives in estuaries, are declining in numbers both locally and statewide.

Recreational and commercial fishing are extremely important components to Florida's economy, with total statewide revenues on the order of \$2.64 billion (U.S.D.O.I., 1982). More than half of Florida's saltwater sport-fishing occurs along the Gulf Coast, meaning that a significant percentage is undoubtedly concentrated near the tourist and population centers of the Tampa Bay Region (Texas Instruments, Inc., 1978). While not as economically important as sportfishing, commercial fisheries in Tampa Bay also represent a significant water use (Giovanelli, 1981).

In a 1968 report, it was estimated that the annual value of the Tampa Bay estuary for fisheries production alone (e.g., nursery, habitat) was \$300/acre or approximately \$82 million per year for the estimated 426 square mile surface area (Giovanelli, 1981). Using an interest rate of 7.63 percent, this annual value may be converted to a capitalized value (i.e., present worth of a perpetual period of service) of about \$1.1 billion for the Tampa Bay fisheries resource alone (presumably in 1967 dollars). Thus, order of magnitude estimates of the value of the fishery resources clearly demonstrate that the biota of the Tampa Bay system is a tremendous economic asset which deserves carefully management and protection.

#### Aquatic Vegetation Habitats

Emergent aquatic vegetation bordering the Tampa Bay system includes mangroves and salt marshes. Submergent vegetation includes five species of seagrasses and more than 200 species of algae (Giovanelli, 1981). Urbanization in the Tampa Bay region has significantly reduced the amount of aquatic vegetation available for fisheries and wildlife habitats. Over the last 100 years, the acreage of emergent vegetation in Tampa Bay declined by approximately 44 percent (Lewis et.al., 1982). Although newly instituted wetland protection programs will help prevent additional losses of major acreages of habitat, the destruction of intertidal wetlands in Tampa Bay will probably continue on a piecemeal basis. During the same period, 81 percent of the Tampa Bay seagrass cover disappeared resulting in a baywide total of approximately 14,200 acres (Lewis, 1983) and less than 400 acres in Hillsborough Bay (Giovanelli, 1981).

Whereas the decline of emergent vegetation can be attributed to nonwater quality factors such as seawall construction and other dredge/fill activities (Giovanelli, 1981), there is evidence from other estuaries such as Chesapeake Bay (EPA, 1982) that the decline of seagrasses can be attributed to water quality conditions as well as dredge/fill operations.

The location and composition of seagrasses is governed by the following major factors (Texas Instruments, Inc., 1978): water transparency, salinity, temperature, and depth relative to tide. Of these factors, water transparency is the one most likely to be affected by water quality. Due to the importance of water transparency, seagrasses are typically limited to areas with relatively shallow depths to ensure sufficient light penetration. In the Tampa Bay estuary, due to generally declining water clarity, seagrass beds have been restricted to very small patches in Hillsborough Bay, small patches in Old Tampa Bay and upper Tampa Bay, and larger patches near the mouth of Tampa Bay.

Seagrasses play at least four roles in the ecology of an estuary: (a) habitat; (b) food source; (c) nutrient buffer; and (d) sediment trap. Seagrasses serve as a fisheries habitat, including: nurseries for juvenile stages of some fish species; refuge for molting blue crabs, other invertebrates, and finfish; a substrate for epiphytic plants and animals; and a habitat for all fauna subsisting directly on seagrasses and its epiphytes, or detritus derived from them. As a food source, submerged aquatic vegetation is eaten by some fish, but most importantly it contributes to the detritus-based food web (EPA, 1982). Seagrass beds accumulate detrital food for invertebrates such as shrimp that in turn serve as food for finfish.

In some estuaries, there are indications that submerged aquatic vegetation also serve as nutrient buffers by absorbing nutrients during high streamflow periods and releasing them during later months as detritus, thus helping to moderate phytoplankton blooms. Other functions of submerged aquatic vegetation are the baffling of water movement, thereby causing enhanced settling of sediment and reduced turbidity, and the binding of sediment, thereby resulting in stabilized bottom sediments and lower rates of shoreline erosion. In summary, seagrass meadows make very important contributions to Tampa Bay's fisheries resources as well as to the overall ecology of the bay.

#### Designated Uses

The water quality goals established for an estuary segment depend upon the designated water uses. According to proposed U.S. Environmental Protection Agency (USEPA) guidelines (EPA, 1982), the suitability of the waterbody to attain a particular use depends upon the "physical, chemical, and biological characteristics of the waterbody, its geographic setting and scenic qualities and the socio-economic and cultural characteristics of the surrounding area."

Tampa Bay is a multiple use water body as defined by Chapter 17-3 of the Florida Administrative Code. The majority of the bay is designated Class III: recreation-propagation and maintenance of a healthy well-balanced population of fish and wildlife. The remainder of Tampa Bay is designated

as Class II: shellfish propagation and harvesting. Finally, parts of Tampa Bay have been designated as Outstanding Florida Waters and are afforded the highest level of protection. Figure 1.8 shows the designated use areas of Tampa Bay. The most critical water quality indicators for designated use attainment are dissolved oxygen, nutrients and chlorophyll-a, coliforms, and toxicants.

Swimming, boating and sportfishing represent the major recreational uses of Tampa Bay. As a very rough indication of the order of magnitude of recreation benefits, a 1968 report estimated an annual value of \$100/acre (i.e., capitalized value of approximately \$360 million at 7.63 percent) for non-fishery uses of the Tampa Bay estuary (Giovanelli, 1981). The most critical water quality indicator for body contact recreation is bacterial contamination based upon total coliform and fecal coliform concentrations. In 1980, the public beaches on the southeast shore of the Courtney Campbell Causeway and at Picnic Island Park were safe for swimming all year, and the only sections of Tampa Bay exceeding the fecal coliform standard of 200 MPN/100 ml for two months or more were McKay Bay, the uppermost sections of Hillsborough Bay, and portions of Old Tampa Bay north of the Courtney Campbell Causeway (Wilkins, 1981).

However, the most critical water quality indicators for fisheries use attainment are toxicants, nutrient, chlorophyll-a and dissolved oxygen. While the levels, sources and impacts of toxicant pollution in Tampa Bay remain poorly understood, the intimate relationships between nutrients, chlorophyll-a and dissolved oxygen are well documented in the baywide symptoms of eutrophication. Current, as well as projected, conditions in Tampa Bay indicate that many portions of the bay are not now attaining, or will not attain in the future, designated use standards (McClelland, 1984). Without stringent regulation and management, designated uses in portions of the bay will realistically need to be downgraded, an action which can only be viewed as regressive. In all cases, the achievement of water quality goals for fisheries (including shellfish) will also produce desireable water quality conditions for other designated uses in Tampa Bay, and should be the primary goal of any recommended bay management strategy.

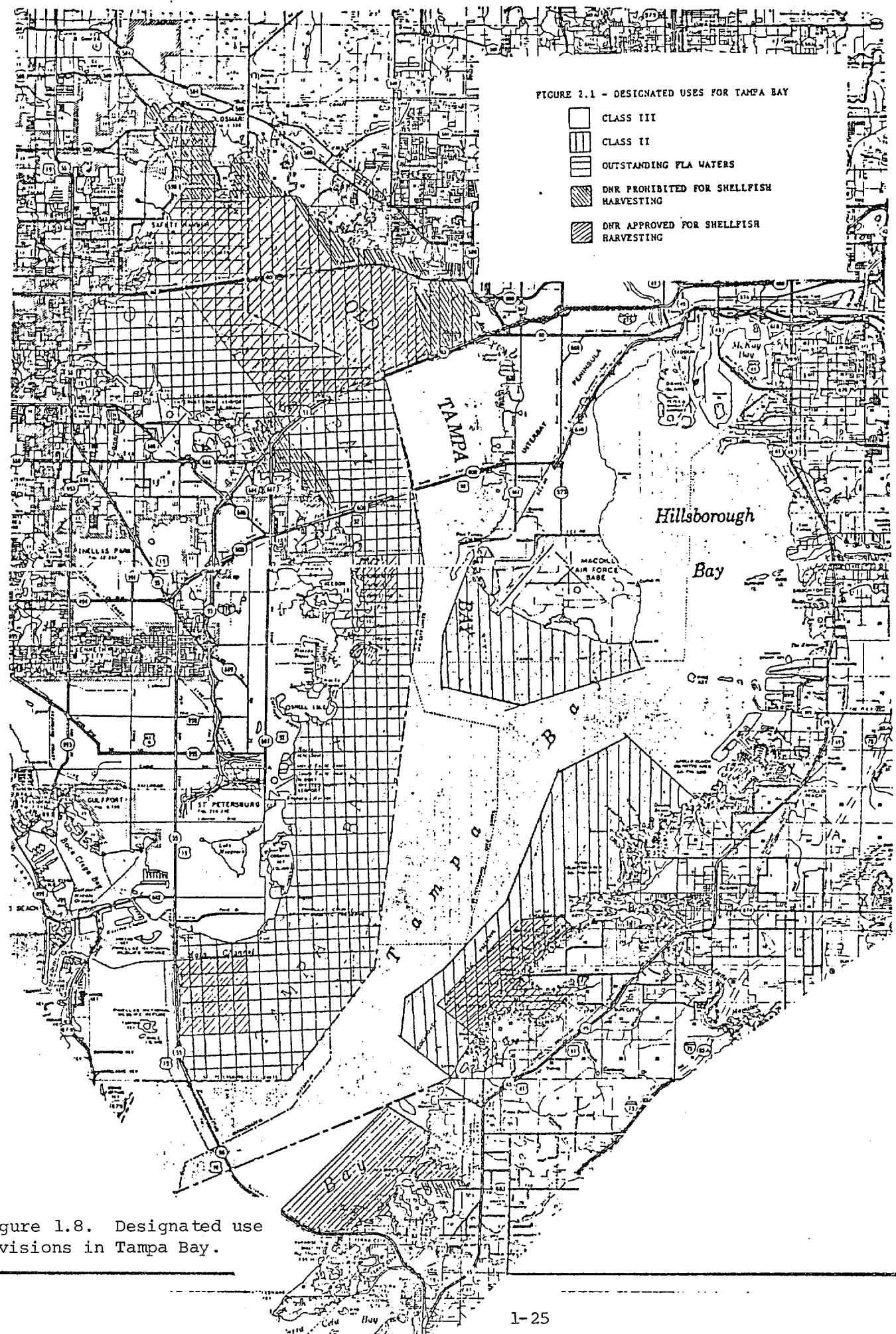


Figure 1.8. Designated use divisions in Tampa Bay.



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## CHAPTER 2

### A. Planning Process

During meetings from July, 1982 to March, 1983 the various Subcommittees of the Tampa Bay Management Study Committee identified local and regional issues, including many site specific concerns, related to the comprehensive management of Tampa Bay. A summary list of general environmental concerns and management issues was approved at the March 22, 1983 Committee meeting and is shown in table 2.1.

The major effort of the Committee following the preparation of this list was to further identify and focus upon specific bay management problems. Through the Subcommittee meetings a total of 42 specific issues were identified. At the August 30, 1983 Committee meeting the final issue list was approved in priority ranking, and is shown in table 2.2.

The task of the Tampa Bay Management Study Commission was to build upon the accomplishments of the previous committee. The 42 specific bay management issues were reviewed by two Subcommittees to determine additional information or research needs and to develop specific recommendations and strategies for rectifying the identified problems. The Science/Engineering Subcommittee reviewed those issues which were more technical in nature and would require particular technical expertise to recommend solutions. The Planning/Management Subcommittee reviewed those issues requiring essentially administrative or political solutions.

In the process of their reviews the two Subcommittees developed a series of issue briefs, one for each identified bay management problem, following a specific format. In the following issue briefs, the format headings can be described as follows:

- Issue Analysis - This heading includes a brief discussion of the specific problem as it relates to Tampa Bay including pertinent facts, data and references.
- Relevant Laws and Statutes - This heading includes a citation of the major federal laws and Florida Statutes considered to be directly related to the specific problem. Local laws and regulations are excluded due to the complexities involved.
- Bay Management Objectives - This heading includes problem-specific goals and objectives statements, consistent with the overall program goals, objectives and policies.
- Bay Management Recommendations - This heading includes both general and specific recommendations aimed at rectifying the identified problem.
- Work Elements - This heading, which always occurs as a sub-heading under a recommendation, encompasses a more specific recommended action or implementation strategy. Also, cited are the specific entities to be involved, as well as estimated needed manpower and funding allocations for proposed studies or programs, where applicable.

- Long-term Management Alternatives - This heading includes three sub-headings referring to three alternative management scenarios under which the specific problem could be addressed. The three scenarios include the existing or status quo management framework, a permanent bay advisory committee under the Tampa Bay Regional Planning Council, and a legislatively mandated bay management authority with regulatory powers. The probability and effect of implementing the recommended solutions is briefly discussed under each of the three scenarios.

Table 2.1. List of major concerns and management issues identified by the Subcommittees.

Environmental Concerns:

Development and Growth  
Industrial, Municipal and Transportation Impacts on Tampa Bay  
Impacts from Changes to Tidal Creeks  
Declining Visual Quality  
Decline in Harvestable Resources  
Habitat Loss and Restoration  
Changes in Bay Circulation  
Loss of Resources Based Recreational Opportunities  
Changes to Species Composition and Community Structure  
(Excessive Blooms, Mass Mortalities, Reduced Diversity, etc.)  
Loss of Assimilative Capacity  
Long Term Changes in Salinity Patterns  
Changes in Hydrography  
Contamination of Life Forms

Management Issues:

Intergovernmental Coordination and Jurisdictional Control over  
Tampa Bay  
Public Participation and Education  
User Conflicts and Limits on Activities  
Ownership of Submerged Lands  
Bay Management Alternatives and Implementation Measures  
Public/Visual Access and Shoreline Recreation Facilities  
Funding  
Value of Tampa Bay for Commerce  
Controls on Industry  
Water Quality Management and Violations of Standards  
Wildlife Management  
Management and Acquisition of Public Lands

Table 2.2. Tampa Bay Study Committee Numerical Priority List

1. Funding
2. Loss of Seagrass in Tampa Bay
3. Non-Point Source Discharges Entering Tampa Bay
4. Spoil Disposal and Management of Spoil Islands
5. Hazardous Waste Disposal and Management
6. Enforcement
7. Control of Septage Waste
8. Aquatic Preserves
9. Seagrass, Marsh and Mangrove Habitat Creation
10. Municipal and Industrial Discharges
11. Stronger State Wetlands Regulation
12. Study and Management of Tidal Creeks and Rivers
13. Wasteload Allocation for Tampa Bay
14. Assessment of Fishery Stocks in Tampa Bay
15. Gypsum Decommissioning, Hillsborough County
16. Commercial & Sport Fishing Regulation
17. Documenting the Economic Importance of Tampa Bay
18. Public Education
19. Urban Waterfront Development and Public Access
20. Load Relief for Major Sewage Treatment Plants
21. Water Quality Improvement for Recreational Uses
22. Stormwater Detention Requirements for Redevelopment
23. Review of Rules and Regulations
24. McKay Bay Management Plan
25. Shellfish Classification
26. Power Plant Entrainment
27. Hendry Fill Restoration Project
28. Contingency Planning for Post-Hurricane Acquisition of Habitat
29. Mitigation Banking
30. Management of Bower Tract and Adjacent Wetlands
31. Management of Passage Key
32. Management and Restoration of Shorelines in Boca Ciega Bay
33. Improvements to Bridge Facilities Crossing Tampa Bay
34. Channel A Restoration
35. Water Quality Improvements Using Tidal Gates and Pumps
36. User Conflicts and Limits on Activities
37. Marina Siting Policy
38. Construction of New Skyway Bridge Pier Protection System
39. Extension of 49th Street (St. Petersburg) Across Tampa Bay
40. Sailboat Launching
41. Odor
42. Manatee River Derelict Train Trestle, Manatee County

## B. Bay Management Issue Briefs

### Issue #1 Funding

Issue Analysis: In many of the issue papers to follow, specific studies, restoration projects and administrative actions are proposed as steps to improve the management of the Tampa Bay estuarine system. Taken either individually or as a comprehensive program these steps will require sufficient sources of both short-term (non-recurring) and long-term (recurring) funding in order to be effectively implemented. A list of possible funding sources for proposed bay management studies, projects and actions is provided below followed by a brief discussion of the function and possible uses of each. Although this list represents a compilation of the most appropriate funding sources presently known to be available, it probably does not include many other lesser known granting programs and fund raising alternatives.

#### Funding Sources:

##### 1. Non-recurring (short term)

###### A. Federal

- Coastal Management grants
- Public Works program
- Section 201 grants
- Section 205(j) grants
- Florida "Sea Grant" program
- Water Research Institute program
- Special federal agency studies

###### B. State

- Florida Coastal Protection Trust Fund (Chapter 376.11, Florida Statutes)
- Water Quality Assurance Trust Fund (Chapter 376.307, Florida Statutes)
- Pollution Recovery Fund (Chapter 403.165, Florida Statutes)
- Water Resources Restoration and Preservation Trust Fund (Chapter 403.0615, Florida Statutes)
- Aquatic Preserve Program (Chapter 258, Florida Statutes)
- CARL program (Chapter 259, Florida Statutes)
- "Save Our Coast" program
- "Save Our Rivers" program
- Growth Management Trust Fund
- Special legislative funding requests

##### 2. Recurring (long-term)

###### A. Federal

- Wallop-Breaux Fund

B. State

- Marine recreational fishing license fees
- Saltwater products license fees
- Submerged land lease fees
- Phosphate severance tax

C. Local

- Ad-valorum taxing authority
- Special commercial net license fees (Pinellas County - Chapter 83-504, Laws of Florida; Manatee County - Chapter 84-471, Laws of Florida)

Discussion:

Coastal Management Grants

These funds are made available under the terms of Section 306 of the federal Coastal Zone Management Act. The Department of Environmental Regulation administers the funds at the state level and accepts proposals from state agencies, water management districts, regional planning councils, port authorities and eligible local governments. Priority is given to projects dealing with the protection and management of natural coastal resources (especially estuaries), management of coastal development, improved public access to coastal areas and improved predictability and efficiency of government decision making. In 1984 \$1,023,969 was awarded to state agency projects while \$611,201 went to local proposals. A matching contribution of 25% of federal funds is required. The activities of the Tampa Bay Management Study Commission and previous committees were entirely funded through this program.

Public Works Program

The Department of Environmental Regulation, under the authority of Chapter 373.026(9), Florida Statutes, each year prepares a program for recommended federal appropriations for Army Corps of Engineers' water resource studies and projects in Florida. Any agency, commission, district, municipality or political subdivision for the state may sponsor a study or project falling into one or more of four general categories including flood damage protection, navigation, beach erosion control and environmental restoration and enhancement. Local sponsors are required to provide a variable proportion of the costs involved as well as lands, easements, disposal areas, materials, etc. which are determined on a project-specific basis. This is not a true granting program as transfer of funds between local sponsors and the Corps rarely take place. Rather, the program allows for local initiation of the federal authorization process for locally implemented corps projects and studies. The Tampa Harbor Deepening Project and related studies were initiated and implemented through this program.

### Section 201 Grants

Section 201 of the Federal Water Pollution Control Act provides federal grants to local governments for the planning and construction of sewage treatment and disposal facilities. At the state level the Department of Environmental Regulation administers the funds through its Bureau of Waste-water Management Grants.

### Section 205(j) Grants

Section 205(j) of the Federal Water Pollution Control Act provides federal grants to states to carry out water quality management planning and technical studies. In Florida, the Department of Environmental Regulation administers the funds and is required to pass through only 1% of the state's award to regional and local entities. Federal 205(j) monies presently provide support for a significant proportion of the state's water quality programs, and were exclusively used to fund the recently completed wasteload allocation study for Tampa Bay (see issue #13).

### Florida "Sea Grant" Program

The National Sea Grant College and Program Act of 1966 established state "Sea Grant" college programs in coastal states providing matching support. Under the guidelines of the general Sea Grant mandate, Florida's three-pronged program of research, education, and technology transfer is pursued by a statewide system of public and private universities and laboratories, in collaboration with industry, government at all levels, and the public. This network concentrates its efforts in the broad program areas of living marine resources, coastal processes and development, marine industries, education, and extension. Grants are awarded bi-annually to university faculty or other qualified researchers for applied work in each of these program areas. Sea Grant funds were used to partially fund the Bay Area Scientific Information Symposium (BASIS) in 1982.

### Water Resources Institute Program

The Water Research Act of 1984 authorized the U.S. Geological Survey (USGS) to establish a granting program within qualified colleges and universities for the purpose of conducting applied research related to the economic, legal, engineering, social, recreational, biological, geographical, ecological or other aspects of water problems. Funds can also be used for the dissemination of water resource information.

### Special Federal Agency Studies

Large sums of money are spent annually by numerous federal agencies (EPA, COE, NMFS, USFWS, USES) on various special studies and projects involving Tampa Bay. A major commitment by a federal agency, such as the Environmental Protection Agency's multi-million Chesapeake Bay Program, represents a potentially significant source of long-term funds and expertise for

improving the management of Tampa Bay. However, until very recently two major problems lead to the virtual waste of these funds. The first is that research program guidance is not coordinated by any one agency in the Tampa Bay area, thus overlap with previous or ongoing studies is common, while other important research areas go unfunded and unstudied. Secondly, the decisions on research study format and methodology are typically made by individuals with little local scientific knowledge or specific interest in the topics under study. The recent efforts of the Tampa Bay Regional Planning Council to coordinate a number of federal, state, regional and local habitat restoration studies in the bay area represents an important and needed function.

#### Florida Coastal Protection Trust Fund

Chapter 376.11, F.S., establishes a fund to be used by the Department of Natural Resources as a non-lapsing revolving fund credited by excise taxes, registration fees, penalties, judgements and other charges related to the discharge of pollutants. The purpose of the fund is to provide a mechanism to have financial resources immediately available for cleanup and rehabilitation following an oil spill. In addition, up to 50% of the interest earned from investments of the fund may be used for the acquisition and improvement of spoil disposal sites.

#### Water Quality Assurance Trust Fund

Chapter 376.307, F.S., establishes a non-lapsing revolving fund credited by an annual transfer of interest funds from the Florida Coastal Protection Trust Fund, and by excise taxes, penalties, judgements and other charges. The fund is administered by the Department of Environmental Regulation and is to be used for the cleanup and restoration of any site which may be contaminated by a hazardous waste. This fund could be utilized to assist in the decommissioning and cleanup of the Gardenier gypsum stack.

#### Pollution Recovery Fund

Chapter 403.165, F.S. establishes a fund which is credited by any monies recovered by the state in any action against any party which has polluted the air, soil or water. The fund is administered by the Department of Environmental Regulation and is to be used to restore the respective polluted areas which were the subjects of state action to their former condition. Any monies remaining in the fund are then to be used by the DER, as it sees fit, to pay for any work needed to restore areas which required more money than the state was able to obtain by court action, or to restore areas in which the state brought suit but was unable to recover any monies from the alleged violators. Between July 1, 1980 and June 30, 1983, a total of \$7,143,174 was available and \$3,479,215 was spent on a variety of projects leaving a balance of \$3,663,959. Although significant funds have been collected from Tampa Bay area violations none have ever been used to restore those particular disturbed areas around the Bay. This fund needs to be properly administered so that funds are returned to, and benefit, the area from which they were generated. This is an obvious source of funds for specific projects such as the Hendry Fill/Little Redfish Creek restoration. However, as noted in other discussions (see issue #27) even the \$80,000 allocated specifically for the Hendry Fill restoration has remained unspent for over three years.

### Water Resources Restoration and Preservation Trust Fund

Chapter 403.0615, F.S. establishes a fund which is credited by transfers of funds from the general revenue, the Pollution Recovery Fund and from available federal monies. The fund is to be used to restore degraded, or preserve pristine, waters of the state. The fund is to be administered by the Department of Environmental Regulation. Although specific rules for the allocation and use of this fund have not yet been finalized, it represents a potential source of monies for restoration and management of tidal creeks and rivers (see issue #12) in the Tampa Bay watershed.

### Aquatic Preserve Program

The Aquatic Preserve designation (Chapter 258, Florida Statutes) is the primary mechanism by which the State preserves and protects large tracts of sovereign submerged and intertidal lands. However, the state outlay of funds for aquatic preserve management, other than that directly spent in Charlotte Harbor, was absent prior to July, 1984. This is in contrast to an increasing demand for a management role throughout the state system of aquatic preserves, both from within state government and from the general public. The 1984 Legislature for the first time funded aquatic preserve management statewide with \$92,174. But this funding is derived from federal Coastal Management grants, is subject to annual renewal, and is totally inadequate to meet the program needs. A long-term source of funds is needed for this program to succeed (see issue #8).

### CARL Program

Chapter 259, F.S., establishes the procedures for the issuance of state bonds not to exceed \$240 million, for the public purchase of environmentally sensitive lands. The program assisted in the public purchase of the Gateway tract in Pinellas County and could be used for similar purchase and preservation of the Bower tract and Coopers Point in Tampa Bay.

### "Save Our Coast" Program

This program is funded by a \$200 million bond program initiated by the Florida Cabinet. The 26 properties now on the "Save Our Coast" priority list would cost approximately \$190 million dollars to acquire. None of the 26, however, are in the three counties bordering Tampa Bay. These funds could potentially be used to purchase extensively altered coastal lands following a major storm disaster (see issue #28).

### "Save Our Rivers" Program

This program, administered by the state Water Management Districts, is funded by a five cents per \$100 documentary tax stamp and is expected to generate \$320 million over 10 years. The Southwest Florida Water Management District had acquired four parcels totaling 1802 acres through April 1984. These funds could be used to preserve portions of major pristine tributaries entering Tampa Bay (e.g. Braden River).

### Growth Management Trust Fund

The Florida State and Regional Planning Act of 1984 established the creation of a non-lapsing fund for the purpose of providing grants to state agencies, regional planning councils and local governments for the performance of studies, reports or other activities, leading to the effective implementation of regional and local comprehensive plans. However, specific rules for the administration of this fund have not yet been developed.

### Special Legislative Funding Requests

Special legislative funding requests could be used to finance specific showcase projects in Tampa Bay. For example, the Dade County legislative delegation had appropriated from state general revenues \$125,000 in planning funds, and over \$2 million in appropriations to the Department of Environmental Regulation for restoration activities in Biscayne Bay.

### Wallop-Breaux Fund

Recent amendments to the Federal Aid In Sport Fish Restoration Act of 1950 have resulted in the creation of the Aquatic Resources Trust Fund, also known as the Wallop-Breaux Fund after its legislative sponsors. The fund will receive monies from manufacturers excise tax on fishing tackle and accessories (\$51 million), import duties imposed on fishing tackle and vessels (\$20 million) and a nine cent per gallon water boat fuel tax (\$90 million). The funds will be passed through to the states for use in fishery research and restoration programs. For the first time a requirement is established for coastal states to equitably allocate monies between freshwater and marine fish projects in the same proportion as the estimated number of freshwater to marine anglers. Coastal states which do not license their marine anglers, such as Florida, and wish to receive Wallop-Breaux monies will need a stable source of matching monies to provide the 25% required match.

### Marine Recreational License Fees

Currently only eight of the 23 coastal states require that saltwater anglers be licensed (Alaska, California, Oregon, Washington, Alabama, Louisiana, Texas, and Maryland). It is estimated that if a \$5.00 license fee were required for Florida residents and a \$10.00 license for visitors, over \$40 million a year would be generated. Interviews indicated that nearly 57% of resident saltwater fishermen would be willing to pay at least \$6.75 for such a license where the proceeds would be used for fishery management. Similarly 52% of all tourist fishermen would be willing to pay at least \$10.50. Monies generated from a marine recreational license fee could be used to fund a number of habitat research and restoration programs (see issues #2 and #9) as well as fishery assessment and management programs (see issue #14). In addition, monies generated from a marine recreational license fee could be used to provide the required 25% state match for receiving federal Wallop-Breaux funds.

### Saltwater Products License

Florida law requires all persons who sell any saltwater products in the state to have a saltwater products license. All transactions in which saltwater products change hands in exchange for cash merchandise or other value are included under the law. The revenues generated by the sale of these licenses are used to support marine research, promote saltwater products and fund the Marine Fisheries Commission. The Department of Natural Resources administers the program.

### Submerged Land Lease Fees

The Department of Natural Resources collects lease fees for private use of state owned submerged lands pursuant to Chapter 253, Florida Statutes. Funds derived from submerged land lease fees presently contribute to the general revenue. Alternatively, these monies could be used to at least partially fund the state Aquatic Preserve Program (see issue #8).

### Phosphate Severance Tax

A State tax on the severance of phosphate was established in 1977 under Chapter 211, Florida Statutes. One of the purposes of the tax was to generate revenue to mitigate the impact of phosphate mining on affected regions. The mining and/or processing of phosphate in the Alafia River Basin and along the eastern shore of Tampa Bay and the shipping of phosphate products through the Port of Tampa and Port Manatee have unquestionably impacted the environmental quality of Tampa Bay. Additionally, the Tampa Harbor Deepening Project with its many related spoil disposal problems would in all likelihood not have been undertaken if not for the urgent need cited by the phosphate industry for a deepwater channel.

Section 211.3103, Florida Statutes provides for the following distribution of the severance tax revenue: 50% to the Conservation and Recreation Lands Trust Fund; 30% to the General Revenue Fund; 10% to the Non-mandatory Land Reclamation Trust Fund; 5% to the Phosphate Research Trust Fund; and 5% to affected counties to be used for phosphate related expenses. The Florida Department of Revenue projects that \$95.0 million in phosphate severance tax will be collected in FY 84-85 and \$103.5 million in FY 85-86. At that rate, one percent of the severance tax revenue collected over the next five years would be sufficient to fund many of the major studies and programs recommended herein.

### Ad-Valorum Taxing Authority

It is not unusual for a multi-county authority to have receive support through a limited millage rate. Both the Southwest Florida Water Management District and the West Coast Regional Water Supply Authority depend upon ad valorum taxes for their operations. There are, however, strong philosophical criticisms of ad valorum taxes in general and the future of this funding source is in doubt. Whether a "Bay Management Authority" could exist by directly collecting a portion of the existing taxes or through each county or municipality, transferring a portion of these funds needs further examination. The Tampa Port Authority has the authority to request 1/2 mill of ad-valorem taxing authority subject to approval by the

Hillsborough County Commission. Such a tax would generate \$6 million/year. A recent proposal has suggested use of these funds to acquire the Port Redwing site for U.S. Navy use. Counter proposals from environmental interests include the use of a portion of this money for completing the erosion control and dike stabilization projects on the two diked disposal islands (2D and 3D) in Hillsborough Bay.

#### Special Commercial Net License Fees

Chapters 83-504 and 84-471, Laws of Florida, establish a fund generated from commercial gill-net license fees collected in Pinellas and Manatee Counties respectively. Pasco County has recently passed a similar special act. It is estimated approximately \$90,000 per year will be generated by these acts. Approximately \$130,000 has been collected to date and expenditures will be administered by the Florida Department of Natural Resources. The acts specifically require that the monies are to be spent by the Department of Natural Resources "for marine habitat research and restoration" in the respective counties from which the funds were collected.

#### General Considerations

Two major problems exist with regard to the funding of environmental and natural resource programs as related to Tampa Bay. They include:

- Funding levels for needed or proposed research, as well as for statutorily mandated management and regulatory programs, have either been totally absent, inadequate or unstable, and dependent upon non-recurring sources; and
- Studies and programs that are implemented locally are usually done so with little or no coordination with other similar or related efforts. As a result, research and planning efforts are often duplicative while permitting and regulatory functions are overlapping and inefficient.

In order to provide a unified comprehensive management framework for Tampa Bay, a long-term stable source of funds, administered in a coordinated and efficient manner, will be essential.

#### Relevant Laws and Statutes:

Not applicable.

#### Bay Management Objectives:

1. Provide a stable, long-term source of funds for the effective implementation of studies and regulatory programs essential to the comprehensive management of Tampa Bay.
2. Provide for a coordinated, efficient and productive use of all funds available for the implementation of studies and regulatory programs relevant to the comprehensive management of Tampa Bay.

Bay Management Recommendations:

1. Trust funds that are credited by monies recovered by the state in legal actions, judgements, penalties or other charges for polluting the air, water or soil should be administered in such a manner so to return funds to the area of the infraction in proportion to the amount generated from that area. This recommendation specifically includes the Pollution Recovery Fund, Water Resources Restoration and Preservation Trust Fund, Water Quality Assurance Trust Fund and the Florida Coastal Protection Trust Fund.
2. A marine recreational fishing license fee should be required of all saltwater sport fishermen statewide. If renewed on an annual basis, the license fees would generate a large source (\$40-\$60 million) of recurring funds that could be used to fund many major marine fisheries management and pollution abatements programs on a statewide basis, and could be used to provide the required 25% state match for federal Wallop-Breaux funds. In addition, by licensing marine anglers, the state would have a reliable statistical base for both recreation and catch-per-unit effort (CPE) analysis.

Work Element 1-1: The Legislature should adopt legislation requiring all saltwater sport anglers to annually purchase a state marine recreational fishing license. Recommended elements of this legislation include the following:

- Cost of the license should be \$5 for residents and \$10 for non-residents.
- The distribution points for the sale of licenses should be widespread and easily accessible (perhaps sold through fishing tackle stores).
- All funds generated from the license fees should be specifically earmarked for exclusive use in state coastal zone management, marine fisheries research and management, and coastal and estuarine habitat restoration/creation programs. Funds generated from this license fee should not be added to the general revenue.
- Monies in the fund should be returned to specific regions for local research, management and restoration efforts in equal proportion to the amount of funds generated from that particular region.
- The Department of Natural Resources should administer the fund.

3. Section 211.3103, Florida Statutes should be amended to distribute one (1) percent of the annual revenue from the phosphate severance tax for each of the next five (5) years to an Agency on Bay Management organized under the Tampa Bay Regional Planning Council (see Long-Term Management Recommendation). It is proposed that the distribution to the General Revenue Fund be reduced from 30 percent to 29 percent over

that same five year time period. This would generate approximately \$1 million per year to fund the specific programs and studies recommended herein.

Work Element 1-2: The Legislature should effect this amendment through appropriate legislation.

4. The general level of funding and staffing for statewide environmental and natural resource programs should be reviewed and increased wherever necessary and feasible.

Work Element 1-3: The Legislature should designate a special committee to investigate the existing funding and staffing levels in the Department of Environmental Regulation and Department of Natural Resources. Funding allocations from all available sources should be considered wherever statutory requirements or program objectives are not being adequately met. Funding and staffing increases should be given highest priority in districts or regions with the highest growth rates.

5. The state should establish a policy by which no local government can be mandated to perform actions or administer programs without being provided with adequate financial assistance or guidance.
6. A local oversight entity should be established to coordinate all proposed or ongoing research efforts and agency programs to avoid duplicative and inefficient use of funds for the management of Tampa Bay.

Work Element 1-4: The Tampa Bay Regional Planning Council should establish a permanent review and advisory committee to seek new sources of funds which could be disbursed to various state regional and local agencies for the implementation of studies and programs essential to comprehensive management of Tampa Bay. In addition, this committee could monitor all proposed or ongoing research efforts and agency programs and coordinate the various activities leading to a more efficient use of available funds.

#### Long-term Management Alternatives:

Status Quo: Under the existing management framework research efforts in Tampa Bay are often unguided and duplicative, and agency programs are severely underfunded and understaffed. An adequate source of long-term funds for environmental and natural resource programs is needed both on a local and statewide basis.

Bay Advisory Committee: A funded and staffed bay advisory committee within the Tampa Bay Regional Planning Council could perform all of the functions described in recommendation 5 above.

Bay Management Authority: Besides providing the same functions as a bay advisory committee a mandated bay management authority could potentially raise funds through an ad-valorum taxing authority. Such an authority could also act as a funding and research clearinghouse for all proposed studies and projects on Tampa Bay.

## Issue #2 Loss of Seagrass in Tampa Bay

Issue Analysis: Seagrass meadows are a vitally important component of the bay's ecosystem which provide food and shelter for a number of fish and shellfish species important in local commercial and recreational fisheries. Historical cover (circa 1876) of seagrasses in the bay has been estimated at 76,495 acres or about 30% of the bay bottom (Lewis et. al. 1984). Extensive physical alteration of the shallow estuarine shelf (less than 6' deep) of the bay for port and residential areas by dredging and filling has eliminated large areas of seagrasses through burial, or excavation of shallow areas to depths too great to support seagrasses (greater than 6') (Taylor and Saloman 1968; Lewis 1977).

General agreement exists that historical dredge and fill activity, and thermal discharges from power plants, contributed heavily to the early losses of seagrasses. However, the role of chemical alteration of bay waters in these losses is currently a point of strong disagreement. Present seagrass cover is approximately 14,202 acres (figure 2.1) or only about 19% of the 1876 cover and 25% of the 1940 cover.

The recently released Florida Department of Environmental Regulation wasteload allocation study includes seagrass maps of the bay for the period 1940-1983 (McClelland, 1984). The study has concluded that while large scale losses of seagrasses have occurred in the upper half of the bay, during the period 1973-1983, a 14% increase (1,048 acres) in seagrass cover occurred in the lower half of the bay. This is in direct contradiction to reports of other scientists who have reported a continued general decline in seagrass baywide (Lewis et al. 1984). In addition, the study concluded that "... none of the grassbeds considered in Tampa Bay appear to be limited in growth by light when one uses the euphotic depth as the reference." Euphotic depths were calculated assuming that seagrasses can survive to a depth where 1% of the surface irradiance (SI) is present. These calculated depths correspond to 12.4 to 20.8 feet deep. These are depths where seagrasses do not presently exist and probably have never existed in the bay.

The problem appears to be that existing scientific literature indicates that seagrasses really need 10-50% SI to survive (Williams and McRoy, 1982; Rice et al, 1983) and these intensities of light only occur in shallow (less than 6') water in the bay. Not surprisingly, historical aerial photographs show that seagrass meadows in undredged portions of the bay did extend into depths greater than six feet but have retreated into shallower depths. This is felt by many local scientists to support the hypothesis that seagrass beds are limited in growth by light and that some substances in the water column have increased in recent years and are responsible for reducing the amount of light that historically supported seagrasses in deeper water.

A number of substances including suspended sediment, detritus, tannins, and chlorophyll pigments in phytoplankton can reduce downwelling light. Downwelling light is sunlight that passes through the water column and is absorbed by plants or reflected by unvegetated bay bottoms. In spite of several decades of water quality data collection for the bay, complete analyses have not been done to attempt to document long-term trends in all these factors as they relate to downwelling light.

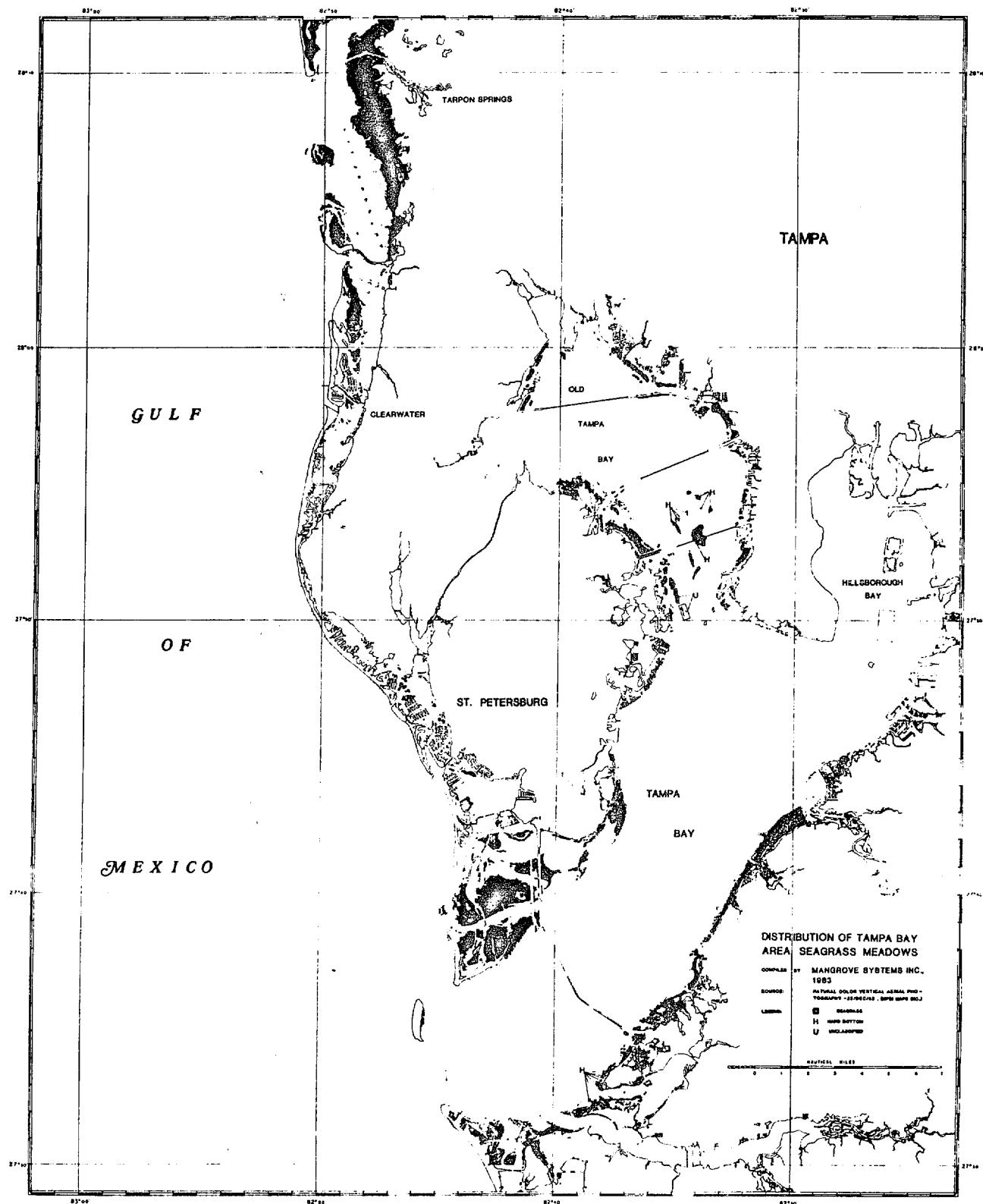


Figure 2.1. Distribution of Tampa Bay area seagrass meadows (Lewis, 1983)

Such analyses plus at least two years of field measurements of downwelling light, water quality, and seagrass productivity are needed to begin to answer the question of the role of light attenuation in loss of the bay's seagrasses.

In addition to potential problems of downwelling light attenuation, it has been demonstrated that excessive growth of microalgae in the water column due to excess nutrients can significantly reduce light reaching seagrass leaves. Whether this is a problem in Tampa Bay is unknown. It has also been hypothesized that the blooms of macroalgae, which are common in the bay, can compete with seagrasses for available light by rapidly growing and covering existing seagrasses (Guist and Humm 1976). Again, the possible significance of this is unstudied.

Finally, with seagrass cover much reduced, pressure from both recreational and commercial fishing vessels seeking fish, shrimp, and crabs in the grassbeds has produced extensive areas of propeller damage. In healthy grassbeds that cover large areas, such damage can be healed rather quickly and probably is of minor concern. But in an area like Tampa Bay where 81% of the seagrass cover is gone and many of the existing beds are apparently stressed, such damage may be devastating.

#### Relevant Laws and Statutes:

National Environmental Policy Act  
Federal Water Pollution Control Act, PL92-500 as amended  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 258, Florida Statutes (Aquatic Preserves)

#### Bay Management Objectives:

1. Prevent further losses of seagrass meadows in Tampa Bay and restore areas of seagrass wherever feasible;
2. Increase fishery habitat and thus harvestable resources for both recreational and commercial fishermen;
3. Increase feeding habitat for wildlife dependent upon seagrass meadows (e.g. sea turtles, manatees, wading and sea birds).

#### Bay Management Recommendations:

1. A comprehensive program of monitoring, research and regulation should be implemented to better understand current stresses on the existing seagrass meadow resource, and to ensure the continued protection of this resource and its restoration back to some feasible, larger acreage than presently exists.

##### A. Monitoring Requirements

###### Work Element 2-1: Historical Trends

As indicated previously, considerable controversy exists as to whether certain areas of the bay have shown historical declines

followed by recent increases in seagrass cover, or just general declines. The U.S. Fish and Wildlife Service in conjunction with the Florida Department of Natural Resources is completing a 1950-1983 trend analysis with mapping at the beginning and end of that period. An appropriate 1:24,000 (1"=2,000') scale is being used instead of the 1:80,000 scale used by FDER in the Waste Load Allocation Study. Maps at the former scale need to be prepared for the 1960 and 1970 periods. Appropriate analyses would then identify areas of persistent (presumably healthy) and declining or non-existent (presumably unhealthy) seagrass meadows.

Work Element 2-2: Current Trends

As a follow-up to Work Element 2-1, a program of photographing and mapping seagrass cover at two-year intervals beginning in 1985 (following two years after the USFWS ca. 1983 maps) should be instituted.

It is essential to monitor the health of seagrasses as indicated by an increase or decrease in areal cover. Natural increases in cover may indicate improved water quality conditions, appropriate for active restoration efforts. Natural decreases in cover could indicate areas not appropriate for restoration efforts.

**B. Research Requirements**

Work Element 2-3: Light Requirements and Water Quality

It is important to establish 1) the existing light climate in Tampa bay; 2) the amounts of light necessary to support healthy seagrass meadows; and 3) the substances in the water column that reduce downwelling irradiance and their individual contribution to light attenuation.

A recent unfunded proposal to Florida Sea Grant from Mangrove Systems, Inc., Mote Marine Laboratory, The Florida Department of Natural Resources, and the Hillsborough Environmental Protection Commission proposed a two-year sampling program at six stations to attempt to answer these questions. A program similar to that proposed will need to be instituted in conjunction with Work Elements 2-1 and 2-2 to help clarify the current status and expected trends in seagrass meadow coverage in the bay.

Work Element 2-4: Geology and Hydrology of Offshore Bars Associated with Seagrass Meadows

A characteristic feature of healthy, persistent seagrass meadows in Tampa Bay (as well as Charlotte Harbor) is the presence of a shallow, often unvegetated, offshore sand bar parallel or nearly so to the shoreline (Lewis et al. 1984). The role of such bars in protecting seagrass meadows from wave action and the possible need to restore them in conjunction with seagrass planting needs careful research.

Work Element 2-5: Habitat Importance of Seagrass Meadows

Much of the values attributed to seagrass meadows in Tampa Bay are based upon sampling in areas far removed from the bay (e.g. Biscayne Bay, Indian River) and are in fact quite different in aspects such as tidal regimes, salinity, and general faunal communities. A comprehensive biological sampling program in conjunction with the proposed synoptic fish stock survey in issue #14 is needed to qualify and quantify the importance of seagrass meadows to fish and invertebrate populations in Tampa Bay.

Work Element 2-6: Restoration Techniques

In spite of several decades of small-scale test plantings to restore seagrasses in the bay, no comprehensive testing utilizing the best available technology over a large area has been done. The Florida Department of Natural Resources is proposing such a test at Lassing Park in St. Petersburg utilizing monies collected under Chap. 83-504 (Pinellas Net License Fee). Support is needed for this effort.

Work Element 2-7: Propeller and Trawl Damage Survey and Recovery Rate Monitoring

Aerial surveys of the bay have revealed some concentrated areas of propeller damage around Mullet Key and Cockroach Bay (Lewis, personal observations, 1983-1984). Trawl damage from shallow trawling for bait shrimp has been hypothesized but is essentially undocumented. If significant damage to seagrass meadows is occurring and recovery rates can be established, then periodic closure of certain areas to boat traffic may be necessary in conjunction with items mentioned under Work Element 2-8 in order to protect existing seagrasses. A research program carried out in conjunction with the Florida Department of Natural Resources Marine Research Laboratory is needed.

C. Regulation

Work Element 2-8: Increased Shallow Boat Channel Marking, Boat Ramp Signage and Boat Use Closure Areas

Based upon the results of all or part of Work Elements 2-1 through 2-7, it is expected that increased regulation of boating activities (both commercial and recreational) might be necessary. As a minimum, it is expected that increased use of small boat channel markers to guide inexperienced boaters away from vegetated shoals and boat ramp signs to increase boater awareness of the potential damage they may cause would be recommended. Such boat ramp signs are already in use in Sarasota County.

Work Element 2-9: Water Quality Criteria and Regulation to Protect Seagrass Meadows

In conjunction with work elements under issues #13 (Wasteload Allocation) and #20 (Load Relief for Major Sewage Treatment Plants), special target criteria to protect and restore seagrass meadows may be required. The draft wasteload allocation study unfortunately did not address such target criteria for reasons mentioned before.

Long-Term Management Strategies:

Status Quo: Because of the complexity and cost of tasks related to this issue, it is unlikely that any significant progress in resolving these issues would be made under the existing management framework. For example, in spite of significant "advisory" help to the Florida Department of Environmental Regulation, the wasteload allocation study did not adequately accomplish Work Element 2-1 of this proposal, as they indicated they would. The work will thus have to be repeated and consequently paid for twice with tax monies. Much of the proposed work could be performed by the Department of Natural Resources and/or the Department of Environmental Regulation but adequate funding and a coordinated, comprehensive approach to this issue would be major obstacles to implementation.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide valuable technical support as well as coordinate interagency activities leading to the completion of the proposed work plan.

Bay Management Authority: A mandated bay management authority could perform all or part of the proposed work program through the use of allocated state funds, or through the acquisition of federal grants. A mandated authority could assume both management and coordinating roles in the implementation of this and other similar comprehensive research programs in Tampa Bay, working closely with other appropriate state agencies.

Table 2.3 Draft cost estimates for a comprehensive seagrass research monitoring, restoration and protection program for Tampa Bay.

Total cost to implement all of thee tasks over a five year period is estimated at \$825,000. Funds for these studies are proposed from the same sources listed under Issues #1 (Funding) and #14 (Fisheries). Acquisition of federal Coastal Zone Management and Sea Grant funds could reduce the state/local cost of individual work elements by up to 50%.

<u>WORK ELEMENT</u>	<u>TIME PERIOD</u>	<u>ESTIMATED COST</u>
2-1 Historical Trends	6 months	\$ 5,000.00
2-2 Current Trends	12 months each (1985, 1987, 1989)	30,000.00
2-3 Light Requirements	24 months	200,000.00
2-4 Offshore Bars	12 months	15,000.00
2-5 Habitat Importance (in conjunction with synoptic survey of fishery stocks)	18 months	75,000.00
2-6 Restoration Techniques	30 months	150,000.00
2-7 Propeller & Trawl Damage	18 months	200,000.00
2-8 Boat Regulation	12 months	25,000.00
2-9 Water Quality Regulation	12 months	75,000.00
 Total		\$825,000.00

### Issue #3 Non-Point Source Discharges Entering Tampa Bay

Issue Analysis: Urban and agricultural stormwater runoff have been identified as the major sources of water pollution in Tampa Bay, with the former apparently predominating (Tampa Bay Regional Planning Council, 1978). Urban rainfall picks up pollutants from the air, dusty roofs, littered and dirty streets, vehicle related substances, corrosion products, hazardous chemical spills, fertilizers, herbicides and insecticides, and distributes them to receiving waters with little or no treatment. Pollutants carried by stormwater runoff to the bay may be characterized as nutrients, organic compounds (including petroleum hydrocarbons and pesticides), suspended solids, bacterial pathogens and heavy metals.

Nutrients present in urban stormwater runoff, particularly nitrogen and phosphorus, cause significant water quality deterioration in receiving water bodies. Estuaries with long detention times (slow flushing rates) like Tampa Bay tend to concentrate nutrients and other pollutants in both the water column and in the bottom sediments. These pollutants can be resuspended and become available to plant growth when anoxic conditions and favorable chemical environments exist. Parts of upper Tampa Bay have been shown to have extremely high concentrations of nutrients bound within the bottom sediments which represent a long term reservoir of available pollutants (McClelland, 1984). Nutrient loads from urban stormwater runoff are generally less than those found in secondarily treated effluents, however, runoff from agricultural areas (especially livestock operations) can contain extremely high concentrations of nitrogen and phosphorous (Tampa Bay Regional Planning Council, 1978).

Organic compounds in urban stormwater include oxygen consuming material which can be represented by biological oxygen demand (BOD) loads, and non-biodegradable organics such as petroleum hydrocarbons, herbicides and pesticides. BOD loads lower dissolved oxygen (DO) levels in receiving water bodies which may be lethal to sensitive species of fish and bottom dwelling organisms. Large portions of Tampa Bay have been shown to undergo severe seasonal anoxia as a result of excessive BOD loads during the summer rainy season (Santos and Simon, 1980). Although significantly higher concentrations have been reported (Huber et al, 1977), BOD concentrations in urban stormwater are generally similar to those found in secondarily treated effluent (U.S. Environmental Protection Agency, 1983). However, it has been estimated that 40 to 80 percent of the total organic loading entering receiving waters from adjacent urban areas is caused by stormwater runoff (Field and Turkeltaub, 1980). Greases and oils from vehicular deposits on roadways constitute the greatest source of organic materials in urban stormwater (Wanielista, 1979).

Other constituents in stormwater runoff generally lead to more localized water quality problems. For example, suspended solids such as sediments from land surface erosion can lead to localized reductions in water clarity. However, if suspended solid loadings are persistent over the same area, bay bottom communities such as seagrass beds may be severely impacted by siltation and reduced ambient light levels. Bacterial pathogens, resulting from septic runoff and pet droppings, may lead to localized human health hazards, both in waters utilized for body contact, and in contamination of shellfish harvesting areas. The fate and effects of pesticides and heavy metals on aquatic organisms, however, remain to be

demonstrated. Recent studies have indicated mixed results with regard to the toxicity of these constituents as they occur in local urban stormwater (Rice, 1984).

Due to the highly urbanized character of the study area, and the slow natural flushing rates in portions of the estuary, non-point source pollution presents a particularly intractable problem for Tampa Bay. This problem stems from the fact that, until recently, urban runoff was not regarded as a significant contributor to the impairment or degradation of the quality of receiving waters. Additionally, floodplain management and the control of urban drainage have traditionally been local matters focusing almost exclusively on the prevention of local flooding problems. Although recent implementation of the state stormwater rule, Chapter 17-25 of the Florida Administrative Code, has generally curbed additional non-point source pollutant loadings to waters of the state, further efforts should be made, both at the state and local levels, to better resolve this chronic problem, both retroactively and in the future.

Relevant Laws and Statutes:

National Environmental Policy Act  
Federal Water Pollution Control Act, PL92-500 as amended  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 17-25, Florida Administrative Code

Bay Management Objectives:

1. Minimize the quantities of non-point source (stormwater runoff) pollutants entering Tampa Bay.
2. For all new upland development or redevelopment within the Tampa Bay watershed, runoff quantity should not exceed that of pre-development conditions, and runoff quality should equal or exceed that of pre-development runoff from the same site.
3. Non-point source loadings of nutrients and organics should be reduced to attain year round dissolved oxygen concentrations in Tampa Bay suitable for supporting a balanced and diverse ecosystem.

Bay Management Recommendations:

1. Chapter 17-25, Florida Administrative Code, should be amended to require the construction of stormwater discharge facilities on all parcels that are subject to redevelopment. As presently enforced, the state stormwater rule only requires the construction of stormwater management systems exhibiting specified design and performance standards on those parcels that were not developed prior to February 1, 1982, or on those parcels that will be redeveloped in such a manner so as to change points of discharge or increase quantities of runoff and pollution loadings. The effect of this recommendation would be to retrofit stormwater management systems in previously developed urban areas over time.

Work Element 3-1: The Legislature should effect the above stated amendment through appropriate legislation.

2. In the absence of implementation of recommendation 1 above, local governments should be encouraged to adopt ordinances accomplishing the same objective.

Work Element 3-2: The Tampa Bay Regional Planning Council should develop a model ordinance to this effect and encourage local government adoption through its Chapter 163, F.S., responsibilities.

3. Since no significant boundary conditions separate designated use areas in Tampa Bay, Chapter 17-25, F.A.C., should be amended to require of those stormwater management facilities which discharge to the waters of Tampa Bay, including Class all III waters, a provision for an additional level of treatment equal to fifty percent of the normal treatment criteria. This is currently required only of those facilities discharging to Outstanding Florida Waters, and Class I and II waters.

Work Element 3-3: The Department of Environmental Regulation should implement the above stated recommendation through proper hearing procedures with the Environmental Regulatory Commission.

4. The use of natural wetland systems for the treatment and storage of stormwater, pursuant to Chapter 17-25.042, F.A.C., should be encouraged. Natural treatment of stormwater is not only more cost effective but it also minimizes maintenance requirements and may provide such benefits as groundwater recharge and replenishment of dewatered wetland habitat.
5. Appropriate state and county agencies, and municipalities located adjacent to Tampa Bay, should implement fully and enforce existing urban stormwater runoff control programs.

Work Element 3-4: The Legislature should allocate additional funds to Southwest Florida Water Management District to allow for stricter enforcement of Chapter 17-25, F.A.C., in bay area municipalities where compliance is poor.

6. Local governments should comply with the EPA mandated state NPDES permitting program for stormwater discharge facilities pursuant to 40 CFR Part 122. Local compliance would provide for a detailed characterization of non-point source pollution problems, as well as verification of treatment compliance in the Tampa Bay watershed.

Work Element 3-5: The Department of Environmental Regulation should provide local financial assistance for this program utilizing federal 205(j) funds.

7. Local governments should be encouraged to adopt and implement a stormwater management ordinance including the provisions of Appendix 11B - Areawide Water Quality Management Plan (208 Plan). In addition, local governments should be encouraged to adopt a policy of acquisition, through purchase, rental or commercial service, subject to budget constraints, of regenerative air (vacuum type) street sweepers prior to investigating or using other less advanced technologies (e.g. brush type) if a street sweeping program is introduced.

demonstrated. Recent studies have indicated mixed results with regard to the toxicity of these constituents as they occur in local urban stormwater (Rice, 1984).

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8. Local governments adjacent to Tampa Bay should consider the concept of point/non-point source trading. The program would work by granting wastewater utilities effluent discharge credits for clearing up runoff pollution.
9. The Department of Environmental Regulation should perform a study to identify the quality, quantity and non-point sources of toxic contaminants entering the bay, and to evaluate their acute and chronic effects on the living resources of the bay (see issue #5 for further breakdown).
10. The design and construction of regional stormwater management systems pursuant to Chapter 17-25.040(6), F.A.C. should be encouraged whenever feasible. Regional stormwater management systems are those discharge facilities which are designed and constructed to accept stormwater from multiple parcels within the same drainage area. These facilities would consolidate and improve the level of stormwater treatment for many singular outfalls prior to discharge to Tampa Bay. The creation of tidal marshes at the mouths of drainage channels, canals and tributaries should also be encouraged as a form of regional stormwater treatment.

Work Element 3-6: The Tampa Bay Regional Planning Council in cooperation with the Southwest Florida Water Management District, should sponsor a series of regional workshops to introduce and explore the feasibility of regional stormwater management systems. Environmental, engineering and planning representatives from all local governments within the Tampa Bay watershed should be included to discuss the feasibility of interlocal agreements and taxing strategies.

11. The Department of Environmental Regulation should sponsor a statewide multi-year public awareness campaign regarding the causes of water pollution, with special emphasis on non-point source contributions and citizen action. The campaign should include public workshops, brochures, television and radio announcements, and newspaper spreads.

Work Element 3-7: The Department of Environmental Regulation should utilize federal 205(j) funds for this purpose. The Legislature should allocate additional funds to the DER as needed. The campaign should be locally coordinated with the Tampa Bay Regional Planning Council and the Marine Information Network.

Estimated Manpower and Cost

<u>Year</u>	<u>1</u>	<u>2</u>
<b>Manpower (man years)</b>		
- Staff (DER)	4	4
- Consultant	-	-
Total	4	4
<b>Source of Funds</b>		
- Federal "205 J"	100,000	100,000
- State (allocated)	100,000	100,000
- Local	-	-
Total	200,000	200,000

Long-Term Management Alternatives:

Status Quo: The problem of non-point source pollution in the Tampa Bay area can only be resolved through complimentary and coordinated state, regional and local programs and efforts. Under the existing regulatory and management framework it is unlikely that adequate funding and attention will be focused on this issue.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide a valuable coordinative role, especially with regard to the development and implementation of local stormwater management ordinances, as well as the design and construction of regional stormwater discharge facilities.

Bay Management Authority: Besides providing the same functions as a bay advisory committee, a mandated bay management authority could potentially assume monitoring and permitting responsibilities for stormwater discharge facilities in the Tampa Bay watershed.

#### Issue #4 Spoil Disposal and Management of Spoil Islands

Issue Analysis: Dredging is a critical component of the port operations which provide a necessary transportation link on which depend major portions of the region's economy. The shallow natural depth of Tampa Bay has required the dredging of well in excess of one hundred million cubic yards of material to create and maintain the large port infrastructure in place today. Historical disposal practices have resulted in large-scale changes in shoreline and benthic topography, and are commonly viewed as major contributors to the loss of natural habitats and changes in water quality which the bay has experienced.

The U.S. Geological Survey has determined that the surface area of the entire Tampa Bay system has been reduced by dredging and filling by 13 square miles since 1880 (Goodwin, 1984). Stated another way, if all port-related dredging and filling since 1880 were concentrated in one place all of MacDill Air Force Base, the Interbay Peninsula south of Gandy Boulevard, and surrounding waters shallower than six feet in depth would entirely disappear.

About 40% of the changes are attributable to causeways and residential or commercial construction. The balance (60%) is due to maritime improvements such as channels, spoils, and port shoreline changes. Except for accesses to Port Manatee and a power plant in Pinellas County, all major maritime alterations to Tampa Bay have occurred within Hillsborough County.

It is, however, wrong to conclude that these immense changes are things of the past which could not be repeated under modern environmental protection. Fully one third of all maritime alterations, more than six square miles of the bay, have been dredged or filled since 1972 because of the Tampa Harbor Deepening Project conducted by the Corps of Engineers under sponsorship of the Tampa Port Authority.

Anticipated future port improvement projects, as well as necessary maintenance of existing channels, will require disposal of additional tens of millions of cubic yards of material. Further, ever-increasing problems with shoaling of residential canals and recreational waterways is creating additional dredged material disposal needs. Locating, designing, and financing disposal sites for this material represents a major challenge for future bay management.

Historically, port maintenance dredging and disposal problems in Tampa Bay have been addressed on a piecemeal basis. However, changing socio-economic conditions, environmental constraints, and port operational considerations now dictate that maintenance dredging and disposal activities be treated not only with a greater degree of importance, but also with a broader, long-term perspective. The future viability of ports in Tampa Bay will depend, in part, upon their ability to develop long-term solutions to problems associated with maintenance dredging and disposal operations.

### Dredged Material Disposal Requirements

The volume of future construction dredging will depend on many variables which cannot be accurately predicted at the present time. These include federal cost-sharing policies, local economic conditions, cargo movement trends, disposal options available, and the conversion of traditional port lands to other uses. For these same reasons the timing of future construction dredging operations is equally unpredictable. However, there are several potential projects which might reasonably be expected to occur. These include the deepening of the Port Sutton Channel (630,000 cubic yards), deepening of at least portions of both Cut D/Sparkman Channel and East Bay (volume unknown), and deepening of existing and new berths to the depths of the 43-foot channel (volume unknown but >1,000,000 cubic yards). Other large projects such as enlarging turning basins, widening channels, creating safety anchorages, etc. may become necessary and would produce significant additional volumes. Additional but unknown volumes of construction material will be produced by projects at Port Manatee.

Future maintenance dredging volumes are somewhat more predictable, but involve similar volumes. The Corps of Engineers has projected that approximately 1,000,000 cubic yards of material per year will have to be removed from the federal project from the Gulf to Ybor Channel and the channel to Port Tampa. Approximately 2,000,000 cubic yards of annual maintenance is projected for the deepened Alafia, Big Bend, and Port Sutton Channels. Maintenance of berths throughout the port is expected to produce about 100,000 yards of material annually. Additional volumes can be expected from the maintenance of East Bay (volume not determined), Port Manatee, Bayboro Harbor, and other sources. The dredging of any single portion of the main channels is expected to occur about every five years. Dredging of berths goes on almost continuously.

### Nature of the Dredged Material

Construction dredging in Tampa Bay generally can be expected to produce a mixture of sand and shell (with a small amount of overlying silt) from strata near the surface and a mixture of limestone, very cohesive clays, and inorganic silts from deeper strata. Due to the very uneven nature of the surface of the underlying strata the nature of the material produced changes dramatically as one moves along any single channel. Due to their geological origins construction materials do not contain anthropogenic compounds and meet all federal disposal criteria.

Maintenance dredging generally produces a mixture of silty sands, shell, clay nodules, and a dark silt derived largely from decomposed organic detritus. While this material is often relatively fine and often contains significant levels of organic matter, it is relatively cohesive and extensive testing by the Florida Department of Environmental Regulation has shown that it does not contain, nor produce in elutriate tests, significant amounts of heavy metals or toxic organic compounds. In its normal reduced condition this material tightly binds most heavy metals and organic compounds. The single constituent which is released in significant amounts in elutriate tests is ammonia, which is common for fine estuarine sediments.

### Methods of Dredging

Three methods of dredging have historically been used in the bay: hopper dredges, hydraulic pipeline dredges, and mechanical dredges such as clam-buckets, draglines, and dipper dredges. Each has its own advantages, problems, and limitations with regard to material disposal.

Hopper dredges have historically been used for a major portion of channel maintenance. They have the advantage of being able to transport material the furthest distance, but have generally been limited to projects utilizing ocean disposal and bottom dumping. While some hopper dredges have been modified to permit pumping of material from their holds, the use of hopper dredges in the bay has been recently precluded by the insistence of the Department of Environmental Regulation that overflowing to reach an economical load be avoided.

Hydraulic pipeline dredges have been used for most construction dredging and maintenance of channels in the upper bay. Due to the requirements for booster pumps and the size of the pipes involved, disposal must be within about five miles of the dredge. This method has the disadvantage of mixing large amounts of water with the dredged material, resulting in a "bulking" of the material to 1.5 to 2 times its original volume. If used in conjunction with confined disposal a large amount of additional volume is needed for water detention.

Mechanical excavation is used for almost all berth maintenance, shoreside construction dredging, and in limited cases for channel deepening or maintenance. It has the advantage of minimizing the final volume of the dredged material. Material is often placed initially onto barges, so transportation over greater distances than pipeline dredges is possible. Because mixing with water is minimized, the initial release of chemical constituents is also minimized. When used in conjunction with ocean disposal unloading of material is accomplished by bottom dump. The disadvantages of this method include the limited locations where material can be offloaded, the problem of transferring the material into confined disposal areas, and the high cost of the repeated rehandling often needed to move the material to its final resting place.

### Disposal Options

Historical dredge material disposal strategies fall into five general areas: ocean dumping, estuarine open-water disposal, estuarine habitat-creation disposal, estuarine confined disposal, and upland confined disposal.

Ocean dumping has been used for many years, particularly in conjunction with hopper dredges, with dump sites just beyond the end of the ship channel in the Gulf. As a result of the requirements of the Marine Protection, Research, and Sanctuaries Act, and past litigation, the only current dump site is located 18 miles offshore of Egmont Key in the Gulf. Designation of this site is only valid for two more years and is restricted to construction material from the completion of the Harbor Deepening project. While there is no ocean disposal area presently available for

maintenance material, it is clear that any truly long-term plan for the maintenance of navigation channels in Tampa Bay must rely on ocean disposal as the primary disposal option.

Open-water disposal within the bay has been the most common historical method of disposal. Almost all past channel deepening projects used this option and it was used for major portions of the current deepening in the lower reaches of the channel. This method has not been used for disposal of maintenance material in many years due to concerns regarding water quality, although it has been used historically.

Open-water disposal in the bay for habitat creation has been utilized during the present harbor deepening, particularly in Hillsborough Bay. Material has been used to create and expand islands designated as bird breeding areas. Open-water disposal for marsh creation has been proposed as part of the Alafia/Big Bend project and has received general acceptance. An additional restoration-related disposal option involving the partial refilling of deauthorized Garrison Channel and reauthorized Seddon Channel which are no longer deep-draft commercial channels has also been suggested.

Confined disposal within the bay has been made possible by the creation of two large islands in Hillsborough Bay. Constructed through open-water disposal of deepening material, the two islands total about 1100 acres. The islands contain return weirs and have been utilized once for maintenance disposal. They have a combined potential capacity of 13,000,000 yards, a figure which can be approximately doubled by raising the dikes to what are the presently-assumed construction limits. Further use of these areas may be possible if additional capacity could be created by excavating dewatered material from within the islands for disposal in the Gulf.

Only a limited number of confined upland disposal sites for hydraulic dredging currently exist around the bay. These include a 40-acre site at Port Manatee, an additional 200-acre site at Port Manatee which may be used once more, a 50-acre site north of Apollo Beach belonging to Tampa Electric Company, and a 50-acre site north of the Alafia River Channel. Tampa Port Authority property on Hookers Point has long been used as an upland disposal site for both hydraulically- and the mechanically-dredged material, but that area is now filled and is being reclaimed for port development. Productive use of dewatered material from within these areas has not been found possible due to its fine organic nature.

#### Capacity Shortfalls

The Corps of Engineers has estimated that the existing diked islands 2D and 3D will provide sufficient capacity for the maintenance of the main ship channel northeast of the Gadsden Point widener and the inner harbor branch channels for 25-35 years. This estimate assumes that the material from the maintenance of the lower reaches of the main channel and the Port Tampa channel will be placed in an ocean dump site. Disposal of maintenance material from other channels or berths, or from deepening projects, into the islands will reduce the useful lifetime of the islands unless the dikes are raised, an improvement which will eventually be needed in any case to meet the 50-year planning requirement which the Corps places upon federally authorized projects.

### Habitat

Historic disposal of dredged material has directly resulted in the loss of hundreds of acres of intertidal and shallow bay-bottom habitat around Tampa Bay. A large portion of this has resulted from the dredging of near-shore channels, berths, and turning basins and the use of dredged material to create shoreside filled land for residential developments, power generating facilities, and lands for industrial and port development. The majority of these losses occurred prior to 1970 and the passage of current environmental legislation.

Significant additional areas of deeper water (>6 feet) habitat have been lost through the creation of channels and spoil islands. However, in the creation of spoil islands additional areas of shallows have been created.

Some island shorelines have been utilized to create, or have naturally generated, new intertidal marshes. Further use of appropriate dredged material to create additional marshes has been recommended and sites offshore of major stormwater discharges have been proposed.

An additional very important habitat aspect of dredged material disposal has been the creation of breeding habitat for colonial waterfowl. Islands created in the bay through dredging have become important rookeries. Disposal island 2D presently supports one of the largest gull colonies in the state and the islands south of the Alafia River Channel constitute the largest mixed-species rookery in the state.

Two significant problems are associated with this avian use of spoil areas. Many of the most stressed species which use these areas must have relatively barren areas to breed successfully. Over time the islands are overrun by a variety of shrubs, a process which severely limits their value. Prevention of this process would require intensive human management. The second problem is the potential interruption of breeding activity by dredging operations. While the timing of construction dredging to avoid breeding periods may be possible, the need to maintain channels, and more particularly berths, may require dredging at any time of the year. This problem might be reduced if funding and regulatory restrictions were changed to permit advanced maintenance (i.e. overdeepening).

### Social Impacts

Considerable conflict has recently arisen regarding the social impacts of ocean disposal of dredged material, particularly with regard to the possible displacement of fishing and SCUBA diving activities from the vicinity of ocean disposal sites. This conflict resulted in the relocation of the disposal site for the completion of the current harbor deepening and will be the major consideration in the designation of an ocean disposal site for future maintenance dredging.

Open-water disposal in the bay has been perceived to have had negative social impacts in terms of the appearance of bay waters. Some concern regarding the visual and navigational impacts of the new spoil islands and submerged disposal areas have also been expressed. However, due to their physical separation from residential areas few long-term social problems with in-bay disposal areas have been experienced.

The existing upland disposal sites listed above have all been used before and have very limited additional capacity in terms of the expected dredging volumes described above. It is clear that large additional areas of either confined in-bay or upland sites will be needed to meet the long-range needs of the region if the present bias toward confined disposal is continued.

The problem of disposal of berth maintenance material is even more severe in the short range. With the completion of the Hookers Point fill there is currently no economically reasonable site for disposal of this material. The Tampa Port Authority is attempting to develop a facility for transferring this material into one of the disposal islands utilizing partial funding from the state, but this facility is not yet assured and may not be available for some time.

#### Site Protection

This issue is primarily related to the two existing disposal islands in Hillsborough Bay and the spoil island adjacent to Port Manatee. Both of the large islands have experienced erosion since their construction, but there is disagreement between the Corps, the Tampa Port Authority, and local environmentalists over the severity of the problem. While there is agreement that there is no immediate danger of dike failure, questions have been raised regarding the impact of shoreline erosion on water quality (see discussion below), the long-term integrity of the dikes, and the loss of potential habitat. Placement of rip-rap revetments on high-energy shorelines, construction of marshes along protected shorelines, and regrading and planting of unvegetated dikes slopes have been recommended by environmental interests. The island near Port Manatee is known to be migrating shoreward with eroded material covering seagrasses in the vicinity. Some form of protection for this island has also been recommended by local environmental interests.

#### Water Quality

The primary historical water quality concerns associated with dredging have been the immediate effects of turbidity and the release of ammonia, other nutrients and heavy metals when "polluted" sediments are disturbed. Research over the past five years by the Corps of Engineers and the Department of Environmental Regulation have shown that the effects of short-term increases in turbidity are very limited and that sediments in Tampa Bay are generally not "polluted" and do not release significant levels of heavy metal when dredged.

At the present time the primary water quality concerns are the effects of chronic low-level increases in turbidity resulting from the disturbance of stable geological sediments and erosion of spoil islands, the release of ammonia during disposal operations, anoxic conditions at the bottom of deep channels, and the effects of accidental spills from confined disposal areas. These impacts have probably contributed significantly to the general decline of seagrasses in the bay and to the initiation of algal blooms, both of which are symptomatic of baywide eutrophication.

An additional problem with the use of any island for recreation involves the maintenance of facilities. Without land access to the areas for such services as garbage pickup, security patrols, etc. city and county recreation agencies have expressed little interest in developing these areas. The installation of docks might solve some of the access problems, but would be subject to the same maintenance problems as other facilities.

#### Regulatory Processes

Until recently all dredging, including repeated maintenance of the same areas, has required individual permits from state and federal agencies. These procedures have resulted in significant delays in maintenance operations, repeated requests for similar data, and the generation of permit stipulations which were impractical and often not complied with. This process encourages the use of state permit exemption procedures to the extent that only a limited percentage of berth maintenance is in fact ever permitted.

A process to correct this situation was recently made available by the passage of port-sponsored legislation and subsequent DER rules to allow for the development of 25-year permits for maintenance dredging of entire ports or reaches of navigation systems. This process requires extensive initial investigations into the nature of the materials to be dredged, existing and expected water quality problems, and existing disposal sites. In addition, prior to entering the long-term portion of the permit a long-term dredged material disposal plan and monitoring plan must be developed.

#### Cost Apportionment

For non-federal channels and all berths the costs of dredging and disposal fall entirely on the owners or operators of those waterways. Under historical federal navigation project policies the entire cost of maintenance dredging, as well as the great majority of the cost of deepening projects was borne by the federal government. The "local sponsor" (Tampa Port Authority, Manatee County Port Authority, City of St. Petersburg) was responsible for providing all necessary improvements such as creating, maintaining, and improving dikes (including such things as placing revetments on diked islands). In addition, local interests were required to deepen berths and/or construct terminals adjacent to new or improved channels so that the transportation benefits of the improvements could be realized.

Due to the limited financial resources of the local sponsors efforts to limit these costs have been involved in most projects. These have included using construction dredging material to create disposal areas, placing dredged material on sovereign-owned bay bottoms, and utilizing ocean disposal.

Current proposals for future federal funding for navigation projects continue the above traditional local costs but add to that 50% of the cost of the dredging itself. Tied to these proposals is the possibility that ports would be able to collect "user fees" to help them pay these additional costs. This is discussed further in the next section. In addition, recent discussions regarding reducing the federal deficit include proposals to reduce the Corps' funding for operation and maintenance of

Historically, used upland disposal sites have generally been located close to the bay in wetland or industrial areas. This occurred in order to keep the disposal area near the dredging sites, to allow for the return of decanted water to the bay, and to minimize the cost of the land involved. With the passage of environmental legislation the use of shoreside wetland areas strictly as disposal sites is not possible. Other near-shore uplands near the shipping channels are generally either residential areas, industrial sites, or deepwater port lands. The use of undeveloped port lands for disposal purposes is seen as unadvisable since such use would most likely necessitate the future creation of additional fill areas.

Future upland disposal sites have been proposed in areas about five miles inland from the bay. While these areas are presently used for agriculture, they parallel the new interstate highway corridor in areas which are designated under existing land use plans for medium-density residential, commercial, and office uses. Recommendations for using hundreds and perhaps thousands of acres of land in this area for disposal sites have already generated strong opposition from some residents and public officials. The perceived social impacts of such areas include odors from the handling of anaerobic sediments, the creation of mosquito breeding areas in proximity to human use areas, the traffic and noise impacts of long overland pipelines, the aesthetic impact of high containment embankments, the reduction of nearby land values, and the reduction of economic opportunities for land development in the interstate corridor.

#### Recreational Use of Spoil Islands

It has been suggested that the existing spoil islands in the bay might be used to provide recreational opportunities. Small islands in lower Hillsborough Bay and in Old Tampa Bay are presently used intensively by boaters as anchorages and for picnicing.

Large disposal area 2D has a very rocky shoreline on two sides and shallow marshes on the remaining sides, making landfall on the island difficult. Disposal area 3D has a sandy beach at present, but installation of the rip-rap revetments and marshes, environmental improvements which have been recommended for that site, will make it equally unaccessible. Both of these large islands have steep diked sides and enclose large areas of unstable soils which can be dangerous to those who might venture out onto them.

In addition, the enclosed disposal areas will be repeatedly reused and often contain high levels of mosquitoes. Modifications of these areas to provide recreational facilities is possible but would entail considerable earthwork, would require considerable funding, would very likely reduce the utility and capacity of the areas for disposal, and would still be subject to problems with access, mosquitos and dangers to users.

Recreational use of other small spoil islands is possible but must be balanced against the present and potential value of these areas for bird habitat. The small islands in Hillsborough Bay and the spoil island adjacent to Port Manatee all support large breeding colonies of waterfowl such as gulls, terns, egrets, and pelicans. The conversion of these areas to recreational use is probably not advisable for this reason.

projects, an action which may force further local expenditures to keep channels open.

#### Funding

Federal funding for dredging and disposal comes from general tax revenues and is appropriated on an annual basis by Congress. The Corps of Engineers processes these funds and has very limited freedom to modify patterns of authorized expenditures.

The City of St. Petersburg receives revenues from the operation of facilities at Bayboro Harbor, in addition to general tax revenues. The Manatee County Port Authority operates on income from leases, wharfage, and dockage and, until recently, tax revenues from parimutual betting. Since the Manatee County Commission acts as the port commission it has the ability to utilize general tax revenues or tax-backed bonds.

The Tampa Port Authority operates entirely on revenues generated by land leases, dockage, and wharfage. It should be noted that only 10% of the total cargo moving through the port moves across Authority docks and contribute to its revenues. While it is entitled to receive up to .5 mil in ad-valorem taxes such revenues must be authorized by the Hillsborough County Commission and are utilized very rarely due to political opposition. All bonds issued by the Authority must be backed by the revenues of the project involved or the general revenues of the Authority. At the present time the Authority's ability to issue new general revenue bonds is limited by its current revenue stream.

Currently, neither the Manatee nor the Tampa Port Authorities can assess user fees against cargo moving through their channels due to the provisions of the Commerce Clause of the U.S. Constitution. This can only be done if specifically authorized by Congress as part of a project. The Tampa Port Authority has recently been able to have state legislation passed which increased the historically minimal Harbor Master Fee assessed against each ship. One half of these new funds (<\$250,000/yr) must be used for fire protection, but the remainder can be utilized for more general harbor improvements.

#### Relevant Laws and Statutes:

Federal Navigation Project Policies  
Federal Water Pollution Control Act  
Marine Protection, Research, and Sanctuaries Act  
Rivers and Harbors Act of 1899  
Fish and Wildlife Coordination Act  
Chapter 403, Florida Statutes (Environmental Control)  
Chapters 17-3, 17-4 and 17-45 Florida Administrative Code  
Chapter 84-447, Laws of Florida (Tampa Port Authority)

Bay Management Objectives:

1. Prevent dredging or spoiling of any significant areas of previously undisturbed bay bottom, and prevent the creation of emergent spoils from existing submerged spoils. Habitat restoration/creation should be excepted if shown to be intrinsically worthwhile and not primarily justified as a means of spoil disposal. Maintenance dredging of existing channels should not be restricted.
2. Establish a procedure for coordinating the long-term plans of ports, governmental agencies, and private interests for disposal of dredged material so as to minimize adverse environmental and social impacts while maintaining a viable maritime industry in the region. This plan should encompass a period of not less than 25 years, giving equal consideration to all disposal alternatives.
3. Maximize the useful life of existing dredged material disposal areas though improvements to and protection of containment structures, and through the development of a state-of-the-art dewatering program.
4. Maximize the beneficial use of appropriate dredged material for beach nourishment and identified habitat needs in a manner which balances the impacts to affected natural and human communities with compensatory mitigation.
5. Protect unique and irreplaceable natural resources from the adverse effects of spoil disposal.
6. Encourage the development and use of innovative and more efficient spoil disposal methods which reduce environmental impacts and financial costs of spoil disposal.
7. Develop an environmentally acceptable system for deepwater offshore disposal of nontoxic spoil material, even where costs of doing so exceed direct costs of in-bay disposal, so as to relieve pressures for inshore filling for reasons other than habitat creation, and to minimize the economic burden of purchasing upland disposal sites.
8. Maximize the multiple use of dredged material disposal areas for recreation and wildlife habitat while maintaining their utility as disposal areas.
9. Reduce the need for maintenance dredging through proper placement and maintenance of disposal areas.
10. Minimize the economic burden on the region's maritime industry while pursuing the environmental and social objectives.

Bay Management Recommendations:

1. Port authorities, governmental agencies and private commercial interests responsible for maintaining navigation channels should seek long-term maintenance dredging permits of a duration commensurate with their ability to realistically and economically plan spoil disposal needs.

Work Element 4-1: The Tampa Bay Regional Planning Council should assist the Department of Environmental Regulation by encouraging and coordinating the development of a Long-Term Port-Wide Maintenance Dredged Material Management Plan, pursuant to Chapter 17-45.19, F.A.C., for all ports in Tampa Bay.

2. Engineering and environmental studies should be undertaken jointly by the Corps of Engineers, the Department of Environmental Regulation, and the ports to determine the following:
  - The total volume of dredged material which might reasonably be expected to be produced by all maintenance dredging and necessary future port improvements;
  - The current and potential capacities of all existing confined disposal areas, including lateral expansion of existing diked disposal islands and maximum elevation of dikes;
  - The physical and chemical nature of the material which would be dredged from various parts of the navigation system and the feasibility of segregating the material for disposal. This would be an extension of the current DER ports study;
  - Lower cost methods of protecting the high-energy shorelines of dredged material islands using demolition rubble or other methods where such measures will have a positive net effect;
  - The potential for removing dewatered dredged material from the diked islands in Hillsborough Bay and transporting it for final disposal in the Gulf of Mexico or for productive use on uplands if feasible; and
  - The feasibility of back-filling those portions of Garrison and Seddon Channels which are no longer utilized for deep-draft navigation to a lesser depth compatible with their future use as recreational channels.
3. The Environmental Protection Agency and the Corps of Engineers should officially designate a long-term ocean disposal site for maintenance material which is environmentally and socially acceptable but which is also economically viable under various scenarios of future federal funding.
4. Local sponsors should identify and acquire as early as possible additional upland disposal sites necessary for the disposal of future dredged material which must be so contained.

Work Element 4-2: The Hillsborough County Commission should grant the Tampa Port Authority ad-valorum taxing powers for up to 1/2 mill for purchase additional upland spoil disposal sites, and for construction related to the protection of existing spoil disposal areas.

5. The Corps of Engineers, the U.S. Fish and Wildlife Service, the Department of Environmental Regulation, the Department of Natural Resources and the ports should develop a long-term program for the use of appropriate dredged material for marsh and other habitat creation to the extent that such habitats can be shown to be ecologically beneficial.
6. The Tampa Port Authority, Corps of Engineers, the U.S. Fish and Wildlife Service and the Department of Natural Resources in coordination with local Audubon Society Chapters should develop a program for improving the wildlife habitat value of existing disposal sites while at the same time minimizing the impact of such a program on necessary maintenance dredging operations.

Work Element 4-3: The Tampa Bay Regional Planning Council or the Tampa Port Authority should propose and sponsor a study, with the objectives of developing programs as described in recommendations 5 and 6 above, in the state's Public Works Program (see issue #1).

7. The membership of the Tampa Port Authority should be enlarged to include a broader range of interests around the bay.

Work Element 4-4: The Legislature should amend Chapter 84-447, Laws of Florida, a special act passed consolidating all previous acts related to the Tampa Port Authority, to include the following elements:

- Provide for fair representation by scientific, environmental, and fishery interests; and
- Specifies the goals and parameters of stewardship for Tampa Port Authority owned submerged lands consistent with the findings and recommendations of the Tampa Bay Management Study Commission.

8. Changes to state and federal laws to allow for mutually-binding long term agreements between local navigation interests, state agencies, and federal agencies regarding dredging, dredged material disposal, habitat protection and restoration, and spoil area management should be implemented wherever feasible.
9. New local, state, and federal funding mechanisms to permit the development of long-term disposal and mitigation projects not associated with immediately concurrent development projects. This would require a basic change in the patterns of federal funding.
10. More efficient mechanisms for mitigating the environmental impacts of port dredging projects should be investigated and established wherever feasible. This should include the creation of an experimental Tampa Bay mitigation bank through an interagency agreement between the Department of Environmental Regulation and the Tampa Port Authority (see issue #29).

Long-term Management Alternatives:

Status Quo: Under the present management framework three basic problems exist with regard to port activities in Tampa Bay including:

- Port authorities are essentially structured and managed as single purpose organizations comprised primarily of shipping industrial and related special interests which do not always consider all public uses of the bay.
- Since ports in each county compete with one another, they are not motivated to implement a baywide program which allocates all costs and benefits equally.
- Existing ports' authority is limited to county boundaries, so no one port agency is capable of implementing a baywide program.

Because there are already agencies which can, could or should be able to provide responses to the above recommendations, but to date have not, the establishment of an alternative agency may be adviseable to coordinate spoil disposal planning among the various separate local navigation and port organizations.

Bay Advisory Committee: A permanent bay advisory committee within the Tampa Bay Regional Planning Council could effectively fill an oversight and coordinative role for regional spoil disposal planning in the Tampa Bay area.

Bay Management Authority: Besides performing a needed coordinating role for spoil disposal planning in Tampa Bay, a mandated bay management authority could potentially assume and consolidate ownership of all bay bottoms under single regulatory agency.

## Issue #5 Hazardous Waste Disposal and Management

Issue Analysis: Prior to the enactment of the Natural Resource Conservation and Recovery Act (RCRA) in 1976, there was no comprehensive federal program to recognize and manage hazardous wastes to protect the public health, safety and welfare. Between 1976 and 1980 the Environmental Protection Agency developed and adopted the majority of regulations and guidelines to implement the federal and state hazardous waste management systems now in existence.

The Florida Legislature enacted the state's first hazardous waste legislation in 1980 by adopting the federal guidelines and directed the Department of Environmental Regulation to develop and implement a statewide hazardous waste management program. Recognizing the need for developing a comprehensive data base on the management of hazardous wastes as soon as possible, the State passed the Water Quality Assurance Act in July 1983. In part, this Act provides for coordinated efforts among local governments, regional planning councils and the state agencies responsible for the implementation of a hazardous waste management program.

The Tampa Bay Regional Planning Council has completed its draft local hazardous waste needs assessments for Hillsborough, Manatee, Pasco and Pinellas Counties pursuant to the Water Quality Assurance Act. The reports, now under review, identify for each county how much hazardous waste is being generated, who the generators are, how the materials are being disposed of, the location of abandoned dump sites and potential environmental problems, current hazardous waste operating procedures at sanitary landfills, effective management procedures which should be implemented, and the selection and designation of appropriate areas for a temporary storage and transfer facility for collecting hazardous wastes.

Cumulatively, the local assessments address the following preliminary conclusions and recommendations:

- Based on an estimate of approximately 108 million pounds of hazardous wastes being produced annually in the four county region, of which approximately 70% or 75 million pounds are being re-used, recycled or treated acceptably, an estimated range of 12.7 - 25 million pounds annually is potentially being disposed of in an unacceptable manner and could be handled by a temporary storage/transfer facility.
- There are acceptable areas in each county where a temporary storage/facility could be located at the initiation of an appropriate hazardous waste management interest.
- Approximately 130 abandoned dump sites have been identified within the region of which 34 (not including the seven identified Superfund priority sites in the region) should be further investigated for the potential for environmental problems to occur.
- Based upon site visits to the active landfills in the region, further training of landfill employees concerning hazardous waste identification and handling procedures is appropriate. Of the 47 facilities identified, eleven are noted for potential environmental problems and should be evaluated and ranked similar to the abandoned dump sites.

The Tampa Bay Regional Planning Council is preparing a regional hazardous waste management assessment which will consolidate the data from the county assessments, evaluate the short-term and long-term needs for hazardous waste management facilities and develop a plan to eliminate any excess demand for off-site hazardous waste management facilities or services. The Florida Legislature perceives transfer facilities as the best means of serving the short-term hazardous waste management needs of the state, particularly in an area as environmentally sensitive as is the Tampa Bay region. The resulting analysis from the hazardous waste assessment will assuredly spur private interest in locating a transfer facility to tap such a ready market.

As referenced in the preliminary assessment findings, the possibility of toxic contamination of water resources from abandoned dumping grounds and landfills having domestic, municipal, or industrial refuse is of special concern because of the potential for serious hazards to public health. This possibility exists because evaluations of geologic and hydrologic conditions were rarely included in the determination of site selection for private or public landfills. Existing and abandoned landfills and dumps invariably were placed on land that had little or no value for other uses.

The TBRPC's Groundwater Protection Plan for the Tampa Bay Region references that dump sites in the region have included low, wetland areas, limestone sinkholes and other areas prone to the development of ground water contamination problems. Recent findings of water contamination throughout Florida resulting from the improper disposal of toxic chemicals further reinforce the importance of mitigative actions once such problems are identified. The acquisition of leachate and water quality data for abandoned dump sites exhibiting the potential for ground water contamination is extremely important due to the potential harmful or even lethal impacts to humans, animals, plants and aquatic life forms.

Based upon minimal study efforts, the tidal waters and sediments of Tampa Bay appear to be relatively free of toxic contamination from metals and hydrocarbons compared to northern estuaries which have been more extensively studied. It is hypothesized that the lack of contamination from these sources is due to the predominance of large grained sediments and high mean annual water temperatures (leading to greater chemical breakdown). However, Tampa Bay probably has the highest recorded ambient levels of radium 226 of any estuary studies, the impacts and sources of which have never been adequately documented. In addition the effects of anti-fouling chemicals discharged from power plants have never been adequately documented for Tampa Bay.

The major concern regarding hazardous waste problems is the lack of resources to support state and local enforcement. The Resource Conservation and Recovery Act and the Water Quality Assurance Act of 1983 require the Department of Environmental Regulation to monitor and enforce the siting, design, permitting and operation of landfill operations and disposal of wastes. County and municipal governments also share in the responsibility for hazardous waste management monitoring and enforcement. Counties, in particular, must annually survey all small quantity hazardous waste generators and verify twenty percent of the responses each year. However, funding for carrying out these costly requirements has historically been scarce.

Relevant Laws and Statutes:

Resource Conservation and Recovery Act (RCRA)  
Comprehensive Emergency Response and Cooperation Liability Act (CERCLA) (40 CFR Parts 260.10 and 261-265)  
Florida Resource Recovery and Management Act  
Water Quality Assurance Act (Part VI) (Sections 403.701 - 403.73, F.S.)  
(Chapter 17-30, F.A.C.)

Bay Management Objectives:

1. Implement the requirements of the Water Quality Assurance Act for a comprehensive statewide hazardous waste management program including the location of temporary storage/transfer facilities for hazardous wastes.
2. Provide needed surface water, groundwater and leachate characterization in and adjacent to potentially dangerous dump sites for application in state and local regulatory responsibilities.
3. Initiate eventual rehabilitation of dump sites through mitigative actions.

Bay Management Recommendations:

1. Additional funding should be made available, both for state and local enforcement responsibilities, and for needed environmental studies.  
Work Element 5-1: The Legislature should increase the three percent tax levied on annual gross receipts of commercial hazardous waste facilities.

Work Element 5-2: The Legislature should assign a portion of the Water Quality Assurance Trust Fund to carry out host local government monitoring responsibilities and annual County surveys and verifications.

2. Balancing all considerations, hazardous waste transfer facilities should be located outside the 100-year floodplain wherever feasible.
3. A study should be performed to assess the quality, quantity, distribution, fate and biological impacts of toxic contaminants in the Tampa Bay watershed and estuary.

Work Element 5-3: The Department of Environmental Regulation should design and conduct the study utilizing the funding sources described above, and federal EPA 205(j) funds. The estimated time frame of such a study is two years. Emphasis should be placed on documenting the toxic contaminant loads to the bay from its many tributaries, and on locating bay front contaminant sources. Monitoring of uranium series radionuclides should be performed around the bay to determine their deleterious effects. Much of the study could be conducted through analysis of existing data.

Estimated Manpower and Cost

Year	1	2
 Manpower (man years)		
- Staff (DER)	3	3
- Consultant	-	-
Total	3	3
 Source of Funds		
- Federal	150,000	150,000
- State	100,000	100,000
- Local	-	-
Total	250,000	250,000

4. Counties should be given the option to utilize regional planning councils individually or collectively for follow-up annual surveys and required 20 percent verifications. Once an allocation is made available to the counties for conducting the annual survey and 20 percent verification, the counties should be given 30 days to decide whether or not they want to perform their own surveys and/or verifications. If a county declines to perform the survey or verification, or fails to respond to DER within the 30-day period, the regional planning council should receive the allocation and perform the survey and verification.

Work Element 5-4: The Legislature should amend Section 403.7234, Florida Statutes, as such.

5. Using the above referenced funding sources, the Department of Environmental Regulation and the Tampa Bay Regional Planning Council should promote local and regional public information programs for citizens and generators of hazardous waste utilizing, at minimum, the following:

- Workshops and conferences with legislative, regulatory and business participation such as the Sarasota conference in November, 1983;
- Coordinate and seek support of Trade Associations, Industry Councils, and Chambers of Commerce;
- Encourage generators to testify on behalf of the needs assessment and location decisions; and
- Advertise in trade journals, newspapers and other media resources the benefits of a long-term hazardous waste management program;
- Develop public information presentations (movies, slides, etc.) for continuing education.

Long-Term Management Alternatives:

1. Status Quo: Existing federal, state, regional (Tampa Bay Regional Planning Council) and local coordination is probably sufficient to develop and implement an effective hazardous waste management plan in the Tampa Bay area. Presently the major drawback is the lack of adequate funding.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide a valuable advisory role with regard to marine and estuarine contamination in the Tampa Bay region.
3. Bay Management Authority: Besides providing the same function as a bay advisory committee a mandated bay management authority could potentially administer the proposed bay contamination study.

## Issue #6 Enforcement

Issue Analysis: The enforcement of marine resource management and pollution abatement laws in Tampa Bay falls primarily under the responsibilities of the Marine Patrol (a division of the Department of Natural Resources) and the Department of Environmental Regulation, respectively. However, in the case of major oil spills as well as disabled vessel search and rescue operations the U.S. Coast Guard and the Marine Patrol have overlapping jurisdiction. In general, effective enforcement of laws relevant to the management of the bay is limited by two major factors including:

- Numerous local laws and special acts are often conflicting or redundant, and are inconsistent from one jurisdiction to the next; and
- Existing levels of funding and staffing are inadequate.

The Marine Patrol has the responsibility of enforcing commercial and recreational fishing laws as well as boating safety regulations in Tampa Bay. Over the years a myriad of special acts and local laws have been passed by the counties and municipalities bordering the bay related to limits on fishing and boating activities. By statute, the Marine Patrol is required to enforce all adopted special acts and local laws. However, many of these acts are obsolete and are no longer relevant or meaningful to current management needs. The majority of these regulations are nothing more than nuisance laws or are related to past political boundary disputes. For example, a 40 year old Manatee County law prohibits gill-netting east of the Alternate Route 41 bridge crossing the Manatee River for no apparent reason relevant to the management of fish stocks in that portion of the estuary (see issue #16).

Furthermore, because local laws often differ markedly from one jurisdiction to the next, enforcement officers are forced to learn an overly complex baywide web of rules and regulations. For example, in Pinellas County waters gill-netting is prohibited within 50 yards of a dock or pier; in Hillsborough County waters the required distance is 100 yards; whereas in the city limits of Tampa gill-netting is prohibited entirely. Although the Marine Patrol is required to enforce a local law only if the local entity has also made a reasonable effort to enforce that law, it often does so strictly in response to public pressure.

Inadequately funding and staffing levels for enforcement and monitoring activities are problems shared by both the Marine Patrol and the Department of Environmental Regulation. The Marine Patrol is responsible for administering a number of licensing and permitting programs in the Tampa Bay area and yet no percentage of the funds received from such programs is specifically earmarked for administrative or enforcement cost. Furthermore, the Marine Patrol receives no percentage of the fines or penalties levied against offenders as all such funds are collected by the local jurisdiction where the offense took place. Similarly, the Department of Environmental Regulation Southwest District Office does not receive a proportionate percentage of the funds recovered from pollution violations as most of these monies are deposited in various trust funds and rarely returned to the originating district for restoration (see issues #1 and #27) and/or increased monitoring capability.

Presently the Tampa District of the Marine Patrol operates in a five county area (Pinellas, Hillsborough, Manatee, Pasco and Hernando) with a total of 21 enforcement officers. Because the Tampa District is one of the few districts that operates on a 24 hour shift, this means that at any given time there are between only 5 and 7 officers on the water over a five county area. In light of the population density of the Tampa Bay region this staffing level is wholly inadequate. Similarly the Department of Environmental Regulation Southwest District Office presently has the funding and the manpower to monitor about 5 percent of the near 4000 permitted point source discharges in the District.

Relevant Laws and Statutes:

Chapter 327, Florida Statutes (Vessel Registration and Safety)  
Chapter 370, Florida Statutes (Saltwater Fisheries)  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Wherever feasible unify and consolidate, on a statewide basis, all special acts and local laws related to marine resource management.
2. Provide adequate funding and staffing levels for increased monitoring and enforcement capabilities in Tampa Bay.

Bay Management Recommendations:

1. All special acts and local laws related to marine resource management, and boating and navigation should be consolidated and unified to be consistent on a baywide basis, wherever feasible.

Work Element 6-1: The Legislature should pass a baywide law repealing all special acts and local laws related to marine resource management and boating and navigation. Appropriate and effective standards and limitations for such activities should be adopted on a statewide scale. Local governments should, however, have the right to petition the Department of Natural Resources for an exemption to the adopted state standards if it can be shown that public safety or natural resource protection is threatened.

2. Funding and staffing levels for the Tampa District of the Marine Patrol should be increased to effectively meet the real enforcement demands of the region.

Work Element 6-2: The Legislature should authorize a special allocation of funds to the Tampa District of the Marine Patrol for the addition of eight enforcement officers as well as for the construction of a needed maintenance shop in the District.

Estimated Manpower and Cost

<u>Year</u>	<u>1</u>	<u>2</u>
<b>Manpower (man years)</b>		
- Staff (Marine Patrol)	4	4
- Consultant	-	-
<b>Total</b>	<b>4</b>	<b>4</b>
<b>Source of Funds</b>		
- Federal	-	-
- State (allocated)	\$350,000	\$350,000
- Local	-	-
<b>Total</b>	<b>\$350,000</b>	<b>\$350,000</b>

3. Local governments should be discouraged from passing special acts without including provisions for funding the enforcement of those laws.

Work Element 6-3: The Legislature should introduce legislation requiring local governments to transfer 25 percent of funds received in fines and penalties to the Department of Natural Resources for those violations in which the arresting officers were of the Marine Patrol. The funds received from these transfers should be used exclusively for increasing enforcement capabilities in the District in which the funds were generated.

4. An appropriate percentage of funds received by the Department of Natural Resources from the collection of various license fees should be specifically earmarked for return to the Marine Patrol for increasing enforcement capabilities.

5. Wherever feasible, local law enforcement officers should assist the Marine Patrol in enforcing marine resource management and pollution abatement laws.

6. Pursuant to Chapter 403.182, Florida Statutes, local governments should be encouraged to develop state approved pollution control programs, and adopt local pollution control regulations compatible with or stricter than those imposed by the state. The development of such programs provides for greater checks and balances of local pollution control compliance. Presently, only Hillsborough and Manatee Counties have approved programs in the Tampa Bay area.

7. The Legislature should allocate additional funds to the Southwest District Office of the Department of Environmental Regulation as needed to improve their compliance monitoring network and capabilities. Present funding levels only allow adequate compliance monitoring of about 5% of all permitted point source discharges. See Work Element 10-1 for further detail.

Long-term Management Alternatives:

Status Quo: The effective enforcement of marine resource protection and pollution abatement laws appear to be limited by a myriad local nuisance laws and by inadequate funding and staffing levels for both the Marine Patrol and the Department of Environmental Regulation. Legislative amendments and increased funding allocations would sufficiently solve the major problems.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide a useful technical advisory function for developing more meaningful standards and limits related to marine resource use and management in Tampa Bay.

Bay Management Authority: Besides performing the same function as a bay advisory committee, a mandated bay management authority could potentially assume compliance monitoring and enforcement responsibilities in Tampa Bay.

## Issue #7 Control of Septage Waste

Issue Analysis: The control and disposal of septage waste is a chronic problem in many areas. Illegal disposal into canals, streams and storm sewers may be placing a significant yet unknown discharge burden on Tampa Bay.

Commercial septage haulers are only authorized to transfer and deposit septic tank waste. However, these services frequently transfer other materials such as oils and greases, sludge, industrial wastes and other potentially hazardous material. As a result, landfill areas which are authorized to receive only septage waste are also illegally receiving other unauthorized substances creating a myriad of potential surface and groundwater problems.

In addition, certain communities on the bay still do not have sewage treatment facilities and rely solely on septic tanks for wastewater treatment and disposal. Notable among such areas are the City of Ruskin in southwestern Hillsborough County. The seepage of septage waste into waters of the state creates human health hazards by raising concentrations of pathogenic bacteria in waters designated for human contact or shellfish harvesting. For example, it has been repeatedly demonstrated that seepage from a large mobile home park is responsible for the frequent closure of Cockroach Bay, a state aquatic preserve, for shellfish harvesting, due to high bacterial counts.

These are wide-spread problems which most local governments are currently attempting to solve. Funding for enforcement and development of adequate disposal sites and sewage treatment facilities is a major problem (see issue #20). Stronger penalty fees and state codes may also be needed. The disposal of septage waste is currently regulated by the Florida Department of Health and Rehabilitative Services through its County Health Units and according to Chapter 10D-6, F.A.C. In addition, septage waste disposal must also comply with regulations issued by the Florida Department of Environmental Regulation. Regarding impacts on Tampa Bay, further investigation is needed to determine cumulative impacts, incidences of direct illegal discharges (i.e. via storm drains, tidal creeks, etc.) enforcement issues and specific problem areas.

### Relevant Laws and Statutes:

Federal Water Pollution Control Act, PL 92-500 as amended  
Florida Resource Recovery and Management Act  
Chapter 403, Florida Statutes (Environmental Control)

### Bay Management Objectives:

1. Determine the degree to which the waters of Tampa Bay are being burdened by the illegal disposal of septage waste.
2. Eliminate existing health hazards due to seepage of septage waste into waters of the state.
3. Ensure the proper regulation and disposal of septage waste and other associated hazardous materials.

Bay Management Recommendations:

1. The regulation and monitoring of septic tanks and commercial septic waste services should be delegated from HRS to the Department of Environmental Regulation, and other approved local pollution control agencies. This reorganization would consolidate all state programs related to surface and groundwater pollution and hazardous waste disposal under one agency.

Work Element 7-1: The Legislature should effect this reorganization through appropriate legislation. Adequate funding and staffing increases for the Department of Environmental Regulation should be included in this legislation.

2. The Department of Health and Rehabilitative Services (HRS) or the Department of Environmental Regulation should conduct a thorough investigation of commercial septic waste disposal services to determine the extent of illegal mixing and disposal of associated hazardous materials in landfill areas authorized to receive only septic waste, and in other unauthorized areas around the bay. A monitoring program should be established in which haulers are required to document and account for the type and volume of material picked up and disposed.
3. Local governments should give high priority to the construction of sewage collection facilities in areas adjacent to Tampa Bay which rely primarily on septic tanks for wastewater treatment and disposal.
4. The DER Bureau of Wastewater Management and Grants should give highest priority to those communities applying for assistance under the small community sewer grant program in which demonstrable water pollution problems consistently result from inadequate sewage treatment facilities.

Long-Term Management Alternatives:

Status Quo: Presently, the regulation and monitoring of septic waste treatment and disposal does not appear to be adequate in the Tampa Bay area, and possibly statewide. Consolidation of these responsibilities with other water and hazardous waste programs under the Department of Environmental Regulation would probably improve the situation. However, adequate funding for monitoring and enforcement would be critical.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be helpful in assisting local governments in procuring needed sewer construction grants.

Bay Management Authority: A mandated bay management authority could potentially assume regulation and monitoring of septic waste treatment and disposal in communities adjacent to Tampa Bay.

## Issue #8 Aquatic Preserves

Issue Analysis: The Aquatic Preserve designation (Chapter 258, Florida Statutes) is the primary mechanism by which the State preserves and protects large tracts of sovereign submerged and intertidal lands. The stated purpose of the designation is to preserve these areas in essentially their natural or existing condition so that their "aesthetic, biological and scientific values may endure for the enjoyment of future generations" (16Q-20, F.A.C.). Within the defined Tampa Bay management boundary there are three areas which have received this designation including all submerged lands in Pinellas County, the Cockroach Bay area in Hillsborough County, and the Terra Ceia area in Manatee County (see figure 2.2). The Terra Ceia Aquatic Preserve was designated in 1984 and is one recommendation of the Council's 1983 Tampa Bay Management Study which has notably been fulfilled.

Many inconsistencies presently exist in the Tampa Bay Aquatic Preserves, both with regards to boundaries (Cockroach Bay), and to the type of area receiving this designation (Portions of Pinellas County). For example, present boundaries of the Cockroach Bay Aquatic Preserve do not extend up to the Little Manatee River or across the river to its north bank. However, the Little Manatee River is also currently designated as an Outstanding Florida Water (OFW) from its headwaters all the way to Tampa Bay. This gap between two areas of preserved status presents ecological and political inconsistencies for management.

In the Pinellas County Aquatic Preserve many areas (primarily Boca Ciega Bay) currently do not resemble their "natural condition". Although many areas of Pinellas County shoreline were urbanized prior to the Aquatic Preserve designation, a great deal of development and shoreline alteration has occurred since, thus calling into question the effectiveness of the designation. Eventually, management strategies for these areas will have to require an emphasis upon restoration, rather than preservation, in order to be consistent with the intent of the Aquatic Preserve designation.

Another major problem with managing Aquatic Preserves so that they retain their natural characteristics is that adjacent upland land-uses often degrade the quality of such areas. The Aquatic Preserve boundary is limited on the shore side to the mean high water line. In most cases, control of adjacent upland uses is outside the legal jurisdiction of existing statutes.

The state outlay of funds for aquatic preserve management, other than that directly spent in Charlotte Harbor, was absent prior to July, 1984. This is in contrast to an increasing demand for a management role throughout the state system of aquatic preserves, both from within state government and from the general public. The 1984 Legislature has for the first time funded aquatic preserve management statewide with \$92,174. These funds have allowed the Bureau of Environmental Land Management (BELM) to add temporary support staff in Charlotte Harbor and Apalachicola, and to establish a staff presence in the St. Petersburg/Tampa Bay, Wekiva River and Indian River area aquatic preserves. This funding is, however, subject to renewal and is entirely inadequate to meet the long-term program needs, both at the state and local levels.

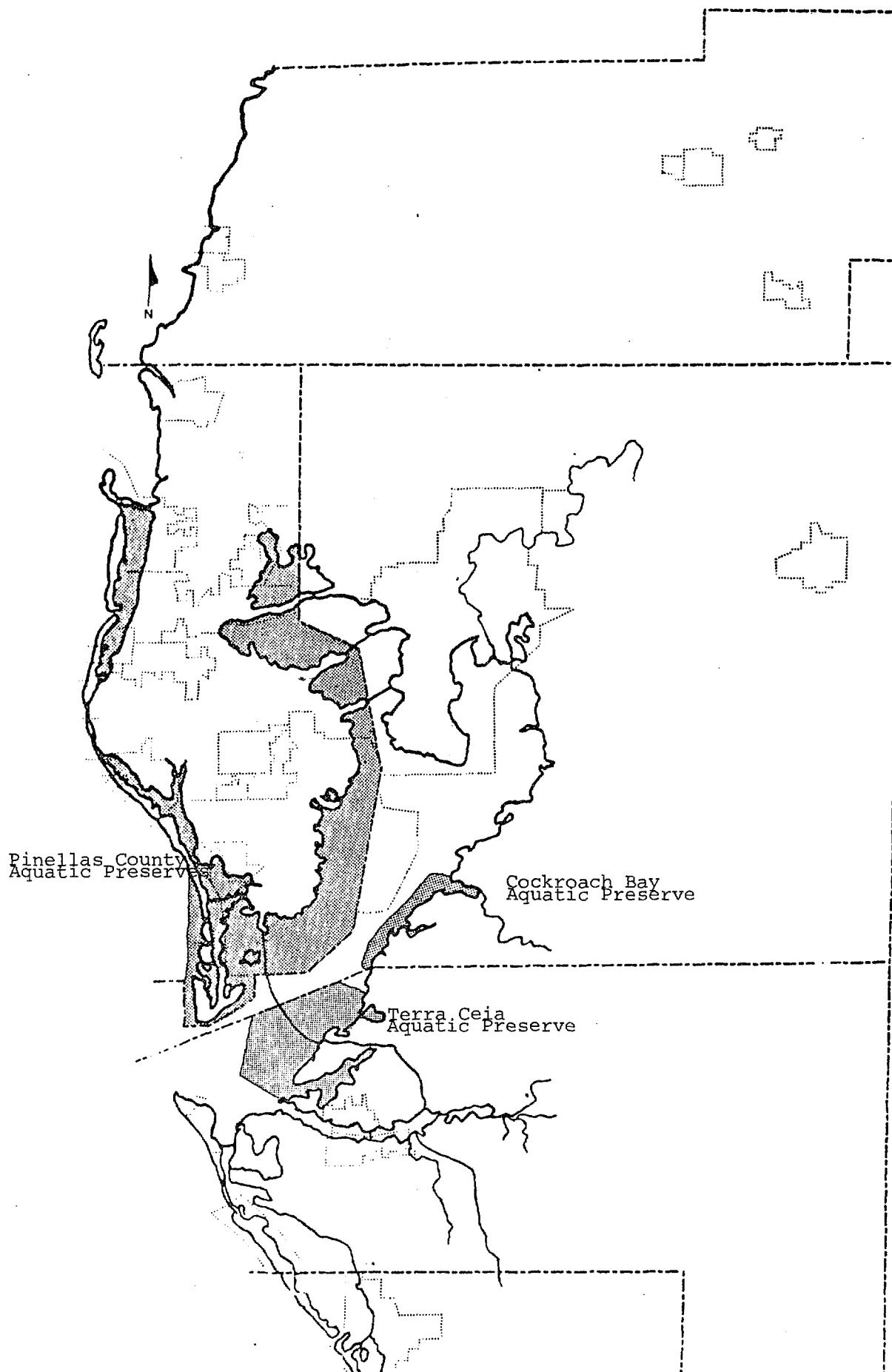


Figure 2.2. Tampa Bay area Aquatic Preserves.

Relevant Laws and Statutes:

Chapter 258, Florida Statutes (Aquatic Preserves)  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Eliminate geographic gaps in Tampa Bay Aquatic Preserve boundaries which result in ecological and political inconsistencies for management.
2. Provide for the staffing of full-time management personnel, and for the development of long-term management plans for the three Tampa Bay Aquatic Preserves.
3. Develop regulations and establish buffer zones necessary to prevent the degradation of water quality and shoreline habitat in Tampa Bay Aquatic Preserves from inconsistent uses of adjacent uplands.

Bay Management Recommendations:

1. The newly created Terra Ceia Aquatic Preserve should be officially designated by the Department of Environmental Regulation as an Outstanding Florida Water (OFW).
2. Pursuant to Chapter 17-4, Florida Administrative code, the Department of Environmental Regulation should develop ambient water quality standards for all areas in the Tampa Bay Management boundary currently designated as Outstanding Florida Waters. This could be accomplished in conjunction with the preparation of management plans.

Work Element 8-1: The Tampa Bay Regional Planning Council should, by resolution, make a formal request to the Department of Environmental Regulation to implement the above state recommendations.

3. The boundaries of the Cockroach Bay Aquatic Preserve should be extended to the north bank of the Little Manatee River.

Work Element 8-2: Tampa Port Authority should officially request this extension, and the Legislature should amend Section 258.391, Florida Statutes, accordingly.

4. The boundaries of the Terra Ceia Aquatic Preserve should be extended to include Passage Key, and all submerged lands extending a distance of 100 yards seaward of M.H.W. from this island (see issue #31 for further discussion).

Work Element 8-3: The Legislature should amend Section 258.393, Florida Statutes, accordingly.

5. The Legislature should allocate funds to the Department of Natural Resources for the staffing of management personnel, and for the development of long-term management plans for the three Tampa Bay Aquatic Preserves, in accordance with Chapter 258, Florida Statutes.

Work Element 8-4: The Legislature could establish the necessary source of funds through the revenues generated from submerged land lease fees, or through the revenues generated from a saltwater fishing license fee. Allocation and level of funding should be perpetual and independent of federal sources (see issues #1 and #37 for further discussion).

Year	<u>Estimated Manpower and Cost</u>				
	1	2	3	4	5
<b>Manpower (man years)</b>					
- Staff (DNR)	5	3	3	3	3
- Consultant	-	-	-	-	-
<b>Total</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>Source of Funds</b>					
- Federal	-	-	-	-	-
- State	\$150,000	100,000	100,000	100,000	100,000
- Local	-	-	-	-	-
<b>Total</b>	<b>\$150,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>

6. In the process of developing Aquatic Preserve management plans, the Department of Natural Resources, pursuant to Chapter 258, Florida Statutes, should officially designate the Pinellas County Aquatic Preserve system as an "Urban" preserve, and the Terra Ceia and Cockroach Bay Aquatic Preserves as "Wilderness" preserves. In urban preserves, policy emphasis should be on developing specific restoration plans and strategies. In wilderness preserves, emphasis should be on maintenance of natural conditions.

7. Appropriate counties and municipalities with uplands located adjacent to Aquatic Preserves should review land use plans and, where possible, establish large buffer zones around the preserves. Special tax incentives should be also established for keeping buffer areas preserved.

Work Element 8-5: The Tampa Bay Regional Planning Council should implement this recommendation through its Chapter 163, Florida Statutes, review responsibilities.

8. Appropriate state and local agencies should give special attention to implementing and fully enforcing existing ordinances and laws controlling encroaching development, point and non-point source pollution, and any alterations to natural habitats surrounding the preserves.

9. Appropriate local governments should give high priority to providing improved wastewater treatment services for those areas adjacent to aquatic preserves.

Long-Term Management Alternative:

1. Status Quo: Adequate funding for the State's Aquatic Preserve program must eventually come through legislative action. Statutorily, responsibility for full implementation of Chapter 258 lies with the Department of Natural Resources. However, in the case of Tampa Bay Aquatic Preserves, the Department of Environmental Regulation, through its OFW designation, and the Tampa Port Authority, through their ownership of submerged lands in Hillsborough County, are also involved. Because the state's Aquatic Preserve program has been selected as part of the Legislature's Oversight Program for 1984 there is a good probability that funds will eventually be allocated for the preparation and implementation of management plans. However, under the status quo alternative it is unlikely that the majority of the above stated recommendations would ever be implemented. This would probably require the directed efforts of a local coordinating body.
2. Bay Advisory Committee: A bay advisory committee within the Tampa Bay Regional Planning Council could be effective in coordinating the many local jurisdictions involved in management activities, and in supporting legislative actions affecting boundary re-alignments.
3. Bay Management Authority: Much of the local management plan preparation and long-term management responsibilities could potentially be effectively delegated by the Department of Natural Resources to a mandated bay management authority. A permanent authority would be especially instrumental in coordinating with the Department of Environmental Regulation in the development of special permitting criteria for dredging and filling activities in the Bay area's Aquatic Preserves.

## Issue #9 Seagrass, Marsh and Mangrove Habitat Creation

Issue Analysis: Marine plant communities in coastal Florida consist of mangrove forests, tidal marshes, seagrass meadows, attached or drifting macroalgae, and microalgae (phytoplankton). All are important to marine life, but recent studies have shown that losses of mangroves, marshes, and seagrasses generally result in the most direct impact on man by decreasing the habitat available to support species of fish and shellfish important to commercial and recreational fisheries. The loss of seagrass, tidal marsh and mangrove habitat in the Tampa Bay estuarine system has been extensive. It has been documented that 44 percent of Tampa Bay's original 25,000 acres of mangrove forests and marshes have been destroyed, and that 81 percent of the original 76,500 acres of seagrasses have disappeared (Lewis et. al., 1982). This habitat loss has resulted in declining populations of economically important fish and shellfish, including a complete collapse of such fisheries as those for scallops and oysters and major declines for bait shrimp, spotted seatrout and redfish (Lewis, 1977). Recent work (Lewis, 1982) has also shown that restoration or creation of marine wetlands is possible and could be used as a tool to reverse the loss of important marine habitats.

The loss of marine and estuarine habitat in Tampa Bay has resulted from two major causes. Intertidal habitat, including saltmarshes and mangrove forests, has primarily been destroyed through the direct physical disturbance of dredging and filling practices. Seagrasses, on the other hand, have been adversely impacted by both dredging and filling practices; and by degrading water quality. Because seagrasses are almost always submerged (subtidal) the clarity of the water column above greatly affects the ability of the plants to survive, grow and reproduce, by determining the amount of light that is available to them (see issue #2). Although the rampant dredging and filling activities of past decades have been slowed significantly in Tampa Bay, the degradation of water quality continues to be a pressing issue.

Many sites along Tampa Bay presently offer the potential for successful restoration/creation of intertidal habitat (see issues #27 and 34) and such efforts are often undertaken to mitigate past and proposed habitat destruction elsewhere around the bay. For example, when asked to prepare a mitigation plan for the proposed widening of the Alafia River turning basin the Tampa Bay Management Study Commission recommended the creation of 22.5 acres of new saltmarsh along spoil island 2D to mitigate the expected destruction of 15.0 acres of mangroves (see appendix D). The technology for the creation of tidal marshes and mangrove forests has progressed to the point where positive results can almost always be attained (Hoffman, 1985). However, the successful replanting of new seagrass beds has proven to be a complex and unpredictable undertaking as many factors related to the health and survival of seagrasses remain poorly understood. Expensive, large-scale seagrass replanting efforts have been attempted elsewhere in Florida, most notably in Biscayne Bay, but these efforts have largely met with discouraging results.

Several studies have been initiated in the past year aimed at identifying other potential sites and preferred methods for marine and estuarine habitat restoration in the Tampa Bay Region. The Tampa Bay Regional Planning Council, the Tampa Port Authority, the U.S. Fish and Wildlife

Service and the Department of Natural Resources are all presently engaged in such studies. Once these studies are complete, the major obstacles to habitat restoration and protection efforts will be funding and public awareness. Chapter 83-504, Laws of Florida, establishes a fund generated from gill net fishing license fees which is to be used specifically for marine habitat research and restoration in Pinellas County. Similar legislation has been passed in both Pasco and Manatee Counties, but these bills sunset after four years. These funds will generate approximately \$60,000 per year during their lifetime and will be very helpful for planning and initiating restoration efforts at the state and regional level. However, more substantial sources of long-term funding will be needed to successfully create and restore significant acreages of marine and estuarine habitat in Tampa Bay (see issue #1 for a discussion of possible funding sources). In addition, to ensure a successful baywide effort, local governments will have to develop and implement similar programs, as has the City of Clearwater with its seagrass restoration project.

Relevant Laws and Statutes:

Coastal Zone Management Act  
Clean Water Act, Section 404  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 253, Florida Statutes (State Lands)  
Chapter 83-504, Laws of Florida

Bay Management Objectives:

1. Wherever feasible, increase the coverage and enhance the productivity of intertidal (saltmarshes and mangroves) and subtidal (seagrasses) habitat associated with the Tampa Bay estuarine system.

Bay Management Recommendations:

1. The U.S. Army Corps of Engineers (COE) and the Tampa Port Authority (TPA) should be required to undertake habitat restoration efforts in association with their maintenance responsibilities for past authorized projects in Tampa Bay.

Work Element 9-1: The Tampa Bay Regional Planning Council should work with the Department of Environmental Regulation to develop and place specific mitigating conditions upon the issuance of a 25-year maintenance dredging permit for all future TPA sponsored, COE authorized, Tampa Harbor Deepening Projects. There are mitigative and habitat restoration measures that were required under past authorized projects involving spoil disposal islands 2D and 3D that have never been implemented.

2. Local governments in Pinellas and Manatee Counties should be encouraged to provide the required local matching funds to utilize funds generated from the referenced gill net license fee legislation for the development and implementation of habitat restoration programs along their respective waterfronts. As an example, the City of Clearwater is instituting a two-year demonstration project to develop a model dredged material island and a seagrass management program.

3. Hillsborough County should adopt legislation, similar to Chapter 83-504, L.F., which generates a fund for marine habitat and restoration from gill net license fees.
4. The Department of Natural Resources should implement a large scale seagrass research and restoration program, as described in issue #2, with special emphasis on Tampa Bay.
5. The Department of Environmental Regulation should consider the creation of new intertidal habitat as partial mitigation for water quality impacts. The creation of marsh habitat at the mouths of point sources and tributaria should be considered.
6. "Up front" mitigation should be requested by the Department of Environmental Regulation on dredge and fill permit applications wherever feasible (see issue #29).
7. The Legislature should adopt legislation allowing for the creation of an experimental mitigation bank through an interagency agreement between the U.S. Army Corps of Engineers, the DER Southwest District Office and the Tampa Port Authority (see issue #29).
8. State, regional and local mitigation policies should be developed to result in a "net gain" of wetland habitat in the Tampa Bay estuarine system.

Long-term Management Alternatives:

Status Quo: Under the existing management framework the Department of Natural Resources will manage the respective gill-net license fee funds for habitat research and restoration in Pinellas, Pasco and Manatee Counties. To date the implementation of these programs has been delayed and poorly coordinated with other ongoing planning efforts. The lack of adequate long-term funding also presents a problem for the implementation of large scale programs.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide a useful coordinating and technical advisory role for local governments interested in implementing habitat restoration programs. In addition, such a committee could serve as the regional coordinating body for all federal, state and local habitat restoration/creation efforts occurring around Tampa Bay, to insure the most effective use of available funds.

Bay Management Authority: Besides performing the same functions as a bay advisory committee, a mandated bay management authority could potentially assume management responsibility for all habitat restoration/creation studies and projects around Tampa Bay.

## Issue #10 Municipal and Industrial Discharges

Issue Analysis: Municipal and industrial wastewaters enter Tampa Bay directly or via its tributaries at over 188 points around the Bay (Tampa Bay Regional Planning Council, 1983). Hillsborough Bay receives the heaviest loadings of both municipal and industrial wastes while Old Tampa Bay receives substantial loadings of predominantly municipal wastes. Relatively smaller amounts of municipal and industrial wastes are discharged into the middle and lower segments of Tampa Bay proper, however, Boca Ciega Bay has been severely impacted by municipal discharges.

In 1982, the surface waters of Tampa Bay received domestic effluent from 49 permitted sources which include facilities with design treatment capacities ranging from 10,000 to 60 million gallons per day (Tampa Bay Regional Planning Council, 1983). Domestic point sources in 1984 discharged 71.01 billion gallons of effluent to Tampa Bay and its associated tributaries as compared to 61.75 billion gallons in 1982, a 15% increase in total annual flow (Moon, personal communication). This increase can generally be attributed to rapid population growth, higher than average rainfall and associated infiltration problems with collection systems.

During the period between 1982 and 1984 baywide nitrogen loadings have increased by 7% while total phosphorous loadings have increased by 10%. Over the same time period nutrient loadings to Boca Ciega Bay have increased even more dramatically with both nitrogen and phosphorous up by 15% and 80%, respectively (Moon, personal communication). Although the marked increase in nutrient loadings in Boca Ciega Bay can be primarily attributed to problems associated with the South Cross Bayou Wastewater Treatment Plant, it is apparent that the nutrient impacts of municipal point source discharges on Tampa Bay as a whole are on the rise. However, because trend data for nutrients in Tampa Bay are scarce and somewhat questionable it is difficult to accurately assess this problem.

It is even more difficult to predict future trends as many unknown factors will come into play. As local governments move towards the implementation of approved 201 plans fewer plants will discharge directly to surface waters of the bay. Alternative effluent disposal practices such as deep well injection, spray irrigation and percolation ponds will become more commonplace. In addition, the level of treatment in regional plants will continue to improve. However, counteracting these positive actions is an increasing trend towards the construction of numerous small (<0.1 MGD capacity) "package plants" in developments not served by existing sewer systems. This trend will result in an overall increase in the number of point source discharges to be monitored, and an overall decrease in level of treatment.

It is nevertheless evident that substantial loadings of nutrients into Tampa Bay including nitrogen, phosphorus, and oxygen demanding materials over the years have created a serious eutrophication problem, particularly in the upper reaches of the bay where discharge points tend to be concentrated and flushing rates are minimal. However, the impacts of domestic wastewater discharges relative to other sources of nutrients contributing to the eutrophication problem have yet to be determined. The mathematical models developed for the Tampa Bay wasteload allocation study (see issue #13), if properly calibrated, may provide the tool necessary to

evaluate the relative significance of the various pollutant sources. Attempts to develop programs to manage domestic wastewater point sources without consideration of other potentially significant sources (e.g. non-point sources and residual oxygen demand in the bay) are not likely to result in efficient and cost-effective solutions to the eutrophication problem.

There are currently 23 industries which are permitted to discharge directly into Tampa Bay waters according to Department of Environmental Regulation National Pollutant Discharge Elimination System (NPDES) permit files. In addition there are 116 industries which are permitted to discharge into the tributaries of Tampa Bay. The makeup and quantities of industrial wastes discharged into Tampa Bay are, however, generally not as well documented as municipal discharges. Accordingly, the impacts resulting from industrial point source discharges are even more poorly understood than the impacts of domestic wastewater discharges. Some toxic pollutants such as heavy metals may come from domestic wastewater and non-point sources as well as from industrial sources. Significant contributions from all sources must be considered for an impact assessment to be most meaningful. Once again, the computer models employed in the wasteload allocation study provide a basic tool with which to evaluate impacts of industrial discharges providing the necessary ambient water quality and effluent characteristics are available.

Of particular concern is the accumulation and high concentrations of heavy metals and uranium series radionuclides in the sediments and water column of Hillsborough Bay. Although it is known that plating wastes and phosphate mine discharges play a significant role in these problems, long-term studies need to be undertaken to identify the sources, distribution and fate of these pollutants as well as their impacts on the living systems of the bay. The degree and effects of percolation pond leaching into the waters of the bay also need investigation. Finally, a major industrial discharge problem facing Tampa Bay is the eventual shutdown of several area phosphate beneficiation plants. Following shutdown, plants must discharge very large quantities of acids, ammonia and radium from their closed processing systems. Advance planning for the assimilation of these potentially disastrous discharges needs to be initiated before the problem has occurred.

Relevant Laws and Statutes:

Federal Water Pollution Control Act, Section 402  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Achieve a thorough understanding of the quantity and composition of municipal and industrial effluents being discharged into Tampa Bay.
2. Develop a reliable methodology for predicting what impacts municipal and industrial discharges will have on water quality and biological communities of Tampa Bay.
3. Wherever feasible reduce the number of point sources and/or the quantity of municipal and industrial effluents discharging into Tampa Bay.

Bay Management Recommendations:

1. Local governments in the Tampa Bay areas should pursue and implement wherever feasible water reuse (spray irrigation, wetland filtration) and other effluent disposal alternatives (deep well injection, Gulf of Mexico outfall) to surface water discharge into the bay. By rule, projects involving water reuse, conservation and other innovative technologies presently receive higher priority for funding under federal/state wastewater management grant programs. See work element 20-1 for further discussion.
2. The Department of Environmental Regulation should perform a multi-year study to assess the source, quality, quantity, distribution, fate and biological impact of all measurable toxic contaminants occurring within the Tampa Bay estuarine system. See Work Element 5-3 for further details. Relevant to point-source discharges the proposed study should perform the following elements:
  - An intensive review of existing data on municipal and industrial discharges into Tampa Bay should be conducted for the purpose of determining what pollutants, and in what quantities, have been and are being discharged into Tampa Bay so as to determine baywide trends.
  - In cases where existing discharges are not adequately characterized to make such a determination, periodic comprehensive analysis of significant discharges into Tampa Bay should be required.
  - A system for tracking changes to existing discharge sources, as well as additions of new sources, should be developed so that the inventory of pollutants and quantities can be kept current.
3. Compliance monitoring activities of permitted point source discharges into Tampa Bay should be significantly improved. In addition, compliance schedules for discharges in violation of state and local pollution control statutes or permit conditions should be mandated.

Work Element 10-1: The Legislature should allocate additional funds to the Southwest District Office of the Department of Environmental Regulation as needed to improve their compliance monitoring network and capabilities. Present funding levels only allow adequate compliance monitoring of about 5% of all permitted point source discharges in the District.

Estimated Manpower and Cost

<u>Year</u>	<u>1</u>	<u>2</u>	<u>3</u>
<b>Manpower (man years)</b>			
- Staff (DER)	2	3	4
- Consultant	-	-	-
<b>Total</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Source of Funds</b>			
- Federal	-	-	-
- State (allocated)	60,000	90,000	120,000
- Local	-	-	-
<b>Total</b>	<b>60,000</b>	<b>90,000</b>	<b>120,000</b>

4. Pursuant to Chapter 403.182, Florida Statutes, local governments should be encouraged to develop state approved pollution control programs, and adopt local pollution control regulations compatible with or stricter than those imposed by the state. The development of such programs provides for greater checks and balances of local pollution control compliance. Presently, only Hillsborough and Manatee Counties have approved programs in the Tampa Bay area.
5. The Department of Environmental Regulation should continue to refine and expand the Tampa Bay wasteload allocation study as the ultimate management tool for determining the impacts from, and regulating point source discharges into Tampa Bay. See issue #13 for further discussion.

Long-term Management Alternatives:

Status Quo: Under the existing management framework the Department of Environmental Regulation has the responsibility for regulating point source discharges, pursuant to the federal NPDES program. Insufficient staffing and funding for compliance monitoring appears to be the major problem preventing improved regulation and control of point source pollution in Tampa Bay.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide a useful grant assistance function for communities in the bay area desiring financial assistance for improvements to sewage collection, treatment and disposal systems.

Bay Management Authority: A mandated bay management authority could potentially assume permitting and compliance monitoring responsibilities for all point sources discharging into Tampa Bay.

## Issue #11 Stronger State Wetlands Regulation

Issue Analysis: Since the turn of the century wetlands in Florida have been destroyed at the rate of approximately 200,000 acres per year. To date, it is estimated that over half of the state's original wetlands have been lost or altered due to dredging and filling practices. During this time period, both the freshwater and tidal wetlands contained within the Tampa Bay watershed have suffered especially significant destruction due to the rapid growth and urban development of the bay area.

The passage of the Environmental Reorganization Act in 1975 placed existing Chapter 253 (Jurisdiction in Waters of the State) and Chapter 403 (Water-Quality Control), Florida Statutes, under the Department of Environmental Regulation for permitting purposes. The consolidation of these responsibilities under one agency along with a growing public awareness of the ecological value of wetlands has significantly limited the destruction and/or alteration of wetlands in the State during the past decade. Development pressures in Florida are, however, greater than ever, and stronger protective measures for wetlands, especially in coastal areas, may be necessary.

Although the Environmental Reorganization Act consolidated Chapters 253 and 403, F.S., no attempt was made to merge the two. That oversight created a number of procedural permitting problems as well as gaps in substantial law necessary for the protection of wetlands. These deficiencies included:

- Lack of authority to consider fish and wildlife habitat impacts above, as well as below, mean or ordinary high water;
- Lack of rule revisions to the vegetative index, and soils indicators for jurisdictional determinations;
- Lack of additional or special criteria for issuing dredge and fill permits;
- Lack of a State policy addressing wetlands;
- Lack of legal authority to assume the Corps of Engineers permitting programs.

With the passage of the Warren S. Henderson Wetlands Protection Act in 1984 many of the previous permitting deficiencies were eliminated. Specifically, the bill addressed the following concerns:

- Wetlands policy. A good wetlands policy statement is contained in the bill. While the policy would be better placed in the body of the bill, placement in the "Whereas" clauses does have legal weight, and can be the basis of a policy adopted by rule by state agencies.
- Fish and Wildlife Habitat Protection. The bill contains language to assure consideration of impact upon fish and wildlife habitat in all DER dredge and fill permitting. The wording in effect tracks the provisions of Chapter 253, which have successfully protected fish and wildlife habitat in the navigable waters of Florida since the mid 1960's.

- Approval of the DER Vegetation List. The bill ratifies the greatly expanded Vegetation Index approved by the Environmental Regulation Commission on January 25, 1984 with what are considered to be minor changes in the list. The Department of Environmental Regulation does not believe that the changes in the list significantly reduce its expanded jurisdiction.
- Special Areas of the State. The bill for the first time gives DER the ability to adopt stricter permitting and enforcement provisions in Outstanding Florida Waters Aquatic Preserves, Areas of Critical State Concern, and resource management plan areas. Previously, DER could not adopt its own rules for Aquatic Preserves, and had limited rulemaking ability in Outstanding Florida Waters. The DER also lacked authority to adopt tougher standards in Areas of Critical State Concern, or in response to recommendations of Resource Planning and Management Committees under Chapter 380.
- Ordinary Mean High Water Mark. Without the wetlands bill, DER faced a legal dilemma when the water table would recede during drought. A series of adverse court decisions has held that unless vegetative indicator species are present, DER can lose jurisdiction over lake bottoms when lakes dry up during drought. The bill will correct this problem by letting DER assert jurisdiction in such situations up to the Mean or Ordinary high water mark.
- Cumulative Impact. This provision allows, among other things, for the Department of Environmental Regulation to consider "...the impact of ... other projects which may reasonably be expected to be located within the jurisdictional extent of waters, based upon land use restrictions and regulations." This means that the department can consider cumulative impact in its permitting decisions.
- Enforcing Powers. Prior to the passage of the wetlands bill the only recourse available to the state has been criminal prosecution, and civil suits for damages. The bill gives DNR the ability to impose, through the Governor and Cabinet, fines of up to \$10,000 per day for activities which damage state lands. Efforts to pass legislation to give the Department this authority have failed in several past legislative sessions.

Of particular concern to the Tampa Bay Management Study Committee was the loss of floodplain wetlands associated with rivers flowing into Tampa Bay, as well as tidal marshes at the mouths of bay tributaries. Water-quality in Tampa Bay is largely dependent upon the assimilative capacities of these wetlands. With the passage of Wetlands Protection Act, however, regulations limiting the development of wetland systems relevant to the health of Tampa Bay have been significantly strengthened.

Existing Laws and Statutes:

Clean Water Act - Section 404  
 Chapter 253, Florida Statutes (State Lands)  
 Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Wherever feasible, increase the coverage and enhance the productivity and diversity of all riverine, and intertidal and subtidal habitat associated with the Tampa Bay estuarine system.
2. Provide for improved protection and management of riverine floodplain, and tidal marsh wetlands associated with all tributaries entering Tampa Bay.
3. Improve the dredge and fill review and permitting process to be as comprehensive, efficient, and locally consistent as possible.

Bay Management Recommendations:

1. The Department of Environmental Regulation should adopt stricter rules and criteria for all jurisdictional wetlands contained within the defined Tampa Bay Management boundary.

Work Element 11-1: The Legislature should amend Section 403.904, Florida Statutes, to authorize DER to promulgate special rules for "other resource management areas" such as the Tampa Bay management boundary as defined in Chapter 84-440, Laws of Florida, the Act creating the Tampa Bay Management Study Commission. Such special rules should emphasize the protective needs of submerged and intertidal wetland habitat in those areas of Tampa Bay not designated as Aquatic Preserves.

2. Wherever feasible the Legislature should strengthen appropriate statutes and implement provisions authorizing the assumption of the Corps of Engineers permitting programs by the Department of Environmental Regulation. Such assumptions of jurisdiction would lead to greater streamlining and consistency in the dredge and fill permitting process.
3. Local governments bordering Tampa Bay should develop and adopt wetlands protection ordinances and rules which are consistent with the above stated bay management objectives and recommendations.

Work Element 11-2: The Tampa Bay Regional Planning Council should develop a model wetlands protection ordinance, specific to the wetlands contained within the defined Tampa Bay management boundary, for eventual adoption by local governments.

Work Element 11-3: The Tampa Bay Regional Planning Council should develop a regional mitigation policy for coastal and estuarine wetland habitat, for eventual inclusion into the model ordinance, and to be reflected in the Council's review responsibilities.

4. The Legislature should initiate legislation enabling the creation of a mitigation bank for wetland destruction. At the regional level a mitigation bank could be established on an experimental basis through the joint cooperation of the Department of Environmental Regulation and the Tampa Port Authority (see issue #29).

Long-Term Management Alternatives:

1. Status Quo: With the passage of the Henderson Wetlands Protection Act of 1984, the destruction rate of wetlands in the Tampa Bay watershed should be reduced under the existing regulatory framework. It has been recommended that the local effectiveness of the Wetlands Protection Act of 1984 be judged, after a trial period of three years, before special permitting criteria should be considered for Tampa Bay (recommendation 1).
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be very effective at assisting local governments with the development, adoption and implementation of local wetland and submerged land protection ordinances (recommendation 3).
3. Bay Management Authority: A mandated bay management authority could potentially assume and centralize dredge/fill permitting responsibilities for the tidal wetlands of Tampa Bay. Such an authority could also assume responsibility for implementing large scale wetland habitat restoration efforts around the bay as well as administering the proposed mitigation bank (recommendation 4).

## Issue #12 Study and Management of Tidal Creeks and Rivers

Issue Analysis: The importance of rivers and creeks to estuaries has been documented by studies throughout the world. Rivers and lesser streams import freshwater and foodstuffs to estuaries and provide critical habitat, refuge, feeding and breeding grounds for the early life history stages of marine and estuarine life forms.

Rivers and tidal creeks are vulnerable to numerous impacts which also become evident downstream in terms of decreased estuarine productivity. Examples include hydroperiod alterations through excess drainage or impoundments; loss of corridor by damming; changes to stream loads by increasing runoff or discharging pollutants, and diverting or preventing flows; increased relief and habitat losses through dredging and filling; and contamination through disposal of toxic materials. As rivers and creeks deteriorate, their ability to buffer cultural shocks to the estuary are lost.

Rivers and creeks flowing to Tampa Bay vary greatly in condition. Historical and anecdotal evidence exists to show that these streams were immensely productive estuarine zones and modern data on relatively pristine rivers and creeks support this view. Much basic information on tidal rivers and creeks is lacking but enough exists to allow important ones to be classified by their overall condition from a management point of view. Seven types of streams are itemized below. "Creeks" are defined as the small streams of the Pamlico Terrace in which tidal prisms are equal to or larger than average discharges. All classifications were based on conditions in the tidal segment of each stream. Figure 2.3 shows the location of the various tributaries.

### Condition 1: Natural Tidal Creeks

Double Branch, Piney Point, Little Redfish, Frog Creeks.

### Condition 2: Restorable Tidal Creeks

Bullfrog, Gamble and Fish Creeks.

Bullfrog Creek has moderate habitat loss through piecemeal development, receives sanitary wastes and is used for stormwater drainage. Gamble Creek is structurally intact but severely affected by agricultural runoff. Fish Creek is an extensive drainage system around Tampa International Airport which could be improved into creek status.

### Condition 3: Highly Stressed Creeks

Wares, Redfish, Sweetwater, Rocky, Allen, Salt, and Booker Creeks and Cross Bayou.

Wares, Allen, Salt and Booker Creeks and Cross Bayou are highly urbanized and affected by stormwater. Sweetwater and Rocky Creeks are controlled and located in rapidly urbanizing basins. Redfish Creek was virtually destroyed by illegal filling operations (see issue #27).

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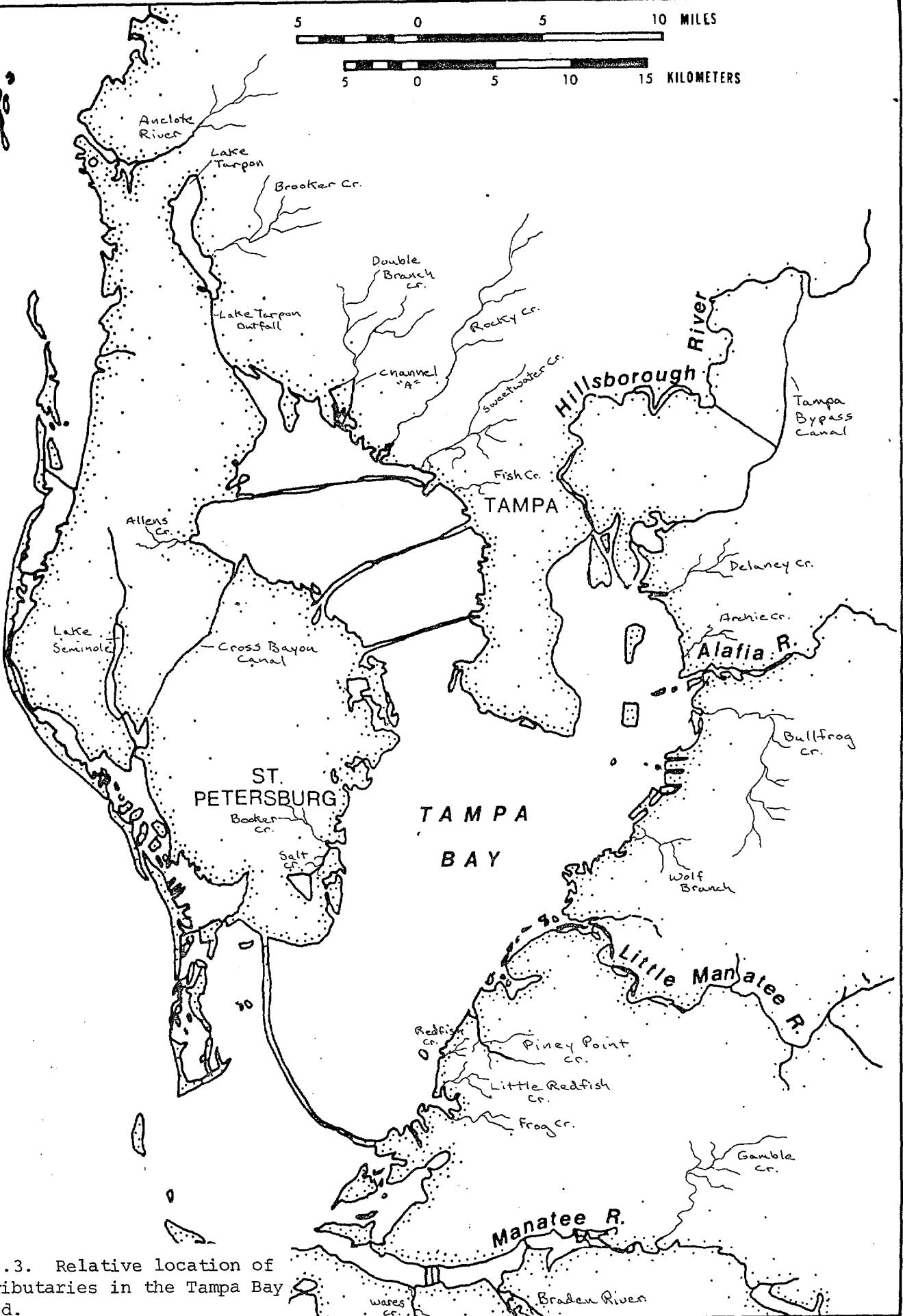


Figure 2.3. Relative location of major tributaries in the Tampa Bay watershed.

Condition 4: Natural Rivers

Little Manatee River.

Condition 5: Restorable Rivers

Alafia, Manatee and Braden Rivers.

The tidal Alafia River has moderate but restorable habitat loss and a long history of poor water quality due to upstream phosphate industry discharges. The tidal Manatee River is in better structural condition, but its flows are checked by a dam. Habitat in the tidal Braden River is in very good condition, but the river is dammed and pollution from stormwater runoff is an increasing problem.

Condition 6: Highly Stressed Rivers

Hillsborough River.

The Hillsborough River is highly urbanized, dammed, and receives large volumes of stormwater runoff. Sediments are contaminated and much of the lower river is affected by poor water quality in Hillsborough Bay.

Condition 7: Man-Made Rivers

Lake Tarpon Outfall, Channel A, Tampa Bypass Canal.

All are major drainageways with hardened or steep banks, control structures, and connections to water table or Floridan aquifers. Habitat value is poor, and all have pulsed discharges leading directly to bay waters.

Relevant Laws & Statutes:

No laws or rules specifically address management of tidal rivers around Tampa Bay as ecosystems. Water quality concerns are partially addressed by 17-3 F.A.C. Wetlands are governed by the Henderson Act of 1984. Stormwater discharges, surface water management systems, and consumptive uses of freshwater are controlled by the Southwest Florida Water Management District. County and city ordinances also apply.

Bay Management Objectives:

1. Preserve natural rivers and creeks and restore others not highly stressed.
2. Incorporate habitat features in man-made streams.
3. Minimize impacts to bay from highly stressed rivers and creeks.
4. Provide long term management of rivers and creeks as ecosystems.

Bay Management Recommendations:

Developing general recommendations for this issue is difficult because of the great diversity of the individual tributary systems involved; their particular condition and management needs; and regulatory, economic and other facets of each problem. Emphasis is placed on restorable rivers and creeks since restoration will prevent them from becoming highly stressed. Attention is then given to preservation of natural streams, followed by the worst-case conditions. Comments specific to each system are made below, followed by generally applicable recommendations.

1. Restorable Creeks and Rivers.

A. Bullfrog Creek:

Work Element 12-1: Hillsborough County should amend its comprehensive plan to tighten controls of shoreline uses and establish incentives for private landowners to restore shorelines. The County should also develop a sub-regional stormwater management system within the watershed of Bullfrog Creek, and provide centralized sewage treatment as described in Item 4.C.

B. Gamble Creek:

Work Element 12-2: The Florida Department of Environmental Regulation (DER), the Southwest Florida Water Management District (SWFWMD), Soil Conservation Service, and Manatee County should establish a task force to scrutinize agricultural runoff problems in Gamble Creek and formulate plans to address these problems by 1990.

Work Element 12-3: Manatee County should revise its comprehensive plan to recognize the unique natural resources of Gamble Creek and determine whether uplands around the creek qualify for either CARL or "Save Our Rivers" purchase.

C. Alafia River:

Work Element 12-4: Hillsborough County should place that segment of the river west of S.R. 53 into a special management category by amending the comprehensive plan, for the purpose of preserving creeks to the river and existing natural shorelines. An incentive program for private landowners to restore shorelines should be adopted.

Work Element 12-5: The Florida DER and SWFWMD should amend rules or regulations as needed to achieve the recommendations of Polychaete Research Inc. (1978) relative to optimal flows in the Alafia River.

Work Element 12-6: Tampa Bay Regional Planning Council should adopt the policy that no new or maintenance dredging projects in the lower Alafia River will be supported unless definite plans for water quality mitigation (as well as habitat mitigation) are incorporated.

D. Manatee River: State agencies (primarily DER, Department of Transportation and Department of Natural Resources) should cooperate in an assessment of the hydrological, chemical and biological effects of numerous derelict, existing and proposed bridge crossings in the middle river segment (see issue #42). Special attention is needed for STP and industrial effluents, boat basins, and stormwater runoff (emphasizing Wares Creek). This project could be assisted by the U.S. Army Corps of Engineers (COE), which is interested in dredging Wares Creek; DOT, which is presently relocating the navigation channel; and EPA, and/or U.S. Fish and Wildlife Service. Refer also to recommendations 1B (Gamble Creek); 1E (Braden River) and 4B (minimum flows).

E. Braden River: Presently, TBRPC is designing water quality studies of the Anclote and Braden Rivers for the FDER.

Work Element 12-7: The water quality program should be implemented at the earliest possible opportunity owing to the very rapid development of the watershed for residential and industrial uses.

Work Element 12-8: Manatee County should amend its comprehensive plan to (a) adopt recommendations of the Southeast Sector Task Force as policy for the watershed south of S.R. 70; (b) establish a new planning sector within the "developing southeast sector", defined as a corridor encompassing both the tidal and non-tidal portions of the river. The latter action would place the river in a planning sector rather than between sectors, and perpetuate its existing and emerging character.

Work Element 12-9: SWFWMD and DER should collaborate with TBRPC and Manatee County to assess the present and future impacts of stormwater in the lower river, especially because of recent reservoir improvements which will reduce base flow.

Work Element 12-10: No increases in consumptive uses of water from the newly expanded reservoir should be permitted by SWFWMD until shorelines of the reservoir are graded so as to provide at least 33% of its total surface area as littoral zones. See also Recommendation 4B (Minimum Flows).

## 2. Natural Creeks and Rivers

### A. Double Branch Creek:

Work Element 12-11: At TBRPC initiative, Pinellas, Pasco and Hillsborough Counties should cooperate to establish a regional stormwater management program for the watershed. Also, recommendations provided in issue #30 (Bower Tract Management) and issue #34 (Channel "A" Restoration) are relevant and should be implemented.

B. Piney Point Creek:

Work Element 12-12: FDER renewal of AMAX NPDES discharge permits to Piney Point Creek (and Bishop Harbor, both Florida Aquatic Preserves) should be based on a demonstration that fluoride, radium, and other toxic materials have not accumulated in waters, sediments, plants, or animals (of either system). As an alternative, NPDES permit reviewers should consider AMAX discharges to the port-wide stormwater retention system proposed for Port Manatee. In the event that TECO constructs a power plant at Beacon Key, DER and Hillsborough County should disallow development in salt barrens, or hydrologic alterations which would effect water quality and habitat integrity in the creek.

C. Little Redfish Creek: See 3B: Redfish Creek.

D. Frog Creek: Frog Creek is threatened by stormwater and agricultural runoff, and hydroperiod changes from a proposed diversion of peak flows to AMAX.

Work Element 12-13: SWFWMD and DER should cooperate with Manatee County to establish a regional stormwater management system in the basin. Manatee County Pollution Control and SCS should work to curtail agricultural runoff. Structural controls on Frog Creek to store water for AMAX should be discouraged since the County will soon have a regional sewage treatment plant in the area and can provide effluent from that plant to AMAX instead.

3. Highly Stressed and Man-Made Rivers and Creeks.

A. Lake Tarpon Outfall:

Work Element 12-14: SWFWMD should evaluate the feasibility of grading one or both banks down to water level, from the present bank to limits of the right-of-way, for littoral zones. Minimum discharges should be established following the procedure used by the District in the Alafia River, to complement the existing draw-down schedules in the Lake. (See Item 4.B).

B. Channel "A": See issue #34: Channel "A" Restoration.

C. Tampa Bypass Canal: See comments at 3A (Lake Tarpon Outfall). In addition, SWFWMD owned tidal segments of the river and McKay Bay should be surveyed for the purpose of determining whether these areas are suitable for habitat restoration projects. If so, such plans should become works of the District by 1990 and incorporated in a McKay Bay management plan (see issue #24).

D. Hillsborough River:

Work Element 12-15: Recommendations for shoreline projects made by the City of Tampa NURP Receiving Water Study should be implemented. In addition, SWFWMD should provide a base flow to the Hillsborough River in such quantities and periods determined useful by NURP data.

Work Element 12-16: Deep holes at the river mouth, in Garrison and Seddon Channels, should be filled with dredged spoil to mitigate anoxic conditions in the lower river (see issue #4). Radical measures such as salinity barriers, aerators, or infilling should be considered to alleviate site specific problems.

E. Urban Creeks: The urban creeks include all streams in Pinellas County flowing to Tampa Bay, Rocky and Sweetwater Creeks in Hillsborough County, and Wares Creek in Manatee County.

Work Element 12-17: These creeks should be inventoried by TBRPC for flow characteristics, basin size, shoreline types, discharges, existing regulations, and restoration potential. Efforts by each municipality should begin, to implement urban redevelopment standards for stormwater control, including "in lieu of" payment programs such as that used by the City of Clearwater to underwrite regional stormwater management systems. (see issue #22, Stormwater Retention for Redevelopment). Radical measures such as salinity barriers, aerators, infilling, artesian base flows, or rerouting of streams through new areas should be considered to alleviate site specific problems (see also issue #35, Tidal Gates and Pumps.)

F. Redfish Creek: The following comments supplement issue #27 (Hendry Fill Restoration). Restoration of Hendry Fill (Redfish Creek) was proposed in a Water Quality and Natural Resource Management Plan developed by Mote Marine Laboratory for Port Manatee, as an off-site mitigation project. Coordination of issue #27 with the Manatee County Port Authority and Pollution Control Department should therefore be emphasized. One element of the port plan calls for the possibility of linking a port-wide stormwater detention system with the restored Little Redfish Creek via "Peanut Lake". Another possibility deserving regulatory scrutiny is restoration of Little Redfish Creek in such a manner as to receive AMAX discharges of non-process wastewater. Such a project would divert existing, permitted discharges from AMAX to Piney Point Creek and Bishop Harbor, two pristine natural areas, to a remade creek where ease of cleanup could be made a design consideration. In any case, creek rehabilitation should include removal of fine sediments on the estuarine flats from the creek mouth north to Port Manatee and south to Bishop Harbor.

#### 4. Baywide Recommendations.

A. Minimum Flows: The provision of adequate quantities of freshwater to Tampa Bay is critical to its maintenance as a productive estuary. The water must be provided at ecologically relevant times, and be relatively free of contaminants. At present, every river flowing to Tampa Bay is either dammed, tapped for cooling water, or has regulated tributaries. Development pressures and demands for potable water are immense and increasing, meaning that the basic estuarine character of Tampa Bay is endangered.

Responsibility for the protection of freshwater supplies to Tampa Bay rests squarely with SWFWMD. The District is to be commended for its sponsorship of minimum flow conferences, workshops on the Alafia River, and CUP studies required of Manatee County in connection with reservoir expansion. The District must be supported by every means possible to establish ecologically meaningful flow regimens for all tributaries to the bay.

Work Element 12-18: A program is urgently needed to (a) evaluate the salinity structure of Tampa Bay and zones of the bay relative to river discharges; (b) link ecological events in the bay to low, average and peak flows so as to identify critical flows for each stream; and (c) still provide for reasonable demands for potable water in the region.

Elements of the program should address flow required for the Braden, Manatee, Little Manatee, Alafia, Palm (Bypass Canal), and Hillsborough Rivers; for Rocky, Sweetwater and Double Branch Creeks; and for Channel "A" and Lake Tarpon Outlet.

Work Element 12-19: A principle should be adopted by the District in determining minimum flows which differs from present policy as used in the case of Lake Manatee where only the impact of new and additional withdrawals were considered. Specifically, all minimum flows should be established on the basis of a new study and reconstruction of historical conditions, e.g., those existing prior to development. New legislation may be required to implement this approach.

Work Element 12-20: Existing legislation should be amended so as to instruct SWFWMD to set all existing flows of rivers in the District as their respective minimum flows. Further amendments should require the District to adopt specific minimum flows, based on scientific data, for each river flowing to Tampa Bay by 1990, in a manner consistent with Work Element 12-19. As interim criteria, two performance standards should be adopted for impounded rivers. Spillways should be modified to allow discharge whenever confined water levels are higher than mean sea level (downstream of the spillway). The releases should be made in amounts sufficient to maintain a 10 0/00 gradient in salinity between the spillway and the river mouth (Example: Braden River in Manatee County). Dams should be operated so as to release an amount equal to, or varying in lesser proportion with inflows to the upstream area. (Example: Hillsborough River, Tampa Bypass Canal in Hillsborough County; Manatee River in Manatee County). These provisions should be relaxed during District declared regional water shortages.

B. Wasteload Allocation: These comments supplement issue #13 (Wasteload Allocation Study) and, issue #10 (Industrial and Municipal Discharges).

There is more than enough evidence in the condition of urbanized creeks around Tampa Bay to argue against any new or continued discharge of municipal or industrial wastes to restorable and

natural creeks. Local comprehensive plans, SWFWMD and DER permit guidelines, and TBRPC review policies should be amended so as to prohibit all such discharges by 1990.

Allocations developed by DER for rivers should not be limited to their tidal segments. Allocations are needed for each river as a whole, based on site-specific data and the use of models with capabilities which are presently unavailable. All such allocations (when they are eventually made) should have a verified relationship to Tampa Bay, and should meet other performance standards set forth in issue #13 (Wasteload Allocation).

Work Element 12-21: Until all aspects of the wasteload allocation process can be specifically justified from a resource based perspective, it is recommended that the Department of Environmental Regulation duly return to enforcing technology based effluent limits (TBEL), and regulating all domestic wastewater discharges to Tampa Bay pursuant to Section 403,086(1)(b), Florida Statutes. At a minimum, to protect the biological resources of rivers flowing to Tampa Bay, all discharges should be encouraged, and provided assistance wherever possible, to upgrade treatment facilities so as to provide advanced wastewater treatment as defined by Chapter 17-6, Florida Administrative Code. In addition, alternatives to surface water discharges should be sought wherever possible.

Work Element 12-22: The Department of Environmental Regulation should continue to expend funds for the expansion and refinement of the Draft Tampa Bay 205(j) Water Quality Impact Study. Before this document can serve as a wasteload allocation study, the findings of which to be reflected in permitting decisions, much work is yet needed. If federal 205(j) grant funds cannot be allocated for this purpose, it is suggested that the Department seek a special legislative appropriation to complete the task. An alternative source of funding worthy of consideration would be a special surtax levied on those domestic and industrial dischargers utilizing the receiving waters of Tampa Bay or its tributaries. Based on 1982 effluent flows a surtax of \$3.00 per MGD would generate approximately \$200,000 per year which could be used for further research leading to the development of scientifically defensible allocations.

#### Long-Term Management Alternatives:

The following conclusions are relevant to the consideration of long-term management alternative.

- Until now there has been no summary statement of the condition of rivers and creeks flowing to Tampa Bay, or of their management problems.
- The various tributaries are naturally different, and each has unique problems as well as problems common to other streams;
- Management of a river or creek as an ecological unit will have to involve several levels of government and authority;

- Although several streams among those considered are highly stressed, more are natural or are still restorable.
- Population growth threatens all bay tributaries and unless actions are taken before 1990 more streams will be irrevocably stressed by the year 2000.

Status Quo: Table 2.4 summarizes the probability of implementing recommendations made herein, as a function of three management alternatives. Under the present management framework no recommendation has a high probability of occurring, and natural systems will get less attention than disturbed areas (i.e., existing regulatory framework is reactionary, not proactive). Implementation is enhanced under the bay advisory committee alternative and is much better if a bay commission is constituted. Under this management strategy, considerable emphasis is placed on use of local comprehensive plans; but except for the advisory review of plans by TBRPC no mechanism will exist to encourage needed amendments to, or compliance with the plans. Accordingly, all local governments should be briefed on findings and recommendations of the 1984 Tampa Bay Management Study Commission before or concurrent with the legislative report. Since local governments will not be interested in problems which transcend their political boundaries, little progress on many recommendations is expected under status quo management scenario.

Bay Advisory Committee: Chances of implementation are improved by this approach if and only if the committee is staffed and funded; but difficulties are expected where special interest are involved (1C: Alafia River; 2B: Piney Point Creek); interactions with SWFWMD are necessary (3A: Lake Tarpon, 3C: Tampa Bypass Canal); or urban creek rehabilitation is a comparatively large project for municipalities (3E: Urban Creeks). While a staffed bay advisory committee within the Tampa Bay Regional Planning Council could fund some of the recommended projects through state and federal grants, several other important ones would not be practical undertakings.

Bay Management Authority: A funded, mandated authority which fully involves existing governments and regulators could accomplish or cause others to implement most of the recommended actions. Even a bay management authority would find obstacles in certain areas due to diffuse responsibility (1C: Alafia River; 2A: Double Branch Creek) or historical inertia of mission-oriented agencies (3A and C: Lake Tarpon Outlet and Channel "A").

Table 2.4. Relative probability of implementing bay management recommendations under the various long-term management alternatives.

Element	Probability of Implementation		
	Status Quo	Advisory Committee	Bay Authority
1.A. Bullfrog Creek	low	average	high
1.B. Gamble Creek	none	average	high
1.C. Alafia River	none	low	average
1.D. Manatee River	none	average	high
1.E. Braden River	average	high	high
2.A. Double Branch Creek	none to low	average	average
2.B. Piney Point Creek	low	average	high
2.C. Little Redfish Creek	average	high	high
2.D. Frog Creek	average	high	high
3.A. Lake Tarpon Outfall	low	low	average
3.B. Channel A	average	high	high
3.C. Tampa Bypass Canal	low	low	average
3.D. Hillsborough River	-----In preparation-----		
3.E. Urban Creeks	none	low	average
3.F. Redfish Creek	average	high	high
4.A. Management Study	average	average	high
4.B. Minimum Flows	average	high	high
4.C. Wasteload Allocation	average	high	high

Issue #13 Wasteload Allocation Study for Tampa Bay

Issue Analysis: Tampa Bay is presently experiencing a number of water quality problems. In particular, there is a periodic depletion of the dissolved oxygen (DO) resources and associated fish kills. There has been a disappearance of grassbeds in the area. Seasonal algal blooms are also encountered. Taken together, these problems appear to be associated with nutrient enrichment of the bay system. An associated concern is the health of grassbeds in the area. Since the primary fisheries habitat, especially for juveniles, is grassbeds and since the bay, for the most part, is classified as Class III (Recreation-Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife), the health of the grassbeds is related to the maintenance of the designated use. Therefore, the primary concern of water quality studies in Tampa Bay should be nutrient loads from point and nonpoint sources.

In 1972 the Florida State Legislature passed what was known as the Wilson-Grizzle Bill (Section 403.086(1)(b), Florida Statutes). This bill stipulated that no domestic wastewater disposal facility constructed after 1972 could discharge any waste into Old Tampa Bay, Tampa Bay, Hillsborough Bay, Boca Ciega Bay, St. Joseph Sound, Clearwater Bay, Sarasota Bay, Little Sarasota Bay, Roberts Bay, Lemon Bay, or Punta Gorda Bay in addition to any bay, bayou or sound "tributary thereto" without providing at least advanced wastewater treatment (AWT). In essence, the area covered by the bill included all saline coastal bodies of water from the Anclote Keys south to Charlotte Harbor.

Advanced wastewater treatment, as defined in the Florida Administrative Code, Chapter 17-6, limited the annual average effluent concentration to 5 milligrams per liter (mg/l) of 5 day biochemical oxygen demand (BOD5) and total suspended solids; 3 mg/l total nitrogen; and 1 mg/l total phosphorus. This requirement was not based on site-specific water quality determinations, but was made in an attempt to reverse what was perceived by many to be deteriorating water quality in the area. No relief mechanism was provided other than a statutory variance.

In 1980 the Legislature modified the Wilson-Grizzle Bill such that the Florida Department of Environmental Regulation (DER) could grant relief for facilities if the applicants initiated a request for such relief and then demonstrated that AWT was not required to protect water quality. The modified Wilson-Grizzle Bill also expanded the "affected area" to include all freshwater tributaries which flow into the original Wilson-Grizzle area. This area was defined hydrologically as the Peace River and Tampa Bay Basins.

Then, in July of 1981, the Legislature repealed the statute requiring AWT for domestic wastewater treatment facilities constructed after 1972. The statute was replaced with a mandate requiring the DER to specify wasteload allocations on a case-by-case basis for domestic point sources. Also required was a survey on the overall impact of existing nonpoint sources discharging into the waters of the original Wilson-Grizzle area.

In 1983 the Department of Environmental Regulation initiated research efforts leading to the development of wasteload allocations for Tampa Bay. In September of 1984 a draft document entitled Tampa Bay 205(j) Water Quality Impact Study was released for public review.

The purpose of the Tampa Bay 205(j) Water Quality Impact Study was to evaluate the present condition with respect to major nutrients and to predict mathematically what effect future discharges to Tampa Bay will have on water quality parameters including chlorophyll-a and dissolved oxygen concentrations. The ultimate uses of this document include long-term wastewater planning (e.g. 201 Facility Planning, Florida Construction Grants Program, N. Pinellas EIS) and permitting. Although no specific wasteload allocations were delineated in the draft the following conclusions were made:

Old Tampa Bay

- 1) The modeling effort was sufficient to make regulatory decisions regarding future point and nonpoint source discharge impacts on dissolved oxygen and nutrient resources in Old Tampa Bay.
- 2) In the absence of point sources it is predicted that in the year 2000 with urban and agricultural Best Management Practicies (BMP's) applied Old Tampa Bay will, during high flow conditions, experience DO values less than the minimum criteria of 4 mg/l and chlorophyll a values greater than 30 ug/l. This is not true for low flow conditions.
- 3) Clearwater East & Northeast could discharge highly treated water from a new outfall in Old Tampa Bay considering DO and nutrients; however, Outstanding Florida Waters (OFW) and Class II water restrictions apply.
- 4) Oldsmar and N. Pinellas 201 could discharge up to 15 mgd from a new outfall with a high degree of treatment; however, OFW and Class II water restrictions apply.
- 5) Hillsborough County/River Oaks should not discharge into Old Tampa Bay at the mouth of Channel "A" due to water quality reasons.

Tampa Bay Proper

- 1) The modeling effort was sufficient to make regulatory decisions regarding future point and nonpoint source impacts on dissolved oxygen and nutrient resources in Tampa Bay proper.
- 2) Albert Whitted STP could discharge with minimum treatment to Tampa Bay proper based upon DO and nutrients; however, OFW and Class II water constraints apply.

Hillsborough Bay

- 1) The modeling effort to date was insufficient to make regulatory decisions regarding point source impacts in Hillsborough Bay. Both the existing and future discharge alternatives need further model runs. Relative to the major dischargers considered in the study, certain conclusions can be drawn.

- 2) In the absence of point source discharges, it is predicted that in year 2000 with urban and agricultural BMP's applied to nonpoint sources, Hillsborough Bay will, during high flow conditions, experience DO values less than 4 mg/l and chlorophyll a values greater than 30 ug/l. During low flow conditions, DO values will be greater than 4 mg/l and chlorophyll a values less than 30 ug/l.
- 3) City of Tampa/Hookers Point facility with high treatment levels at 98.38 mgd and at its current point of discharge will cause a significant negative impact on water quality in Hillsborough Bay. However, other sources were being considered in these model runs and alternate discharge sites were not considered. Additional runs are needed to isolate the impacts of all existing and proposed dischargers.
- 4) Hillsborough County/Alafia STP impacts were unresolved due to incomplete knowledge of the relative contribution of other point sources in the area.

Shortly following the release of the document the Tampa Bay Management Study Commission provided a detailed review of the Draft Tampa Bay 205(j) Water Quality Impact Study to the Department of Environmental Regulation (see appendix D). In that review, several technical flaws in both study design and execution were cited. In general, these flaws included the following:

- dissolved oxygen measurements were averaged over the entire water column for modeling purposes;
- the rationale for water quality targets was not clearly documented and the linkage between water quality goals and resource use attainability was not adequately established;
- the computer model was not adequately calibrated or verified;
- analysis of the contribution of benthic pollution sources was based on insufficient data;
- the modeling approach excluded convective acceleration terms from the equations of motion;
- historic water quality and meteorological trends were not adequately considered;
- data on nutrients and eutrophication from other estuaries were not utilized for comparative purposes;
- seagrass meadows were mapped at an inappropriate scale resulting in a critical loss of resolution;
- the compensation point of seagrasses used in the development of resource based water quality targets was not justifiable based upon the available literature;

- the effects of epiphytic algae, as an indicator of eutrophication, on the elimination of seagrasses were not considered;
- the specific purpose and ultimate use of the document was not clearly stated; and
- no regulatory alternatives were discussed regarding the impacts on non-point source nutrient loadings.

It was, however, concluded that the study did result in a useful tool (i.e. the Tampa Bay model) which will facilitate the understanding of DO and nutrient resources in Tampa Bay. There is much to be gained from developing such a model for Tampa Bay, as it could eventually be used to predict both short and long term effects of many types of management and regulatory decisions.

Relevant Laws and Statutes:

Federal Water Pollution Control Act, Section 402  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Develop a scientifically justifiable research tool for assessing and predicting the impacts of nutrient loadings from point and non-point source discharges on the living resources of Tampa Bay.
2. Establish legally enforceable, resource based, effluent allocations for all municipal and industrial point sources discharging to Tampa Bay.

Bay Management Recommendations:

1. The findings of the Draft Tampa Bay 205(j) Water Quality Impact Study should not be reflected in the regulatory process until such time as all of the problems cited in the Tampa Bay Management Study Commissions review of the document are resolved (see appendix D).
2. Until all aspects of the Draft Tampa Bay 205(j) Water Quality Impact Study are amended to be scientifically justifiable from a resource based perspective the Department of Environmental Regulation should duly return to enforcing technology based effluent limits (TBEL), and regulating all domestic wastewater discharges to Tampa Bay pursuant to Section 403.086(1)(b), Florida Statutes. At a minimum, to protect the biological resources of Tampa Bay, all dischargers should be encouraged, and provided assistance wherever possible, to upgrade treatment facilities so as to provide advanced wastewater treatment as defined by Chapter 17-6, Florida Administrative Code. In addition, alternatives to surface water discharges should be required wherever feasible or necessary.

Work Element 13-1: The Tampa Bay Regional Planning Council should, through their Chapter 163, F.S., review responsibilities, encourage and assist local governments to purchase needed land and implement effluent

spray irrigation and wetland filtration programs. A special sub-committee of the Council should be established to develop regional capital improvement strategies and grant assistance for future areawide wastewater treatment and disposal needs.

3. During this interim period, the Department of Environmental Regulation should continue to support and expend funds for the expansion and refinement of Draft Tampa Bay 205(j) Water Quality Impact Study.

Work Element 13-2: If federal 205(j) grant funds cannot be allocated for this purpose it is recommended that the Department seek a special legislative appropriation to complete the task. To replenish state spending for this purpose an alternative source of funding worthy of consideration would be a special surtax levied on those domestic and industrial dischargers utilizing the receiving waters of Tampa Bay. Based on 1982 effluent flows a surtax of \$3.09 per MGD would generate approximately \$200,000 per year which could be used for further research leading to the development of scientifically defensible WQBEL for Tampa Bay. Periodic re-assessment of wasteload allocation figures to determine accuracy and to continually update the wasteload allocation analysis should also be performed at least bi-annually.

Estimated Manpower and Cost

Year	1	2	3	4	5
<b>Manpower (man years)</b>					
- Staff (DER)	2	2	2	2	2
- Consultant	-	-	-	-	-
<b>Total</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Source of Funds</b>					
- Federal (205j)	100,000	100,000	-	-	-
- State (Allocated)	100,000	100,000	-	-	-
- Local (Surtax)	-	-	200,000	200,000	200,000
<b>Total</b>	<b>200,000</b>	<b>200,000</b>	<b>200,000</b>	<b>200,000</b>	<b>200,000</b>

Long-term Management Alternatives:

Status Quo: Under the present regulatory framework the Department of Environmental Regulation will complete and enforce the findings of Tampa Bay wasteload allocation study. However, critical review of the draft study by local scientists and engineers proved to be extremely useful in uncovering problems in the research effort completed to date. A study of this importance will require maximum peer review before it is reflected in critically important regulatory decisions.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could continue to provide a valuable technical advisory role leading to the refinement and continued updating of the wasteload allocation analysis. In addition, such a committee could also provide a useful grant assistance function for local governments seeking effluent disposal alternatives.

Bay Management Authority: Besides providing the same functions as a bay advisory committee a mandated bay management authority could potentially assume management responsibilities for ongoing wasteload allocation analyses as well as permitting authority for all point-sources discharging into Tampa Bay.

Issue #14 Assessment of Fishery Stocks in Tampa Bay.

Issue Analysis: The yield of sport and commercial fishes from Tampa Bay is one of the most tangible expressions of its productivity. Because of studies in other estuaries we know that particular activities will be detrimental to fisheries production whereas other actions will be beneficial; but these insights do not allow us to state the relative significance of singular or combined management actions on particular species in the bay.

Annual catches of sport and commercial fishes and invertebrates are poorly documented for the waters of Tampa Bay, but available information shows that numerous stocks are declining or are maintaining at low levels compared to historical records. Reasons for stock declines may be several but until such time as the biology of these species is known no certain evaluations of pollution, habitat loss or gain, or other management factors can be made.

Existing regulations concerning fisheries management in Tampa Bay are primarily limitations to commercial activities near residential waterfronts, although state season and size or catch limits apply to clams and oysters, stone crabs, pompano, flounder, mackerel, spotted sea trout, redfish and snook. Protection of existing habitat and water quality will be necessary but not sufficient for long-term rehabilitation of these and other fishery stocks. A lack of information on the present status of fisheries is the single greatest impediment to their effective management.

Relevant Laws and Statutes:

National Environmental Policy Act

Federal Water Pollution Control Act

Fisheries Conservation and Management Act

Numerous state laws, special acts and administrative rules

Bay Management Objectives:

1. Provide for maximum sustained yields of important fishery resources, with recognition that optimal yields may be smaller due to competing social needs.
2. Provide for maintenance without compromise of genetic diversity within stocks, and species diversity of the estuary as a whole.
3. Enhance habitat and water quality for regional as well as local fishery resources.

Bay Management Recommendations:

1. A complementary program of fisheries research, monitoring and regulation of all valued stocks in Tampa Bay should be implemented with a secure base of user-oriented funding. The proposed program involves seven complementary elements as follows:

A. First Generation Model: A systems model for the production of sport and commercial fishery products in Tampa Bay is recommended as the first activity in the bay research program. This nine-month effort is budgeted at \$33,000, and would frame the conceptual basis against which all synoptic data needs can be defined or subsequent site investigations interpreted. The model has the long-term goal of predicting stocks of specific species under a variety of natural or cultural pressures. The first generation model would be based on existing bay data and literature plus those facts transferable from other subtropical estuaries similar to Tampa Bay. The model would be exposed to the scrutiny of at least one technical and one public workshop for enhancement or revision, as needed.

B. Synoptic Survey of Stocks: The synoptic survey of fishery stocks in Tampa Bay is designed around a 12-month program which would begin after completion of the first generation model. The full year of sampling begins in January and is comprised of six elements. In the winter and late fall 30 stations in the bay would be sampled a total of three times for ichthyoplankton, juveniles and adults. Sampling would be performed at night and during the day in the water-column and epibenthic environments. The stations would be distributed as equitably as possible among salt marsh, mangrove, oyster bar, live bottom and open waters of the bay. Sampling in rivers, the open bay environment, inlets and beaches also would be performed four times between March and August, and would be a larger geographic effort encompassing a total of 50 stations. During each of the 30-station or 50-station sampling events, standard measurements of species richness, density, size, fecundity and condition would be made for representative subsamples of all catches. In addition, gut contents would be determined for nested subsamples among species of interest. Water chemistry will be measured on a monthly basis with emphasis on in situ metered parameters such as currents, temperature, salinity, pH, dissolved oxygen, color, etc. Primary production, phytoplankton, biomass and zooplankton biomass will be measured at selected stations. This program will be coordinated as carefully as possible with existing monitoring programs of local governments to avoid duplication of efforts and unnecessary costs. Prior to each 30-station and 50-station sampling effort fishery pressure will be determined through intensive monitoring of sport and commercial activities (see next item). On a less frequent basis (three times during the year), estimates of entrainment losses will be made at power plants surrounding the bay.

C. Fishery Pressure: A key element in understanding the production of sport and commercial fisheries in Tampa Bay is an accurate measurement of the harvest efforts made by the sport and commercial sectors upon these resources. Six intensive surveys of sport and commercial fisheries will be performed as part of the synoptic fishery surveys. Measurements of recreational and commercial fishing pressures will be accomplished through aerial and ground surveys using the appropriate statistical approach so as to accurately describe fishing pressures for the week preceding each

collection. By the third such survey, preliminary catch-per-unit-effort (CPUE) estimates will be made for all key species. By the fifth such survey, second estimates of CPUE will be made for use in year and phase two modeling.

D. Phase 2 Modeling: The second generation model will be based on synoptic and CPUE surveys for both commercial and sport species generated during the year long survey. The modeling can begin in October of the synoptic survey year and continue through April of the following year. The purpose of the second modeling effort is to identify and evaluate relevant model elements and interactions affecting fishery stocks. A second purpose of the modeling effort is to identify the site specific investigations which should be performed in the months of May and July of the third year (as means of verifying predictions of the model). Once these site investigations have been made the model can be used to evaluate production rates under a variety of management scenarios.

E. Site Investigations: The site investigations are of narrow geographic scope and are meant to provide the data necessary to calibrate the ecological model developed during the prior six months. Elements of the site investigations will include physical and chemical characterizations, samplings by day and night or tide for all target species and assessment of fishery pressure (and entrainment, if necessary) in March-April and again in May-June. A second goal of the site investigations is to identify those sites and techniques useful in a long-term program of fisheries monitoring at a modest scale, as a means of predicting sustainable yields likely to result from natural or cultural stresses. A third purpose of the site investigations is to allow for the calibration of a state fisheries program adapted for Tampa Bay (next item).

F. Bay Fisheries Statistics Program: The fisheries stock assessment program described thus far is a three-year program which would not begin until approximately \$425,000 has been escrowed and projections of revenue clearly showed that funds would be available for the completion of the program. By this time the State DNR Statewide Fisheries Statistics Program will be fully operable and should be adaptable with finer resolution to Tampa Bay. Elements of this program would include a) delineation of sectors within the Bay for which sport and commercial fisheries stocks and pressures can be assessed; b) determination of minimally adequate sampling for stocks and fishing pressure; c) alignment of the fine grain data base with the general state-wide program, and d) a one-year program in which the bay-sector data base is compared to the state-wide program. The synoptic survey, modelling and fine grain statistical program would all be complete by the 36th month of the stock assessment project and lead to a regulatory phase.

G. New and Revised Regulations: One recommendation of the Commission could be ongoing during the stock assessment study phase, e.g. the encouragement and assistance of the Marine Fisheries Commission in standardizing local acts. However, the synoptic sampling, modeling and statistical program is expected to lead to a more effective, scientifically grounded regulatory program. Performance standards

are set for target species with regard to seasons, sizes, other limitations such as catch-by-sex, gear restrictions, or the closing of certain waters. The effectiveness of the regulatory program so defined could then be assessed through the continuation of the bay specific fisheries statistics program.

2. Most of these elements have been drawn together as a single work plan for stock assessment of bay-wide fisheries. A 36-month program will be required to accomplish the majority of the recommendations summarized above. The three-year cost of this program is anticipated to be \$641,900 or an average monthly expenditure of approximately \$17,830 (see table 2.3). Because of the necessity to link fishery research and regulation to a secure base of steady funding, it is proposed that the work outlined below not begin until such time as funds have been accumulated to equal or exceed 66% of the necessary total. In other words, the three years of field work analysis and regulatory adjustments proposed below should not begin until such time as a majority of the requisite funds have been established.

Work Element 14-1: The following steps are proposed for the purpose of securing funds for the stock assessment. First, a recreational fisheries license should be adopted for the marine waters of the State with a portion earmarked for return to the fisheries program in proportion to the amount of funds generated from the Tampa Bay area. In making this recommendation the Commission recognizes the need for a) the ready accessibility of a saltwater fishing license and b) provisions for a fair and equitable program of licensing for charter boats and head boats. In addition to this state-wide source of funds, and as an alternative source in the event the license program is never adopted, the Legislature should authorize the return to the Tampa Bay Fisheries Program of trawl net fees, saltwater products license fees, fines related to marine fisheries violations, and such other miscellaneous funds as deemed appropriate for this purpose. Once an assessment is made of the revenue likely to be generated from these two sources, serious consideration should be given to a third source of local, independent funds to supplement remaining fiscal needs for an ongoing fisheries program. A levy on sewage treatment plant discharges to Tampa Bay, for effluents treated to less than advanced levels, is one possibility. Contributions from local sources should also be solicited, in particular from seafood restaurants and other fishery dependent commerce. Finally, an alternate source of local support could be derived from funds contributed by industries in lieu of direct mitigation of their impacts to Tampa Bay. For further discussion of other funding alternatives see issue #1.

Long-Term Management Alternatives:

1. Status Quo: The proposed studies could be adequately administered by the Department of Natural Resources, Bureau of Marine Research, or by the State University System with guidance from the Marine Fisheries Commission.

2. Bay Advisory Committee: A standing advisory committee within the Tampa Bay Regional Planning Council could be effective in assisting the above cited agencies in conducting and administering the proposed studies.

This alternative, however, would require very explicit description of funding, fund management and project continuity in the absence of an administrative agency.

3. Bay Management Authority: A mandated bay management authority could administer the proposed study program with assistance from, and coordination with, the above cited agencies and consulted services. The authority could generate, manage and disburse funds as outlined in the above stated recommendations.

Table 2.5 Draft Estimate of Costs for a Baywide Stock Assessment Work Plan.

<u>ELEMENT</u>	<u>STARTS</u>	<u>ENDS</u>	<u>DURATION</u>	<u>FREQUENCY</u>	<u>LEADS FROM</u>	<u>LEADS TO</u>	<u>TOTAL COST<sup>1</sup></u>
Fund Accumulation	with legislation	at 66% total \$	?	continuous	Commission Recommendation	Study	\$425,000
First Model	Month 1	Month 9	9 months	continuous	Funding Threshold	Synoptic Survey	\$ 33,000
30-Station Surveys*	Month 8 (February)	Month 18 (December)	12 months	months 8,16,18	First Model	Second Model	\$ 50,900
50-Station Surveys	Month 10 (April)	Month 13 (August)	6 months	alternate months	same	same	\$125,700
Trophic Studies*	Month 8 (February)	Month 18 (December)	11 months	with 30 & 50 station surveys	same	same	\$ 25,600
Physical Data*	Month 7 (January)	Month 18 (December)	12 months	monthly	same	same	\$ 47,600
Effort Surveys *	Month 1 (January)	Month 18 (December)	12 months	week prior to 30 & 50 station surveys	same	same	\$ 67,100
Entrainment*	Month 8 (February)	Month 18 (December)	12 months	months 8,12,16	same	same	\$ 53,500
Second Model	Month 16 (October)	Month 28 (November)	12 months	continuous	Synoptic Survey	Synoptic Investigations	\$ 45,000
Site Investigations*	Month 23 (May)	Month 25 (July)	3 months	determined by model	Second Model	Bay Statistics Program	\$ 95,000
Bay Statistics	Month 26 (August)	Month 32 (March)	6 months <sup>3</sup>	continuous	all above	Regulatory Programs	\$ 65,000
Regulations	Month 32 (March)	---	ongoing	continuous	all above	Commission Goal	\$ 33,500

NOTES:

<sup>1</sup>Estimates are 1984 Direct Costs

<sup>2</sup>Includes Items marked by \*

<sup>3</sup>An ongoing program budgeted for only 6 months

## Issue #15 Gypsum Field Decommissioning

Issue Analysis: The Gardinier, Inc., Gypsum field located west of U.S. Highway 41 and north of the Alafia River represents a continuing source of contamination to Tampa Bay through leaching of acidic waters, fluoride and radionuclide enrichment, and sedimentation (see figure 2.4). Past leaching has resulted in the formation of an extensive calcium flourite delta along the adjacent bay bottom. Benthic epifaunal and infaunal productivity and diversity in the vicinity of this delta has thus been significantly reduced.

In 1983 Gardinier, Inc., applied for a development approval, through the Development of Regional Impact (DRI) process (Chapter 380, Florida Statutes), for a new gypsum field to be located east of U.S. Highway 41. Many conditions of approval related to the decommissioning of the old gypsum field were incorporated into the Development Order, including the following:

### No. 3 - TBRPC

"To assure that the existing stack is properly and adequately decommissioned and closed, Gardinier shall prepare and present for review and approval to Hillsborough County and TBRPC a plan prepared pursuant to the U.S. Environmental Protection Agency regulations. This plan shall identify the manner proposed to close the top of the stack and the existing collection system for leachate and shall address Gardinier's commitment to maintain and/or improve this system over future years. This plan shall also require a commitment to maintain vegetation on the existing stack over future years." (TBRPC Recommended order, 3)

### No. 38 - HCEPC

"Gardinier shall submit to the EPC a close-out plan for the existing gypsum stack at least six months before decommissioning begins." (HCEPC Report, p. 6)

### No. 39 - HCEPC

"Decommissioning of the existing gypsum stack shall begin within six months of switch-over and de-bugging of the new gypsum stack." (HCEPC Report, p. 6)

### No. 40 - HCEPC

"Decommissioning of the existing gypsum stack shall include sealing the top of the stack with an impermeable material to prevent continued leaching of contaminated water." (HCEPC Report, p. 6)

### No. 41 - HCEPC

"Decommissioning of the existing gypsum stack shall include vegetation of the side slopes to reduce fugitive particulate emissions." (HCEPC Report, p. 6)

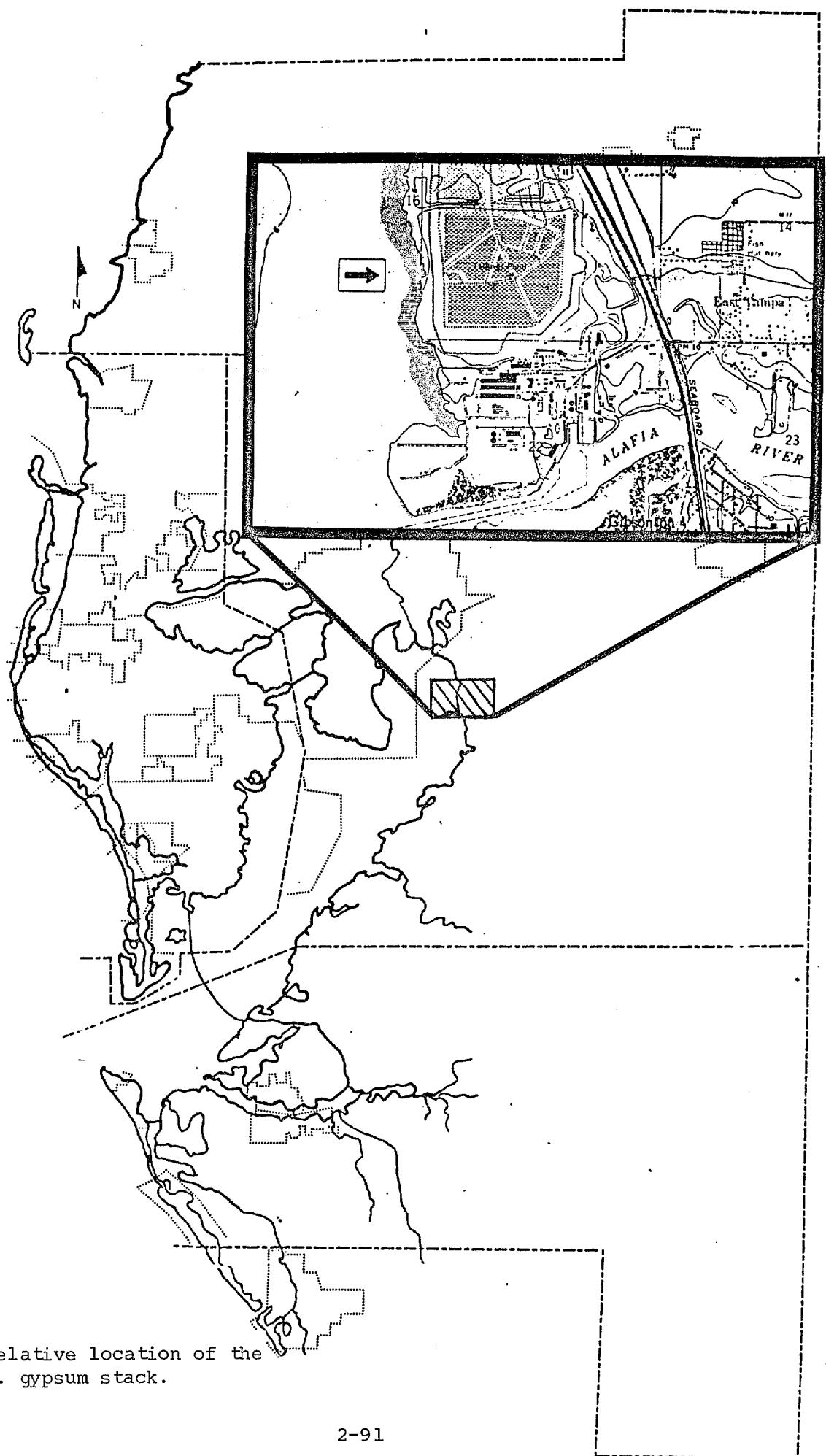


Figure 2.4. Relative location of the  
Gardenier, Inc. gypsum stack.

No. 42 - HCEPC

" Decommissioning of the existing gypsum stack shall include restoration and revegetation of the shoreline of the bay." (HCEPC Report, p. 7)

Gardinier, Inc., is committed to the conditions described above in accordance with Chapter 380, F.S.. The DRI monitoring process implemented by the Department of Community Affairs and the Tampa Bay Regional Planning Council will allow for long-term observation of progress with regards to the decommissioning of the old gypsum field.

Relevant Laws and Statutes:

National Environmental Protection Act (NEPA)  
Chapter 380, Florida Statutes (Land and Water Management)  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 376, Florida Statutes (Pollutant Discharge, Prevention and Removal)

Bay Management Objectives:

1. The Gardinier, Inc., gypsum field should be decommissioned in such a manner so as to preclude all future adverse environmental impacts on Tampa Bay.
2. Previously incurred environmental impacts on Tampa Bay resulting from the presence of the gypsum field should be reversed wherever feasible.

Bay Management Recommendations:

1. The Department of Community Affairs, the Tampa Bay Regional Planning Council and the Hillsborough County Environmental Protection Commission should continue to monitor compliance with the Development Order as related to the decommissioning of the old gypsum field. A substantial deviation from this Development Order in the future may allow for additional mitigation.
2. Since this is a unique location for a gypsum stack with its own existing and anticipated long-term problems, funding should be made available, through phosphate industry severance taxes, to conduct a detailed study of long-term maintenance problems and environmental impacts wherever they may occur. Funds from the Water Quality Assurance Trust Fund (Chapter 376.307, F.S.) should also be used for this purpose. The Department of Natural Resources, Bureau of Mines, should coordinate this effort.
3. A clean-up fund should be established by Gardinier, Inc., to mitigate impacts from natural disasters and to provide for long-term maintenance in the event of company bankruptcy or other failure.
4. The Florida Institute for Phosphate Research should step up efforts to find safe uses and disposal alternatives for gypsum and other phosphate industry waste products.

Long-Term Management Alternatives:

1. Status Quo: Monitoring of the committed decommissioning of the old gypsum field could be adequately implemented through the mandated Chapter 380, F.S., responsibilities of the Tampa Bay Regional Planning Council, and the Department of Community Affairs.
2. Bay Advisory Committee: Initiatives for the mitigation of past environmental impacts (i.e. removal of the calcium flourite delta) on Tampa Bay could be more effectively implemented through the efforts of a standing bay advisory committee within the Tampa Bay Regional Planning Council.
3. Bay Management Authority: A mandated bay management authority could potentially assume responsibility for large scale habitat restoration projects in Tampa Bay through proper access to a variety of funding sources.

## Issue #16 Commercial and Sport Fishing Regulation

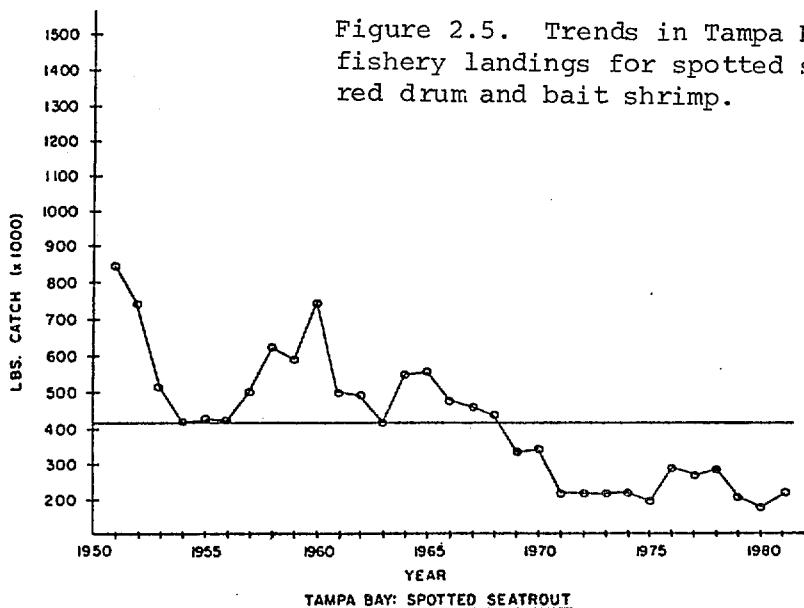
Issue Analysis: Florida's commercial and sport fishing industries represent an extremely important component of the states' economic base. According to a national survey (U.S. Department of the Interior, 1982) Florida ranked third in the number of resident anglers with 2,127,000; this figure represented over 25% of the state's population in 1980. Residents and tourists generated direct sport fishing oriented expenses of nearly \$1.4 billion. During the same year Florida's commercial fisherman harvested fish and shellfish with an estimated retail value of \$1.24 billion. Thus, taken together the state's recreational and commercial fishing industries generated approximately \$2.64 billion in revenues in 1980 exceeding, at least at the wholesale level, the combined revenues of both the citrus and cattle ranching industries.

However, despite the obvious value of the fishing industry to the states' economy, relatively few dollars are spent on fisheries research and management programs. In fiscal year 1983-84 Marine Fisheries programs (4.7 million/year) received \$3.6 million from general revenue and \$1.1 million from trust fund revenues. Overall, the state returns from general funds to fisheries programs less than 5 1/2 cents of each dollar of the approximately \$70 million of sales tax revenue generated.

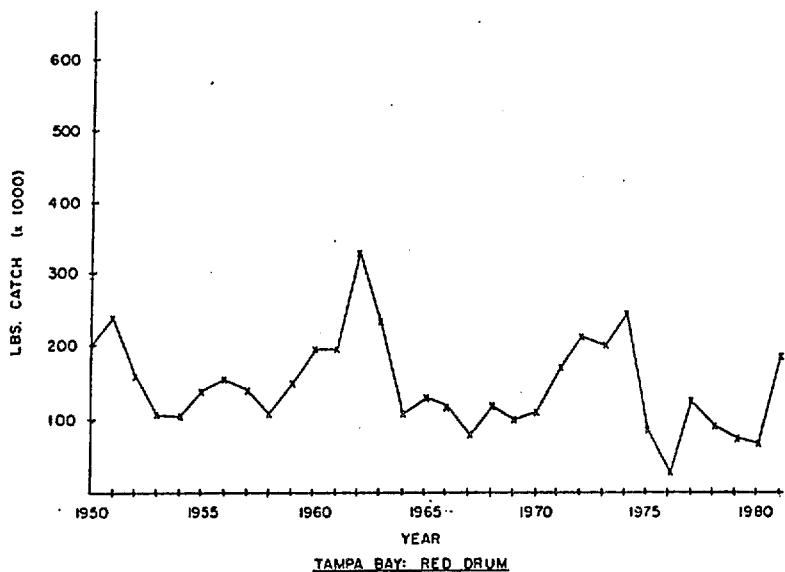
Historically, Tampa Bay has been one of the states' most productive fishery habitats. Prior to the turn of the century sturgeon were still fished commercially; and the bay supported thriving scallop and oyster fisheries up until about the early 1950s. While those fisheries have since collapsed completely due to overfishing and water quality degradation, Tampa Bay still supports reasonably productive fisheries for shrimp, bait shrimp and a variety of finfish including spotted seatrout, red drum, mullet, flounder and black drum. However, although fishery statistics for Tampa Bay are scarce, available data appear to indicate that even these fisheries may be threatened; most notably those for trout, redfish and bait shrimp. Commercial trout landings in the bay have decreased from 650,000 pounds in 1951 to 138,000 pounds in 1983, and, coincident with the loss of seagrasses in the bay, bait shrimp landings have declined markedly during the same time period. Red drum landings have fluctuated in recent years but the long-term trend appears to be downward for this species as well (see figure 2.5).

Spotted seatrout and red drum are two of Florida's most important recreational and commercial fish. Once staples of recreational fishing businesses, restaurants and seafood markets, red drum and spotted seatrout have disappeared at an alarming rate from Texas to North Carolina. Because these species spend almost their entire life histories within estuaries like Tampa Bay the problems of habitat destruction, pollution and overfishing by an increasing number of fishermen are critically linked to their declines. The only existing Florida laws regarding trout and red drum establish 12-inch size limits. However, new studies indicate that both fish species reach sexual maturity at sizes larger than 12 inches. Florida regulations, in essence, have encouraged the harvest of fish before they are big enough to reproduce even once.

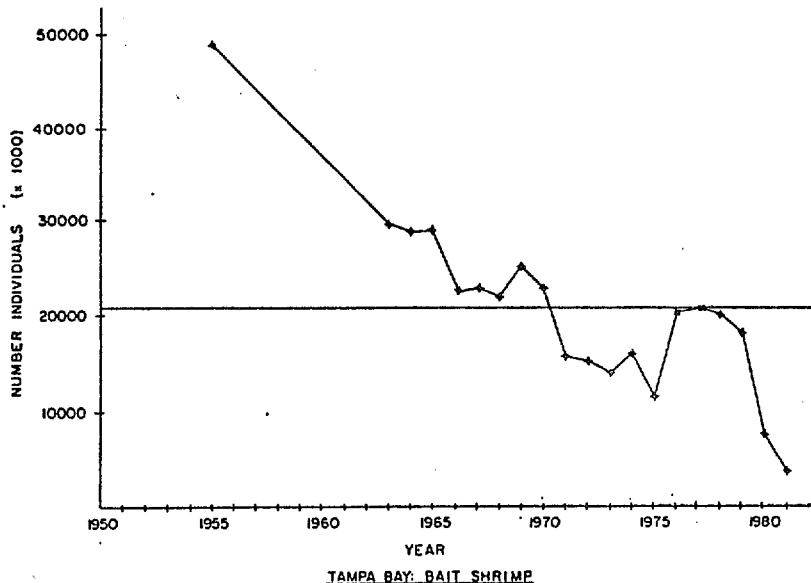
Figure 2.5. Trends in Tampa Bay fishery landings for spotted seatrout, red drum and bait shrimp.



TAMPA BAY: SPOTTED SEATROUT



TAMPA BAY: RED DRUM



TAMPA BAY: BAIT SHRIMP

Source: Department of Natural Resources  
National Marine Fisheries Service

Other states have taken recent steps to conserve what trout and red drum remain. Georgia has prohibited gill netting, the most efficient commercial gear. Alabama has banned the sale of native-caught fish, established bag limits of no more than 15 trout and 15 red drum per angler and prohibited the taking of red drum smaller than 14 inches and trout smaller than 12. Mississippi has banned nets made from near-invisible monofilament that catch more fish than other kinds of nets. However, Texas has been the leader in aggressive management. Native red drum and trout cannot be sold in Texas. No more than five reds and 10 trout can be taken by fishermen. Legal trout must be 14 inches or longer; red drum need be 18 inches. Only one 30-inch red drum, the prime spawning size can be kept. Texas Parks and Wildlife, which regulates fisheries, also maintains a hatchery program that stocked 7-million reds into its waters last year, and is augmented by a complementary artificial reef program which has created fish attracting habitat in numerous bays and estuaries. In light of these efforts, and declining Tampa Bay stocks, new management strategies for these species need to be considered on a regional, if not a statewide, scale.

Effective management of commercial and recreational fish stocks in Tampa Bay is also severely hampered by the large number of special acts and local laws, many of which are conflicting or redundant. Furthermore, many local fishing regulations were passed more as nuisance laws and are often not relevant to current management needs and objectives. This lack of uniformity from one area to another make current laws nearly unenforceable (see issue #6). The Marine Fisheries Commission has recently undertaken a statewide review of all local laws and special acts related to fisheries management with the objective of consolidating and standardizing these regulations on a statewide basis. This effort should be continued, and further studies should be initiated to ensure that all new regulations are biologically defensible and enforceable.

Relevant Laws and Statutes:

Chapter 327, Florida Statutes (Vessel Registration and Safety)  
Chapter 370, Florida Statutes (Saltwater Fisheries)  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Implement protective regulations and management strategies for those fisheries on the decline in Tampa Bay.
2. Improve the enforcement of fishing regulations by consolidating and standardizing all special acts and local laws related to fishing activities.
3. Develop and implement biologically defensible fishing regulations through expanded fisheries assessment and research programs.
4. Enhance fishery productivity wherever feasible through pilot stocking and habitat creation/restoration programs.

Bay Management Recommendations:

1. New statewide size and bag limits, and possible gear regulation, should be placed upon the commercial and recreational harvest of spotted seatrout and red drum.

Work Element 16-1: The Marine Fisheries Commission should introduce legislation establishing appropriate size and bag limits, and gear regulation, for both seatrout and red drum to allow for a more successful reproduction by these species. Appropriate elements of this legislation should include:

- Size limits for red drum and seatrout of 18 and 14 inches respectively;
- Recreational bag limit of four red drum per person per day; and
- Seasonal closures and gear regulation for commercial harvest of red drum.

2. All local laws and special acts related to the regulation of fishing activities should be consolidated and standarized on a statewide basis wherever feasible.

Work Element 16-2: The Marine Fisheries Commission should complete its' ongoing review of local fishing regulations and make recommendations for statewide standardization. Legislation should be introduced repealing all local fishing regulations deemed to be outdated, redundant or biologically irrelevant. The proposed legislation should replace all such regulations with a set of biologically defensible, and enforceable, statewide fishery management regulations.

3. The Department of Natural Resources Marine Research Laboratory should undertake a large scale fishery stock assessment/monitoring program as described in issue #14.
4. The Department of Natural Resources Marine Research Laboratory should undertake a study with the objective of determining the extent of seagrass damage attributable to trawl netting in the bay, as proposed in Work Element 2-7. Gear restrictions should be considered if it can be shown that trawling adversely effects seagrass beds.
5. The Department of Natural Resources Marine Research Laboratory should investigate the feasibility of implementing successful stocking programs for seatrout, red drum and snook in Tampa Bay.

Long-term Management Alternatives:

Status Quo: With sufficient funding the Marine Fisheries Commission and the Marine Patrol could adequately develop and enforce biologically defensible, standardized fishing regulations in Tampa Bay without further assistance. The Department of Natural Resources however, would need additional funding to implement the recommended studies.

Bay Advisory Committee: A permanent bay advisory committee within the Tampa Bay Regional Planning Council could provide a valuable local technical advisory function through interactions with the Marine Fisheries Commission during the development of statewide regulations.

Bay Management Authority: Besides providing the same function as a bay advisory committee, a mandated bay management authority could manage the proposed studies through coordination with the Department of Natural Resources.

Issue Analysis: The Tampa Bay estuarine system is, both directly and indirectly, a vitally important economic asset to the numerous municipalities surrounding the bay. Examples of economic entities which are dependent upon the direct utilization of Tampa Bay would include the port facilities of Tampa, St. Petersburg and Manatee County; the ship building and repair firms as well as other marina facilities located around the bay; and the commercial and recreational fishing industries. Indirectly, the mere presence of the bay attracts industries and businesses such as water-oriented residential developments, restaurants, and a myriad of related support industries and commercial and recreational activities.

The value of the estuary as a regional economic resource is, however, viewed by various industries and individuals from many different, and often conflicting, perspectives. For example, industries relying upon the availability of a source of water-bound transport may perceive the bay's value in the same sense that land-based industries would value railroad frontage in determining location decisions. For other firms, industries and even local governments, the bay is considered to be a convenient receptacle for the inexpensive disposal of industrial and urban wastes, or available space for further development. But for those industries dependent upon the harvest of living resources, or the availability of bay-oriented recreational opportunities, the value of the bay is perceived to be intimately tied to its ecological health.

The rapid growth rate of the Tampa Bay region's population and business sector over the past 30 years confirms that the mere presence of Tampa Bay has contributed significantly to the economic growth and diversity of the region, especially from a historic perspective. And yet, the value of the Tampa Bay estuary as a natural and cultural amenity to the overall economic base of the region has never been documented or quantified.

The environmental quality of the bay is, intuitively, an important component in the decision making processes of the majority of individuals and industries considering locating and/or operating in the Tampa Bay area. The Federal Water Pollution Control Act (Clean Water Act) amendments of 1972 mandated that, wherever possible, water quality is to be suitable for the protection and propagation of fish and wildlife, and to provide for recreation in and on all waters by July 1983. Further, the Act required that all point source pollutant discharges are to be controlled or eliminated by 1985. Local implementation of this Act over the past decade has generally resulted in an overall improvement in the water quality of Tampa Bay, but no analyses have ever been attempted to document the impacts of this improvement, from a benefit-cost perspective on the overall economic framework of the area, or to describe available alternatives in achieving an economic/environmental balance in light of the continuing requirements of the Clean Water Act, as well as other relevant federal and state environmental legislation.

In 1984 the Tampa Bay Regional Planning Council obtained federal Coastal Zone Management funds to initiate a study with the objective of documenting the importance of Tampa Bay estuarine system to the economic base of the region, in its static condition. Under this objective the following tasks are to be completed:

1. Using an export driven economic base model based upon employment figures, economic impact analysis will be performed for a designated target area around Tampa Bay. From this analysis the value of all direct (resource based) goods and services generated by the presence or use of the bay will be quantified.
2. Using benefit-cost analyses and attitudinal surveys the economic benefits derived from various attributes and uses of the bay will be quantified. These attributes and uses would include the following:
  - water based recreation - swimming, fishing, boating, etc;
  - shipping and water based commerce and transportation;
  - commercial fishing;
  - aesthetic contributions - tourism and real estate valuation;
  - ecological services - natural erosion protection and water pollution assimilation by wetland systems.

A subsequent phase of this project was proposed but the level of funding provided was prohibitive. In this phase net benefit-cost analyses would be performed in relation to a series of hypothetical scenarios in which the environmental quality of Tampa Bay is allowed to vary. The economic impacts of allowing industries to pollute bay waters and develop wetland habitat with varying degrees of regulation and constraint would be analyzed and quantified using sophisticated computer models.

It was hoped that the findings of this second phase of the proposed study would be incorporated into, and could be used to justify, the growth management recommendations and long-term management guidelines developed for Tampa Bay in local, regional, and state comprehensive, and resource management, plans and policies. However, without adequate funding it is unlikely that the study will be satisfactorily completed.

Relevant Laws and Statutes:

Not applicable

Bay Management Objectives:

1. Acquire adequate funding to effectively complete the proposed Tampa Bay economic study.
2. Utilize the findings of the proposed Tampa Bay economic study to model the economic impacts of, and support, growth management policies and long-term management recommendations developed for the Tampa Bay region.

Bay Management Recommendations:

1. The Tampa Bay Regional Planning Council should seek alternative sources of funding the federal Coastal Zone Management funds, which are presently unpredictable, to complete the proposed Tampa Bay economic study.

Work Element 17-1: The Legislature should allocate adequate funds to the Tampa Bay Regional Planning Council for this purpose. The proposed Tampa Bay economic study represents an unprecedented approach towards regional economic/environmental planning and could be used by the state as a model for similar efforts elsewhere. The degree of accuracy and resolution yielded from the study will depend largely on the level of funding provided.

Estimated Manpower and Cost

<u>Year</u>	<u>1</u>
<u>Manpower (man years)</u>	
- Staff (TBRPC)	2
- Consultant (USF)	1
<u>Total</u>	<u>3</u>
<u>Costs</u>	
- Federal (CZM)	\$50,000
- State	\$100,000
- Local	-
<u>Total</u>	<u>\$150,000</u>

Long-Term Management Alternatives:

1. Status Quo: With adequate funding the Tampa Bay Regional Planning Council could satisfactorily complete both phases of the proposed study.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be instrumental in interpreting the findings of the proposed study, and in converting these findings into local and regional plans and policies.
3. Bay Management Authority: A mandated bay management authority could further expand and refine the proposed study in an effort to economically justify the implementation of a comprehensive management plan for Tampa Bay.

## Issue #18 Public Education

Issue Analysis: Because Tampa Bay is a large, diverse and vital natural resource bordering on a major metropolitan area, it is important that the surrounding population is aware of the bay's problems, trends and potentials. Recent surveys taken in Florida, however, have indicated that the public, in general, has a very poor understanding of marine plant and animal life, the ecological value of estuaries, the sources of water pollution and the relationships between the destruction of habitat and fisheries yields (Department of Natural Resources, 1985). Problems resulting from the public ignorance include the destruction of seagrass beds by recreational boaters, unlawful dredging and filling practices, unauthorized discharges of wastes and littering. In addition, public ignorance of water pollution sources contributed to non-point source runoff significantly.

The majority of Tampa Bay area high schools, community colleges and universities have developed marine related curricula, but a large proportion of the bay's user-groups has not been exposed to, and/or does not have easy access to this information. A more comprehensive and extensive public awareness and environmental education program for Tampa Bay is needed to better inform the public at large.

### Relevant Laws and Statutes:

Not applicable

### Bay Management Objectives:

1. Increase the public knowledge of the functioning and interdependence of habitats and organisms within the Tampa Bay estuarine system.
2. Increase the public knowledge of the sources of water pollution.
3. Improve the public awareness of the historical and archeological values of the bay.
4. Improve the public awareness of the economic, commercial and recreational opportunities that the bay provides.
5. Keep the public informed about bay related activities, user-groups conflicts and their impacts on the bay.
6. Inform the public of the principle bay-related jurisdictions, their powers and responsibilities, and their permitting procedures.

### Bay Management Recommendations:

1. The Department of Environmental Regulation should implement a large scale statewide public education program dealing with the problem of non-point source pollution, and emphasizing best management practices for the public at large (see issue #3 for further discussion).

2. The Tampa Bay Regional Planning Council should establish a volunteer speaker's bureau, including a list of potential speakers with various related expertise, to address public groups and organizations on present and future bay management issues. To assist the speaker's bureau an automated slide presentation should also be developed. Special emphasis should be given to direct and frequent contact with local editorial boards.
3. The Tampa Bay Regional Planning Council in a joint effort with the Department of Natural Resources should develop and distribute a series of public brochures addressing the above stated bay management objectives.

Work Element 18-1: The development and distribution of a public brochure will require outside funds. Funding should be sought from granting programs (i.e. Sea Grant, CZM) or from the Legislature.

Estimated Manpower and Cost

Year	1
<b>Manpower (man years)</b>	
- Staff	1
- Consultant	-
<b>Total</b>	<b>1</b>
<b>Source of Funds</b>	
- Federal	\$10,000
- State	\$10,000
- Local	-
<b>Total</b>	<b>\$20,000</b>

Work Element 18-2: The dissemination of the brochures should be coordinated with and implemented by the Department of Natural Resources, the newly created Florida Marine Information Network (MARINE - National Marine Fisheries Service), local government planning, park and recreation departments, local conservation and recreation groups, and the media. Dissemination strategies might include having the Department of Natural Resources include the brochure in its annual mailing of boat registrations to all boat owners in the bay area.

4. The Florida Marine Information network should be encouraged to develop and disseminate public service announcements relevant to bay management issues.

Long-Term Management Alternatives:

1. Status Quo: The above cited recommendations could be satisfactorily accomplished through the efforts of the Tampa Bay Regional Planning Council if funding and staff levels remain sufficient.

2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could ensure the proper updating of pertinent information as well as the continuity and perseverance that are often needed to effectively implement public education programs.
3. Bay Management Authority: A mandated bay management authority could permanently assume the responsibility for all aspects of the proposed public education program.

## Issue #19 Urban Waterfront Development and Public Access

Issue Analysis: Urban waterfronts along Tampa Bay, as elsewhere in the nation, have become a focus of community redevelopment and revitalization efforts. Because the shoreline of Tampa Bay is largely urbanized, community redevelopment activities may account for many of the future improvements in development and public access. The attention devoted to such improvements will partly depend on how well opportunities are identified and provided for through local planning. Local planning for public access, shoreline aesthetics and facility improvements varies in accomplishment around the Bay, through waterfront/parkland improvement projects, waterfront zoning regulations, condition and user inventories, as well as in the updating of elements of the comprehensive plans. The City of St. Petersburg is especially recognized for maintaining an expansive and aesthetic public waterfront.

While local efforts contribute to specialized improvements and information on the use and restoration of urban waterfronts there is a need to support more regionally significant improvements. This is evident in a recently completed recreational survey (T.B.R.P.C., 1982) where respondents noted a need for more regional parks with camping facilities, and in addressing interjurisdictional problems such as stormwater management.

The enforcement and presence of programs to preserve and restore significant shoreline resources, including native vegetation and historic and archaeological sites, also varies between and within communities. Communities may enforce regulations stricter than State requirements, yet in areas such as mangrove protection, the State may be relied upon to exert their jurisdiction (see issue #11). Programs are needed to protect the natural integrity of shoreline areas. Where public access is permitted, vegetative cover can be worn away by vehicle and foot traffic. Shoreline erosion along Tampa Bay is a particular problem, in areas unplanned for but used as a public pathways, where the land has been left uncovered and susceptible to wind and wave action. Public improvements in these areas might include replanting the native vegetation and protecting it by designating parking areas and constructing walkovers.

Beyond the realm of government, there is a need to provide guidance and promote improvements along the vast portions of privately-owned shoreline. Seawalls in need of repair are prevalent where property owners are responsible for their maintenance. Many of these areas present excellent opportunities for replanting and restoring natural shorelines.

Where natural shorelines do exist, but are disturbed by bordering development, replacement of the native vegetation by exotic plants (particularly Brazilian peppers) has become a problem. Despite other noxious characteristics of exotic plants (i.e., skin and respiratory irritants), uninformed property owners may continue to use them in landscaping. Native plants are adapted to climate and soil conditions of a given area and usually more resistant to pests and disease. Therefore, their use in landscaping can decrease maintenance. There are a wealth of native plants for use in the urban home landscape, yet there is a need to: (1) encourage

their use in native habitats and (2) increase the availability of more diverse types of plant material. To promote more desirable shoreline conditions, restoration programs should be specifically directed to waterfront property owners.

Relevant Laws and Statutes:

Coastal Zone Management Act  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 253, Florida Statutes (Public Lands and Property)  
Chapter 161, Florida Statutes (Beach and Shore Preservation)  
Chapter 375, Florida Statutes (Water Management Lands Trust Fund)  
Chapter 380, Florida Statutes (Land and Water Management)  
Chapter 163, Florida Statutes (Local Government Comprehensive Planning Act)  
Chapter 267, Florida Statutes (Historic Preservation)

Bay Management Objectives:

1. Identify opportunities for shoreline restoration, preservation of significant resources and public and visual access improvements.
2. Develop local waterfront planning and designs that encourage: (a) varied public uses, (b) linkages between key activity areas, (c) preservation of the integrity of natural and unique resources and (d) aesthetically pleasing waterfront vistas.
3. Provide information on successful local approaches toward waterfront management to initiate improvements in the use and restoration of urban waterfront shorelines.
4. Promote exotic plant control and the use and availability of native plant material for landscaping and restoration work.

Bay Management Recommendations:

1. A regional base of knowledge on the Tampa Bay shoreline should be established through review of comprehensive plans, condition/user inventories, historic surveys, and other sources. Additional site surveys should be accomplished, as is necessary, to produce regional/county maps showing existing and planned facilities and areas of high potential for shoreline restoration and/or improvements.

Work Element 19-1: The Tampa Bay Regional Planning Council, with local assistance, should establish this base of knowledge through the creation of a regional natural resources library. Funding for this effort could be obtained through the newly established Growth Management Trust Fund or through federal coastal zone management funds.

2. Local governments should expand public access and use of existing facilities, where appropriate through: functional improvements to open space, picnic and play areas, and recreational structures; improvements in traffic circulation (i.e., roads/bike paths) and linkages to parking and activity centers; and enhancement of conditions (i.e., water quality, shoreline stabilization) and access at the water's edge.

Work Element 19-2: The Legislature should amend the LGCRA (Chapter 163, F.S.) to require that local coastal zone elements specify waterfront zoning requirements and design standards, such as height restrictions, setbacks and building perpendicular to waterfronts, being used to maximize water views and compatibly integrate the waterfront with upland uses.

3. The purchase and classification of environmentally sensitive shorelines and buffer zones should be given high priority through state/local land acquisition and land exchange programs.
4. Local governments situated on the bay should be encouraged to adopt ordinances that provide specific protection to mangroves and other shoreline vegetation. In addition, the development of a Marine Park or a similar zoning ordinance such as that adopted by the City of Dunedin, should also be encouraged.

Work Element 19-3: The Tampa Bay Regional Planning Council should attempt to implement the above recommendations through their Chapter 163, F.S., review responsibilities.

5. The Department of Community Affairs has provided local governments with an excellent analysis of various local approaches toward urban waterfront management through its publication of a quarterly Resource Report, financed through the Coastal Zone Management Program. Should funding for the publication be cutback, DCA should continue to submit articles to various planning/landscaping newsletters showcasing project designs that provide ecological improvements in urbanized settings.
6. Local governments should utilize architectural review boards wherever feasible to ensure visually aesthetic and consistent waterfront development.
7. The County Extension Service working in cooperation with the Department of Natural Resources and other local organizations, such as the Native Plant Society, should develop a Waterfront Property Owners Handbook with guidelines applicable to natural and structural features of the Tampa Bay shoreline.
8. Local governments should utilize taxing incentives wherever feasible to promote private waterfront development that is consistent with the Bay Management Objectives.

Long Term Management Alternatives:

1. Status Quo: A majority of the above-stated recommendations could be satisfactorily accomplished through local zoning, government comprehensive plans, capital improvement programs and the coordinated efforts of communities surrounding the Bay. A major problem inhibiting local efforts has been a lack of adequate funds to prepare and implement detailed research projects and programs which are required but not typically provided for by the Legislature. An attempt to adopt strict regulations without a sufficient factual base could result in

the regulations being challenged and many local governments do not have sufficient resources to compile the necessary factual data. Therefore, mandates placed on local government should be accompanied by sufficient funding and technical assistance. If well managed, the newly created Growth Management Trust Fund may provide some assistance in this area.

2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively assist in managing the Trust Fund and coordinating local and regional programs. With adequate funds and State/Regional guidelines the majority of the above recommendations could be carried out through the existing LGCPA program. In addition, a funded and staffed committee could effectively develop and manage the proposed regional natural resources library.
3. Bay Management Authority: Besides providing the same functions as an advisory committee a mandated bay management authority could potentially assume regional management of the Growth Management Trust Fund as well as overview authority for all waterfront development.

## Issue #20 Load Relief for Major Sewage Treatment Plants

Issue Analysis: It is projected that by the year 2000 the population of the Tampa Bay region will increase by about 30%. With this growth many existing sewage treatment plants (STP's) in the area may approach their design capacity limits in the near future; and following the completion of the wasteload allocation study for Tampa Bay (see issue #13) the surface discharge of effluent may no longer be a viable disposal alternative for many communities adjoining the bay. Furthermore, in certain areas of the region, most notably northwestern Hillsborough and northeastern Pinellas counties, development is far outpacing the abilities of local governments to provide adequate sewage treatment facilities. Rapid growth coupled with a sharp decline in the availability of federal sewer construction grants has thus promoted the need for a regional reassessment of wastewater treatment and disposal alternatives.

Pertinent to this issue are the long-term water quality trends in Tampa Bay. In light of the findings of the draft Tampa Bay wasteload allocation study, as well as OFW and Class II water restrictions in Pinellas County, it is expected the high cost of sewage treatment for surface water disposal will prompt many local governments to question the practice of throwing away a valuable resource which could be used to augment the available freshwater supply to satisfy various needs. In many areas around Tampa Bay water reuse presents a cost-effective and ecologically sound alternative to surface water discharge. In addition, for those communities in the North Pinellas 201 planning district, a Gulf of Mexico outfall still remains a viable solution to effluent disposal restrictions in Tampa Bay. However, if these alternatives are ever to be effectively implemented it is imperative that advance planning and purchase of needed land begin now.

The need for load relief for existing bay area STP's is being, or will be, exacerbated by three factors. First, funds for federal sewer construction grants have been sharply cut in recent years slowing the implementation of approved 201 plans. In addition, cost sharing for the construction of regional facilities has been adjusted to a local:federal ratio of 55:45 percent. Secondly, many local governments drastically overcommit available sewage treatment capacity to developers and builders during the early planning stages in an effort to stimulate growth. This practice is often justified by the fact that many proposed projects are never completed. However, the long-term effect of this practice is to encourage growth and thus sewage treatment demand in excess of planned design capacity. Finally, water conservation methods in Florida have largely been unsuccessful.

In rapidly growing areas around the state, such as the Tampa Bay region, policies need to be established whereby developers and proponents of rapid growth provide a greater share of the cost for wastewater treatment and disposal at the time of commitment, during the early planning stages. Also needed are policies that encourage developers to enter into multi-party agreements with local governments to fund the construction of new regional plants, which are consistent with approved 201 plans. Many local governments (including Hillsborough and Pinellas Counties) have passed ordinances allowing private interests to construct small "package plants" (usually less than .1 MGD capacity) to treat wastewater in developments where no wastewater services are available; contingent upon dedication of

that plant to the local government for maintenance and control. While this practice does provide load relief for major regional plants, it creates many new problems. By greatly increasing the overall number of point source discharges which need to be monitored, the construction of numerous satellite plants leads to a greater potential for illegal effluent and sludge disposal, and has resulted in a myriad of water pollution problems. In addition, package plants generally provide a much lesser level of wastewater treatment than do regional plants, they are notoriously poor at accomodating seasonal surges in demand, and operators are infrequently present to notice and correct problems. For those reasons and because various effluent disposal alternatives are only feasible in larger, regional plants, the construction of smaller satellite plants should be discouraged.

Relevant Laws and Statutes:

Federal Water Pollution Control Act, PL92-500 as amended  
Chapter 403, Florida Statutes (Environmental Control).

Bay Management Objectives:

1. Encourage water reuse and other effluent disposal alternatives to surface water discharge into Tampa Bay.
2. Prohibit overcommitment of wastewater treatment and disposal capacities on the part of bay area local governments.
3. Require greater private interest cost-sharing in the construction of new regional wastewater treatment facilities.
4. Discourage the construction of numerous project-specific "package plants".

Bay Management Recommendations:

1. Local governments in the Tampa Bay area should pursue and implement wherever feasible water reuse (spray irrigation, wetland filtration) and other effluent disposal alternatives (deep well injection, Gulf of Mexico outfall) to surface water discharge into the bay. By rule, projects involving water reuse, conservation and other innovative technologies presently receive higher priority for funding under federal/state wastewater management grant programs.

Work Element 20-1: The Tampa Bay Regional Planning Council should, through their Chapter 163, F.S., review responsibilities, encourage and assist local governments to purchase needed land and implement effluent spray irrigation and wetland filtration programs. A special sub-committee of the Council should be established to develop regional capital improvement strategies for future areawide wastewater treatment and disposal needs.

2. Regional or statewide legislation applicable to the Tampa Bay study area should be introduced which encompasses the following elements:

- Prohibits the Department of Environmental Regulation from issuing a general permit for the construction of sewage collection systems (interceptors) unless the county or municipality involved can demonstrate adequate sewage treatment capacity as well as a permitted effluent/sludge disposal strategy.
- Requires developers to purchase sewage treatment capacity rights after a plants' capacity has been fully committed or attained, unless the county or municipality involved can demonstrate an approved 201 work schedule with adequate funding.
- Assesses developers an impact fee for the construction of new interceptors not approved in previously adopted 201 plans.
- Requires developers to make permitted effluent disposal provisions, including the construction of new pumping facilities, in those cases where plant capacity is adequate but permitted effluent discharge limits have been attained.
- Provides significant incentives for those developers which enter into multi-party agreements resulting in the construction of larger, regional sewage treatment plants, (greater than 1.0 MGD capacity) followed by the dedication of said facilities to the county or municipality involved.
- Provides significant disincentives for those developers seeking the construction of smaller "package plants" (less than .1 MGD capacity), which are to serve only single developments.

Work Element 20-2: The Legislature should draft and implement the above recommended legislation.

3. An innovative solution in some communities for reducing loads to sewage treatment plants has been mandatory retro-fitting of water saving devices with the burden of cost placed on local governments. Reduced loads have been as high as 30%. Bay area local governments should pursue and implement this wherever feasible.

Long-term Management Alternatives:

Status Quo: Under the present regulatory framework many regional STP's are rapidly reaching or have already reached, treatment and effluent disposal limits. Without regional or statewide legislation addressing this issue, this aspect of unbridled growth will continue to worsen.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide the technical assistance and coordinated long-term planning needed for developing and implementing regional wastewater treatment and disposal strategies.

Bay Management Authority: A mandated bay management authority would achieve little more than a bay advisory committee. Regional statewide legislation is probably required to fully solve this problem.

## Issue #21 Water Quality Improvement for Recreational Uses

Issue Analysis: Many potential recreational uses of Tampa Bay have been severely limited due to generally poor water quality. These limitations include prohibited shellfishing, poor fishing, limited swimming and almost non-existent scuba diving opportunities. A recreational survey performed by the previous Tampa Bay Management Study Committee indicated specific problem areas including Hillsborough Bay (all recreational activities), Old Tampa Bay (poor fishing), and a general concern about swimming in all areas of the bay, including publicly approved beaches. Although it has never been quantified, the economic loss to the region resulting from these recreational limitations is probably substantial (see issue #17).

The various recreational limitations cited above result from different water quality problems discussed in other issues of this report. Potentially viable shellfishing areas are primarily closed because of fecal and streptococcal coliform contamination (see issues #3 and #7), but may also be closed due to suspected heavy metal or toxic substance contamination (see issues #5 and #10). Similarly, swimming activities are often limited by localized high concentrations of pathogenic bacteria. Alternatively, poor fishing is most attributable to the loss of habitat which is critical to the support of the early life history stages of most marine organisms. The general problem of marine eutrophication, however, is not only directly responsible for the loss of scuba diving opportunities, due to a resulting reduction in water clarity, but also exacerbates other recreational limitations by reducing dissolved oxygen levels in the bay and by producing obnoxious odors in localized areas (see issues #10, #13 and #41).

A long-term comprehensive program to restore and enhance Tampa Bay is needed to improve the region's water based recreational opportunities. This should include establishing attainable water quality goals for high use recreational areas around the bay as well as improving the monitoring of water quality problems in areas currently not adequately monitored.

### Relevant Laws and Statutes:

Federal Water Pollution Control Act, PL 92-500 as amended  
Chapter 403, Florida Statutes (Environmental Control)

### Bay Management Objectives:

1. Wherever feasible, maximize all water-based recreational opportunities in and around Tampa Bay.
2. Maintain all designated use classifications for the waters of Tampa Bay.
3. Establish attainable water quality goals for high use recreational areas around Tampa Bay.
4. Improve baywide water quality monitoring.

Bay Management Recommendations:

1. Utilizing existing federal Coastal Zone Management funds the Tampa Bay Regional Planning Council should attempt to document the economic losses associated with reduced recreational opportunities in Tampa Bay resulting from water quality degradation. This effort should be an element of the ongoing economic assessment study of the Tampa Bay estuary (see issue #17).
2. Pursuant to Chapter 403.182, Florida Statutes, local governments should be encouraged to develop state approved pollution control programs, and adopt local pollution control regulations compatible with or stricter than those imposed by the state. The development of such programs provides for greater checks and balances of local pollution control compliance and would improve the water quality monitoring network around the bay.

Long-term Management Alternatives:

Status Quo: Recreational opportunities in Tampa Bay will improve as the individual components of water quality degradation in the bay are addressed. However, regulatory responsibilities for the various contributions to water pollution in the bay are fragmented among numerous agencies and programs, none of which address water quality problems exclusively as they relate to recreational uses.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could coordinate the efforts of local governments and relevant agencies in implementing water quality goals for water based recreation around the bay.

Bay Management Authority: Besides providing the same function as a bay advisory committee, a mandated bay management authority could potentially assume many of the water quality monitoring responsibilities from other agencies.

## Issue #22 Stormwater Detention Requirements for Redevelopment

Issue Analysis: As presently enforced the state stormwater rule (Chapter 17-25, Florida Administrative Code) only requires the construction of stormwater management systems exhibiting the specified design and performance standards on those parcels which were not developed prior to February 1, 1982, or on those parcels that will be redeveloped in such a manner so as to change points of discharge or increase quantities of runoff and pollution loadings. As land becomes available for redevelopment, previously urbanized areas should also be retrofitted with stormwater treatment facilities to address historic water quality problems resulting from urban runoff from these areas. Under the present rules and regulations only the status quo quality of runoff from urbanized areas can be maintained; no net improvement can be attained.

In the Tampa Bay watershed, an area which has been highly urbanized for many decades, it is appropriate that stormwater runoff be managed in such a way so as to result in a net improvement in water quality as the region continues to grow and evolve. The construction of regional stormwater management facilities may present an alternative solution to achieving this goal which would also reduce maintenance burdens on the local governments involved. See issue #3 for a more detailed discussion of non-point source pollution in Tampa Bay.

### Relevant Laws and Statutes:

Federal Water Pollution Control Act, PL92-500 as amended  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 17-25, Florida Administrative Code

### Bay Management Objectives:

1. Minimize the quantities of non-point source pollutants entering Tampa Bay.
2. For all new upland development or redevelopment within the Tampa Bay watershed, runoff quantity should not exceed that of pre-development conditions, and runoff quality should equal or exceed that of pre-development runoff from the same site.

### Bay Management Recommendations:

1. The Legislature should introduce legislation amending Chapter 17-25, F.A.C., to require the construction of stormwater discharge facilities on all parcels that are subject to redevelopment. The effect of this recommendation would be to retrofit or establish stormwater management systems in previously developed urban areas resulting in a net improvement in runoff water quality over time (see issue #3). Alternatively, more stringent regulations to this effect should be developed by the Southwest Florida Water Management District for the Tampa Bay watershed.

2. The design and construction of regional stormwater management systems pursuant to Chapter 17-25.040(6), F.A.C. should be encouraged whenever feasible. Regional stormwater management systems are those discharge facilities which are designed and constructed to accept stormwater from multiple parcels within the same drainage area. These facilities would consolidate and improve the level of stormwater treatment for many singular outfalls prior to discharge to Tampa Bay. The creation of tidal marshes at the mouths of drainage channels, canals and tributaries should also be encouraged as a form of regional stormwater treatment.

Work Element 22-1: The Tampa Bay Regional Planning Council in cooperation with the Southwest Florida Water Management District, should sponsor a series of regional workshops to introduce and explore the feasibility of regional stormwater management systems. Environmental, engineering and planning representatives from all local governments with the Tampa Bay watershed should be included to discuss the feasibility of interlocal agreements and taxing strategies (see issue #3).

3. Wherever feasible, counties and municipalities should attempt to locally implement recommendations 1 and 2 above.

Work Element 22-2: The Tampa Bay Regional Planning Council should develop a model ordinance incorporating the provisions of both recommendations 1 and 2 above. The ordinance should be modeled after example efforts such as that by the City of Clearwater. Implementation of the model ordinance should be encouraged through the Chapter 163, F.S., responsibilities of the Tampa Bay Regional Planning Council (see issue #3).

Long-Term Management Alternatives:

Status Quo: Statewide regulatory changes will probably be required as local governments are generally reluctant to develop ordinances which are perceived as discouraging to urban redevelopment.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could assist in the development of the recommended model ordinance, and could be effective in encouraging its regionwide implementation.

Bay Management Authority: A mandated bay management authority could develop the recommended model ordinance and could design an areawide plan for the construction of regional stormwater management systems. Such an authority could also potentially assume permitting responsibilities for stormwater discharge facilities in the Tampa Bay area.

### Issue #23 Review of Rules and Regulations

Issue Analysis: Controversy exists over the adequacy of current rules and regulations which directly impact the ecological, recreational or economic aspects of Tampa Bay (too many rules vs. not enough rules). Many jurisdictions overlap while there are also gaps where current rules and regulations may not adequately meet the original legislated mandates or the needs of the area or they may be so narrowly defined that they restrict the use of the best possible solution to a particular conflict. In addition, permitting and other review procedures place a costly burden on the applicant and the public.

The Tampa Bay Regional Planning Council has assembled an existing authorities matrix (see appendix C) which depicts the overlapping jurisdictions of the numerous federal, state, regional and local agencies and departments involved in the management of Tampa Bay. To fully comprehend the complexity of the existing regulatory framework, so as to recommend strategies to improve and streamline management of the bay, further detailed study of all relevant rules and regulations is needed.

#### Relevant Laws and Statutes:

Not applicable.

#### Bay Management Objectives:

1. Document all existing rules and regulations relevant to the management of Tampa Bay.
2. Identify and analyze the gaps, overlaps, cost-effectiveness and needed improvements of the existing regulatory and management framework regarding Tampa Bay.
3. Identify potential roles and responsibilities for a bay management advisory committee or authority.

#### Bay Management Recommendations:

1. The Tampa Bay Regional Planning Council should initiate a legal study addressing the bay management objectives stated above. Possible sources of funding for this effort would include federal Coastal Zone Management or Sea Grant funds, or a Legislative allocation.

Estimated Manpower and Cost

<u>Year</u>	<u>1</u>
Manpower (man years)	
- Staff (TBRPC)	1
- Consultant	-
Total	1
Source of Funds	
- Federal (CZM)	\$30,000
- State (allocated)	\$10,000
- Local	-
Total	\$40,000

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Long-term Management Alternatives:

Status Quo: This is a proposed, somewhat academic, study not currently under the jurisdiction of any single agency. However, most agencies involved with Tampa Bay may be involved. The Tampa Bay Regional Planning Council could satisfactorily accomplish the stated objectives contingent upon the availability of adequate grant funds.

Bay Advisory Committee: A funded and staffed bay advisory committee within the Tampa Bay Regional Planning Council could accomplish the stated objectives more effectively due to the technical input and guidance from committee members.

Bay Management Authority: The structure and function of a mandated bay management authority should be based upon the findings and recommendations of the proposed study. The creation of an authority should not be considered until a well defined role, which is effective and non-duplicative, can be established through such a study.

## Issue #24 McKay Bay Management Plan

Issue Analysis: McKay Bay is a small sheltered body of water at the head of Hillsborough Bay (see figure 2.6). Water circulation is limited by the 22nd Street Causeway and the narrow channel at the southern end of East Bay. There is one major source of freshwater, the Palm River/Tampa Bypass Canal. Two important urban drainage basins also empty into McKay Bay, the 29th and 43rd Street outfalls. Shorelines along the west side are bulkheaded. Past dredging projects have resulted not only in the construction of the 22nd St. Causeway, but also a rectangle of land now used by the Tampa City Resource Recovery Project, a cement plant and the Police Department. Mangroves have successfully recolonized altered shorelines, however, and the bay has a generally natural aspect despite previous alterations. Nearshore waters are very shallow and broad mudflats are exposed at low tide. McKay Bay waters are classified Class III. Sport and commercial (i.e., primarily mullet netters and crabbers) fishermen still use the bay, although yields have decreased significantly over the past few decades.

Drainage of heavily industrial portions of Tampa into McKay Bay, and water exchange with East Bay, make it likely that heavily metals and possibly other environmental contaminants are accumulating in bay sediments and organisms. The degree to which this is occurring, and the magnitude of any health hazard that may exist to human or wildlife consumers, is unknown although some preliminary research has been performed (Gude 1977).

Birds are the most conspicuous wildlife users of McKay Bay habitats. The mangroves, mudflats and protected waters are particularly important to migrant and wintering shorebirds and waterfowl, as well as pelicans, herons, ibis, gulls and terns and a variety of other species (see Lewis and Courser 1972, Courser and Lewis 1975). G. E. Woolfenden has conducted winter censuses in McKay Bay, and found an average count of 25,000 birds per day, half of which were shorebirds. This places McKay Bay among the most important wintering areas for shorebirds in the United States (Paul and Woolfenden in press). More qualitative observations suggest that McKay Bay may be the key locality for populations of wintering shorebirds that range along the entire eastern shore of Hillsborough Bay according to tidal conditions. The site is widely known among birdwatchers, many of whom visit the area from out-of-state, and tours there are regularly scheduled by local Audubon Society chapters.

In recognition of the value of McKay Bay to bird life and as a nursery area for marine life, sanctuary status has long been proposed as the best means to protect the site. In 1976 an agreement was reached among Save Our Bay Inc., Tampa Audubon Society, Hillsborough Community College and the City of Tampa to provide some protection for a small lake known as the Incinerator Pond. That agreement has been superceded by state water quality regulations and in any event never was extensive enough to confer sanctuary status on the waters and shorelines of the bay itself. With current attention focussed on the Tampa Bay system by the Tampa Bay Management Study Commission, an opportunity exists to consider the best means of establishing a mechanism to manage and protect the environmental values of McKay Bay. Such action would not affect existing commercial or sport

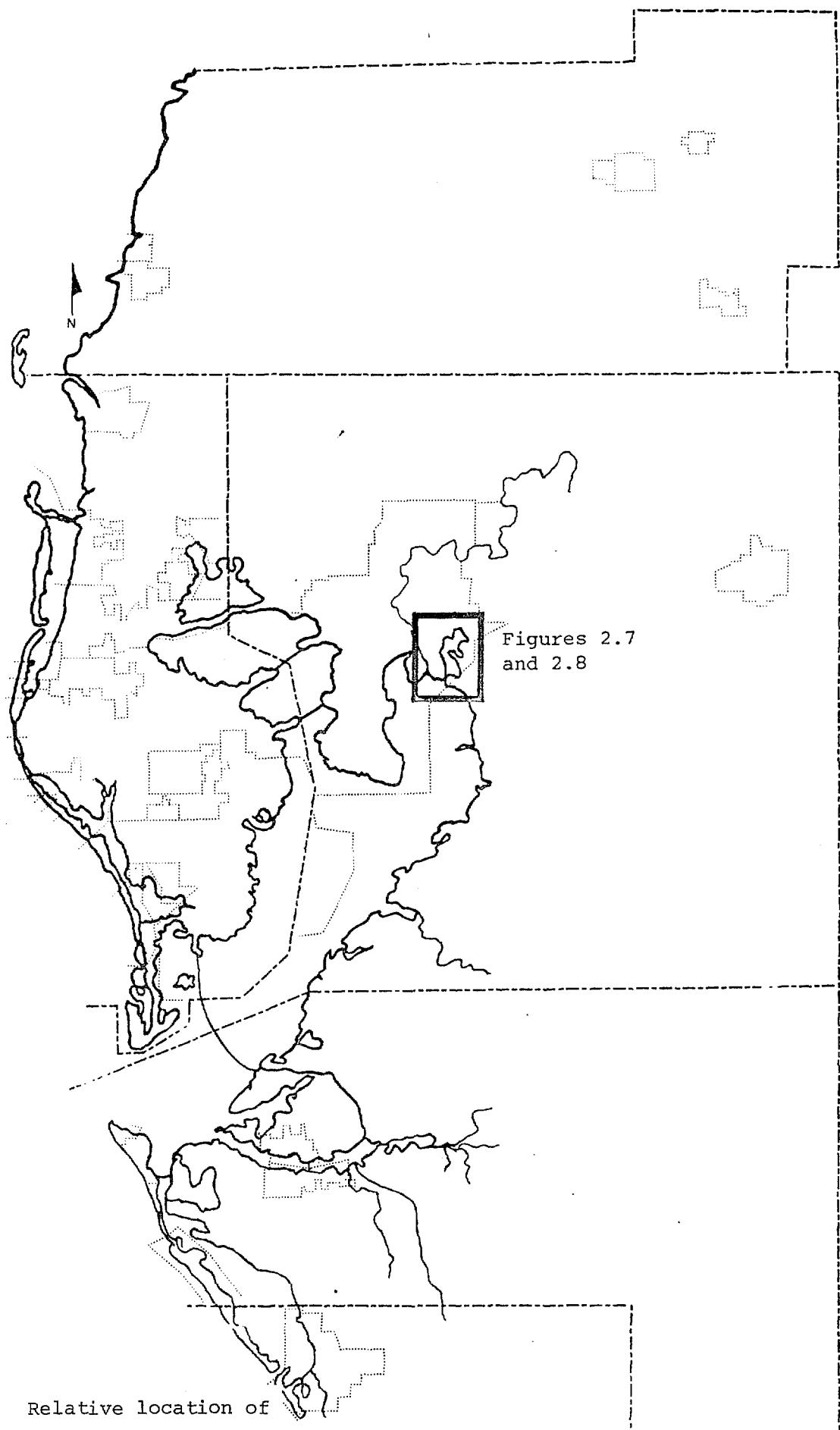


Figure 2.6. Relative location of  
McKay Bay.

fishing, nor existing industrial activities (since there are none on bay borders). Nor would waterfowl hunters be affected, because McKay Bay lies within Tampa city limits and no hunting is permitted (although some illegal shooting does occur).

The basic approaches to establishing a sanctuary are summarized as follows: 1) acquisition and management by a federal agency; 2) acquisition and/or management by a state agency; 3) management by local agencies and property owners through cooperative agreement and possibly designation of a single lead agency. The latter course seems the most feasible for three reasons. The City of Tampa Land Use Plan has designated nearly the entire shoreline of McKay Bay as "Preservation" (see figure 2.7). In addition, just seven landowners have been identified, including three public agencies (see figure 2.8). The City of Tampa and the Southwest Florida Water Management District have already indicated interest in the possibility of a sanctuary. Finally, little additional property would need to be acquired, and administration and management of the area could be accomplished through existing agency offices such as the City of Tampa Parks Department.

The combination of no commercial development of McKay Bay shorelines, few landowners and interest already expressed by two public agencies suggests that the establishment and management of a McKay Bay Bird Sanctuary would be inexpensive and quite feasible. In addition, by virtue of these factors as well as the urban setting of McKay Bay, an excellent opportunity exists here to develop a showcase urban wildlife preserve of national prominence and importance.

Relevant Laws and Statutes:

Migratory Bird Treaty Act

Clean Water Act of 1977, Section 404

Rivers and Harbors Act of 1899, Section 10

Chapter 403, Florida Statutes (Environmental Control)

Chapter 259, Florida Statutes (Land Acquisitions for Conservation and Recreation)

Bay Management Objectives:

1. Protect the waters, shorelines and wildlife of McKay Bay through establishment of a McKay Bay Bird Sanctuary.
2. Promote the recreational potential and aesthetic values of a showcase urban wildlife preserve established within the city limits of Tampa.

Bay Management Recommendations:

1. The waters and shoreline of McKay Bay should be nominated as a possible state land acquisition target under the Conservation and Recreation Lands (CARL) program.

Work Element 24-1: The City of Tampa, or the Tampa Bay Regional Planning Council should officially sponsor this nomination.

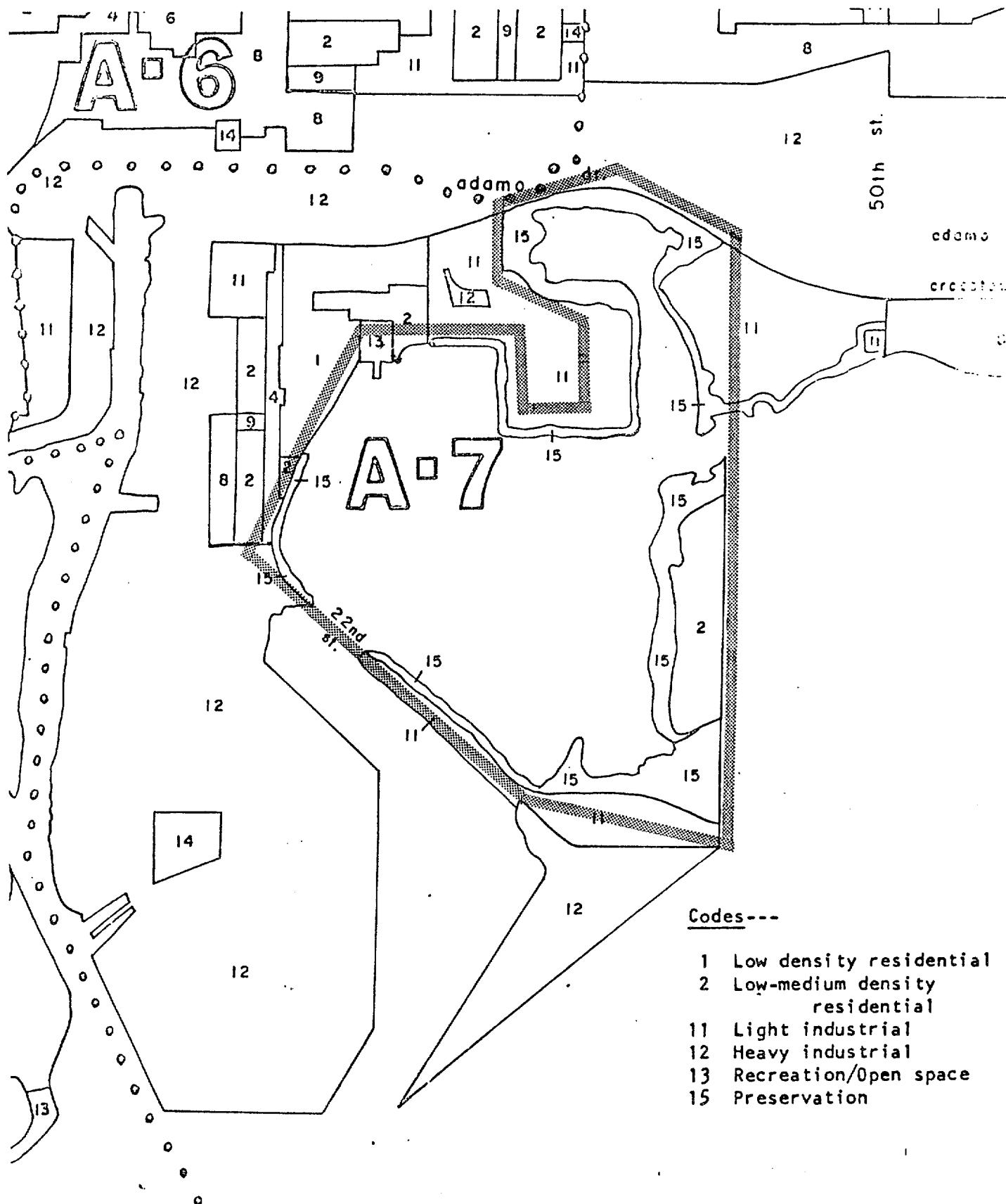


Figure 2.7. City of Tampa land use plan: McKay Bay and vicinity.

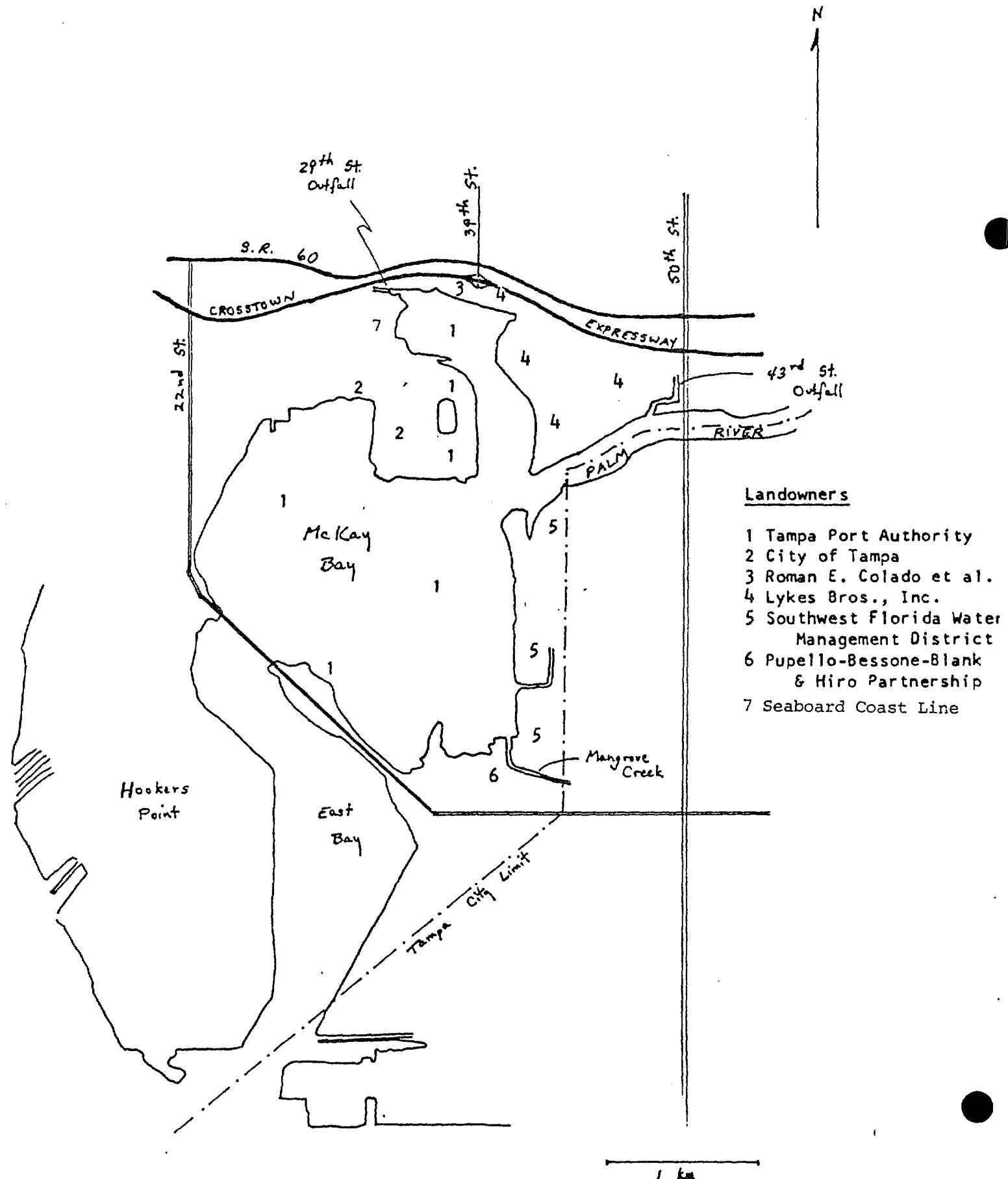


Figure 2.8. Land ownership surrounding McKay Bay.

2. The Tampa Bay Regional Planning Council should sponsor negotiations between the City of Tampa, the Southwest Florida Water Management District, the Tampa Port Authority and all other owners of contiguous land around McKay Bay to explore the feasibility and mechanics of establishing a locally administered sanctuary through interlocal agreements.
3. The Tampa Port Authority should, pursuant to Chapter 84-447, L.F., designate McKay Bay as a "Marine Preserve".
4. A comprehensive management plan should be prepared, characterizing the ecology of the bay, identifying further research needs and evaluating opportunities for resource management and public uses.
5. A formal request should be made to the U.S. Fish and Wildlife Service to conduct a full ecological assessment of McKay Bay.
6. A study should be designed and initiated to a) determine existing contaminant levels in the sediments and benthic organisms of McKay Bay and to b) monitor contaminant levels in the incoming waters of the Palm River and the two major urban drainage systems. Much of this data could be obtained from a review of existing data. This information should be carefully evaluated and incorporated into an eventual wildlife management plan.
7. The Greater Tampa Chamber of Commerce should investigate the economic value (tourism, aesthetics, etc.) of establishing a showcase urban wildlife preserve around McKay Bay.

Long-Term Management Strategies:

McKay Bay has retained outstanding wildlife values despite loss of area, occasional severe perturbations of local habitats and probably some chronic sources of pollution. The sanctuary proposal outlined briefly here requires a permanent commitment to the protection and management of these values.

1. Status Quo: It is unlikely that the waters and shoreline of McKay Bay will be seriously considered for formal long-term preservation without further coordination. The Southwest Florida Water Management District has expressed an interest in converting its land holdings to preservation but no official effort to initiate a comprehensive effort for the entire bay has yet taken place.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively organize and assist negotiations leading to the kind of interlocal agreements needed to establish a locally administered sanctuary.
3. Bay Management Authority: A mandated bay management authority could effectively sponsor CARL nominations and interagency negotiations as well as develop and administer the comprehensive management plan for McKay Bay.

## Issue #25 Shellfish Classification

Issue Analysis: Not all parts of Tampa Bay are classified for shellfish sanitation, so these areas are closed (prohibited) for harvesting, including recreational harvesting (see figure 2.9). Classification for shellfish sanitation is the responsibility of Florida Department of Natural Resources and lack of funding is the major impediment to reviewing all of Tampa Bay for shellfish classification. In addition to the costs of initially reviewing an area, regular monitoring is required of all classified shellfish harvesting areas.

Once the entire Tampa Bay estuary is classified, routine monitoring would provide valuable long-term water quality information and could be used as a management tool for evaluating Aquatic Preserves and upgrading shellfish harvesting areas. Areas undergoing frequent opening and closing for harvesting should be evaluated with the objective of upgrading to open classification. In addition, the public is not always aware of which areas are open to shellfishing and the health hazards associated with shellfishing in closed areas. Additional patrolling of closed shellfishing areas and expanded public information is needed.

In September 1984, the Department of Natural Resources closed a number of areas in Old Tampa Bay previously "approved" for shellfishing (see figures 2.10 and 2.11). This action was based on historical and potential fecal coliform pollution rather than actual measured ambient coliform levels. The decision to close these areas may also be related to anticipated permitting determinations regarding wasteload allocations in Tampa Bay. In addition, the Department of Natural Resources is considering closing the Cockroach Bay Aquatic Preserve to shellfishing due to periodic coliform contamination from an adjacent mobile home park. However, to re-open these areas will require a full sanitary survey and reappraisal to evaluate those factors influencing the sanitary quality of the growing areas. Under present staffing and funding levels it is highly unlikely that the Department of Natural Resources will ever accomplish this survey and these areas will remain permanently closed. As a consequence, many potentially harvestable shellfishing areas in Tampa Bay cannot be utilized, either commercially or by the public, even when sanitary conditions are acceptable.

### Relevant Laws and Statutes:

Chapter 370, Florida Statutes (Saltwater Fisheries)  
Chapter 381, Florida Statutes (Public Health: General Provisions)  
Chapter 16B-28, Florida Administrative Code

### Bay Management Objectives:

1. Increase public recreational opportunities for shellfish harvesting.
2. Increase public awareness of "approved" and "prohibited" shellfish harvesting areas.

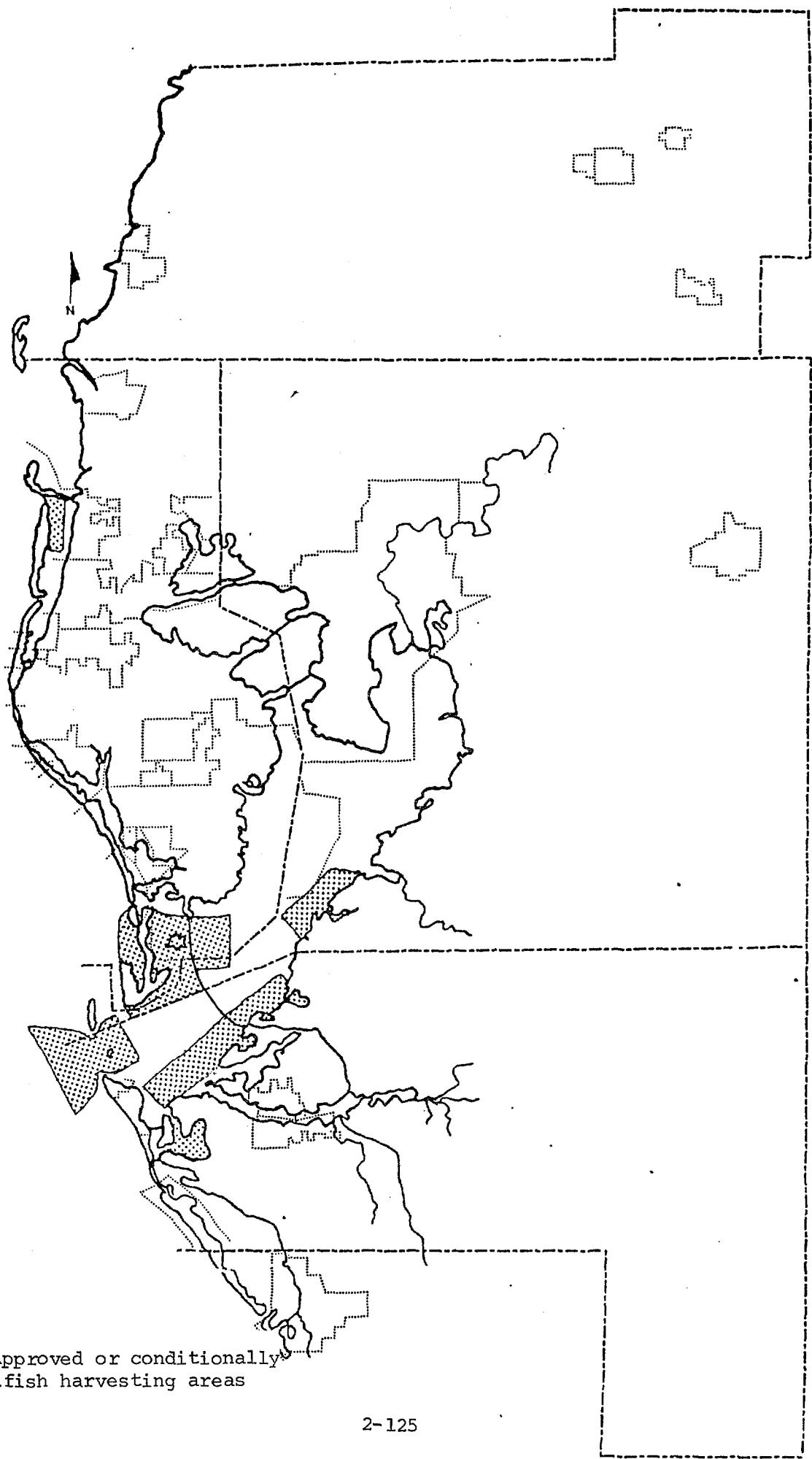


Figure 2.9. Approved or conditionally approved shellfish harvesting areas in Tampa Bay.

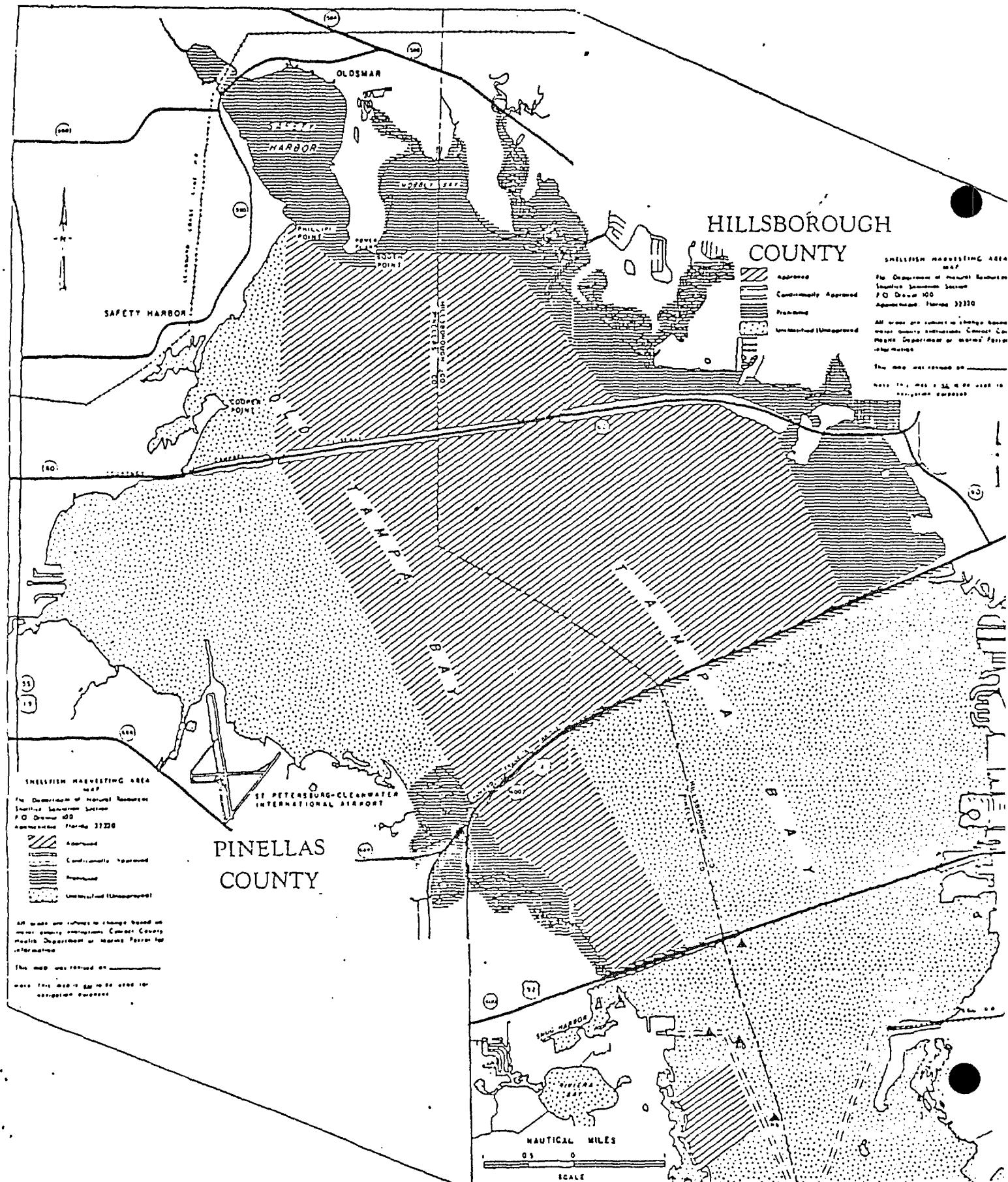


Figure 2.10. Current classification of shellfish harvesting areas in Old Tampa Bay.

OLD TAMPA BAY  
HILLSBOROUGH/PINELLAS COUNTY  
SHELLFISH HARVESTING AREA MAP

FLORIDA DEPARTMENT OF NATURAL RESOURCES  
3900 COMMONWEALTH BOULEVARD  
TALLAHASSEE, FLORIDA 32303

ALL AREAS ARE SUBJECT TO CHANGE BASED ON  
WATER QUALITY EVALUATIONS. CONTACT THE  
FLORIDA MARINE PATROL FOR INFORMATION.

THIS MAP IS NOT TO BE USED FOR NAVIGATION  
THIS MAP WAS REVISED ON March, 1984.

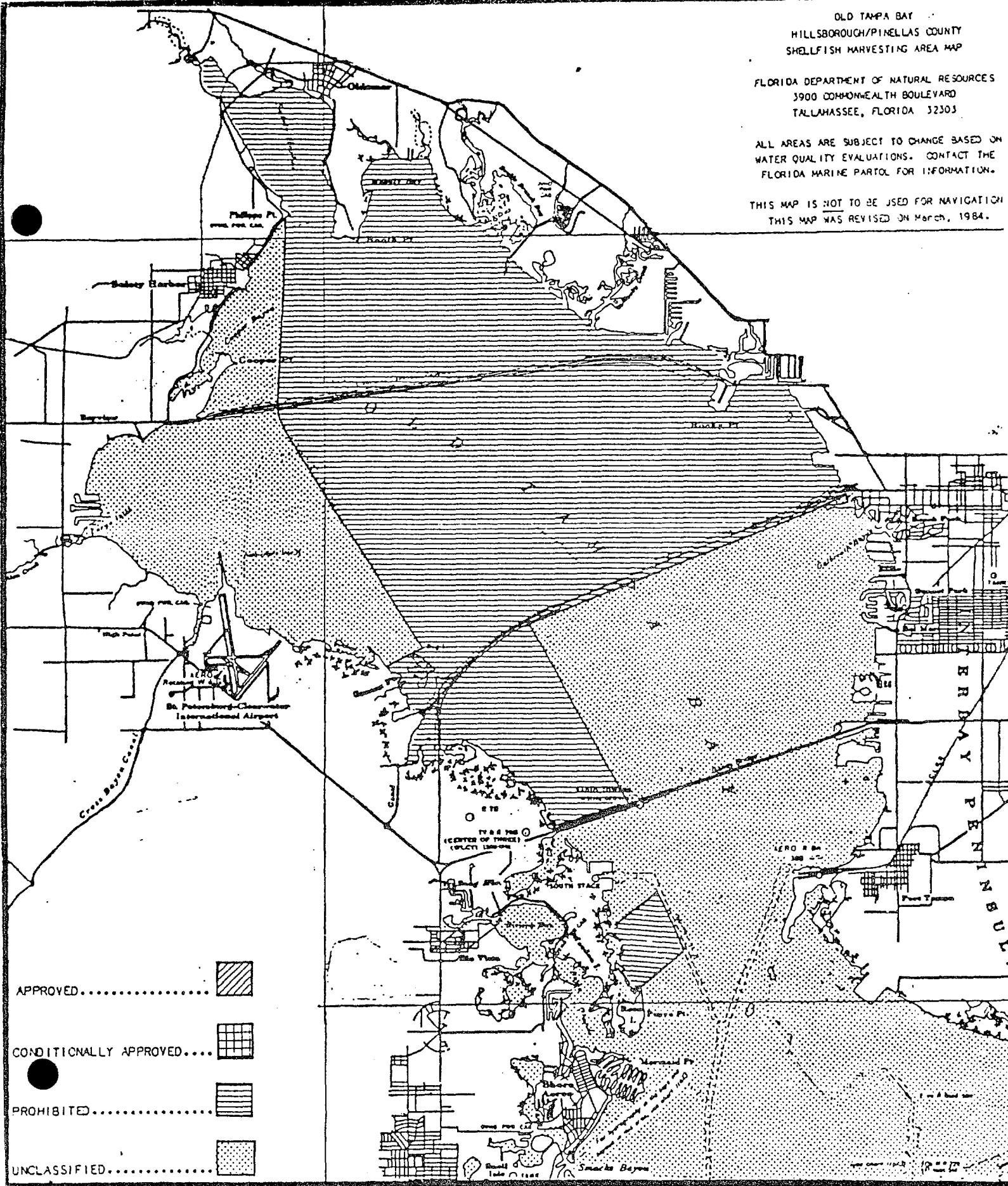


Figure 2.11. Proposed classification of shellfish harvesting areas in Old Tampa Bay.

3. Provide a valuable source of long-term water quality information to be used as a management tool for evaluating Aquatic Preserves and upgrading other shellfish harvesting areas.
4. Prevent health hazards associated with shellfish harvesting in "prohibited" areas.
5. Wherever feasible, restore and maintain existing designated use classifications of Tampa Bay.

Bay Management Recommendations:

1. The Department of Natural Resources should establish a permanent sanitary survey team in the Tampa Bay area. Presently, two environmental specialists in the Punta Gorda office are responsible for surveying and monitoring the majority of the Gulf coast, excepting the panhandle. Additional staffing for the Tampa Bay area is justifiable.

Work Element 25-1: The Legislature should allocate adequate funds for this purpose. The allocated revenues should be perpetual and could be generated from a recreational saltwater fishing license (see issue #1 for further discussion).

Year	<u>Estimated Manpower and Cost</u>				
	1	2	3	4	5
<b>Manpower (man years)</b>					
- Staff (DNR)	2	2	2	2	2
- Consultant	-	-	-	-	-
<b>Total</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Source of Funds</b>					
- Federal	-	-	-	-	-
- State	120,000	120,000	120,000	120,000	120,000
- Local	-	-	-	-	-
<b>Total</b>	<b>120,000</b>	<b>120,000</b>	<b>120,000</b>	<b>120,000</b>	<b>120,000</b>

2. Areas currently "prohibited" for shellfish harvesting in Tampa Bay should be reappraised, and those areas which are considered "unclassified" should be evaluated for potential upgrading to approved harvesting. Program emphasis should be placed on opening as much of Tampa Bay to shellfish harvesting as is possible without sacrificing public safety.
3. The existing or the proposed survey team should expand public information on areas open and closed to shellfishing through posted signs, public newspapers, mailings to marinas, etc. through coordination with the Marine Patrol.

4. The Marine Patrol should increase the patrolling of closed shellfishing areas.
5. Water quality information generated from monthly sanitary monitoring should be placed into the state's STORET data base for shared access by other appropriate agencies.

Long-Term Management Alternatives:

1. Status Quo: With adequate funding the Department of Natural Resources could effectively administer the recommended shellfish sanitary program in Tampa Bay.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively assist in the public education aspects of this issue.
3. Bay Management Authority: A mandated bay management authority could potentially assume and administer the entire recommended shellfish sanitary program in Tampa Bay.

## Issue #26 Power Plant Entrainment

Issue Analysis: Steam electric power plants typically consist of a heat source, boiler, turbine, generator and a condenser system. Steam from the boiler drives the turbine which spins the generator to produce electricity. After passing through the turbine, the steam must be condensed and returned to the boiler. The most economical way of achieving this is a once-through, or open-cycle, cooling system which passes water from the environment through the condenser system and discharges it back into the environment at an elevated temperature.

There are currently five steam electric plants situated on Tampa Bay which utilize open-cycle cooling systems. These include the Tampa Electric Company's (TECO) Big Bend, Gannon and Hookers Point facilities, as well as the Florida Power Corporation's (FPC) Higgins and Bartow plants (see figure 2.12). Although once-through cooling is the most economical way of condensing the exhaust steam from the turbines of steam electric plants, the volumes of water used for this purpose, and the quantities of "waste" heat added to the aquatic environment, are extremely large, thus prompting demands for alternatives.

Although the discharge of "waste" heat into the subtropical Tampa Bay estuary results in demonstrable impacts, perhaps a greater problem results from the capture and inclusion of planktonic eggs and larvae of fish and shellfish in the cooling water of power plants. This process, termed "entrainment", usually leads to high rates of mortality for those organisms involved. Mortality results from thermal stresses, chemical stresses associated with biocides used to prevent fouling of the cooling system, and physical stresses associated with pressure changes, shear forces, impact and abrasion during passage through the cooling water.

The combined annual cooling water flow for the five Tampa Bay steam electric plants is approximately four times greater than the combined annual freshwater flow of all tributaries entering Tampa Bay. Based upon NPDES permit studies performed at the FPC Higgins plant, and the TECO Big Bend plant, it is estimated that  $2.74 \times 10^9$  fish eggs and  $8.30 \times 10^9$  fish larvae are entrained annually by the five steam electric plants situated on Tampa Bay. Assuming a 100% mortality rate for all entrained organisms, and adjusting for estimated natural mortality rates of estuarine ichthyoplankton (fish eggs and larvae), it can be estimated that power plant entrainment is responsible for annually removing  $2.84 \times 10^9$  (approximately 3 billion) harvestable adults from the commercial and recreational fisheries of Tampa Bay.

Intuitively, the impact of steam electric plants on the fishery stocks of Tampa Bay would appear to be significant. However, in the absence of sufficient baseline information with regard to stock size, spawning biomass, fecundity and natural survival rates, it is virtually impossible to assess this impact. The U.S. Environmental Protection Agency recognized fine mesh intake screens (FMS) as the Best Available Technology to minimize the entrainment impacts at the TECO Big Bend steam electric plant; a plant with an open-cycle cooling system. In the Tampa Bay area, fine mesh screens have only been constructed for use on two units at the TECO Big

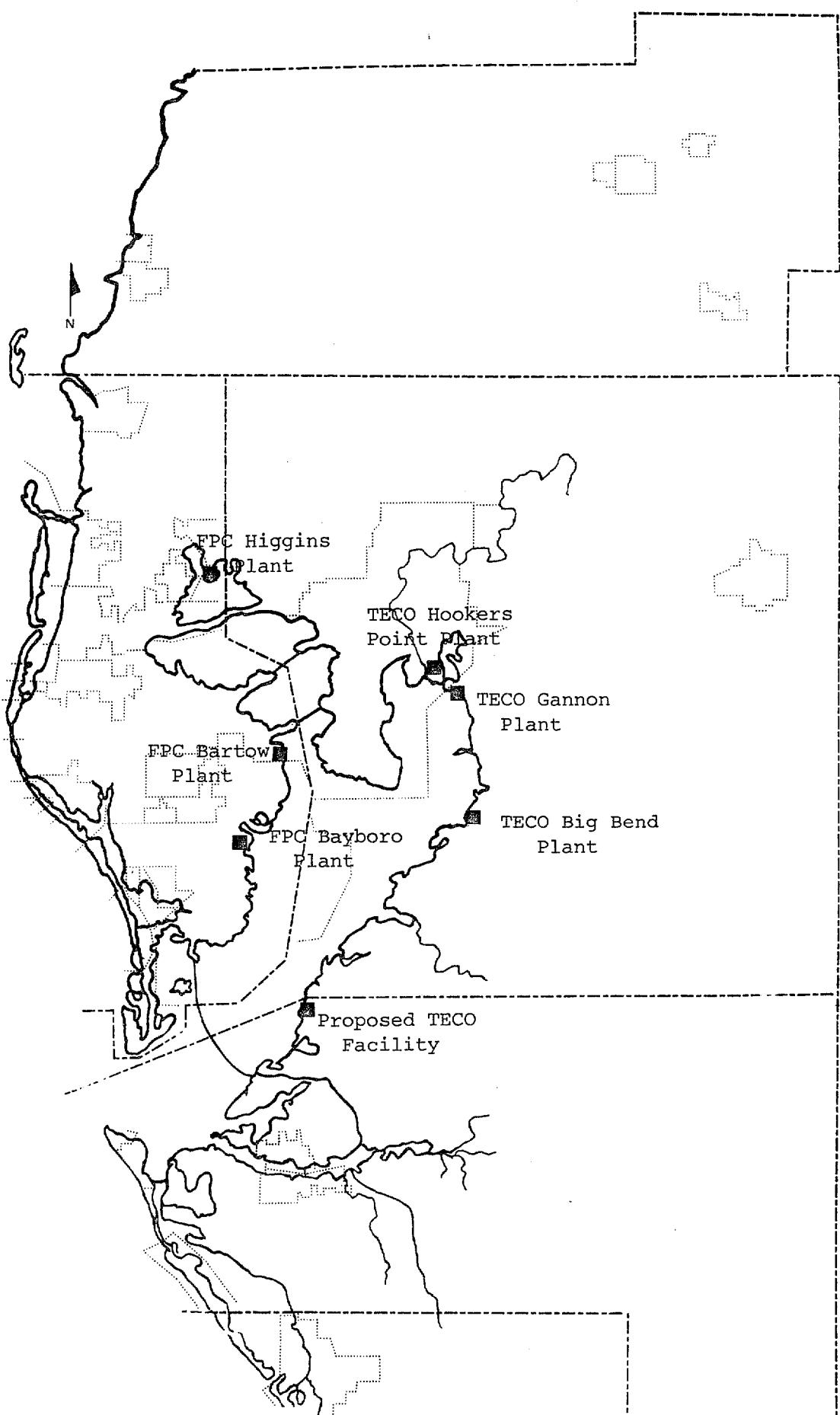


Figure 2.12. Relative location of electrical power plants around Tampa Bay.

Bend plant. To date, the effectiveness of FMS has been difficult to demonstrate, and the real costs involved in retrofitting additional existing units may be prohibitive without substantiating evidence.

Relevant Laws and Statutes:

National Environmental Policy Act

Federal Water Pollution Control Act - Sections 316 (a,b), 402.

Florida State Comprehensive Planning Act (Section 23.0191, F.S.)

Florida Electrical Power Plant Siting Act (Sections 403.501 - 403.517, F.S.)

Bay Management Objectives:

1. Assess and quantify the present and future impacts of power plant entrainment on the overall depletion of fishery resources in Tampa Bay.
2. Wherever feasible, minimize the present and future meroplankton (fish and shellfish larvae) mortality rates attributable to power plant entrainment in Tampa Bay.

Bay Management Recommendations:

1. A complimentary program of research, monitoring and regulation of valued fishery stocks in Tampa Bay should be implemented with the partial goal of assessing the impact of power plant entrainment on those stocks.

Work Element 26-1: The Legislature should authorize the adoption of a recreational fishing license for the marine waters of the state. Funds generated from statewide license fees, in proportion to those funds generated from the Tampa Bay area, should be specifically allocated to the Department of Natural Resources for the implementation of the Tampa Bay Fisheries Program. See Issue #14 for a detailed breakdown of the program elements and costs.

2. Special attention should be directed to the proper site selection for future power plants in Tampa Bay to ensure acceptable combinations of power plant design and biological value of the local environment (i.e. future plants should be located in areas of low biological productivity).
3. Wherever feasible in the conversion of existing plants, or in the construction of new plants, closed-cycle cooling systems should be encouraged over once-through cooling systems.
4. New plants utilizing once-through cooling should be designed for maximum operational flexibility in order to minimize entrainment impacts. Design criteria should consider the following:
  - At any given plant the optimal combination of delta -t (change in cooling water temperature from inflow to outflow) and flow rate changes seasonally. Circulating water pumps should be designed to allow for a wide range of flow rates to minimize thermal stresses;

- Whenever feasible, plant activities should be coordinated with organism density. For example, plant shutdowns for refueling and maintenance should be scheduled to coincide with periods when the most important and/or vulnerable organisms are most abundant in the plankton. In Tampa Bay planktonic densities generally peak during the spring (April-May) and fall (October-November).
- Intakes should be designed to pump from various depths, and therefore draw water from zones where organism density is relatively low due to behavioral (vertical migrations) or physical factors (density stratification);
- Pumping rates should also be adjusted to account for the natural variability in the density of organisms, as diurnal and tidal variations are often predictable; and
- Auxiliary pumps to increase the dilution and therefore the cooling of the discharge water should never be used because of the extreme physical stresses involved.

Work Element 26-2: Recommendations 2, 3 and 4 stated above should be implemented by the Department of Community Affairs and the Department of Environmental Regulation pursuant to Chapters 23 and 403, Florida Statutes, respectively.

Long-Term Management Alternatives:

1. Status Quo: The proposed Tampa Bay Fisheries Program (see issue #14) could be effectively administered by the Department of Natural Resources, or the State University System with guidance from the Marine Fisheries Commission. It is, however, unlikely that the above recommended power plant site planning, design and operational criteria would be implemented and enforced under the existing regulatory framework.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be effective in implementing the above recommended power plant site planning, design and operational criteria through its site certification and ten year site plan review responsibilities.
3. Bay Management Authority: A mandated bay management authority could administer the proposed Tampa Bay Fisheries Program and could provide detailed review of power plant site certification and ten year site plans for compliance with the above recommended criteria.

## Issue #27 Hendry Fill Restoration Project

Issue Analysis: In 1969 the Hendry Corporation illegally filled 71 acres of pristine submerged and intertidal lands adjoining Bishops Harbor on the north, in Manatee County (see figures 2.13 and 2.14). The fill material was generated from the initial excavation of the main channel entering Port Manatee. After years of litigation a settlement was finally reached between the State of Florida and the Hendry Corporation in 1980. In the settlement the state received title to the disturbed lands, an additional 452 acres of adjacent undisturbed lands, and \$80,000 in fines.

Restoration of the disturbed site utilizing the \$80,000 settlement is required under the law. However, despite many local attempts to develop a recovery plan, and to mobilize the funds from the state, the Department of Environmental Regulation has not yet initiated a restoration effort.

### Relevant Laws and Statutes:

Section 403.165, Florida Statutes (Pollution Recovery Fund)

Section 403.0615, Florida Statutes (Water Resources and Preservation Trust Fund)

### Bay Management Objectives:

1. To the greatest degree feasible, restore the Hendry fill site to its natural condition.
2. Preserve all undisturbed lands obtained by the state in the Hendry settlement in their natural condition.

### Bay Management Recommendations:

1. A restoration plan for the Hendry fill site should be developed.

Work Element 27-1: The Department of Natural Resources, using recently allocated funds for the preparation of Tampa Bay Aquatic Preserve management plans, should perform a complete survey of the Hendry fill site and the additional lands obtained in the settlement (see issue #8 for further discussion).

Work Element 27-2: The Tampa Bay Regional Planning Council should coordinate the efforts of the Department of Natural Resources and the Department of Environmental Regulation, and local planners, scientists engineers and environmentalists in the preparation of the restoration plan. This plan could be developed in conjunction with the preparation of a management plan for the Terra Ceia Aquatic Preserve, within which the Hendry fill site lies.

2. The Department of Environmental Regulation and the Department of Natural Resources should initiate restoration of the Hendry fill site.

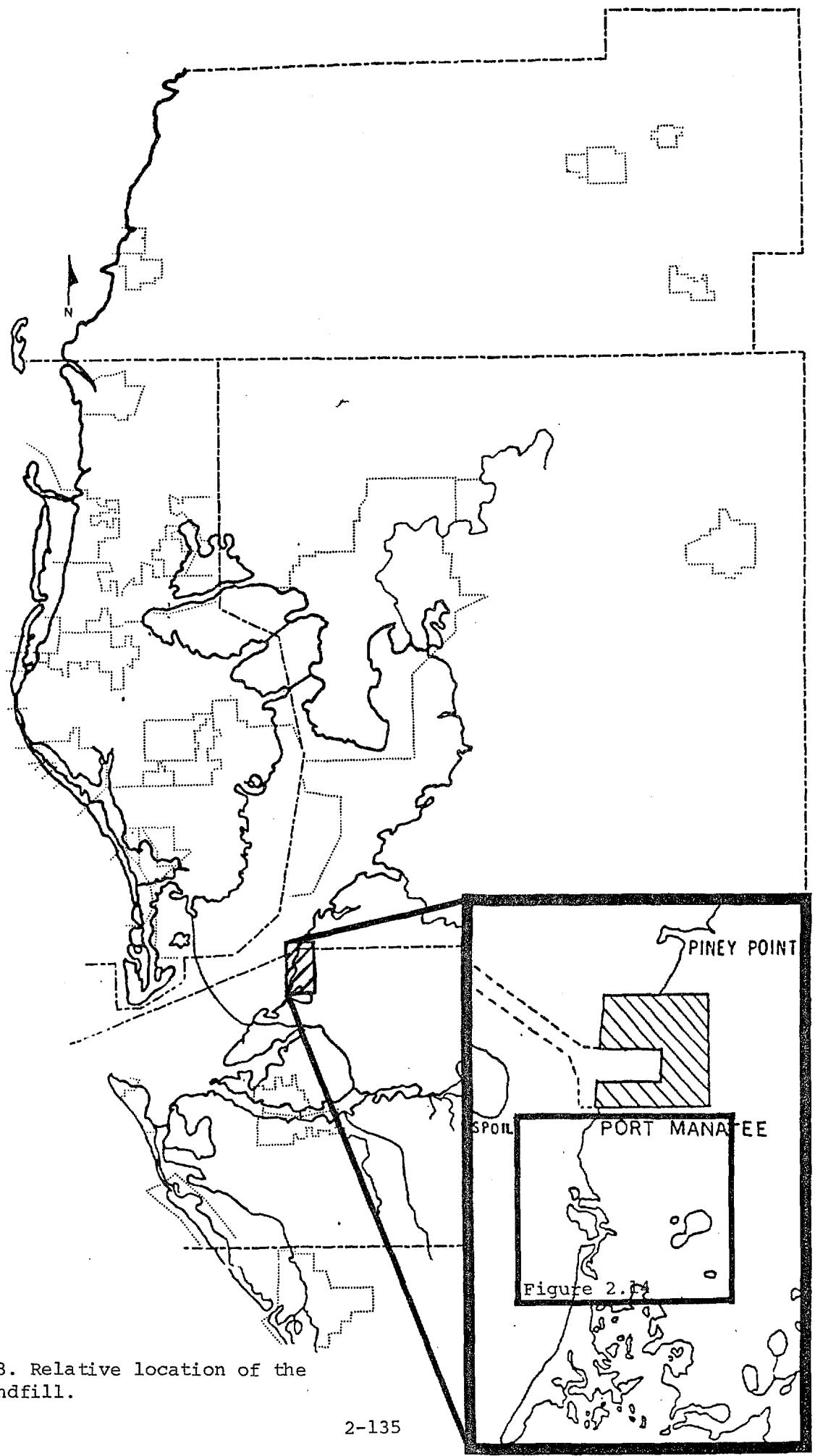


Figure 2.13. Relative location of the Hendry landfill.

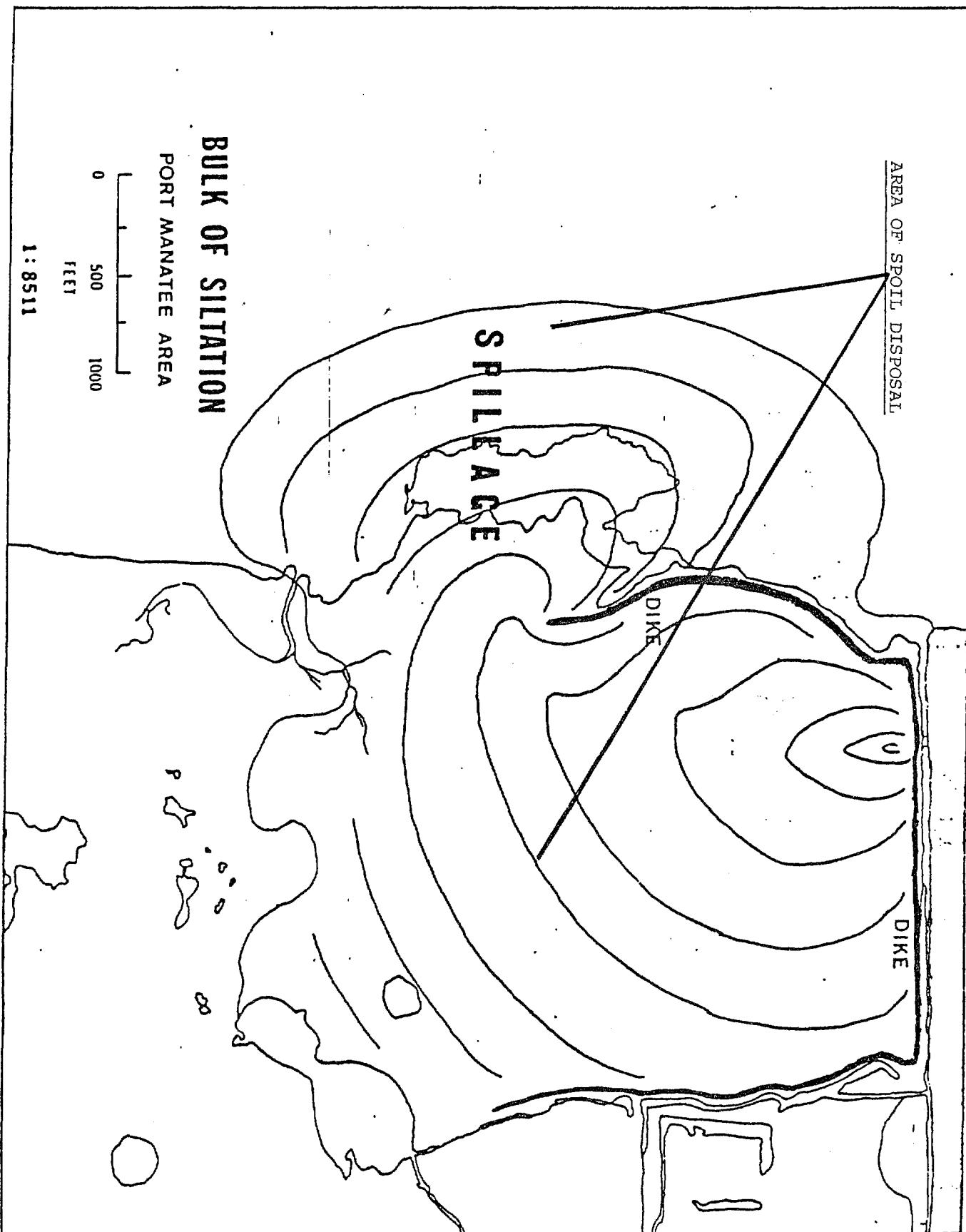


Figure 2.14. Detail of the area affected by the deposition of spoil material.

Work Element 27-3: The Department of Environmental Regulation should mobilize the \$80,000 in settlement fines, as well as additional funds from Sections 403.0615 and 403.165, Florida Statutes, and release them to the Southwest District Office of the Department of Environmental Regulation.

Work Element 27-4: The Legislature should also release up to 50% of the funds generated from Section 84.471, Florida Statutes, to the Department of Natural Resources. This statute requires a special \$300 annual license fee to use commercial fishing nets in Manatee County waters. These funds are to be utilized solely for aquatic habitat research and restoration in Manatee County. It is expected that approximately \$40,000 will be generated per year, for four years, after which the statute sunsets.

Work Element 27-5: The Department of Environmental Regulation and the Department of Natural Resources should coordinate in an interagency agreement to pool the above referenced funds and to proceed with restoration. The Department of Natural Resources Marine Research Laboratory in St. Petersburg should assume the management role for all contracted services. The restoration effort should be spread over four years.

Estimated Manpower and Cost

Year	1	2	3	4
<b>Manpower (man years)</b>				
- Staff (DNR)	2	2	2	2
- Consultant	5	-	-	-
<b>Total</b>	<b>7</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Source of Funds</b>				
- Federal	-	-	-	-
- State (Pollution Recovery Funds)	80,000	20,000	20,000	20,000
- Local *(Gill-net License Fees)	20,000	20,000	20,000	20,000
<b>Total</b>	<b>100,000</b>	<b>40,000</b>	<b>40,000</b>	<b>40,000</b>

3. Upon restoration of the Hendry Fill site, and completion of a management plan, the Department of Natural Resources should maintain the additional lands obtained in the settlement as buffer areas around the Terra Ceia Aquatic Preserve. The potential of these lands for the construction of a state park should also be considered.

Long-Term Management Alternatives:

1. Status Quo: This particular issue probably best exemplifies the need for a local coordinating body to oversee and/or implement a bay management program. Although the existing laws and statutes sufficiently address the problem, interagency coordination is lacking to the point where four years after the settlement, no action has yet been taken to remedy the situation.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be effective in organizing the political pressure, and in coordinating the interagency cooperation, often needed in initiating large scale restoration projects of this nature.
3. Bay Management Authority: A mandated bay management authority could potentially assume statutory responsibility for all such restoration projects around Tampa Bay.

## Issue #28 Contingency Planning for Post-Hurricane Acquisition of Habitat

Issue Analysis: Mitigative options as well as opportunities for habitat restoration and enhancement are severely limited in coastal areas such as Boca Ciega Bay which have already been extensively developed. In addition, the potential exists for disastrous losses of life and property in the event of a hurricane force storm striking such areas.

Despite the disastrous economic consequences of hurricane damage in urbanized coastal areas, opportunities exist for the public to acquire newly formed or extensively altered barrier islands, spits and other natural features resulting from such storms. Once acquired, these areas could be restored to their previous or potential habitat value, or preserved in their natural state. In addition, in highly developed areas which undergo severe infrastructure damage during large storm events, opportunities exist for true enforcement of constraints placed upon inadvisable reconstruction practices.

In order to be implementable, land acquisition mechanisms must be in place prior to large storm events. At the present time, however, no State lands program exists which specifically addresses post-hurricane acquisition. Constraints upon post-hurricane reconstruction could presently be exercised through implementation of the Governor's Executive Order 81-105.

For bay management purposes, contingency planning for post-hurricane acquisition of lands should focus on all coastal and estuarine habitat lying seaward of the inland limit of the velocity zone, as defined by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs), or the Department of Natural Resources Coastal Construction Control Line, whichever is further inland at any point.

### Relevant Laws and Statutes:

Coastal Zone Management Act

Coastal Barrier Resources Act

Chapter 380, Florida Statutes (Land and Water Management)

Chapter 259, Florida Statutes (Land Acquisitions for Conservation or Recreation)

Chapter 253, Florida Statutes (State Lands)

Chapter 161, Florida Statutes (Beach and Shore Preservation)

Executive Order 81-105

### Bay Management Objectives:

1. Restore or enhance the natural resources and habitat value of severely damaged, newly formed or extensively altered coastal areas following disastrous storm events.
2. Establish a land acquisition mechanism which will specifically enable public acquisition of newly formed or extensively altered coastal lands.
3. Prevent inadvisable reconstruction in severely damaged developed coastal barrier areas (as defined by the Department of Community Affairs).

Bay Management Recommendations:

1. The Environmentally Endangered Lands (EEL) and the Conservation and Recreation Lands (CARL) programs should be amended to give highest priority to the acquisition of newly formed or extensively altered coastal lands, as well as existing undeveloped barrier areas.

Work Element 28-1: The Legislature should amend Chapter 259, Florida Statute, accordingly.

2. The Department of Community Affairs should include in the rulemaking for Executive Order 81-105 a provision stating that all state subsidies for post-hurricane redevelopment in defined barrier areas shall be contingent upon compliance with all applicable environmental regulations, and consistency with the Florida Coastal Management Program (FCMP).

Work Element 28-2: The Tampa Bay Regional Planning Council, through the IC&R review process, should implement this inclusion.

3. The Department of Community Affairs should amend the draft rule for E.O. 81-105 so as to limit state subsidies for the rebuilding of the major public facilities infrastructure (water, wastewater treatment, transportation etc.) in severely damaged developed coastal barrier areas only to essential levels of service for the intact development remaining in those areas.

Work Element 28-3: The Tampa Bay Regional Planning Council, through the IC&R review process, should implement this amendment.

4. Local governments should be encouraged to acquire and convert extensively altered developed barrier lands into preservation, conservation or recreation areas.

Work Element 28-4: The Tampa Bay Regional Planning Council, through its Local Government Comprehensive Plan Act (Chapter 163, Florida Statutes) review responsibilities, should encourage the development of local ordinances to this effect.

Long-Term Management Alternatives:

1. Status Quo: Final implementation of the above stated recommendations could probably be satisfactorily accomplished through the existing review responsibilities of the Tampa Bay Regional Planning Council.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could more effectively lobby for legislative action as well as coordinate interagency cooperation.
3. Bay Management Authority: A mandated bay management authority could potentially assume ownership and management responsibility for submerged lands in the bay allowing for more direct control over resource management decisions affecting Tampa Bay.

## Issue #29 Mitigation Banking

Issue Analysis: To mitigate is defined as, "to moderate in force or intensity; alleviate." Wetlands mitigation, as defined by the U.S. Fish and Wildlife Service Mitigation Policy (Federal Register 46(15): 7644-7663, 1981), includes the following specific elements represented in the desirable sequence of steps in the mitigation planning process:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree of magnitude of an action and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

In the State of Florida the creation or restoration of substitute habitats (e.g. marsh creation) has become a common condition placed upon the issuance of dredge and fill permits for projects in jurisdictional wetlands. Most of this mitigation is done by individual property owners and is customarily required to be performed on property owned by the applicants. As a result of this policy, the great majority of mitigation projects undertaken involve relatively small acreages (less than 1 acre), thus driving the restoration/creation per acre costs quite high (\$10,000 - \$15,000 per acre including excavation of uplands as needed). In addition, this policy often excludes off-site mitigation, even in cases where restoration or creation of larger and/or more ecologically valuable systems could be accomplished. The concept of mitigation banking involves several items including the restoration or creation of larger, combined and more ecologically valuable sites, as well as the mitigation of isolated-wetland destruction in waters of the state, funded by fees for mitigation assessed during permitting.

Mitigation banking is a concept that would allow individual wetland restoration or creation projects to be credited to the "account" of agencies, corporations or individuals that routinely needed to mitigate for wetland impacts. Examples might include state and federal Departments of Transportation or Ports Authorities. The credits could be accumulated and drawn upon as needed to satisfy the reviewing agencies' requested mitigation for a given project. Conceptually, mitigation banking is attractive in that it allows potential permittees to plan in advance for the cost effective efforts, and can evolve into an "up-front mitigation" effort, which is highly desirable to many reviewing agencies.

"Up-front mitigation" implies that the mitigation activity (usually wetland creation or restoration) is accomplished and approved as successful prior to the permitted destruction of another wetland. The concept is attractive

since it insures that the reviewing agencies have an opportunity to see and approve of a successful mitigation activity prior to the loss of another wetland, instead of losing the wetland in question and then waiting for the mitigation activity to be completed and hoping it works.

The only functional mitigation banking program presently being implemented is in the State of Oregon, pursuant to Chapter 541.626, Oregon Statutes. This program is part of a complex mitigation policy involving a relative habitat value scale, ranging from 1.0 to 6.0 (1.0 = least valuable, e.g. unvegetated rock - 6.0 = most valuable, e.g. marine seagrasses), mitigation credits, a mitigation bank, and a mitigation trust fund. Although the system is relatively new, it is being actively, and effectively, implemented (Hamilton, 1984).

One of the major arguments in support of mitigation banking is that given a certain level of funding for wetland restoration or creation, greater acreages (often contiguous) of better quality habitat will result through an organized banking effort. Major arguments against mitigation banking, as well as against the concept of mitigation in general, include the idea that it could lead to the "selling" of permits for normally unacceptable habitat destruction, especially in the case on non-water dependent projects. In addition, there are no "environmental performance criteria" to determine if a wetland mitigation program is successful, and there is, as yet, no truly objective method of rating the relative "value" of one habitat type over another. There may, in fact, be situations that could never be mitigated for, such as the loss of productive oyster bars.

A number of studies have recently been initiated to identify appropriate habitat restoration sites in Tampa Bay, including those of the Tampa Bay Regional Planning Council, the Department of Natural Resources, and the Tampa Port Authority in conjunction with the U. S. Fish and Wildlife Service. Once these studies are complete they should serve as the basis for a comprehensive plan for future habitat restoration/creation in Tampa Bay. However, there presently appears to be no mechanism to ensure that mitigation efforts in Tampa Bay be performed in concert with that plan. A mitigation bank, if properly structured and managed, could provide that mechanism.

Relevant Laws and Statutes:

Clean Water Act, Section 404  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 17-3, Florida Administrative Code

Bay Management Objectives:

1. Improve the success rate and ecological quality of habitat restoration projects in and around Tampa Bay.
2. Encourage large scale habitat restoration projects through combined efforts at selected sites.
3. Maximize effective utilization of the limited funds available for habitat restoration/creation in the Tampa Bay area.

Bay Management Recommendations:

1. The Legislature should adopt enabling legislation allowing for the creation of local mitigation banks, through interagency agreements, in areas where such an arrangement is deemed feasible and where significant habitat improvements could be made over existing mitigation procedures.

Work Element 29-1: The Legislature should amend Chapter 403, F.S., accordingly. Chapter 541.626, Oregon Statutes, should be used as a legislative precedent.

2. The Department of Environmental Regulation should initiate rulemaking establishing the mechanism for an experimental Tampa Bay mitigation bank created through a joint agreement between the U.S. Army Corps of Engineers, the DER Southwest District Office and the Tampa Port Authority, and other appropriate state and local agencies.
3. The Tampa Bay Regional Planning Council should sponsor habitat restoration workshops for all agencies, local governments, and companies involved in habitat mitigation in and around Tampa Bay. The emphasis of the proposed workshops should be to coordinate a unified and planned approach to habitat mitigation in the bay.

Long-term Management Alternatives:

Statue Quo: There presently is no enabling legislation in the State of Florida allowing for the creation of a structured mitigation bank. If enabling legislation were passed, the Department of Environmental Regulation would most likely be the agency charged with the responsibility of rulemaking and implementation. Because of the local interest and knowledge in habitat restoration needs, Tampa Bay would present an excellent situation for the trial of a local mitigation bank.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively sponsor the recommended habitat restoration workshops as well as coordinate closely with the experimental mitigation bank to ensure that major mitigation efforts are consistent with the comprehensive habitat restoration plans.

Bay Management Authority: A mandated bay management authority could potentially assume full administrative responsibility for a locally established mitigation bank.

Issue #30 Management of Bower Tract and Adjacent Wetlands

Issue Analysis: The Bower Tract consists of a 1549 acre tract on the north shores of Tampa Bay (see figure 2.15). It is one of the last undeveloped sections of the Bay. About 1377 acres of the tract are wetlands and consist of a diverse estuarine system of mangrove islands, salt marshes, mud flats, oyster bars, creeks, small bays and bayous. The upland portion is about 170 acres and is separated from the wetlands by salt barrens. The uplands are mostly pine flatwoods with hammocks, perched ponds and small creeks. Presently, the uplands are zoned for development.

A wide variety of wildlife inhabits the Bower Tract, some of which rely on the uplands for feeding and nesting habitat. The tract's estuarine areas have been documented as being highly productive, both as a source of food for area wildlife and as a nursery for many species of marine organisms of both sport and commercial importance. Several endangered or threatened wildlife species are common to the site including the American Bald eagle, manatee, wood stork and brown pelican. In addition, the assimilative capability of the tract's wetlands are extremely important in maintaining water quality in Old Tampa Bay, which has recently been shown to be an extremely stressed system (FDER, 1984).

Future management of the Bower Tract should include the preservation of the tract to insure its continued ecological productivity. Although some areas of the uplands are well suited to development for a public park, care should be taken to insure that runoff waters from the uplands remain of good quality. Soil conditions of the upland portion of the Bower Tract are such that much of the water tends to run off rather than percolate. This phenomenon is critical due to the fact that seagrass beds found in the site's estuaries are highly susceptible to increases in silt and water turbidity. Seagrasses are a vital component of the Tampa Bay ecosystem. Since seagrasses have been reduced to 20% of the original extent in the Bay, every effort should be made to avoid further reduction of the community (see issue #2).

It is for the above reasons, i.e. wildlife habitat, recreation, and critical protection of sensitive estuarine habitat; that the uplands of the Bower tract should become public and that they be preserved and/or developed with great care. Because the Bower Tract lies directly contiguous to the existing Upper Tampa Bay Park the Hillsborough County Department of Parks and Recreation has proposed that these vital natural resources and public access would be more effectively managed through this expansion and that increased recreational and natural history interpretation opportunities would be a positive benefit of this access. In anticipation of eventual public acquisition Hillsborough County has already prepared a detailed management plan and budget. However, more important is the long range objective of preserving the integrity of the Bower Tract for its inherent value and what it will mean to future generations.

In 1980 the Bower Tract was proposed as a CARL (State Conservation and Recreational Lands Program) acquisition by Hillsborough County and was subsequently ranked number 12 on the 1980 CARL acquisition priority list. The acquisition priority list, prepared yearly, guides the acquisition efforts of the CARL Program, which are actually carried out by the

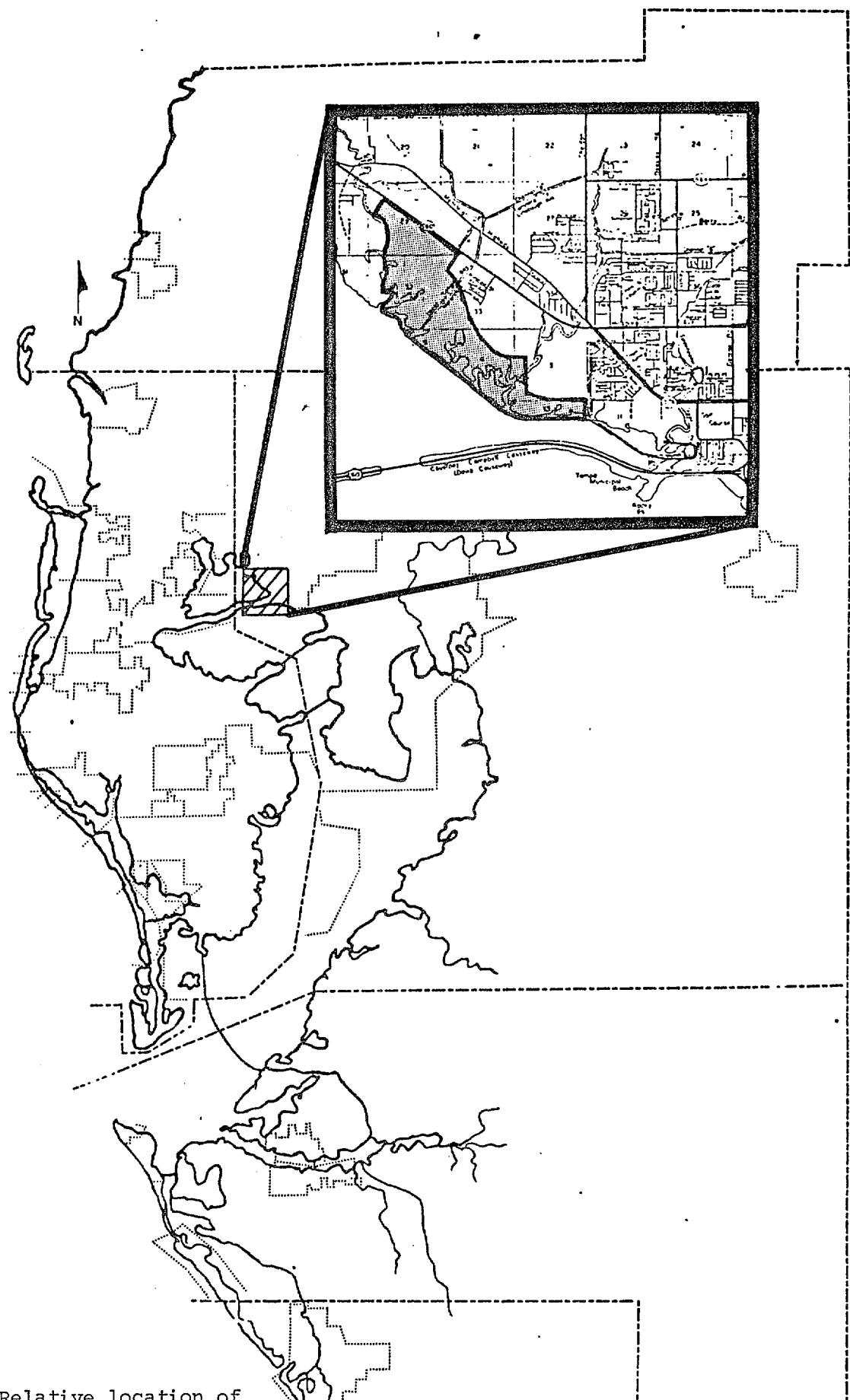


Figure 2.15. Relative location of the Bower tract.

Department of Natural Resources (DNR). The following year, the Bower Tract moved up to number 9 on the priority list. With the relatively high ranking accorded this project, the DNR began negotiations with the owner to acquire it; however, the owner declined to sell the tract to the state at its appraised value, which is by law the most the state can offer. Hillsborough county attempted to assist in the negotiations, but to no avail. Thereupon, the CARL Selection Committee recommended to the Governor and Cabinet that the Bower Tract be dropped to the bottom of the priority list. Thus, Bower Tract fell to number 27 on the September 1983 interim priority list.

In an effort to assist negotiations on this project, the Legislature, in 1984, gave the DNR the power of eminent domain to acquire this tract. The recently adopted acquisition priority list for 1984-85 ranks Bower Tract 26th out of 48 projects. Inasmuch as the DNR has already begun negotiations on projects as far down the list as number 23, it would seem that negotiations on the Bower Tract acquisition might be reopened in the near future. However, further efforts will be needed to ensure final public acquisition of these valuable wetlands.

Relevant Laws and Statutes:

Chapter 259, Florida Statutes (Land Acquisition for Conservation or Recreation)

Bay Management Objectives:

1. Convert the Bower Tract from private to public ownership through state purchase under the Conservation and Recreation Lands (CARL) acquisition program followed by transfer of ownership to Hillsborough County.
2. Effectively manage the vital natural resources and public access on the Bower Tract by expanding Hillsborough County's jurisdictional boundaries and management responsibilities for Upper Tampa Bay Park to include the contiguous Bower Tract acreage.

Bay Management Recommendations:

1. Hillsborough County should officially request the CARL committee to pursue additional independent property appraisals of the Bower Tract. Since the Gateway property in Pinellas County was purchased a new comparable has been established.
2. The Tampa Bay Regional Planning Council should pass a resolution officially requesting the Governor and Cabinet to advance the Bower Tract higher on the CARL acquisition list so that the Department of Natural Resources can begin negotiations under the eminent domain process.
3. The Department of Natural Resources should further pursue purchase of the Bower Tract under the threat of "friendly condemnation".

Long-Term Management Alternatives:

1. Status Quo: Hillsborough County originally sponsored the CARL nomination of the Bower Tract and has done a commendable job in pursuing public ownership. However, it is apparent that greater public and political support will be needed to accomplish the task.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be effective in expanding the public awareness of the importance of this tract, and in organizing the needed public and political support for public purchase.
3. Bay Management Authority: A mandated bay management authority could potentially assume ownership and management responsibility for submerged land in Tampa Bay. However, public ownership of the Bower Tract would still have to occur through existing state land acquisition programs. It is unlikely that such an authority would be any more effective at accomplishing this than a bay advisory committee.

## Issue #31 Management of Passage Key

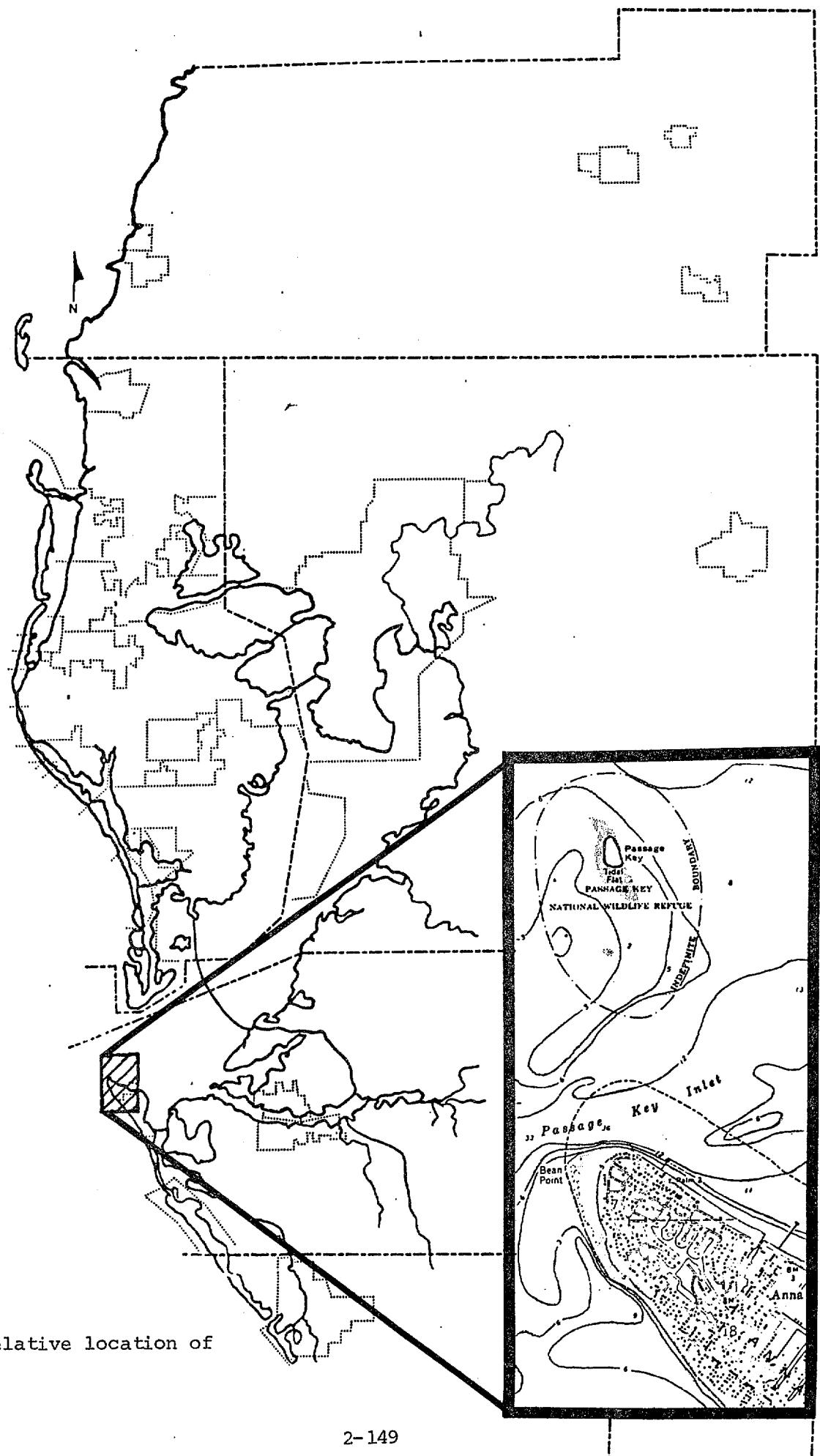
Issue Analysis: Passage Key National Wildlife Refuge (NWR) is a small migrating barrier island located at the mouth of Tampa Bay in Manatee County (see figure 2.16). Set aside 80 years ago as one of the first National Wildlife Refuges, the island currently provides nesting habitat for the following bird species: Laughing Gull (5000-20000 breeding pairs in recent years), Royal Tern (1000 pairs), Black Skimmer (250 pairs), Least Tern (up to 4- pairs), American Oystercatcher (6-8 pairs), Sandwich Terns and possibly Snowy Plovers (a few pairs each, at most). The island is also an important roost site for eastern Brown Pelicans and Double-crested Cormorants, and is used by thousands of terns and shorebirds during migration.

Of the seven nesting species noted, all but Laughing Gulls are considered at risk in Florida (Florida Game and Fresh Water Fish Commission or Florida Committee on Rare and Endangered Plants and Animals). The primary reason for this is the loss of secure breeding habitat where these birds can nest undisturbed by humans. All eight species nest on the ground, with Laughing Gulls favoring areas vegetated by grasses or low forbs and the other species requiring bare sand or shell substrates. Mid-day surface temperatures during the spring-summer nesting season may exceed 45 degrees C (113 degrees F), sufficient to quickly kill embryos or small chicks if the adults are disturbed from their nests.

Created in 1905 by Executive Order, Passage Key was the third National Wildlife Refuge established in the United States. Pursuant to Title 50, Code of Federal Regulations, and the Refuge Administration Act, all National Wildlife Refuges are initially closed to public use until they are officially declared open for such use. Passage Key NWR has never been officially opened for public visitation. The island and surrounding shallows are, however, very popular with recreational boaters, especially on weekends and holidays. The clear waters and white sands invite swimming, sunbathing, fishing, shelling and other beach activities (even jogging!). As a result, nesting activity is significantly disrupted.

For management purposes Passage Key NWR is presently posted by the U.S. Fish and Wildlife Service (USFWS) and closed to public entry during the period April 1 through September 1. However, a significant number of visitors simply ignore the signs. The Refuge Manager does patrol Passage Key during times of peak human activity in the area in an effort to prevent entry into the breeding colonies and disruption of nesting efforts, but there are two primary limitations to his ability to adequately protect the breeding birds including the following:

- The manager cannot always be present at Passage Key when necessary, and even when present and intercepting one party he may not be able to reach other visitors landing elsewhere on the island shore; and
- The USFWS legal enforcement authority begins at the mean high water line (MHW). The manager cannot legally intercept trespassers seaward of MHW, which means in many cases disturbance of nesting birds cannot be prevented, but only stopped after it has occurred. Considerable egg or nestling mortality has occurred as a result.



In addition to these limitations, the Passage Key Refuge was designated as a National Wilderness Area in 1970. The practical effect of this designation was to prevent any physical habitat manipulation or enhancement. Thus the Refuge Manager must manage the island in its natural state and cannot implement any habitat management measures that would minimize disruption of nesting activity.

Relevant Laws and Statutes:

Migratory Bird Treaty Act  
National Wildlife Refuge System Administration Act  
Title 50, Code of Federal Regulations

Bay Management Objectives:

1. Extend the Refuge Manager's legal jurisdiction to allow more efficient protection of breeding birds.
2. Improve public awareness of the problem through a variety of educational activities. Emphasis should be on enlisting support of a variety of local organizations and arranging a program with long-term continuity.

Bay Management Recommendations:

1. In order to consistently manage the biological resources on the island, Passage Key should be posted and closed to public use on a year-round basis.
2. The U.S. Fish and Wildlife Service should enter into a perpetual lease agreement with Manatee County to allow for legal management and enforcement authority on all submerged lands extending seaward a distance of 100 yards from the mean high water line around the perimeter of Passage Key. Provisions should be made to designate this as a buffer area, which will be posted, and from which the Refuge Manager may legally intercept boat or foot traffic.

Work Element 31-1: The Tampa Bay Regional Planning Council should assist in the local coordination of this effort.

3. To ensure long-term management continuity with other marine preservation areas in Tampa Bay, the boundaries of the Terra Ceia Aquatic Preserve should be extended to include Passage Key and all submerged lands extending seaward a distance of 100 yards from MHW.

Work Element 31-2: The Legislature should enact a bill amending the boundaries of the Terra Ceia Aquatic Preserve as described above (see issue #8).

4. The U.S. Fish and Wildlife Service should assign additional public use specialists to the Chassahowitzka System of National Wildlife Refuges to increase enforcement capabilities for Passage Key. A full-time refuge manager should be assigned specifically to Passage Key.

Work Element 31-3: The Tampa Bay Regional Planning Council should adopt a resolution requesting additional USFWS staffing for the Passage Key, Egmont Key and Pinellas National Wildlife Refuges.

5. The U.S. Fish and Wildlife Service, the Department of Natural Resources and Manatee County should coordinate in the development of a shoreline information program aimed specifically at alleviating the trespassing problems at Passage Key.

Work Element 31-4: The Tampa Bay Regional Planning Council should assist in the local coordination of this effort. The program should include the following:

- Distribution of posters, brochures etc. at marinas, fishing piers and boat ramps;
- Contact with local fishing editors and other newspaper reports, magazines;
- Contact with other marine education outlets including the Florida Sea Grant Program, Marine Extension Service and the Florida Marine Information Network; and
- Solicitation of volunteer management efforts by local conservation and marine groups such as the Manatee Audubon Society, the Sierra Club, Manasota 88, the Coast Guard Auxiliary and the Power Squadron.

Long-Term Management Alternatives:

1. Status Quo: It is unlikely that final implementation of the above stated recommendations would take place under this alternative as future funding and staffing levels at the Tampa Bay Regional Planning Council may be prohibitive. Although much of the framework for developing a volunteer program is already in place - for example, the Manatee County Audubon Society has already endorsed the concept of National Audubon's Adopt-A-Refuge program - the maintenance of continuity and consistency in such volunteer programs will be difficult without proper interagency coordination. In addition, when the present Refuge manager is transferred, current funding and manpower restrictions in the U.S. Fish and Wildlife Service suggest that the position may not be immediately filled. In this event, the administration of an effective management program would be extremely difficult without the assistance of a regional or local coordinating body.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively assist in the coordination of interagency agreements, and in the administration of the recommended shoreline information program.
3. Bay Management Authority: A mandated bay management authority could be very effective at arranging interagency agreements, could assist in the enforcement of no trespassing regulations, and could fully administer the shoreline information program.

Issue #32 Management and Restoration of Shorelines in Boca Ciega Bay,  
Pinellas County

Issue Analysis: Located landward of the south Pinellas County barrier islands (see figure 2.17), Boca Ciega Bay is currently a stressed and degraded aquatic ecosystem. What was once a pristine and productive estuary, now supports limited fisheries and exhibits extremely poor water quality.

The major causes of this degradation have included the following:

Extensive Dredging and Filling - Since 1900, 2,506 acres of Boca Ciega Bay have been filled to create real estate and causeways. This acreage encompasses approximately 22% of the total acreage of the bay. Thousands of additional acres of bay bottom have been dredged to deep depths to provide both navigation channels and fill for the "upland" development. The primary effects of the dredging and filling activities have been the direct destruction of shallow seagrass beds and mangrove forests.

The secondary efforts of the past dredging have been the creation of an "environment" of a maze of islands and dead-end finger canals lined with hard vertical seawalls. The combined effects have been the total elimination of the most productive littoral zones (mangroves, seagrass, marsh) in Boca Ciega Bay. This maze of finger canals has significantly impeded and reduced tidal flushing by blocking tidal ebb and flood in many areas of the flow. Other areas have been excavated beyond flushing depths, causing the areas harbors, bays, and canals to accumulate stagnant, polluted muck and water at lower depths. This situation has contributed to the frequent water quality violations occurring there.

Stormwater/Wastewater - Boca Ciega Bay receives an enormous amount of polluted stormwater and wastewater. Boca Ciega Bay receives a major portion of the runoff from the southwest side of the Pinellas peninsula, extending from North Largo to Mullet Key. The pollutants discharged to this area are extremely slow to flush out of Boca Ciega Bay due to poor tidal flushing and circulation restriction aforementioned.

The area from Largo to 74th Avenue North in Seminole drains into Boca Ciega Bay through man-made Lake Seminole. About 85% of the lake's drainage basin is developed with residential and commercial areas. The Cross Bayou Canal and Joe's Creek drain the area to the east and south of Lake Seminole. Both the canal and the creek receive runoff from residential areas. Joe's Creek also receives runoff from commercial areas and one of the County's major wastewater treatment plants. Drainage in the southernmost mainland portion of Pinellas County enters Boca Ceiga Bay through an urban drainage network.

The potential for urban runoff related problems is very high in the Lake Seminole and Boca Ciega Bay areas, due to the large coverage of relatively impermeable urban land in the drainage basin. In many areas of the subject drainage basin, shorelines as well as drainage ways, have been cleared of vegetation, and natural slopes have been steepened. The removal of shore-

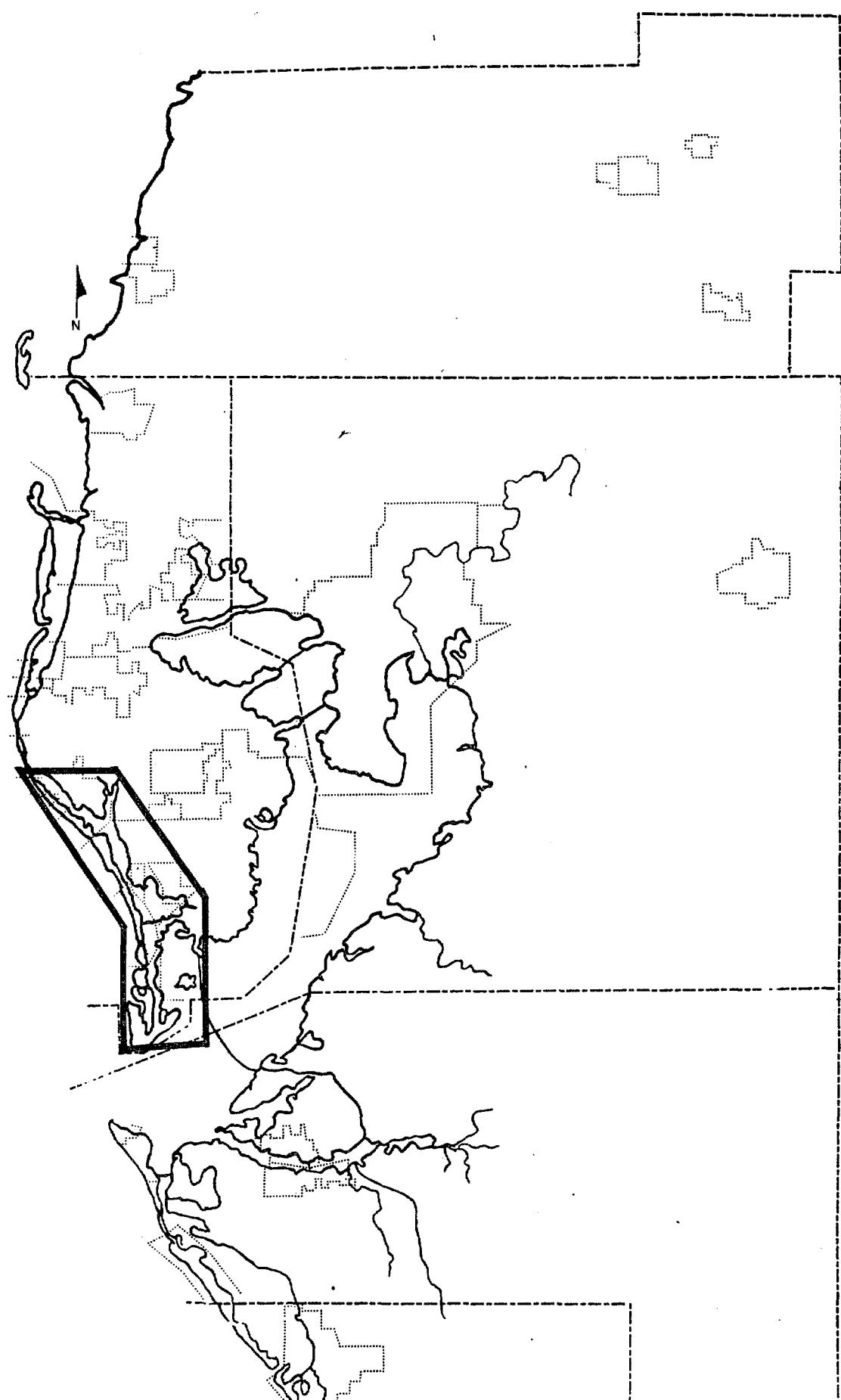


Figure 2.17. Relative location of Boca Ciega Bay.

line, bottom and drainage way vegetation, which serve as constant nutrient assimilators, and the increased nutrient impacts resulting from urban runoff, has contributed most significantly to lowering of water quality in the bay.

Numerous point sources of pollution have been identified within the drainage basin. Although most of them are sewage treatment plants, other noteworthy sources include cooling water discharges and electroplater discharges. In localized portions of this basin water quality problems appear to be primarily caused by improper or poorly treated sewage. Such pollutant sources have included the St. Petersburg Beach Plant and at least six others within the drainage segment. These discharges have led to extremely high levels of total and ortho-phosphorous, TKN, NH<sub>3</sub>, chlorophyll and coliform/fecal bacteria.

Other Physical Alterations - Existing submerged wetland areas have been further degraded by local power boat operators. It has been well documented that power boat propellers can leave denuded scars through marine grass beds, which often persist for years.

In addition, many riparian land owners have removed significant amounts of mangrove tree vegetation in order to obtain full unobstructed vistas of the water. On a cumulative scale, such trimming has significantly reduced the food chain, habitat and water filtration contributions of mangroves in Boca Ciega Bay.

Relevant Laws and Statutes:

Federal Water Pollution Control Act, PL 92-500 as amended  
Coastal Zone Management Act  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 258, Florida Statutes (Aquatic Preserves)  
Chapter 163, Florida Statutes (Intergovernmental Programs)

Bay Management Objectives:

1. Reduce point and non-point source pollutant loads entering Boca Ciega Bay.
2. Improve tidal flushing in the Boca Ciega Bay system.
3. Preserve existing and, wherever feasible, create new submerged and intertidal wetland habitat.

Bay Management Recommendations:

1. Local governments in the Central and South Pinellas 201 planning districts should continue to seek alternatives to surface water discharges of wastewater into Boca Ciega Bay. Top priority should be given to deep well injection. Another viable alternative would be a combined Gulf of Mexico outfall.
2. A wasteload allocation study should be completed for Boca Ciega Bay to provide water-quality based effluent limits for wastewater treatment facilities discharging to surface waters.

Work Element 32-1: Through funds procured from the EPA 205(j) grant program, the Department of Environmental Regulation should design and implement a Boca Ciega wasteload allocation study.

3. Non-point source pollutant loads entering Boca Ciega Bay should be minimized by strict local enforcement of the state Stormwater Rule (Chapter 17-25, F.A.C.), and by the adoption of a state law requiring stormwater detention for redevelopment in urban areas (see issues #3 and #22 for further discussion).

Work Element 32-2: The Southwest Florida Water Management District should make appropriate increases in staffing in order to more effectively enforce the Stormwater Rule in the Tampa Bay area.

4. Pinellas County and the municipalities bordering on Boca Ciega Bay should coordinate in developing and implementing a sub-regional drainage plan specific to the protective needs of the Bay. The plan should emphasize the aquisition and construction of multi-jurisdictional retention/detention areas (see issue #3 for further discussion).
5. Special criteria for dredging and filling practices should be developed for the Boca Ciega Bay Aquatic Preserve with special emphasis on the protective needs of existing subtidal and intertidal wetlands in the bay.

Work Element: 32-3: As mandated in Chapter 403.904, Florida Statutes, the Department of Environmental Regulation should develop special, more stringent, rules and criteria for dredge and fill practices in Boca Ciega Bay.

6. Hydrologic studies should be undertaken to determine the effectiveness and feasibility of using mechanical tidal gates and pumps for alleviating the frequent water quality violations occurring in association with the numerous dead end finger fill canals in Boca Ciega Bay (see issue #35 for further discussion).
7. A land aquisition program should be established to allow for the transfer of newly created or extensively altered coastal lands to public ownership following disastrous storm events. The purpose of such a program would be to prevent inadvisable redevelopment of such areas, and to restore additional coastal and estuarine habitat (see issue #28 for further discussion).
8. Pinellas County and municipalities bordering Boca Ciega Bay should step up efforts to implement their respective Coastal Zone and Conservation Elements of their adopted Comprehensive Plans.

Work Element 32-4: The Tampa Bay Regional Planning Council through its Chapter 163, Florida Statutes, review responsibilities, should coordinate and assist where possible in the implementation of appropriate Comprehensive Plan Elements, with special emphasis on the immediate needs of Boca Ciega Bay.

9. A public education program aimed specifically at power boat impacts on seagrass beds, and on the value of intertidal wetland habitat, should be implemented in the Tampa Bay area (see issue #18 for further discussion).
10. A management plan for the Pinellas County Aquatic Preserve system should be developed and implemented with sufficient staffing and funding levels (see issue #8 for further discussion). In the preparation of this plan, the Boca Ciega Bay Preserve should be officially designated as an "Urban Preserve", and eventually managed as such.

Long-Term Management Alternatives:

1. Status Quo: The problems associated with Boca Ciega Bay are numerous, complex, perseverent and multi-jurisdictional in nature. Under the existing regulatory framework it is unlikely that the above stated objectives will ever be effectively accomplished.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be effective in coordinating interagency cooperation, as well as assisting in the implementation of local government comprehensive plans.
3. Bay Management Authority: A mandated bay management authority could potentially assume ownership of submerged land in the bay as well as the management responsibility for the Boca Ciega Aquatic Preserve. Under this alternative many of the relevant overview and permitting responsibilities would be centralized under one regulatory body allowing for a much more efficient and comprehensive management capability.

### Issue #33 Improvements to Bridge Facilities Crossing Tampa Bay

Issue Analysis: Currently, four major bridge facilities cross Tampa Bay including the Sunshine Skyway, the Gandy Bridge, the Howard-Franklin Bridge and the Courtney-Campbell Causeway. While the former facility crosses the mouth of Tampa Bay the latter three facilities bisect Old Tampa Bay (see figure 2.18).

Because all four bridges have incorporated the filling of large areas of bay bottom for the construction of causeway approaches, major alterations to the natural tidal current patterns and flushing rates have resulted (Ross and Jenkins, 1978). Computer simulations of net surface current velocities over a single tidal cycle have indicated that the causeway structures cause the occurrence of large tidal gyres, and significantly reduce tidal flushing rates in areas adjacent to the structures (see figure 2.19). This effect has been most negative in Old Tampa Bay where restrictions to tidal flow have significantly increased the residence time of nutrients and organic matter discharged from sewage treatment plants.

Because of increasing traffic rates the Florida Department of Transportation is preparing plans to improve roadway conditions along the Hillsborough County portion of the Courtney Campbell Causeway.

The major improvements include:

- Addition of median and paved shoulders from the bridge to a point east of the municipal beach.
- Upgrading of the four-lane section to six-lanes from east of the municipal beach to a point west of SR 589.
- Construction of new bulkheads with subsequent filling between the bulkhead and existing shoreline. Revetment construction on waterward side of bulkhead.
- Revetment construction with associated filling between the revetment and existing shoreline, where no bulkheading is required.

As a result of these roadway improvements, secondary seagrass beds and intertidal habitat adjacent to the affected portions of the causeway may be destroyed. To date, no mitigation has been proposed.

In addition, the U.S. Department of Transportation has begun planning the widening of the Howard-Franklin Bridge as part of the I-275 Interstate Route. An environmental impact statement will have to be prepared for this work under federal requirements.

During the review and commentary period for the required dredge and fill permits, and the environmental impact statement, opportunities may exist for offsite mitigation of water quality impacts and the loss of bay habitat. Provisions for the improvement of tidal circulation around causeway structures, including the installation of tidal gates or additional culverts should be actively pursued as viable mitigative options.

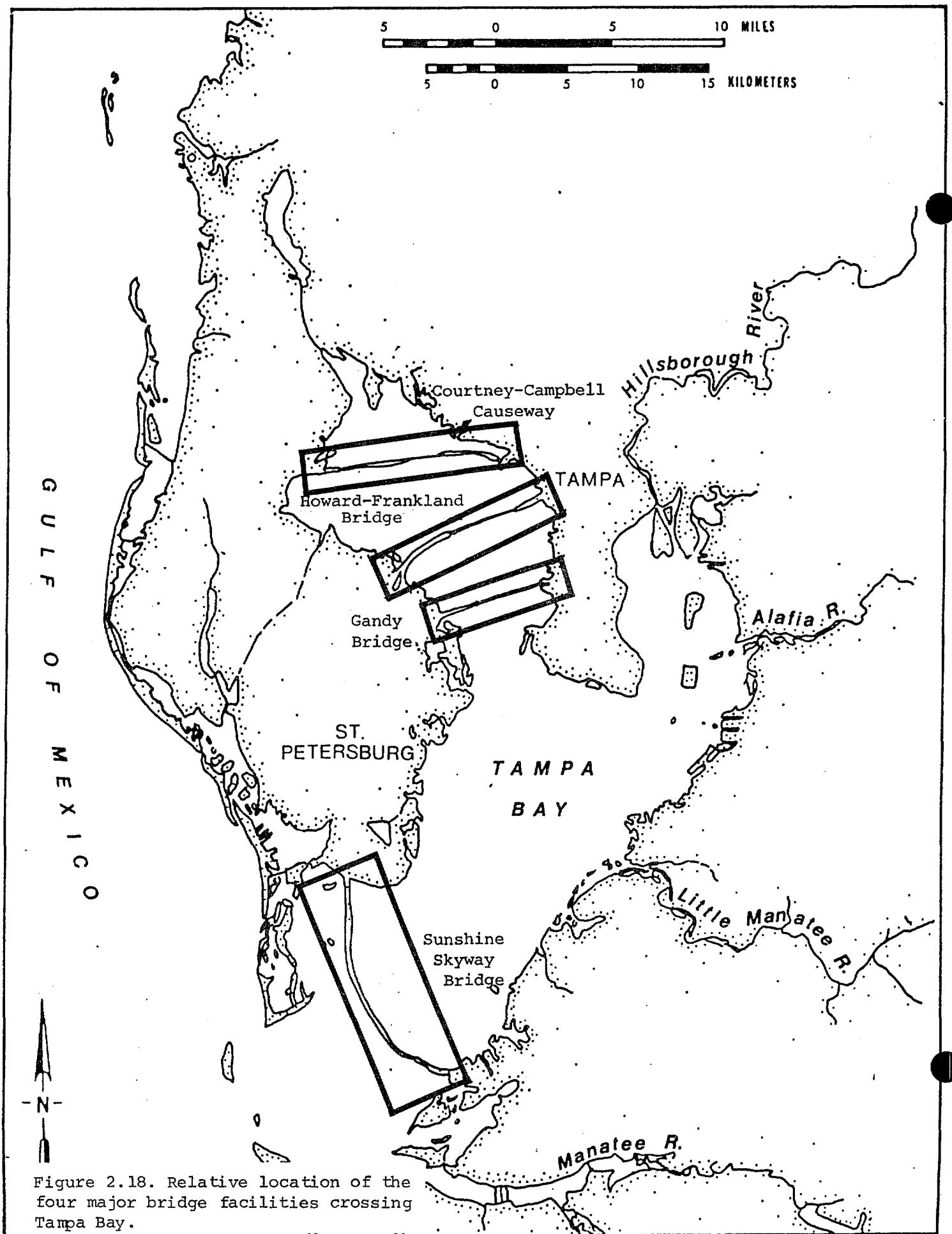


Figure 2.18. Relative location of the four major bridge facilities crossing Tampa Bay.

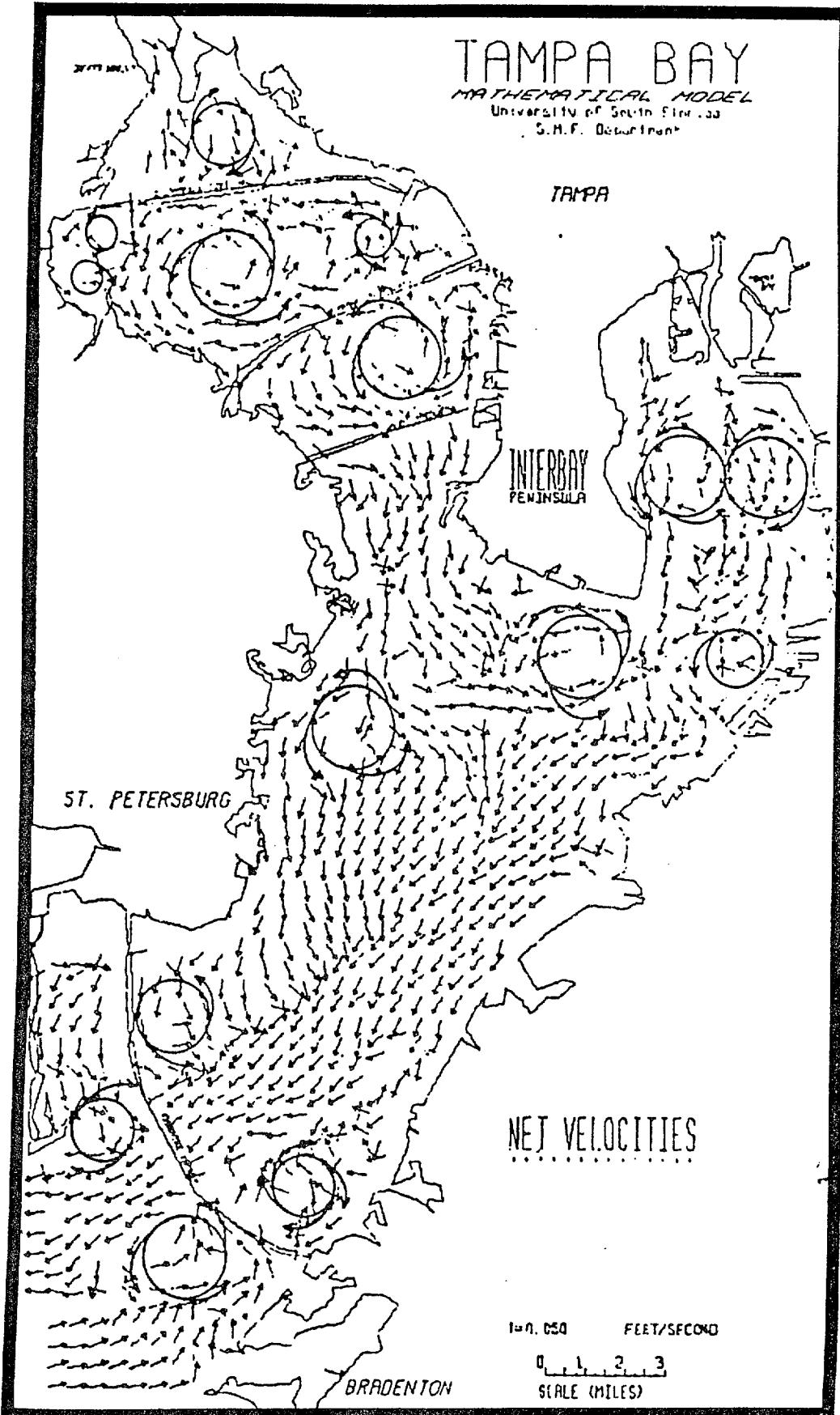


Figure 2.19. Net current velocities after one complete tidal cycle in Tampa Bay. Circular features represent tidal gyres.

Relevant Laws and Statutes:

National Environmental Policy Act  
Federal Water Pollution Control Act, Section 404  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Improve tidal circulation and flushing around causeway structures through the installation of tidal gates or additional culverts.
2. Provide a mechanism for offsite mitigation of water quality and habitat impacts associated with the improvement and widening of the Courtney Campbell Causeway and the Howard-Franklin Bridge.

Bay Management Recommendations:

1. Discussions should be initiated with the Department of Environmental Regulation, Environmental Protection Agency, Corps of Engineers, Florida Department of Transportation to explore the feasibility of offsite mitigation involving improvement to tidal circulation.

Work Element 33-1: The Tampa Bay Regional Planning Council should sponsor a series of scoping meetings including the above agencies. The objective of the meetings would be to develop an "up front" mitigation plan for many water quality and habitat impacts expected from the proposed modifications to the Courtney Campbell Causeway and the Howard Franklin Bridge.

Long-term Management Alternatives:

Status Quo: Under the current regulatory framework the Corps of Engineers and the Department of Environmental Regulation accept and consider comments from public reviewing agencies during the dredge and fill permitting process. Similarly the Environmental Protection Agency reviews public commenting during the EIS process. However, under present regulations it is very difficult to arrange for the mitigation of past actions, or offsite mitigation. Coordinated planning and special arrangements will be necessary to accomplish the above stated objectives.

Bay Advisory Committee: A permanent bay advisory committee within the Tampa Bay Regional Planning Council could effectively coordinate and sponsor the recommended scoping meetings.

Bay Management Authority: A mandated bay management authority would carry much greater legal weight than a bay advisory committee in negotiating a plan involving large scale efforts mitigation of past damaging actions in Tampa Bay.

#### Issue #34 Channel "A" Restoration

Issue Analysis: Channel "A" is a large drainage canal located in northwestern Hillsborough County (see figure 2.20). It was constructed during the late 1960s to serve as a flood diversion for Rocky Creek, a meandering urbanized tidal creek which outfalls to Old Tampa Bay. During the construction of Channel "A" a 7' deep channel was excavated through an extensive tidal marsh and mangrove area, and large levees of spoil material were deposited on both sides of the excavated channel. Further inland, portions of Rocky Creek were channelized and hardened and just north of Hillsborough Avenue, and a 3.5' salinity barrier was installed.

The adverse impacts resulting from the construction of Channel "A" include the following:

- discharge of poor quality water directly to Old Tampa Bay without assimilation by surrounding tidal wetlands;
- disruption of tidal flow patterns in the affected wetland areas;
- alteration of salinity patterns; and
- significant destruction of marsh and mangrove wetland habitat, both through dredging and filling, and through permanent alterations in current and salinity patterns.

In addition to the above impacts, encroaching development threatens to worsen water quality problems associated with Channel "A". Although Channel "A" is not a maintained navigational channel, several finger canals intercepting the channel have been built for a residential development and a large marina project directly on Channel "A" has been proposed. Furthermore, the River Oaks sewage treatment plant presently discharges effluent at the mouth of Channel "A".

Recently, the Anclote Basin Board of the Southwest Florida Water Management District voted to appropriate funds for wetland restoration efforts along Channels "A" and "G" in Hillsborough County. This action coupled with the relative value and sensitivity of the wetlands surrounding Channel "A" provide a unique opportunity for habitat restoration in Tampa Bay.

#### Relevant Laws and Statutes:

Chapter 403, Florida Statutes (Environmental Control)  
Chapter 163, Florida Statutes (Intergovernmental Programs)

#### Bay Management Objectives:

1. Restore the natural hydrology of the tidal wetlands surrounding Channel "A".
2. Restore tidal wetland vegetation where damaged by the construction of Channel "A".
3. Prevent inappropriate land use on and around Channel "A".

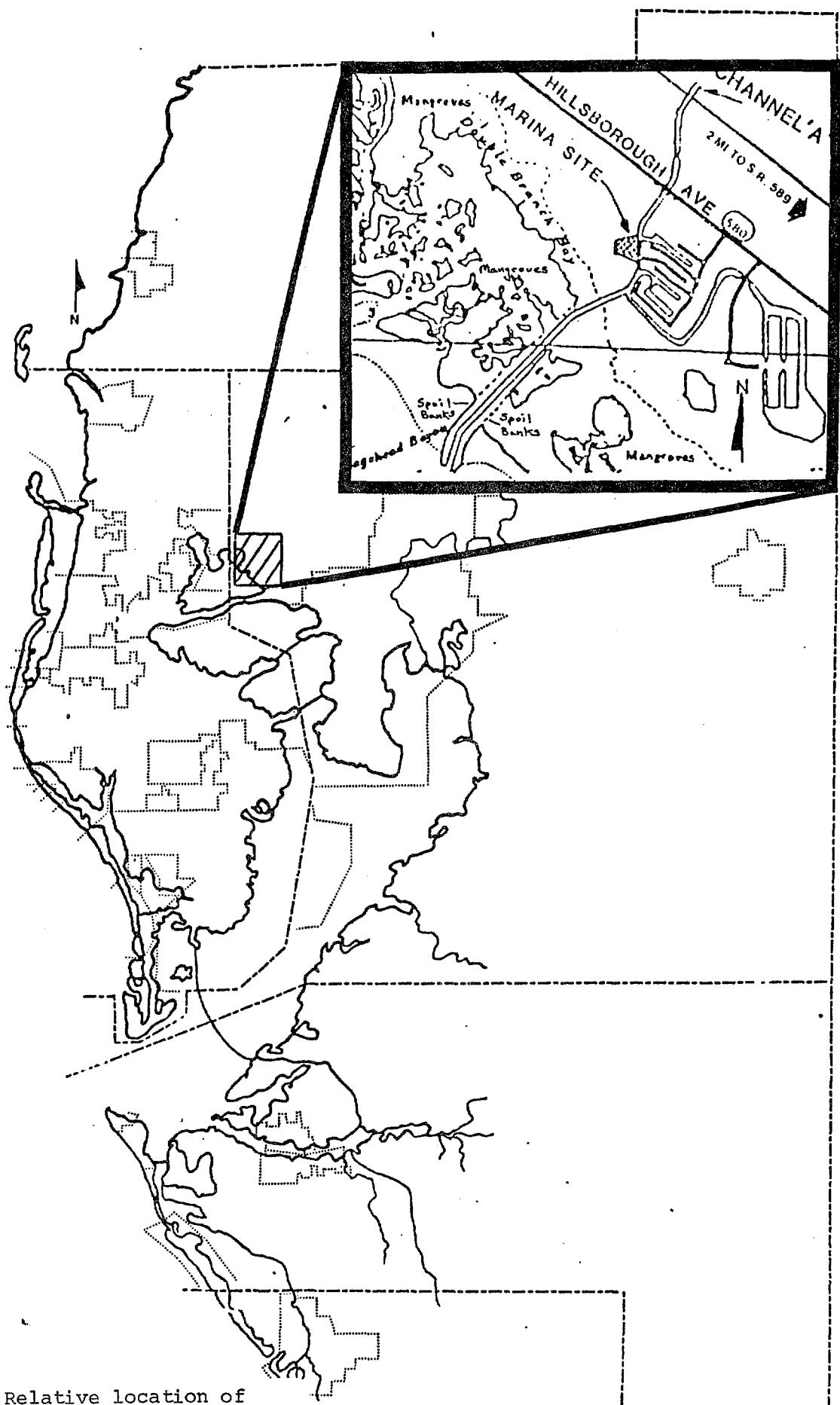


Figure 2.20. Relative location of Channel "A".

## Issue #35 Water Quality Improvements Using Tidal Gates

Issue Analysis: Much of the poorest water quality in Tampa Bay occurs in areas most accessible and most frequented by the public. Many natural and man-made water bodies along the periphery of Tampa Bay act as settling basins for organic material that, in turn, degrade the quality of the overlying water and often lead to fish kills and reduced biological diversity. One of the primary causes of this accumulation is less than adequate water circulation. Areas often having low circulation include marinas, finger canals, small embayments, and regions isolated from Tampa Bay by causeway placement.

It is possible to induce greater circulation through many of these water bodies by harnessing available tidal energy with strategically placed tide gates that act as tidally driven pumps. These pumps can replace poor-quality water with better-quality water from Tampa Bay. The poor-quality water represents a minute fraction of the total volume of Tampa Bay and will be rapidly assimilated. The pumps essentially extend naturally available tidal circulation to more parts of the bay. One such tidal pump is operating in Old Tampa Bay on a culvert underneath the most easterly segment of the Courtney Campbell causeway. The purpose of the tide gate is to induce greater water circulation through a region of poor-quality water to the north of the causeway.

The hydraulic operation and water-quality impacts of the Courtney Campbell tide gate is the subject of a report by Morgan et al (1984). The report concludes that about 16.5 million cubic feet of water are pumped through the area of concern during each tidal cycle. This figure is in substantial agreement with predictions by Goodwin (personal communication 1975) made prior to construction of the pump. Morgan et al (1984) also demonstrate that waterborne material, fecal coliform bacteria and phytoplankton, are moved from the degraded area to Old Tampa Bay. They conclude that substantial improvements in water quality will probably occur, but the reservoir of organic material on the bottom is so large that it may take a long time.

Tidal pumps have demonstrated a capability to increase water circulation and constituent flushing in water bodies that are semi-isolated from Tampa Bay. The time needed for increased circulation to result in a general improvement of water quality is likely to be variable depending on the size of the water body, the amount of induced circulation, the quality of Tampa Bay water, and the thickness and character of benthic deposits. Tidal pumps have the potential, over time, to permanently improve the water quality of degraded areas along the periphery of Tampa Bay that are most used and most assessable to the general public, and their use should be further pursued.

### Relevant Laws and Statutes:

Federal Water Pollution Control Act, PL92-500 as amended  
Chapter 403, Florida Statutes (Environmental Control)

### Bay Management Objectives:

Wherever feasible in Tampa Bay, improve degraded water quality conditions in areas with inadequate tidal circulation through the use of tidal gates.

Bay Management Recommendations:

1. A Channel "A" restoration plan should be prepared and implemented including studies of the following possible actions:

- complete removal of levees for use as fill material dependent upon grain size analysis of spoil;
- installation of culverts or one-way tide gates in the channel levees to promote perpendicular tidal flow and channel discharge into surrounding marshes;
- marsh grass and mangrove revegetation wherever feasible; and
- installation of aerators or tide gates in the channel and finger canals to facilitate more efficient mixing and tidal flushing.

Work Element 34-1: The Southwest Florida Water Management District should prepare and implement the Channel "A" restoration plan using funds appropriated for this purpose. Target date for initiation should be FY 1986. The restoration plan should be prepared and implemented in coordination with the Department of Environmental Regulation, the Tampa Port Authority and the Tampa Bay Regional Planning Council.

2. The construction of marinas and other additional boating facilities on and along Channel "A" should be discouraged.

Work Element 34-2: The Tampa Bay Regional Planning Council should attempt to implement the above recommendation through its Chapter 163 and 380, F.S., review responsibilities.

Long-term Management Alternatives:

Status Quo: The Southwest Florida Water Management District presently has adequate funding and staffing to design and implement the recommended restoration plan without assistance, however, interagency coordination would be helpful.

Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide additional technical input and could facilitate interagency coordination.

Bay Management Authority: A mandated bay management authority could potentially assume responsibility for this and other habitat restoration projects around the bay. However, adequate solutions to this issue presently exist.

Bay Management Recommendations:

1. The Department of Environmental Regulation in conjunction with the U.S. Geologic Survey (USGS) should conduct a detailed survey of water-quality and tidal conditions in all semi-isolated water bodies on the periphery of Tampa Bay to assess the need and potential for circulation enhancement using tide gates. A priority list of locations with substantiating data will be the product of the survey. For the top two or three areas identified on the priority list, suitable analysis techniques and projected impacts of tide-gate installation at each area should be developed.
2. At a minimum, one tide gate system should be constructed as a demonstration project at a priority site identified in the survey. The DER and the USGS should monitor tide gate operations and water quality impacts for comparison with projected results. Overall results should be thoroughly evaluated to decide whether or not the use of tide gates should be pursued at other priority sites.

Work Element 35-1: The Legislature should allocate a portion of the state's federal 205(j) budget for implementing the above stated construction and study. Year 1 efforts should include the initial survey and construction, while year 2 efforts should focus on monitoring, data analysis and overall evaluation.

Estimated Manpower and Cost

Year	1	2
<b>Manpower (man years)</b>		
- Staff (DER)	2	2
- Consultant (USGS)	1	1
<b>Total</b>	<b>3</b>	<b>3</b>
<b>Source of Funds</b>		
- Federal 205(j)	100,000	50,000
- State	-	-
- Local	-	-
<b>Total</b>	<b>100,000</b>	<b>50,000</b>

3. If results of the above stated study indicate significant benefits the Tampa Bay Regional Planning Council should coordinate the collection of local funding contributions for similar tide gate construction at other priority sites around the bay.

Long-Term Management Alternatives:

1. Status Quo: Federal and/or state funding will be required to complete the initial studies. The U.S. Geological Survey has obtained federal funds for such a study but needs local matching funds in order to proceed. Without coordination and assistance it is unlikely that local matching funds will be obtained.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could be instrumental in coordinating local government interest and cooperation in the use of tide gate technology in solving localized water quality problems.
3. Bay Management Authority: A mandated bay management authority could be very effective in generating local matching funds, administering studies and implementing tide gate technology around Tampa Bay.

## Issue #36 User Conflicts and Limits on Activities

Issue Analysis: The public uses of Tampa Bay involve numerous recreational and commercial activities. Conflicts occur when certain uses of the bay overlap with, and preclude, other uses. Examples of user conflicts might include the unregulated placement of crab-pots and fish nets causing navigational hazards for recreational boaters. Certain areas where boating conflicts frequently occur such as navigational channels and bridges, should be authorized for specific uses and patrolled to avoid user conflicts and safety hazards.

In a much larger scale, however, are those conflicts which occur between designated water uses (e.g. Class II-Propagation and Harvest of Shellfish) and attainable water quality goals (see issue #35). This issue relates to the concept of segmentation as the ultimate comprehensive management tool for a multiple use estuarine system like Tampa Bay. Segmentation is the compartmentalizing of an estuary into subunits with homogeneous physical, chemical, and biological characteristics. The segmentation process is a management tool which recognizes that Tampa Bay is an interrelated ecosystem composed of chemically, physically, and biologically diverse areas.

It assumes that an ecosystem as diverse as Tampa Bay cannot be effectively managed as only one unit, since different resource uses and water quality objectives will be appropriate and feasible for different regions of the bay. The segmentation approach to water quality management has been successfully applied to several large receiving water systems, most notably Chesapeake Bay, the Great Lakes, San Francisco Bay, and the Thames River.

In the absence of water pollution, physical characteristics of different regions of the bay influence the suitability for major water uses. Therefore, one major objective of segmentation is to subdivide the Bay into segments with relatively homogeneous physical characteristics so that differences in the biological communities among similar segments may be related to man-made alterations. Once the segment network is established, each segment can be subjected to an analysis of the relationship between use attainability and water quality. In addition, the segment network offers a useful management structure for focusing local citizen involvement and for monitoring conformance with water quality goals in future years.

### Relevant Laws and Statutes:

Rivers and Harbors Act of 1899  
Coastal Zone Management Act  
Chapter 327, Florida Statutes (Vessel Registration and Safety)  
Chapter 403, Florida Statutes (Environmental Control)  
Chapters 17-3 and 17-4, Florida Administrative Code

### Bay Management Objectives:

1. Maximize boating safety on all water dependent uses of Tampa Bay.
2. Provide for a multiple use management system for Tampa Bay which minimizes user conflicts.

Bay Management Recommendations:

1. The Tampa Bay Regional Planning Council should sponsor joint workshops involving the Marine Patrol and the U.S. Coast Guard with the objective of defining areas in Tampa Bay where boating safety and resource management are threatened by user conflicts. Findings and recommendations generated from these workshops should be developed into appropriate rule changes and legislation wherever needed.
2. The concept of resource segmentation as a comprehensive management tool for Tampa Bay should be further explored.
3. A mediating board for resolving short-term user conflicts involving Tampa Bay should be established.

Work Element 36-1: A official mediating board should be established within the Tampa Bay Regional Planning Council and should include members of all agencies, local government representative and interests relevant to bay management.

Long-term Management Alternatives:

Status Quo: Under the existing management framework no agency or entity is capable of mediating user conflicts and establishing a long-term comprehensive management plan for Tampa Bay with the objective of maximizing all potential uses of the bay.

Bay Advisory Committee: A permanent funded and staffed bay advisory committee within the Tampa Bay Regional Planning Council could effectively sponsor workshops and serve as a mediating board for bay related user conflicts.

Bay Management Authority: Beside providing the functions of a bay advisory committee, a mandated bay management authority would have the primary charge of developing, refining and implementing a comprehensive management plan for Tampa Bay using the concept of resource segmentation.

## Issue #37 Marina Siting Policy

Issue Analysis: Florida's coastline, as well as the shorelines of the state's navigable lakes, rivers and streams represent extremely valuable resources. These resources provide recreational opportunities for the public, and are renewable in many ways. The increasing population of recreational boaters utilizing Florida's coastal and inland waterways is a major component of the state's growth. The coastal environment, however, is limited in its capacity to support competing human activities without some damage to the environment. Determining where marinas should be located requires consideration of numerous, complex resource-related issues, ranging from the destruction of sensitive coastal habitats to the displacement of marinas by non-water dependent uses such as restaurants, hotels, etc.

The Tampa Bay Region is presently one of the most rapidly growing areas throughout the entire State of Florida. With its numerous rivers, bays and barrier islands, the region contains over 750 miles of linear coastline, and 31 of the 43 local governments incorporated within the region are located along the coast. Consequently, the Tampa Bay Region, with its many competing uses of, and demands upon, its diversified shorelines is facing increasing marina siting pressures. This fact is well documented in the City of Clearwater's Marina Facilities Element by statistics which show that, of the 429 private and public slips in the city limits, 100 percent are occupied year round, and waiting lists containing 213 names are maintained.

The provision of new marina facilities, however, especially in Tampa Bay proper, must be carefully balanced with environmentally-sound siting policies. Rapid urban development has radically changed the character and ecology of the Tampa bay estuary over the past three decades. For example, studies have indicated that 44 percent of the original mangroves and marshes have been destroyed, and 81 percent of the original seagrass beds have disappeared (see issue #2). In addition, many of the tidal tributaries entering Tampa Bay have been filled, hardened or channelized. This habitat loss has resulted in declining populations of commercially-valuable fish and shellfish, including a complete collapse of such fisheries as those for scallops and oysters, and major declines for bait shrimp and spotted sea trout (see issue #14). The principle impacts of marina development upon the natural environment of Tampa Bay result from the following:

- Physical destruction of natural marine and estuarine habitats including, grass beds, tidal marshes and tidal mangrove swamps;
- Degraded water quality from heavy metals, nutrients, and oils and greases in association with stormwater runoff from adjacent parking facilities;
- Short-term increases in water turbidity and associated loss of bottom dwelling life when dredging occurs;
- Reduced tidal flushing of waters due to the construction of enclosed basins and underwater obstructions such as pilings, boat hulls, etc.;

- Leaching of toxic contaminants from anti-fouling coatings on boats in the marina;
- Accumulation of surface flotsam and oil slicks from engines in marina basins; and
- Shading of potentially productive bay bottom by docks, pilings and boat hulls.

A survey performed by the Tampa Bay Regional Planning Council in 1984 indicated that relatively few of the 43 local governments contained within the region have adopted specific ordinances or policies related to marina development. In general, local regulations related to marina facilities are limited almost entirely to zoning ordinances and building codes which address upland development only. A more comprehensive and consistent marina siting policy at the state level, or at least the regional level, would help protect the vital aquatic resources of the bay and would lead to a more predictable regulatory framework for prospective developers.

Relevant Laws and Statutes:

Chapter 161, Florida Statutes (Beach and Shore Preservation)  
Chapter 163, Florida Statutes (Intergovernmental Programs)  
Chapter 258, Florida Statutes (Aquatic Preserves)  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 373, Florida Statutes (Water Management Districts)

Bay Management Objectives:

1. Balance the provision of adequate marina facilities around Tampa bay with the protection of water quality and valuable marine and estuarine habitat.

Bay Management Recommendations:

1. The Department of Natural Resources should develop a comprehensive statewide marina siting policy to be enforced through proper coordination with the Department of Environmental Regulation and, at the local level, the Tampa Port Authority. The comprehensive marina siting should include but not be limited to the following elements:

A. Land Use (Existing/Permitted)

1. Existing Zoning: Marinas should not be sited in areas where local zoning specifically prohibits such uses. This policy should not apply in those instances in which marinas are unintentionally omitted from the list of permitted uses as documented by the applicant.

2. Comprehensive Plans: Marinas facilities should not be located in areas which are designated in a comprehensive plan approved in accordance with Chapter 163, Florida Statutes, for land uses which explicitly exclude marinas. This policy should not apply in those instances in which a comprehensive land use plan has not been approved in accordance with Chapter 163, F.S. Neither should it apply to approved land use plans which do not include marinas in any land use category, or which omit such facilities unintentionally as documented by the applicant.
3. Existing Use: Preference should be given to sites which have been previously disturbed, as opposed to sensitive natural areas. Expansion of existing marina facilities should be encouraged over the development of new facilities.
4. Surrounding Uses/Zoning: Special consideration should be given to sites which would not conflict with the permitted land uses or zoning of properties within a one thousand foot radius of the site.
5. Non Water Dependent Uses: Facilities such as restaurants and bait and tackle shops should be situated on uplands, except where the location of such facilities over public lands is found to be clearly in the public interest, or where sensitive upland natural systems are present.

B. Support Services (Utilities/Public facilities)

1. Adequate Uplands/access: Marinas proposed for state-owned submerged lands should demonstrate that they have sufficient upland area to accomodate all needed utilities and marina support facilities. If insufficient uplands exist, or if significant sensitive natural systems would be damaged by siting of support facilities, adequate access to all needed utilities should be demonstrated. Preference should be given to facilities which provide parking areas which do not generate excessive stormwater pollution.
2. Adequate Traffic Capacity: Applicants should demonstrate that the adjacent area and on-site roadways have the capacity to accommodate the projected number of customers.
3. Sewage Capacity: All new marinas should provide adequate capacity to handle sewage in accordance with state standards, either by means of on-site pump-out and treatment facilities or connection to a treatment plant. Applicants should document the availability and capacity of the above sewage facilities to handle the anticipated volume of wastes. All marinas with fueling facilities should provide pump-out facilities at each fuel dock. Marinas which serve live-aboards or overnight transient traffic should provide shower, restroom and sewage treatment facilities at the dock. Facilities of 50 slips or more should provide permanent pump-out facilities.

4. Spill Containment: All applicants should provide documentation of their capability to respond as rapidly and effectively as possible to contain any spills of petroleum or other hazardous materials within the boundaries of leased area.

C. Resource Constraints (Environmental Considerations)

1. In the following sensitive areas, the applicant should be required to demonstrate that a marina is clearly in the public interest before approval to build is granted:

- Aquatic preserves,
- Outstanding Florida Waters,
- Class I waters,
- Class II waters,
- Marine Sanctuaries,
- Estuarine Sanctuaries,
- Manatee Sanctuaries or Critical Manatee Habitats,
- Areas approved or conditionally approved by DNR for shellfish harvesting,
- Other highly productive and/or unique habitats as determined by DNR, based on vegetation and/or wildlife species, and
- Areas designated on the Department of Community Affairs' Oil Spill Sensitivity Atlases as sensitive to oil spills.

2. Hurricane Evacuation and Protection: Applicants should document sufficient capacity to provide maximum practicable protection of the contents of the proposed premises from damages caused by wind and wave forces resulting from hurricanes. Structures should comply with all applicable coastal construction codes. Applicants should also demonstrate the ability to evacuate persons and vessels by area roadways (by documenting traffic capacities) and by area waterways.
3. Water Quality: A specific lease condition for any new, renewed, or expanded docking facility for 50 or more boats should be that the lessee shall maintain water quality standards as provided by Chapter 403, Florida Statutes. To assure compliance, the lessee should maintain a water quality monitoring program approved by the Department of Environmental Regulation. Water quality data should be periodically reviewed by DER. If it can be determined that the docking facility and/or the riparian uplands are causing water quality

violations, then the lessee should be given written notice to correct the problem within 120 days, then, on failure to do so, the lease should be subject to cancellation by the Board with the resultant removal of the docking facilities.

4. Water Depth: Preference should be given to docking facilities in locations having adequate water depths to accommodate the proposed boat use. A minimum water depth of 4-feet mean low water should be required. Greater depths should be required for those facilities designed for or capable of accommodating boats having greater than a 3-foot draft. These depth requirements shall also apply to the area between the proposed facility and any natural or other navigation channel, inlet or deep water. Where necessary, marking of navigational channels may be required.
5. Access/dredging: Preference should be given to docking facilities which require minimal or no dredging or filling to provide access by canal, channel or road. This restriction should also apply to widening or deepening any existing canal or channel; but not to regular maintenance dredging and filling to meet depth standards of existing canals or channels. Preference should be given to marina sites adjacent to naturally maintained channels.
6. Environmental Restoration: In reviewing applications for new docking facilities, or for renewal of existing leased facilities, an effort should be made to identify ways to improve, mitigate or restore adverse environmental impacts caused by previous activities. This may include shallowing dredged areas, restoring wetlands, or submerged vegetation or making navigable channels. Such mitigation or restoration could be required as a condition of approval for new, renewed or expanded facilities.
7. Cultural Resource Protection: Preference should be given to facilities which demonstrate no adverse impact on archeological or historic properties as defined by the Florida Department of State.
8. Access Markers: Immediate access (ingress and egress) points should be delineated by channel markers, indicating speed limits and any other applicable regulations.
9. Erosion Prevention: On sites with historically erosion-prone shorelines, applicants should ensure that appropriate shoreline protection measures (as determined by DNR and DER) will be taken.

#### D. Economic Considerations

1. Proximity to Population/Navigable Water Bodies: Preference should be given to facilities which are within reasonable travelling distance of a significant population of marina

users, as determined by DNR's Marina Needs Analysis, by roadway and by waterway. Preference should also be given to facilities which have access to a large navigable water body.

2. Economic Need: Priority should be given to facilities which document significant economic need for the proposed facilities at that site, based on methodology used in "Projections of Marina Need by County", by Dr. Frederick Bell, submitted to the Department of Natural Resources, Tallahassee on April 30, 1984.
3. Public Access: Preference should be given to facilities which will be open to the public on a "first come, first served" basis.
2. The Tampa Bay Regional Planning Council should adopt the above cited marina policy and implement it through its Chapter 163 and 380 statutory responsibilities.
3. The Department of Natural Resources should develop a variable lease fee schedule for marina and other shoreline development on state owned submerged lands. The intent and net result of a variable lease fee would be to strongly discourage marina development in ecologically sensitive or highly productive areas. In order to achieve this result, the lease fee differential should not be tied exclusively to the Aquatic Preserve designation, as was proposed by the Governor's Blue Ribbon Marina Committee. The vast majority of environmentally-sensitive submerged lands in the state are not defined or protected by the aquatic preserve designation. In order to protect such lands from destructive potential or marina development and related activities, it is recommended that the lease fee schedule be applied differentially, based upon an objective assessment of the ecological value and sensitivity of the aquatic environment in question. The variable lease fee might have a ceiling rate of ten times the then-existing base rate, for extremely sensitive areas. If, however, local policies or permitting criteria are more restrictive than the resulting state guidelines, or prohibit marina development outright in certain areas, the local process should take precedence over a state lease fee schedule.
4. Monies derived from submerged land lease fees should be used to help establish an Aquatic Preserve Management Fund within the Department of Natural Resources. Although the DNR has a mandated responsibility to develop and implement management plans for Aquatic Preserves around the state, funding has historically been a problem in implementing this program (see issue #8). The specific appropriation of at least a portion of the funds derived from lease-fees should be seriously considered as a viable alternative to correct this deficiency.
5. The Department of Natural Resources should draft a model marina siting ordinance. As was determined in the TBRPC survey of existing local regulations, many local governmental entities have no zoning ordinances or building codes which specifically relate to marina development. As a result of this lack of a regulatory framework, marina siting decisions at the local level are usually made without adequate consideration of the regional impacts involved in marina development.

To offset the regulatory discrepancies between local governments, it is recommended that a model marina siting ordinance which incorporates many or all of the protective provisions outlined in the above proposed guidelines be prepared. The model ordinance should, however, be flexible enough to allow many of the features of a site specific approach. The drafting of a model ordinance for voluntary inclusion into the regulatory framework of local governments would minimize both the burden on local governments, and the delays in implementation. The development of site specific building codes and special land use plans for each separate coastal area requires expenditures of time and money that many communities are either unable, or unwilling, to bear. Local preparation and passage of such regulations, moreover, would entail lengthy delays, leaving local governments with alternatives of either imposing a moratorium on further marina development, or allowing coastal property to remain unregulated during the interim.

6. In order to effectively establish a variable lease fee and a statewide model marina siting ordinance it may be necessary to create a temporary Marina Siting Commission. The responsibilities of such an entity could be to establish a consistent, statewide basis for the assessment of variable lease fees in environmentally sensitive areas of the state, and to assess the appropriateness of marina development in those areas based upon a rating system developed from the proposed state considerations. The Commission's objective in establishing a variable lease fee schedule would be to develop and incorporate a set of scientifically sound criteria for rating environmentally-sensitive areas in terms of their ecological value. The degree of environmental-sensitivity, and the subsequent appropriate intensity of marina development would thus be reflected in the lease-fee schedule to be implemented locally. A statewide atlas should be prepared which identifies the rated environmentally-sensitive areas, and the resulting variable lease-fee zones. It is suggested that the commission utilize, and model this proposed atlas after, the Department of Community Affairs' Oil-Spill Sensitivity Atlases. If, in localized cases, it was felt that the assessed lease fee had been unreasonably derived, the commission would also serve as an adjudicatory board to handle direct appeals.

In addition, the Marina Siting commission could be assigned the tasks of developing a statewide model marina siting ordinance, and coordinating its site-specific inclusion into the local regulatory framework where it is presently inadequate. It is suggested that, in the preparation of this ordinance, current permitting processes at the state and local level be thoroughly reviewed to ensure consistency with overall marina siting objectives, and to avoid excessive regulatory duplication.

Work Element 37-1: The Legislature should designate a temporary Marina Siting Commission. The above stated responsibilities could possibly be assumed by the existing Marine Fisheries Commission, or delegated to a division of the Department of Natural Resources. The proposed siting commission should include membership from local regulatory agencies having jurisdiction over significant acreage of submerged lands throughout the state. In the Tampa Bay Region, the Tampa Port Authority and the Pinellas County Water and Navigational Control

Long-Term Management Alternatives:

1. Status Quo: The above cited recommendations could be adequately implemented under the present regulatory framework through proper coordination between Department of Natural Resources, the Department of Environmental Regulation, the Legislature and local regulatory agencies.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could provide effective interagency coordination, as well as detailed review and monitoring of all major marina development proposals around Tampa Bay.
3. Bay Management Authority: A mandated bay management authority could potentially assume part or all regulatory responsibilities for implementing and enforcing the above stated marina siting program in the Tampa Bay region.

Issue #38 Construction of New Skyway Bridge Pier Protection System

Issue Analysis: During the scoping process for the Skyway Bridge project a joint Florida Department of Transportation/Department of Environmental Regulation Committee of Hydrologists for the Study of the Sunshine Skyway Bridge Pier Protection System was established. As a result of testimony and deliberation during a meeting held on August 19, 1983, the Committee identified ten hydraulic/hydrologic issues of concern relative to the placement of the pier protection system, the accepted Alternative A, in Tampa Bay. The Committee again deliberated the issues and additional testimony was received during meetings on August 31 and September 28, 1983. A fourth meeting was held on July 27, 1984 to evaluate results of numerical and physical models that were designed to provide additional information relative to many of the identified concerns. Committee recommendations were finalized at the July 27 meeting. Following are brief descriptions of each identified concern, relevant findings, and recommended actions.

CONCERN 1

**STATEMENT:** The animal and plant communities associated with areas of high tidal marsh and salt barrens are dependent on the existing frequency of inundation by high spring-tide water levels. Construction of the pier protection islands may cause enough additional hydraulic resistance to water flowing into Tampa Bay to significantly reduce high, spring-tide water levels and negatively impact the high marsh communities.

**FINDINGS:** Numerical modeling results indicate that the pier protection islands may cause a reduction in spring-tide water levels of 0.01 foot or less in tidal marsh areas. Analysis of long-term tidal records in Tampa Bay and the eastern Gulf of Mexico show an increasing trend in sea level of about 0.006 foot per year that should completely offset the computed minimal effect due to the island in one or two years.

**RECOMMENDED ACTION:** No action needs to be taken regarding this concern.

CONCERN 2

**STATEMENT:** The pier protection islands will cause velocity increases in the ship channel between the two central islands of Alternative A. Velocity increases will also occur between the island pairs on each side of the ship channel. These velocity increases could cause navigational problems for commercial and recreational vessels.

**FINDINGS:** Numerical modeling has indicated that maximum ebb spring-tide velocities are likely to increase from 4.5 to 7.0 feet per second (2.7 to 4.1 knots) in the ship channel due to the pier protection islands. Physical modeling has indicated an increase from 3.8 to 5.2 feet per second (2.2 to 3.1 knots). Both models also show similar increases in the openings between each island pair. The Committee believes the numerical model results are more realistic. Testimony by members of the Tampa Bay Pilots Association, tugboat captains, and U.S. Coast Guard representatives indicated that maximum velocities computed with the island in place, 7.0 feet per second, should pose no navigational problem for large ocean-going ships. Large ocean-going tub/barge combinations will be more affected than ships but should still be navi-

gationally safe. Smaller, less-powerful tug/barge combinations, particularly in a towing rather than pushing configuration, were said to be more navigationally sensitive to high velocities and therefore could experience problems. The Committee has been unable, as yet, to schedule a tug/barge trip under the Sunshine Skyway during high velocity conditions to gain firsthand experience with which to make a more informed decision regarding navigationally safe velocities.

Testimony was also given indicating that recreational boats would have no difficulty handling the increased velocities. Navigational problems for recreational boaters could occur, however, due to lack of awareness of localized regions of high velocity.

**RECOMMENDED ACTION:** Two actions are suggested. Agencies responsible for navigational safety should be requested to analyze the potential for navigational problems with low-powered tug/barge combinations during maximum ebb, spring-tide velocities. An educational program should be undertaken to inform the recreational-boating public about localized, high-velocity areas near the pier protection islands.

#### CONCERN 3

**STATEMENT:** An abrupt change in direction of water flow relative to the ship channel is navigationally undesirable. Placement of pier protection islands may sufficiently deflect the direction of water flow or cause large eddies that could adversely affect navigation.

**FINDINGS:** Physical modeling results have shown that the direction of water flow in the ship channel between the islands is largely controlled by the presence of the ship channel itself. Alignment of the pier protection islands either with the ship channel or with the predominant flow direction has little effect on current speed or direction within the channel. With either island alignment, however, flow directions are significantly altered and current speeds are increased in localized areas near the islands. Physical modeling results have shown that the rounded corners of the islands limit the size of eddies so the ship channel is not affected. Eddies are shown to occur in localized areas near the islands and could create problems for uninformed recreational boaters.

**RECOMMENDED ACTION:** No action needs to be taken regarding alignment of the pier protection islands. The educational program for recreational boaters, recommended under Concern 2, should include reference to rapid changes in flow direction and occurrence of eddies near the islands.

#### CONCERN 4

**STATEMENT:** The existence of pier protection islands will cause flow changes in the vicinity of the islands. Flow changes may hinder island repair or vessel retrieval after collision with an island.

**FINDINGS:** No testimony was presented that suggested possible excessive hindrance to tugs or construction equipment that might be used to extricate a grounded vessel or repair a damaged island.

RECOMMENDED ACTION: No action needs to be taken regarding this concern.

CONCERN 5

STATEMENT: The potential for environmental damage due to oil spills near the mouth of Tampa Bay is recognized. Probably oil dispersion patterns have been computed and results reported for conditions without pier protection islands. Computed oil dispersion patterns may be significantly different with the islands in place.

FINDINGS: The pier protection islands were found to have very limited influence on tidal flow conditions a few thousand feet away from the islands. The dispersion of oil is primarily controlled by wind forces and secondarily by tidal forces. There is no evidence or testimony to suggest that oil dispersion patterns with the pier protection islands will be substantially different than the computed patterns without the islands.

RECOMMENDED ACTION: No action needs to be taken regarding this concern.

CONCERN 6

STATEMENT: Construction of pier protection islands will reduce the flow cross-section at the bridge location by about 10 percent. This reduced cross-section could cause adverse changes in tidal characteristics in Tampa Bay. These changes may be counteracted by removing some of the existing causeway.

FINDINGS: The findings given under Concern 1 are applicable here and indicate very minor tidal effects caused by reduced flow cross-section. Additional numerical modeling results also show that removal of two, one-half mile segments of existing causeway will have negligible effects on the tide and would not serve to offset the minor changes caused by the islands.

RECOMMENDED ACTION: No action needs to be taken regarding this concern.

CONCERN 7

STATEMENT: Construction of pier protection islands will cause changes in erosion and deposition of bottom sediment near the islands. Erosion may cause destabilization at the base of the islands. Eroded sediment may deposit in the ship channel and cause a need for additional maintenance dredging.

FINDINGS: Methods for determination of changes in sediment erosion and deposition in tidally-affected waters are not well developed. Physical and numerical modeling as well as analytical approaches all have limitations and drawbacks. Changes in island design have been made to provide protection from erosion at their base. Results of physical modeling indicate that pier protection islands should not cause increased sediment deposition in the ship channel. The Committee has strong reservations, however, concerning adequacy of the techniques used to physically

simulate sediment motion. Numerical modeling results indicate little difference between sediment deposition patterns with and without the pier protection islands.

RECOMMENDED ACTION: No action needs to be taken regarding this concern. The Committee suggests, however that state-sponsored research be undertaken to develop a greater understanding of sediment transport dynamics in tidal waters, particularly as it is impacted by man-made structures.

CONCERN 8

STATEMENT: Pier protection islands may create unanticipated or unreported navigational hazards.

FINDINGS: Numerical and physical model results given under Concerns 2 and 3 are applicable here.

RECOMMENDED ACTION: The actions given under Concerns 2 and 3 are applicable here.

CONCERN 9

STATEMENT: The construction of pier protection islands near the mouth of Tampa Bay may change the characteristics of a hurricane-created storm surge.

FINDINGS: Results of numerical modeling indicate that storm surge heights computed with the islands generally varied between  $\pm 0.05$  foot of the heights computed without the islands. These differences are considered insignificant. Small velocity increases of between 0.10 and 0.50 foot per second in the vicinity of the islands were computed. These velocity increases were also considered insignificant.

RECOMMENDED ACTION: No action needs to be taken regarding this concern.

CONCERN 10

STATEMENT: Tide-induced circulation and constituent flushing of Tampa Bay could be changed by construction of pier protection islands. These changes could cause long-term increases or decreases in the concentration of most waterborne constituents.

FINDINGS: Circulation patterns computed by two different numerical modeling systems were compared and found to agree very well. This comparison tends to confirm that computed circulation is real. Results of numerical modeling of circulation patterns both with and without pier protection islands indicate only local differences in the vicinity of the islands. The differences are not considered sufficient to cause long-term changes in Tampa Bay constituent concentrations.

RECOMMENDED ACTION: No action needs to be taken regarding this concern.

Relevant Laws and Statutes:

The Rivers and Harbors Act of 1899 (Section 10)  
Coastal Zone Management Act  
Chapter 161, Florida Statutes (Beach and Shore Preservation)

Bay Management Objectives:

1. Minimize all potential navigational hazards as well as hydrological/biological impacts on Tampa Bay resulting from the construction of the Skyway Bridge pier protection system.

Bay Management Recommendations: The Tampa Bay Management Study Commission supports the recommended actions of the Committee of Hydrologists.

1. The U.S. Coast Guard auxiliary should analyze the potential for navigational problems with low-powered tug/barge combinations during maximum ebb, spring tide velocities.
2. The U.S. Coast Guard and local Power Squadron groups should coordinate to implement an educational program to inform the recreational-boating public about localized, high velocity areas near the pier protection islands.
3. The Florida Department of Transportation should install signs on the bridge piers and along the pier protection system warning boaters of high current velocities and shears.
4. The Florida Department of Transportation should undertake further studies of sediment transport dynamics in tidal waters, particularly as it is impacted by man-made structures.

Long-Term Management Alternatives:

1. Status Quo: The above cited recommendations could be adequately implemented under the existing regulatory framework by the U.S. Coast Guard Auxiliary, the Florida Department of Transportation and the Department of Environmental Regulation.
2. Bay Advisory Committee: A standing bay advisory committee could provide additional federal/state/local coordination towards the implementation of the above stated recommendations.
3. Bay Management Authority: Besides providing an inter-agency coordinative function, the establishment of a bay management authority would not serve any further purpose with regard to this issue.

Issue #39 Extension of 49th Street (St. Petersburg) across Old Tampa Bay

Issue Analysis: Upon construction of a bridge linking McMullen Booth Road to 49th Street North, these two facilities would provide a continuous arterial connection between St. Petersburg and rapidly developing northeast Pinellas County (see figure 2.21). If completed, this minor arterial would serve as a high level alternative to travel on U.S. Highway 19, and would help to relieve much of the congestion on that facility. In addition, by reducing traffic congestion this arterial would contribute to a reduction in localized air pollution problems (Pinellas County is presently designated as a non-attainment area for ozone and total suspended particulates) as well as to local energy conservation initiatives (petroleum products). Thus, public pressure to construct a 49th Street bridge will expectedly increase in the future.

Public opposition expressed thus far to the construction of this facility is based on both environmental and aesthetic concerns. These concerns include:

- The construction of either a causeway or pier structure would destroy potentially productive bay bottom, and would reduce tidal circulation in the vicinity of the bridge. The degree of these impacts would, however, be significantly greater for a causeway structure.
- The construction of bridge approaches would result in the destruction of valuable wetland habitat;
- Wildlife utilizing the surrounding habitat would be seriously disturbed;
- Stormwater runoff from the bridge would increase pollutant loads to Old Tampa Bay; and
- The bridge's appearance, as well as the generated traffic noise, would be aesthetically disturbing to local residents.
- There is no conclusive evidence that a significant volume of north-south traffic would be diverted to the McMullen-Booth - 49th Street alignment as a result of the presence of this bridge structure; and
- There is no conclusive evidence that this bridge could be financially self-supporting based upon diverted traffic volumes to the facility.

The construction of this facility is projected in the Unincorporated Pinellas County Comprehensive Plan (Sector 6), as well as in the Long Range Plan of the Pinellas County Metropolitan Planning Organization (MPO). In addition, it is the only project in the MPO plan with a stated prerequisite for full scale environmental and financial feasibility studies.

In accordance with the MPO plan provision, Pinellas County has performed initial environmental and financial feasibility studies. These studies concluded that a pier structure was the preferred design for environmental reasons. However, it was also concluded that the facility was not financially feasible as a bonded project.

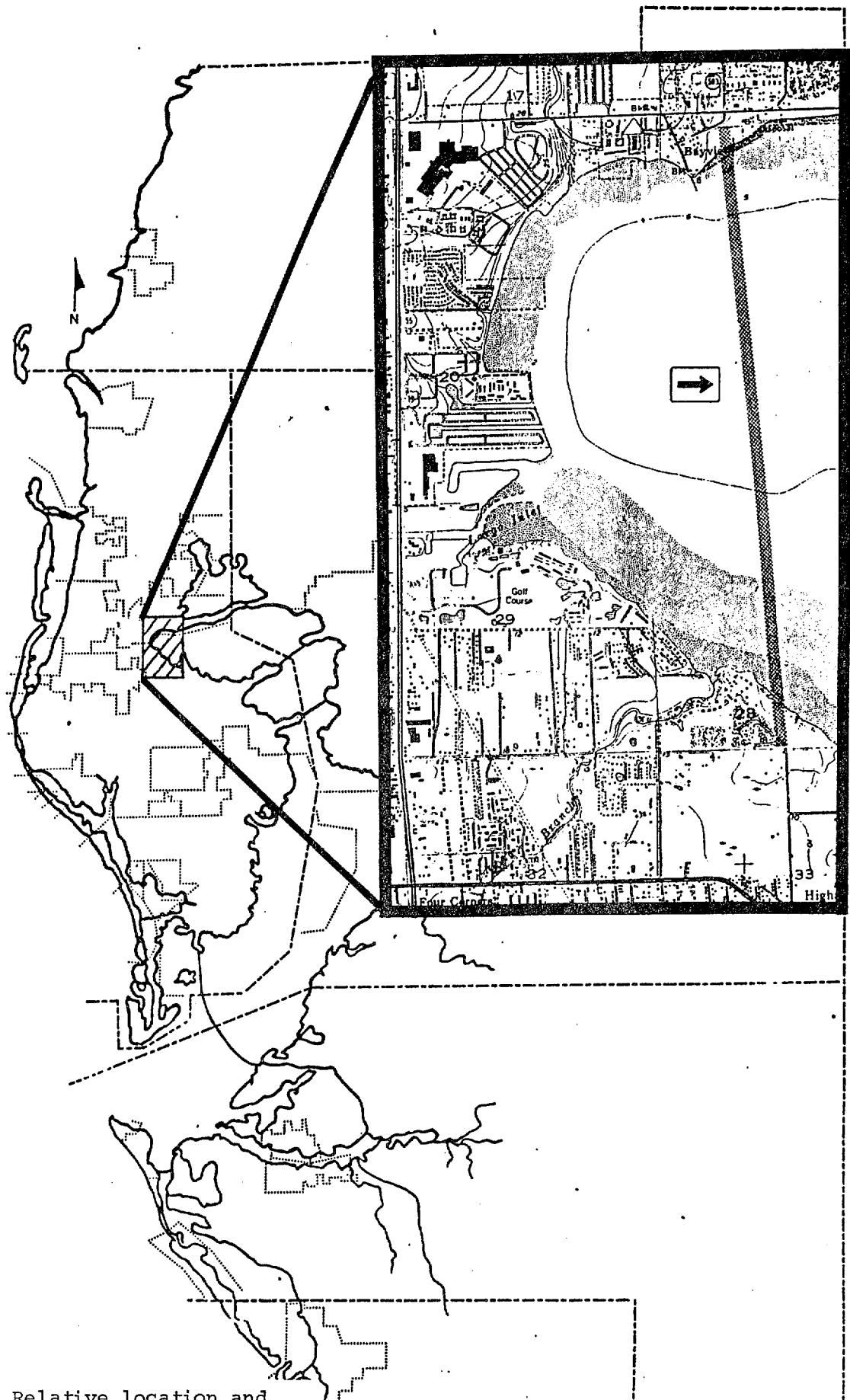


Figure 2.21. Relative location and alignment of the proposed 49th Street Bridge.

Relevant Laws and Statutes:

Surface Transportation Assistance Act of 1962.  
Chapter 163, Florida Statutes (Intergovernmental Programs)  
Chapter 335, Florida Statutes (Transportation Planning).

Bay Management Objectives:

1. Minimize the adverse environmental and aesthetic impacts associated with extension of 49th Street North in the Largo Inlet area of Old Tampa Bay.

Bay Management Recommendations:

1. Pinellas County should continue to seek upland alternatives to the construction of a 49th Street Bridge in order to ease north-south traffic congestion (i.e. overpasses for major intersections on Highway 19).
2. In the event that upland alternatives to the construction of a 49th Street Bridge are not feasible, a commitment should be obtained from Pinellas County and the Florida Department of Transportation that the final design consist of a pier supported structure rather than a causeway system.
3. The MPO and Pinellas County should retain the provision in the year 2000 Long Range Plan that affirmative financial feasibility and environmental impact studies be completed and approved before the project can be considered for implementation.

Work Element 39-1: The Tampa Bay Regional Planning Council, through its Local Government Comprehensive Planning Act (Chapter 163, Florida Statutes) and IC&R review responsibilities, should encourage the implementation of above stated recommendations.

Long-Term Management Alternatives:

1. Status Quo: Final design criteria for the 49th Street Bridge would have to comply with all relevant federal, state and local environmental regulations. The Tampa Bay Regional Planning Council through its existing review responsibilities, could further coordinate with Pinellas County and the MPO towards the resolution of bay management concerns if the project does adequately meet the provision of the MPO plan and is considered for implementation.
2. Bay Advisory Committee: Bay management concerns, would be more effectively expressed and incorporated into these criteria if a standing bay advisory committee within the Tampa Bay Regional Planning Council was in existence to more effectively coordinate with the various agencies involved during the planning and permitting process.
3. Bay Management Authority: A mandated bay management authority could potentially assume the review responsibility and permitting authority for all dredging and filling activities proposed for the tidal waters of Tampa Bay.

## Issue #40 Sailboat Launching

Issue Analysis: A baywide recreational survey completed by the Tampa Bay Management Study Committee in 1982 indicated that there was an unsatisfied public demand for non-powered vessel launching areas around Tampa Bay. Several popular areas for the launching of small sailboats such as Hobie Cats have been altered to restrict such activities. In most cases, rock rip-rap has been placed along the shorelines as erosion control measures. However, in many instances, small beach areas along the bay could remain or be developed to provide launching space. Noted in the survey was the need to provide such additional space along the Courtney Campbell and Gandy Bridge Causeways.

Often as a result of this lack of public access recreational boaters have attempted to launch vessels in areas unsafe for such use. Vessel damage and personal injury have resulted from masts striking power lines and from collisions with submerged hazards. This issue, however, is actually a component of the more general problem of adequate public access around Tampa Bay (see issue #19).

### Relevant Laws and Statutes:

Chapter 163, Florida Statutes (Intergovernmental Programs).

### Bay Management Objectives:

1. Maximize recreational usage of Tampa Bay through the provision of adequate public access for the safe launching of non-powered vessels.

### Bay Management Recommendations:

1. The Department of Natural Resources, Division of Recreation and Parks, should establish policies requiring consideration of alternative launching areas as a part of funding programs and plan approvals for new parks, coastal construction and marina siting.
2. The Tampa Bay Regional Planning Council should adopt recreational policies requiring the provision of adequate safe public access to Tampa Bay for the launching of non-powered vessels. These policies should be incorporated into the regional policy plan and implemented through the Council's Chapter 163 and 380 statutory responsibilities.
3. In light of the fact that wet slip supply will probably never meet demand in the Tampa Bay area local governments should be encouraged to provide new safe boat launching facilities in lieu of additional wet slips wherever feasible. The conversion of abandoned marina frontage should also be considered for this purpose.

### Long-Term Management Alternatives:

1. Status Quo: The above stated objective could be satisfactorily accomplished under the existing regulatory framework, through amended state recreational policies, and through the implementation of local comprehensive plans and capital improvement programs.

2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively assist in the coordination of local and regional programs leading to the implementation of the above cited recommendations.
3. Bay Management Authority: A mandated bay management authority could potentially assume all overview and permitting responsibilities for waterfront and marina development. such an authority could be very effective in coordinating with other state and federal agencies with the purpose of providing adequate recreational facilities in association with large waterfront projects such as the proposed widening of the Courtney Campbell Causeway.

Issue #41 Odor Along Bayshore Boulevard

Issue Analysis: It has been reported as far back as 1928 that noxious odors have been occasionally present along the west shore of Hillsborough Bay. Thus, at the request of local authorities and the Florida State Board of Health, the Federal Water Pollution Control Administration (FWPCA) initiated extensive field and laboratory investigations in Hillsborough Bay in June of 1967. The objectives of these studies were: to identify and quantify key sources of waste in Hillsborough Bay and to determine their effect on water use; to determine the cause or causes of noxious odors in Hillsborough Bay; and to recommend means of modifying conditions in Hillsborough Bay to eliminate the causes of obnoxious odors and make possible other desirable uses.

As a result of these studies the following conclusions were made. Obnoxious odors along the western shore of Hillsborough Bay are the result of the death and decay of the marine algae, Gracilaria. There are two odors: a nauseating vegetative odor occurring predominantly at McDill Air Force Base from Gracilaria deposited on beaches and shorelines and; an intense hydrogen sulfide odor occurring predominantly along the upper western shore north of MacDill as a result of anaerobic decay of Gracilaria in shallow waters. The immediate causative agent in the death and decay of the benthic algae is freshwater from the Hillsborough River part of which is diverted along the western shore during high flow periods primarily occurring during August and September. When freshwater flow in the Hillsborough River exceeds 2,400 cfs, chloride concentrations along the western shore are reduced below 6 g/l which is the salinity stress point for Gracilaria. Poor flushing along the western shore tends to keep the chloride concentration reduced thereby accelerating the death process. Dissolved oxygen is used up during decay of the Gracilaria and hydrogen sulfide is produced.

Waste discharges from point sources do not produce the odor problem directly. In fact, Gracilaria is tolerant to degraded water quality. However, waste effluents and excessive nutrient concentrations create the water quality conditions whereby Gracilaria can flourish at the expense of a number of other plant species that would produce a healthy diversified ecosystem if water quality were improved. Therefore, the contribution of nutrients and organic wastes to Hillsborough Bay is the ultimate cause of the obnoxious odors along the western shore of Hillsborough Bay.

The excessive growths of phytoplankton in the Bay are primarily the result of the extremely high concentrations of phosphate and higher than desirable concentrations of total nitrogen in the Bay. The cause of these concentrations is the effluents generated from the phosphate processing plants on the Alafia River, the Tampa sewage treatment plant (Hookers Point), U.S. Phosphoric Products Company, the Nitram Chemical Company and water hyacinth control practices. Because of the massively excessive phosphate concentrations in Hillsborough Bay, it is concluded that the biological plant system is limited by available nitrogen. A high percentage reduction of available nitrogen as well as phosphorous would help to limit the growth of aquatic vegetation.

Low dissolved oxygen in Hillsborough Bay is the result of the discharge of inadequately treated effluent from the City of Tampa sewage treatment plant. There is also a substantial demand on the oxygen resources of the Bay from organic benthic material which accounts for the excessively low dissolved oxygen values at the deeper levels. The principal sources of these benthic deposits are the solids inflow from the Hillsborough and Alafia Rivers, the discharge of the Tampa sewage treatment plant and the settling of phytoplankton and other organisms.

Although the patterns of pollution and water quality degradation, as well as the complexities of the ecological system in Hillsborough Bay, were defined in these earlier studies little has been done since to truly rectify the problems. Even though the Hookers Point sewage treatment plant was upgraded during the 1970's these problems have persisted. Further, while water contact recreational activities are still feasible in many other parts of Tampa Bay, presently degraded water quality, caused by the untreated and inadequately treated waste sources listed above, continue to preclude these desirable uses in Hillsborough Bay.

Relevant Laws and Statutes:

National Environmental Policy Act  
Federal Water Pollution Control Act  
Chapter 403, Florida Statutes (Environmental Control)

Bay Management Objectives:

1. Reduce the input of inorganic nutrients and inadequately treated organic wastes into Hillsborough Bay.
2. Increase hydrologic flushing along the western shore of Hillsborough Bay.

Bay Management Recommendations:

1. No specific recommendations are made with regard to odor along Bayshore Boulevard as this issue is considered to be only a symptom of the more generalized problem of eutrophication in Tampa Bay.

Long-Term Management Alternatives: The generalized problem of eutrophication in Tampa Bay is intimately related to many other previously identified bay management issues including: #3 Non-Point Source Discharges Entering Tampa Bay, #4 Spoil Disposal and Management of Spoil Islands, #7 Control of Septage Waste, #10 Municipal and Industrial Discharges, #13 Wasteload Allocation for Tampa Bay, and #20 Load Relief for Major Sewage Treatment Plants. Because of the numerous contributing causes, as well as the magnitude and complexity of potential solutions, eutrophication probably presents the greatest threat to the overall ecological integrity of Tampa Bay.

1. Status Quo: Presently, no single federal, state or local agency is organized, equipped or committed to dealing effectively with the multi-faceted problem of eutrophication in Tampa Bay. To do so will require a regional, multi-jurisdictional effort involving a great deal of intergovernmental coordination and cooperation .

2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively provide the needed interagency coordination to undertake a large scale multi-jurisdictional nutrient control program for the Tampa Bay watershed.
3. Bay Management Authority: A mandated bay management authority could assume all development, management and regulatory responsibilities for a bay-wide nutrient control program.

## Issue #42 Manatee River Derelict Train Trestle

Issue Analysis: Located just east of the U.S. Highway 41 bridge crossing the Manatee River lies an old, partially submerged train trestle bridge, which is no longer in use (see figure 2.22). Two major pollution sources, including effluents from the Tropicana processing plant and the City of Bradenton's wastewater treatment plant, discharge into the Manatee River just upstream of this structure. Initial concerns were raised regarding the effects of this structure on tidal flushing and the resulting impacts on water quality. Preliminary hydrological modeling studies have indicated that the trestle does not affect the tidal amplitude (flushing volume), but does appear to impede the tidal period (flushing time) in this portion of the river. In addition, benthic studies have indicated that the structure may be acting as a sediment trap. In general, the sediments upstream of the trestle contain significantly more sediment oxygen demand, and significantly fewer organisms, than those downstream of it (Mote Marine Laboratory, 1983).

The actual hydrological impacts of the derelict trestle are difficult to ascertain as there are presently three other functioning bridge structures downstream of it. These include the U.S. Highway 41 bridge, the Seaboard Coastline Railroad bridge and the Green Bridge. A fourth bridge east of the existing Green Bridge is also presently under construction. In addition to the problems created by these structures several large borrow pit holes still exist along the north bank of estuary, and the Corps of Engineers is scheduled to begin dredging for the purpose of deepening and realigning the main channel. Decisive action regarding the derelict trestle is further clouded by strong public pressure by recreational fishing groups to retain the structure as an artificial reef. In conclusion, this issue is more complex than the problems associated exclusively with the derelict trestle. Future bay management efforts should more appropriately be focused on the cumulative hydrological and biological impacts of all existing and proposed structures and dredge/fill alterations in this segment of the Manatee River estuary.

### Relevant Laws and Statutes:

Federal Water Pollution Control Act  
Chapter 403, Florida Statutes (Environmental Control)  
Chapter 161, Florida Statutes (Beach and Shore Preservation)

### Bay Management Objectives:

1. Balance transportation and recreational demands with water quality considerations in the Manatee River estuary.
2. Maximize circulation and tidal flushing in the Manatee River estuary.
3. Wherever feasible, achieve and maintain Class II water quality standards.

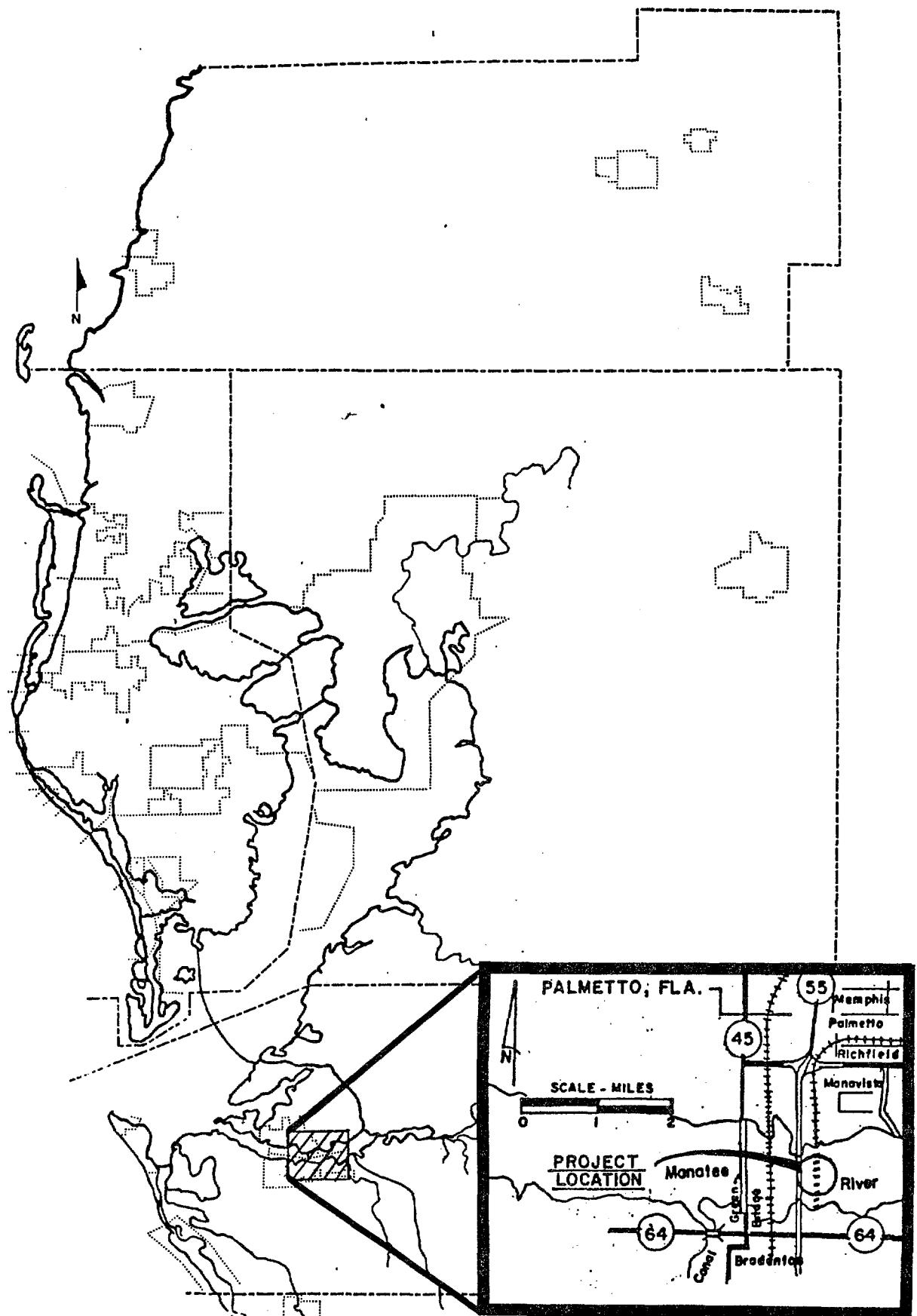


Figure 2.22. Relative location of the Manatee River derelict trestle structure.

Bay Management Recommendations:

1. Existing hydrological and biological data should be used to model the cumulative impacts of all existing and proposed structures and alterations on the Manatee River estuary.

Work Element 42-1: The Department of Environmental Regulation should use the information generated from the Manatee River wasteload allocation study for this purpose. The resulting data base should be used to assess cumulative impacts, and to develop appropriate and effective mitigation strategies for future dredge and fill projects in this segment of the Manatee River estuary.

2. If hydrological and biological studies warrant such action, the Department of Natural Resources, pursuant to Section 161.053(c)(5), Florida Statutes, should remove the derelict trestle. This action should be coordinated with the Manatee County Sea Grant program with regard to the potential use of rubble for the construction of artificial reefs elsewhere.

Long-Term Management Alternatives:

1. Status Quo: The monitoring and eventual resolution of this particular issue will require efficient interagency coordination. The Department of Environmental Regulation is currently developing water quality based effluent limits for discharges under present conditions. In addition, the Department of Environmental Regulation will be reviewing permit applications for the dredging and filling involved in the above referenced projects. The Department of Natural Resources does have statutory authority to remove the derelict trestle, but only if it is shown to be a "public nuisance". However, under this alternative it is unlikely that a coordinated overview of the situation would occur.
2. Bay Advisory Committee: A standing bay advisory committee within the Tampa Bay Regional Planning Council could effectively coordinate interagency activities leading towards the mitigation of the cumulative hydrological/biological problems occurring in the Manatee River estuary.
3. Bay Management Authority: Besides providing the same coordinative role stated above, a mandated bay management authority could develop and administer the proposed cumulative impact study as well as potentially assume the permitting authority for all dredge/fill activities proposed for the tidal waters of the Tampa Bay estuarine system.

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## CHAPTER 3

### A. Synthesis of Issues

During the process of review of the 42 previously identified bay management issues it became clear to members of both the Science/Engineering and Planning/Management Subcommittees that each priority issue did not represent a singular, discrete problem. Rather, many of the issues were found to be either symptoms of, or components of, larger, more generalized problems. In recognition of this fact, and in an effort to simplify the interpretation of the problems facing Tampa Bay, the Commission attempted to categorize each issues under a minimal number of major problem headings. In December of 1984 the Commission approved the final reorganization of all priority bay management issues under five major problem categories as shown below.

#### 1. Water Quality Improvement

##### a. Eutrophication

- #2 Loss of Seagrass in Tampa Bay
- #3 Non-Point Source Discharges Entering Tampa Bay
- #4 Spoil Disposal and Management of Spoil Islands
- #7 Control of Septage Waste
- #10 Municipal and Industrial Discharges
- #12 Study and Management of Tidal Creeks and Rivers
- #13 Wasteload Allocation for Tampa Bay
- #20 Load Relief for Major Sewage Treatment Plants
- #21 Water Quality Improvement for Recreational Uses
- #22 Stormwater Detention Requirements for Redevelopment
- #41 Odor

##### b. Hazardous/Toxic Waste Management

- #3 Non-Point Source Discharges Entering Tampa Bay
- #5 Hazardous Waste Disposal and Management
- #7 Control of Septage Waste
- #10 Municipal and Industrial Discharges
- #13 Wasteload Allocation for Tampa Bay
- #15 Gypsum Field Decommissioning

##### c. Improvements to Circulation

- #4 Spoil Disposal and Management of Spoil Islands
- #12 Study and Management of Tidal Creeks and Rivers
- #33 Improvements to Bridge Facilities Crossing Tampa Bay
- #35 Water Quality Improvements Using Tidal Gates
- #38 Construction of New Skyway Bridge Pier Protection System
- #42 Manatee River Derelict Train Trestle

2. Habitat Protection and Restoration

- #2 Loss of Seagrass in Tampa Bay
- #4 Spoil Disposal and Management of Spoil Islands
- #8 Aquatic Preserves
- #9 Seagrass Marsh and Mangrove Habitat Creation
- #11 Stronger State Wetlands Regulation
- #24 McKay Bay Management Plan
- #27 Hendry Fill Restoration Project
- #28 Contingency Planning for Post-Hurricane Acquisition of Habitat
- #29 Mitigation Banking
- #30 Management of Bower Tract and Adjacent Wetlands
- #31 Management of Passage Key
- #32 Management and Restoration of Shorelines in Boca Ciega Bay
- #34 Channel A Restoration

3. Fisheries and Shellfish Management

- #6 Enforcement
- #14 Assessment of Fishery Stocks in Tampa Bay
- #16 Commercial and Sport Fishing Regulation
- #25 Shellfish Classification
- #26 Power Plant Entrainment
- #36 User Conflicts and Limits on Activities

4. Development and Use of the Bay

- #18 Public Education
- #19 Urban Waterfront Development and Public Access
- #21 Water Quality Improvement for Recreational Uses
- #36 User Conflicts and Limits on Activities
- #37 Marina Siting Policy
- #38 Construction of New Skyway Bridge Pier Protection System
- #39 Extension of 49th Street (St. Petersburg) Across Tampa Bay
- #40 Sailboat Launching

5. Legal Framework for Comprehensive Management

- #1 Funding
- #6 Enforcement
- #8 Aquatic Preserves
- #11 Stronger State Wetlands Regulation
- #16 Commercial and Sport Fishing Regulation
- #17 Documenting the Economic Importance of Tampa Bay
- #18 Public Education
- #23 Review of Rules and Regulations
- #29 Mitigation Banking

## B. Legislative Work Plan

During their review of the 42 priority bay management issues, the Commission developed numerous general and specific recommendations for addressing each problem. Recommendations included local actions; state agency directives; and, in many instances, legislative amendments, initiatives and funding allocations. The following work plan outlines the major legislative actions recommended by the Commission for consideration by the Florida Legislature during the 1985 session. Recommended actions are appropriately organized under the five major problem categories for Tampa Bay listed above and include citations for the implementing agency(s), estimated funding needs, and target completion dates, wherever applicable. In addition, the page on which the specific recommendation is discussed in the issue brief text is cited for cross reference. During the development of this work plan it was understood by the Commission that all economic costs to public and private entities could not be considered.

### 1. Water Quality Improvement

a. Eutrophication: The over-enrichment of a body of water with nutrients like phosphorous and nitrogen results in a number predictable a characteristic water quality conditions. Acute algal and phytoplankton blooms take place which increase turbidity and shade the seagrasses below. As the massive quantities of algae begin to break down dissolved oxygen is severely depleted, especially near the bottom. Low dissolved oxygen can lead to localized fish kills, or can completely defaunate an entire area of bay bottom. The shading effect over time will also destroy the seagrasses below, by reducing critical light levels. Eutrophication is well documented in Tampa Bay, especially in the upper reaches of Hillsborough Bay and Old Tampa Bay. The causes of this problem are equally well documented and understood. They include excessive discharges of inadequately treated sewage, and stormwater runoff from surrounding urban and residential areas. A broad scale, multi-faceted nutrient control program for the entire Tampa Bay watershed is needed to circumvent this problem.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Amend Chapter 17-25, F.A.C., to require the construction of stormwater discharge facilities on all parcels subject to redevelopment.	DER SWFWMD	1985	N/A	2-23
Allocate additional funds for improved compliance monitoring and enforcement of stormwater pollution controls in the Tampa Bay region.	SWFWMD DER	1985	-	2-24

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Amend Chapter 17-25, F.A.C., to require an additional fifty percent level of treatment for stormwater management facilities discharging into Class III waters of Tampa Bay.	SWFWMD DER	1985	N/A	2-24
Allocate funds for a statewide two-year public awareness campaign regarding the causes of water pollution with special emphasis on non-point source contributions.	DER	1987	\$400K	2-25
Allocate additional funds for compliance monitoring and enforcement of point source discharges into Tampa Bay.	DER	1988	\$270K	2-61
Allocate funds for the refinement and completion of the Wasteload Allocation Study for Tampa Bay.	DER	1990	\$1,000K	2-82
Mandate the enforcement of advanced wastewater treatment for municipal discharges into Tampa Bay until the Wasteload Allocation Study is complete.	DER	1985	N/A	2-81
Initiate regional or statewide legislation, to be implemented locally, requiring developers to purchase sewage treatment capacity rights, and prohibiting the issuance of an interceptor permit unless the municipality can demonstrate adequate treatment capacity.	DER	1985	N/A	2-110

b. Hazardous/Toxic Waste Management: The degree of hazardous/toxic waste pollution in Tampa Bay is not well documented. Furthermore, the impacts of such pollutants on the living resources of the bay are even less understood. It is known that high levels of heavy metals, especially lead, do occur in the water column and sediments of certain portions of the bay, but the sources of these contaminants are often difficult to identify. The phosphate industry discharged large quantities of acids and radionuclides into the bay, the effects of which need to be assessed.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Initiate legislation increasing the three percent tax levied on annual gross receipts of commercial hazardous waste facilities.	DER	1985	-	2-42
Allocate funds for increased monitoring and verification of hazardous waste generators.	DER Local Governments	1985	-	2-42
Allocate funds for a two-year study to determine the sources, quantities, distributions, impacts and fates of major toxic contaminants in Tampa Bay.	DER	1987	\$500K	2-42
Amend Chapter 403.7234, F.S., to allow counties to utilize regional planning councils for performing annual hazardous waste generator surveys.	Regional Planning Councils	1985	-	2-43
Initiate legislation transferring the responsibility for the regulation and monitoring of septic tanks and commercial septage waste services from HRS to DER.	DER HRS	1985	N/A	2-50
Allocate funds for a investigation of commercial septage waste disposal practices in the Tampa Bay area.	DER	1986	-	2-50

c. Improvements to Circulation: The construction of numerous causeway structures, the dredging of deep-draft navigational channels, the deposition of spoil material islands, and the impoundment of freshwater flows have significantly altered the natural tidal prism and circulation patterns of Tampa Bay. The major effect has been to reduce tidal flushing, thus increasing the retention time of pollutants and exacerbating other water quality problems.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Allocate funds for the construction of a tide gate system along the Courtney-Campbell Causeway.	DER USGS	1987	\$150K	2-165

2. Habitat Protection and Restoration: Much of the natural fish and wildlife habitat of the Tampa Bay estuarine system has been lost over the past century. Shoreline development, and dredging and filling have been responsible for the destruction of 44% of the original marsh and mangrove acreage in the bay while water quality degradation has led to the loss of 80% of the original seagrass beds. These habitat losses have contributed significantly to declining fishery yields in the bay. Recent efforts have demonstrated that intertidal habitat can be effectively restored or created, whereas much study is needed to determine the critical requirements of seagrasses.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Allocate funds for a comprehensive monitoring, research and restoration effort for seagrasses in Tampa Bay.	DER DNR	1990	\$825K	2-17
Allocate funds for the permanent staffing of management personnel for the Pinellas, Cockroach Bay, and Terra Ceia Aquatic Preserves.	DNR	1990	\$550K	2-54
Initiate legislation designating the Terra Ceia Aquatic Preserves an Outstanding Florida Water.	DER	1985	N/A	2-53

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Initiate legislation extending the boundaries of the Terra Ceia Aquatic Preserve to include Passage Key National Wildlife Refuge.	DNR	1985	N/A	2-53
Mandate the establishment of ambient water quality standards for all OFW areas in Tampa Bay.	DER	1986	-	2-53
Amend Chapter 403.904, F.S., to authorize promulgation of special, more stringent, dredge and fill rules for all tidal waters of Tampa Bay, to be defined as an "other resource management area".	DER	1985	-	2-65
Allocate funds for the restoration of the Hendry fill site.	DER DNR	1989	\$220K	2-134
Amend Chapter 259, F.S., to give highest priority to the state acquisition of newly formed, extensively altered or undeveloped coastal habitat.	DNR	1985	N/A	2-140
Initiate enabling legislation allowing for the creation of local habitat mitigation banks wherever feasible.	DER TPA COE	1985	N/A	2-143

3. Fisheries and Shellfish Management: Major declines have been observed for spotted seatrout, red drum and bait shrimp in Tampa Bay over the past three decades, while prior to that, once thriving scallop and oyster fisheries in the bay completely collapsed. Much of the blame for declining fishery yields in Tampa Bay has been attributed to the loss of suitable habitat, and the concurrent degradation of water quality. However, in the cases of spotted seatrout and red-drum, overfishing may have contributed significantly. Nevertheless, fisheries data for Tampa Bay is badly lacking, and will be needed to more efficiently manage economically important fishery stocks.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Initiate legislation requiring all saltwater sport fisherman to annually purchase a marine recreational fishing license.	DNR	1985	N/A	2-12
Allocate funds for comprehensive program of fisheries research, monitoring and regulation for all valued stocks in Tampa Bay.	DNR	1988	\$1,067K	2-84
Initiate legislation consolidating and standardizing all local fishing laws and regulations.	DNR MFC	1986	N/A	2-97
Initiate legislation placing statewide size and bag limits on commercially and recreationally harvested spotted seatrout and red drum.	DNR MFC	1985	N/A	2-97
Allocate funds for the establishment of a shellfish sanitary survey team in the Tampa Bay area.	DNR	1990	\$600K	2-128

4. Development and Use of the Bay: Tampa Bay is a highly urbanized estuary which supports a number of waterfront and water dependent uses. Shoreline development and recreational use of the bay have placed demands upon the natural systems and aesthetic values of the bay. Careful comprehensive planning will be needed to preserve these values as the Tampa Bay area continues to grow.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Allocate funds for a local public awareness/education campaign regarding the environmental values of Tampa Bay.	TBRPC DNR	1986	\$20K	2-103
Amend Chapter 163, F.S., to require Coastal Zone elements of local government comprehensive plans to specify waterfront zoning requirements and design standards.	TBRPC DCA	1985	N/A	2-107
Initiate legislation creating a State Marina Siting Commission to develop a state-wide marina siting ordinance and a variable lease fee schedule for marina development on environmentally sensitive submerged lands.	DNR	1985	N/A	2-174
Initiate legislation establishing an Aquatic Preserve Management Trust Fund using funds derived from submerged land lease fees.	DNR	1986	N/A	2-174

5. Legal Framework for Comprehensive Management: Under the present regulatory framework, comprehensive management of Tampa Bay is not accomplished. Greater interagency coordination, consolidation of regulatory programs, representation by a broader range of interests and a long-term source of adequate funding are needed.

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Amend Chapter 211.3103, F.S., to distribute 1% of the annual revenue of the Phosphate Severance Tax for each of the next 5 years to the Tampa Bay Regional Planning Council to fund the Agency on Bay Management.	TBRPC	1985	N/A	2-13 3-14
Appoint a special legislative committee to investigate the adequacy of existing funding and staffing levels for all agencies involved in major environmental programs involving Tampa Bay. This committee should also reorganize the distribution of monies of various appropriate trust funds to the area from which they were collected.	DER DNR	1985	N/A	2-12 2-13
Amend Chapter 84-447, L.F., to allow for fair representation from scientific, environmental and fishing interests on the board of the Tampa Port Authority.	TPA	1985	N/A	2-38
Allocate funds for a study documenting the economic importance of the Tampa Bay estuary to the region and state.	TBRPC	1986	\$150K	2-101
Allocate funds for a study to identify and analyze gaps and overlaps in all existing federal, state, regional and local laws and regulations affecting the management of Tampa Bay.	TBRPC	1987	\$40K	2-116

Recommended Action	Implementing Agency(s)	Target Date	Funding Needs	Reference Page
Contingent upon the strengthening of state and regional planning legislation, initiate legislation enabling the creation of a Tampa Bay Management Authority with taxing and regulatory powers.	-	1986	N/A	3-12

### C. Long-Term Management Recommendations

Tampa Bay, as defined above, is bordered by three counties and 17 municipalities. Management responsibility for the bay's shoreline, submerged land, open water and associated living resources is currently divided among these local governments as well as numerous federal, state and regional agencies and authorities. There is no single agency with the legislated authority to implement a long-term unified management program for Tampa Bay. As a result, regulatory decisions are often made on a problem-specific and/or site-specific basis, and management of Tampa Bay as a holistic natural resource has heretofore not taken place.

Recognizing this regulatory fragmentation the Tampa Bay Management Study Commission evaluated the potential effectiveness of various long-term management alternatives in relation to each of the specific bay management issues under review. The objective of this effort was to reach a consensus regarding which of the various management/regulatory scenarios would result in the most effective implementation of the recommended bay management plan. The long-term management alternatives under consideration included the following:

- Implementation under the status quo or existing regulatory framework;
- Appointment of a resource planning and management committee pursuant to Chapter 380.045, Florida Statutes;
- Creation of a mandated bay management authority; and
- Continuation of a bay advisory committee within the Tampa Bay Regional Planning Council.

#### Status Quo

Under the status-quo alternative, implementation of the recommended bay management plan would most likely result from state agency action in response to legislative directives and appropriations. Although individual elements of the work plan could potentially be accomplished under such a scenario, it is highly unlikely that any one agency would take a lead role in directing and coordinating the overall bay management program. Regulatory responsibility and jurisdictional accountability would remain fragmented and the inertia of the consensus building process leading to a unified management approach to the bay would probably come to a halt.

It is for these reasons that the Tampa Bay Management Study Commission concluded that some sort of working group should continue to convene on a regular basis. At a minimum such a group could perform advisory and coordinative roles which would aid existing agencies in the partial implementation of the recommended bay management plan. At a maximum such a body could assume certain regulatory functions from existing agencies in an effort to consolidate permitting procedures under a more unified bay management approach. Regardless of how much authority a working group could assume, the most important function such a body could provide would be a mechanism for mediating past, present and future conflicts between competing interests for the use of the bay's resources.

### Bay Management Authority

The creation of a mandated bay management authority, empowered with regulatory capabilities, has no legal precedent in the State of Florida. However, enabling legislation for similar regional authorities involved in natural resource management throughout the state does exist. For example, Florida Statutes Chapter 373.1962, passed in 1974, encouraged municipalities and counties to enter into cooperative agreements leading to the creation of regional water supply authorities for the purpose of managing water for county and municipal purposes in such a manner as to reduce the adverse environmental effects of excessive or improper withdrawals of water from concentrated areas. This legislation also gave authorities the power to levy ad valorem taxes, acquire water and water rights, exercise eminent domain, and issue revenue bonds. In the Tampa Bay area, the West Coast Regional Water Supply Authority is the functioning product of this legislation.

Similarly, Florida Statutes Chapter 315 provides the basis for the operation of port authorities in the state. Besides general powers relating to port operations, the Tampa Port Authority, by virtue of a special legislative act passed in 1944 (consolidated under Chapter 84-77, Laws of Florida), holds title to all submerged lands in Hillsborough County, and regulates dredge and fill activities in said waters.

Nationally, the concept of an empowered bay management authority is not without legal precedent. Established in 1965, the San Francisco Bay Conservation and Development Commission (BCDC) was the first intergovernmental committee created to manage a coastal resource in the United States. The BCDC was originally given a four-year life span and was assigned the task of preparing a bay management plan for San Francisco Bay. In 1969 the Commission was granted permanent status and three major areas of responsibility leading to the implementation of the bay management plan including: 1) permitting authority for all filling, dredging and changes in existing uses on the bay; 2) veto power over any significant development activity within 100 landward feet from the shoreline; and 3) jurisdiction over any proposed filling of salt ponds and other wetlands adjacent to the bay.

Many benefits can be cited for development of a similar regional bay management authority for Tampa Bay. Probably foremost among these benefits would be the consolidation and subsegment streamlining of certain environmental permitting programs for proposed activities in and around the bay. Examples of the types of resource management responsibilities that such an authority could assume include: sewage disposal and other point source discharges to the bay; stormwater management systems involving tidal waters; dredge and fill activities in the bay; shoreline development; aquatic preserve management; mosquito control projects; classification of sanitary shellfishing areas; and habitat restoration projects. Presently, these programs are managed by an array of state, regional and local agencies. Local assumption and consolidation of these programs under one umbrella authority would streamline the permitting process for all potential users of the bay and, more importantly, would result in a more unified management overview of the Tampa Bay estuarine system as a holistic natural resource.

In addition, consolidated ownership of all bay bottoms by a single regulatory authority would greatly simplify the regulatory framework and would significantly augment management capabilities for Tampa-Bay. This concept is consistent with the primary approach to resource management programs employed at the state level where outright ownership is usually the case. The "Save Our Rivers," and CARL programs are relevant programs. An authority which owns title to the submerged lands under Tampa Bay would be able to affect every resource management decision occurring within the bay either through overview with veto power or through direct regulatory authority. The most significant of these would be dredge and fill activities, in particular, the creation, improvement and maintenance of navigational channels. Finally, under such a scenario the accountability for the success or failure of the bay management program would reside essentially in one agency.

Political arguments against the establishment of a Tampa Bay management authority with regulatory powers, however, remain quite strong. The proposal is still primarily viewed by many powerful interests around the bay, as adding "another layer of bureaucracy" to an already complex and sluggish environmental permitting system. It is for this reason that the Tampa Bay Management Study Commission decided against the recommendation of immediately establishing an empowered bay management authority, even though the majority of members felt that, in the long-term, this alternative would be needed to effectively accomplish all stated bay management goals and objectives.

It was further noted that the recommendation of such an authority carries with it significant political risk. The movement towards a unified regional management program for Tampa Bay has gained considerable inertia over the past few years, and many of the more discrete bay management objectives can probably be achieved in the absence of such an authority. Recommending the establishment of an empowered bay management authority will likely mobilize considerable political opposition which may threaten those accomplishments made to date, and those that can be made in the future. Furthermore, it was felt that such an authority would probably have to evolve slowly, first by establishing credibility through accomplishments gained via all available mechanisms, and second by gradually assuming responsibilities delegated from other agencies.

#### Resource Planning and Management Committee

The 1979 amendment to the critical areas component of Chapter 380 requires that a resource planning and management committee (RPMC) be appointed and operate in the study area for a minimum period of six months prior to any formal designation of an area of critical state concern (ACSC). Within one year after the time of its appointment, the RPMC must report the results of its study on growth management issues in the resource management study area. Past committees have usually developed resource management plans or programs for the area under study. These plans identify resource management issues, develop implementation strategies for resolving problems and identify the state agencies or local entities which should have responsibility for implementing the recommended strategies.

In reviewing the structure and function of a RPMC, the Tampa Bay Management Study Commission concluded that it had essentially served the same role, and had developed an equivalent final product, as would a RPMC. To recommend that a RPMC be appointed for the Tampa Bay area was viewed as a duplicative effort that would probably result in the loss of time during which implementation of the already recommended work plan could be initiated. In addition, it was noted that, like the Commission, a RPMC is an advisory group in nature and has no real authority under the law to enforce its recommendations or to require active participation by local governments. Although the threat of formal ACSC designation is the leverage upon which the RPMC must rely, experience with implementation of the critical areas program has shown this lever to be one of little influence.

Since the real strength of the RPMC approach lies in the consensus-building nature of a working group, it was concluded that similar results could be obtained more expeditiously through the efforts of an expanded version of the existing Tampa Bay Management Study Commission. Although a RPMC is essentially an advisory group, it does have legal standing and a formal role through state planning legislation. To be effective the proposed working group would need to have a similar role, a formal structure, and comparable legal credibility as would a RPMC.

#### Bay Advisory Committee

To best meet the above stated requirements of an effective working group, as well as the immediate need for continuing a comprehensive bay management program, the Tampa Bay Management Study Commission concluded that a formally structured advisory group within the Tampa Bay Regional Planning Council would represent the most feasible long-term management alternative at this time. The proposed committee would be served by a permanent staff and would have policy, review and planning authority. The committee, however, would not have any direct regulatory authority. The establishment of such a committee in the State of Florida has precedence in the case of the Biscayne Bay Management Committee, which was created by a Dade County ordinance as a committee of the County Commission.

The following elements represent the general recommended structure of the proposed advisory group:

1. The advisory group should be entitled the Agency on Bay Management, hereby referred to as the Agency.
2. The Agency should be formalized via the adoption of rules and procedures pursuant to Chapter 120.53, Florida Statutes. Said rules and procedures should be included into the formal organizational structure of the Tampa Bay Regional Planning Council pursuant to Chapter 29H-1.05, Florida Administrative Code.
3. The Tampa Bay Regional Planning Council should make available a renewable source of funds, at an initial level of \$25,000.00 per annum, to provide support for staff functions and other activities leading to the refinement and/or implementation of the bay management plan.

4. The Agency should continue to seek state and federal funds, and other outside grants, to supplement staff functions and to undertake other studies, projects and efforts leading to the refinement and/or implementation of the bay management plan.
5. The Agency should consist of no more than 40 members to be appointed by the Tampa Bay Regional Planning Council to include but not be limited to the following groups:
  - a. The Florida Senate representing the Tampa Bay Region.
  - b. The Florida House of Representatives representing the Tampa Bay Region.
  - c. Environmental interests in the Tampa Bay Region.
  - d. Commercial interests in the Tampa Bay Region.
  - e. Industrial interests in the Tampa Bay Region.
  - f. Science and academic interests in the Tampa Bay Region.
  - g. Recreational interests in the Tampa Bay Region.
  - h. Hillsborough, Manatee, and Pinellas Counties, respectively.
  - i. The Tampa, Manatee and St. Petersburg Port Authorities.
  - j. The Cities of St. Petersburg and Tampa.
  - k. Two other municipalities bordering Tampa Bay.
  - l. The Tampa Bay Regional Planning Council.
  - m. The U.S. Army Corps of Engineers.
  - n. The National Marine Fisheries Service.
  - o. The Florida Department of Natural Resources.
  - p. The Florida Department of Environmental Regulation.
  - q. The Florida Department of Community Affairs.
  - r. The Florida Department of Transportation.
  - s. The Southwest Florida Water Management District.
  - t. The Tampa Bay Region at large.
6. The members of the Legislature appointed to the Agency should participate in the activities of the Agency to the extent that such participation is not incompatible with their respective positions as members of the Legislature.

7. The members of the Agency should serve without compensation.
8. The chairman of the Tampa Bay Regional Planning Council should designate the chairman and vice-chairman of the Agency.
9. Every attempt should be made to ensure a geographic balance of regional representation in the Agency.
10. The Agency should strive to improve the comprehensive management of Tampa Bay among business, environmental, and public interest organizations and individuals. To this end the powers and duties of the Agency should be as follows:
  - a. The Agency should meet at times and places as it may deem proper. Every effort should be made to meet bi-monthly at a minimum.
  - b. The Agency as a body, or as a subcommittee composed of one or more members, should hold hearings at such times and places as it may deem proper.
  - c. The Agency should cooperate with, and secure the cooperation of, all affected municipal, county and other local agencies in implementing the recommended bay management plan.
  - d. The Agency should cooperate with, and secure the cooperation of every relevant department, agency, or instrumentality in the state government including but not limited to the Department of Natural Resources, the Department of Environmental Regulation, the Department of Community Affairs and the Southwest Florida Water Management District in implementing the recommended bay management plan.
  - e. The Agency should cooperate with, and secure the cooperation of every relevant department, agency, or instrumentality in the federal government including but not limited to the National Marine Fisheries Service, the United States Army Corps of Engineers and the United States Fish and Wildlife Service in implementing the recommended bay management plan.
  - f. The Agency should serve to monitor and coordinate the existing regulatory programs and studies of all federal, state, regional and local agencies involved in management of Tampa Bay.
  - g. The Agency should serve a secondary function to the Tampa Bay Regional Planning Council as its Natural Resources Technical Advisory Committee.
  - h. The Agency should serve as a liaison between the Tampa Bay Regional Planning Council and other environmental agencies, organizations and interest groups.
  - i. The Agency should recommend an annual environmental management work program to the Tampa Bay Regional Planning Council.

- j. The Agency should develop a regional environmental resources library and information system within the Tampa Bay Regional Planning Council.
- k. The Agency should publish an annual state-of-the-bay document highlighting new issues, problems and progress in the comprehensive management of Tampa Bay.
- l. The Agency should sponsor a regional environmental conference annually, emphasizing growth management and natural resource issues in the Tampa Bay area.
- m. The Agency should operate a public speakers bureau addressing bay management issues.

It is recognized that the ultimate success of the recommended Agency on Bay Management within the Tampa Bay Regional Planning Council will be dependent upon the overall strengthening of state growth management legislation. As such, this recommendation is contingent upon the following proposed fortification of state, regional and local growth management laws and statutes:

- 1. The state should adopt an authoritative system of incentives and disincentives as a means of assuring consistency between, and enforcing compliance with, state, regional and local comprehensive plans so as to be consistent with the bay management program proposed herein. This system should include but not be limited to:
  - a. Special consideration in state financial assistance for natural resource management and protection (e.g., land acquisition funds, sewage treatment construction grants, etc.);
  - b. Special consideration in state environmental permitting and regulatory programs (e.g., more stringent dredge and fill permit criteria in special resource management areas); and
  - c. State assumption of local government controls, pursuant to Chapter 380, F.S., wherever existing local controls have proved to be inadequate.
- 2. The role of regional planning councils in growth management functions should be strengthened, especially with regard to bay management.
- 3. Strong minimum criteria for the content of regional comprehensive plans should be established.
- 4. The recommended bay management program contained herein should be incorporated into the Tampa Bay regional, and state, comprehensive plans wherever applicable.

5. The state comprehensive plan should be required to include the findings, provisions and recommendations of all Resource Planning and Management Committees, and other established special resource management committees including the Tampa Bay Management Study Commission.
6. In the absence of significant strengthening of state growth management legislation in the near future, the Tampa Bay Management Study Commission recommends that the Legislature initiate the development of enabling legislation for the establishment of a Tampa Bay Management Authority as referenced on page 3-12.

APPENDIX-A

LAWS OF FLORIDA

CHAPTER 70-524

Became a law without the Governor's approval.

Filed in Office Secretary of State July 2, 1970.

CHAPTER 70-524

House Bill No. 4727

AN ACT creating the Tampa Bay conservation and development study commission; prescribing the membership, appointment, powers, duties, and expiration of the commission; providing an effective date.

*Be It Enacted by the Legislature of the State of Florida:*

Section 1. Declaration of policy.—The legislature hereby finds and declares that it is imperative to define the public interest in Tampa Bay and that the effects of further filling of Tampa Bay on navigation, fish and wildlife, and air and water pollution of the bay region be determined. The legislature, therefore, declares that it is in the best interests of the people of the state, and particularly the people of the Tampa Bay area, that a Tampa Bay conservation study commission be created to study these matters and report thereon to the legislature. The legislature further declares that the functions of the Tampa Bay conservation study commission are of an advisory nature and shall not be construed to abrogate or supersede the functions of the legislature or of the duly constituted planning agencies of local government.

Section 2. Definition of Tampa Bay.—

(1) For the purpose of this act, Tampa Bay includes the water areas from the north end of the bay to the Gulf of Mexico line and, specifically, the marshlands (land lying between mean high tide and the top of the barnacle line); tidelands (land lying between mean high tide and mean low tide); and submerged lands (those lands which are not subject to tidal action); and tributaries.

(2) The definition of Tampa Bay provided in this section is merely for the purpose of prescribing the authority of the commission created by this act. The definition shall not be

construed to affect title to any land or to prescribe the boundaries of Tampa Bay for any purpose except the authority of the commission created by this act.

Section 3. Tampa Bay conservation and development study commission.—

(1) The Tampa Bay Conservation and Development Commission is hereby created. The commission shall consist of ten (10) members to be selected as follows:

(a) One (1) senator representing Hillsborough county to be selected by the senators representing Hillsborough county.

(b) One (1) senator representing Pinellas county to be selected by the senators representing Pinellas county.

(c) One (1) senator representing Manatee county.

(d) One (1) member of the house of representatives representing Hillsborough county to be selected by the members of the house of representatives representing Hillsborough county.

(e) One (1) member of the house of representatives representing Pinellas county to be selected by the members of the house of representatives representing Pinellas county.

(f) One (1) member of the house of representatives representing Manatee county to be selected by the members of the house of representatives representing Manatee county.

(g) One (1) member of the board of county commissioners from each of the respective boards of county commissioners for Hillsborough, Pinellas and Manatee counties to be appointed by the chairmen of the respective boards of county commissioners.

(h) The chairman of the Tampa Bay regional planning council.

(2) The members of the legislature appointed to the commission shall participate in the activities of the commission to the extent that such participation is not incompatible with their respective positions as members of the legislature.

(3) The members of the commission shall serve without compensation but each of the members shall be reimbursed for expenses incurred in the performance of official duties in accordance with section 112.061, Florida Statutes.

(4) The commission shall select by majority vote from its membership a chairman and a vice-chairman.

(5) The time and place of the first meeting of the commission shall be prescribed by the chairman of the Tampa Bay regional planning council, but in no event shall it be scheduled for a date later than ten (10) days after the effective date of this act.

**Section 4. Powers and duties of the commission.—**

(1) The commission shall undertake a study designed to ascertain the public interest in Tampa Bay, and shall report thereon to the legislature not later than the fifth legislative day of the 1971 regular session, together with recommended legislation defining the public interest in Tampa Bay and recommended legislation for protecting such public interest.

(2) The commission shall also undertake a study of the effects of further filling of Tampa Bay on navigation, fish and wildlife, and air and water pollution, and of the regional needs of the future for the bay region, and shall report thereon to the legislature not later than the fifth legislative day of the 1971 regular session of the legislature.

(3) It is the express intention of the legislature that this commission and every aspect of it shall expire as of the date on which the last report is submitted to the legislature.

(4) In carrying out its duties and responsibilities, the commission shall have all of the following powers:

(a) To meet at such times and places as it may deem proper.

(b) As a body or, on the authorization of the commission, as a subcommittee composed of one (1) or more members, to hold hearings at such times and places as it may deem proper.

(c) To administer oaths.

(d) To employ, pursuant to laws and regulations governing state civil service, a secretary and such clerical, legal, and technical assistants as may appear necessary.

(e) To employ an executive secretary.

(f) To contract with such other agencies, public or private, as it deems necessary, for the rendering and affording of such services, facilities, studies and reports to the commission as will best assist it to carry out its duties and responsibilities.

(g) To cooperate with and to secure the cooperation of county, city, city and county, and other local agencies in investigating any matter within the scope of its duties and responsibilities.

(h) To cooperate with every department, agency, or instrumentality in the state government, including but not limited to the department of natural resources, the department of air and water pollution control, the department of transportation, and the game and fresh water fish commission; and to secure directly from every department, agency, or governmental unit full cooperation, access to its records, and access to any information, suggestions, estimates, data, and statistics it may have available.

(i) To cooperate with any other state or local agency which is engaged in making developmental studies in the bay and surrounding regions.

(j) To cooperate with the United States Army Corps of Engineers and the Department of the Interior.

(k) To authorize its agents and employees to absent themselves from the state when necessary for the performance of their duties.

(l) The Commission may select necessary consultants to serve at its pleasure. Said consultants may accept grants from the federal government or from other public or private agencies and use such funds for the purposes set forth in this act.

(m) To do any and all other things necessary or convenient to enable it fully and adequately to perform its duties and to exercise the powers expressly granted it.

(5) The legislature recognizes the current efforts of the Tampa Bay regional planning council in the field of regional planning in the Tampa Bay area, and the commission is requested to cooperate with the Tampa Bay regional planning council in making its studies under this act so as to avoid duplication of efforts.

LAWS OF FLORIDA      CHAPTER 70-526

Section 5. This act shall take effect July 1, 1970.

Became a law without the Governor's approval.

Filed in Office Secretary of State July 2, 1970.

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CHAPTER 70-525

House Bill No. 4803

AN ACT relating to circuit courts; providing for appointment by governor of a census committee pursuant to section 26.011, Florida Statutes, to determine population of the seventeenth judicial circuit; providing for the expenditure of county funds for the conduct of such census; providing an effective date.

*Be It Enacted by the Legislature of the State of Florida:*

Section 1. There shall be appointed by the governor a census commission as provided by section 26.011, Florida Statutes, to determine the population of the seventeenth judicial circuit in its relation to the number of circuit judges permitted by law.

Section 2. The board of county commissioners of Broward County is authorized and directed to pay all reasonable expenses and costs incident to the taking of said census and the execution of this act from any county funds not otherwise appropriated.

Section 3. This act shall take effect upon becoming a law.

Became a law without the Governor's approval.

Filed in Office Secretary of State July 2, 1970.

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CHAPTER 70-526

House Bill No. 5178

AN ACT relating to protection of marine turtle eggs; repealing chapter 61-744, Laws of Florida, which provides for taking such eggs for personal use at certain times in counties having a population of not less than four thousand five hundred fifty-five (4,555) and not more than four thousand six hundred (4,600), according to the latest official decennial census; providing an effective date.

ENROLLED

SB 755

First Engrossed

1                   A bill to be entitled  
2                   An act relating to Hillsborough, Manatee, and  
3                   Pinellas counties; creating the Tampa Bay  
4                   Management Study Commission; prescribing the  
5                   membership, appointment, powers, duties, and  
6                   expiration of the commission; providing an  
7                   effective date.

8  
9                   Be It Enacted by the Legislature of the State of Florida:

10  
11                  Section 1. Declaration of policy.--The Legislature  
12                  hereby finds and declares that it is imperative to define the  
13                  public interest in Tampa Bay and that the environmental and  
14                  economic assets and opportunities made possible by Tampa Bay  
15                  be enhanced and protected. The Legislature, therefore,  
16                  declares that it is in the best interests of the people of the  
17                  state, and particularly the people of the Tampa Bay area, that  
18                  a Tampa Bay Management Study Commission be created to study  
19                  these matters and report thereon to the Tampa Bay Regional  
20                  Planning Council. The Legislature declares that the functions  
21                  of the Tampa Bay Management Study Commission are of an  
22                  advisory nature and shall not be construed to abrogate or  
23                  supersede the functions of the Legislature, Tampa Bay Regional  
24                  Planning Council, or of the duly constituted planning agencies  
25                  of local government.

26                  Section 2. Definition of Tampa Bay.--

27                  (1) For the purpose of this act, Tampa Bay includes  
28                  the water areas from the north end of the bay at the  
29                  transition of shoreline vegetation from tidal to freshwater  
30                  forms south to the water areas of the bay that touch the  
31                  northwesternmost point of Snead Island and west to the

1 northernmost point of Anna Marie Island. Tampa Bay  
2 specifically includes the marshlands, defined as land lying  
3 between mean high tide and the top of the barnacle line;  
4 tidelines, defined as land lying between mean high tide and  
5 mean low tide; and submerged lands defined as those lands  
6 which are not subject to tidal action; and tributaries. The  
7 upland limit is that line above which terrestrial land forms  
8 and vegetation occurs.

9 (2) The definition of Tampa Bay provided in this  
10 section is merely for the purpose of prescribing the authority  
11 of the commission created by this act. The definition shall  
12 not be construed to affect title to any land or to prescribe  
13 the boundaries of Tampa Bay for any purpose except the  
14 authority of the commission created by this act.

15 Section 3. Tampa Bay Management Study Commission.--

16 (1) The Tampa Bay Management Study Commission is  
17 hereby created. The commission shall consist of between 15  
18 and 20 members to be appointed by the Tampa Bay Regional  
19 Planning Council as follows:

20 (a) One member of the Florida Senate representing the  
21 Tampa Bay Region.

22 (b) One member of the Florida House of Representatives  
23 representing the Tampa Bay Region.

24 (c) Three representatives of environmental interests  
25 in the Tampa Bay Region.

26 (d) Two representatives of commercial interests in the  
27 Tampa Bay Region.

28 (e) One representative of Hillsborough, Manatee, and  
29 Pinellas counties, respectively.

30 (f) One representative of a municipality bordering  
31 Tampa Bay.

1 | (g) Two representatives of industrial interests in the  
2 | Tampa Bay Region.

3 (h) Three representatives of science and academics in  
4 the Tampa Bay Region.

5 (i) One representative of recreational interests in  
6 the Tampa Bay Region.

7 (j) Not more than 5 representatives of the Tampa Bay  
8 Region at large.

14 (3) The members of the commission shall serve without  
15 compensation.

16 (4) The chairman of the Tampa Bay Regional Planning  
17 Council shall designate the chairman and vice-chairman of the  
18 commission.

19 Section 4. Powers and duties of the commission.

10 (3) It is the express intention of the Legislature  
11 that this commission and every aspect of it shall expire  
12 concurrent with the end of the 1985 legislative session.

13 (4) In carrying out its duties and responsibilities,  
14 the commission shall have all of the following powers:

15 (a) To meet at such times and places as it may deem  
16 proper.

17 (b) As a body or, on the authorization of the  
18 commission, as a subcommittee composed of 1 or more members,  
19 to hold hearings at such times and places as it may deem  
20 proper.

21 (c) To cooperate with and to secure the cooperation of  
22 county, municipal, municipal and county, and other local  
23 agencies in investigating any matter within the scope of its  
24 duties and responsibilities..

25 (d) To cooperate with every department, agency, or  
26 instrumentality in the state government, including but not  
27 limited to the Department of Natural Resources, the Department  
28 of Environmental Regulation, the Department of Transportation,  
29 and the Game and Fresh Water Fish Commission; and to secure  
30 directly from every department, agency, or governmental unit  
31 full cooperation, access to its records, and access to any

1 information, suggestions, estimates, data, and statistics it  
2 may have available.

3 (e) To cooperate with any other state or local agency  
4 which is engaged in making developmental studies in the bay  
5 and surrounding regions.

6 (f) To cooperate with the United States Army Corps of  
7 Engineers and the Department of the Interior.

8 (g) To do any and all other things necessary or  
9 convenient to enable it fully and adequately to perform its  
10 duties and to exercise the powers expressly granted it.

11 Section 5. This act shall take effect upon becoming a  
12 law.

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TAMPA BAY MANAGEMENT STUDY COMMISSION  
EXISTING AUTHORITIES MATRIX

Over the past six months the Long-Term/Existing Authorities Subcommittee of the Tampa Bay Management Steering Committee has been developing an inventory of all federal, state, regional and local governmental agencies having jurisdiction over activities associated with Tampa Bay. This inventory has been prepared in matrix form and is intended to be used to pinpoint agency and authority jurisdiction and responsibilities with regard to the priority bay management issues. During the upcoming months the Tampa Bay Management Study Commission will be using the matrix to develop solutions and specific implementation strategies for each identified issue. From this process it is anticipated that a more refined understanding of each agency's function, as well as jurisdictional gaps and overlaps, will be derived. At this point in time, four categories of agency involvement have been identified. These categories are defined as follows:

- Regulation/Enforcement Category

By statute or ordinance an agency has the authority to issue a permit and/or veto a project or activity. This category of involvement is denoted in the matrix by a \* symbol.

- Review/Advisory Category

By statute, ordinance or local policy, an agency is required to become aware of a project or activity and make recommendations or comments. This category of involvement is denoted in the matrix by a o symbol.

- Planning/Policy Development

Through statute, ordinance or local policy, this agency will establish goals and set guidelines, and develop implementation strategies for activities or projects. This category of involvement is denoted in the matrix by a + symbol.

- Research/Education

Agencies which contribute research and/or education information to other agencies and to the general public. This category of involvement is denoted in the matrix by a - symbol.

FEDERAL GOVERNMENT

ACTIVITY

RESOURCE UTILIZATION

- Boating and Navigation
- Commercial and Recreational Fishing
- Public Access to Shoreline

RESOURCE MANAGEMENT

- Habitat Management
- Fish and Wildlife Management
- Shoreline Parks and Marine Preserves
- Protection of Water Quality
- Protection of Water Quantity
- Soil Conservation and Erosion Control
- Pest and Aquatic Weed Control
- Hazardous Waste Disposal
- Protection of Air Quality

RESOURCE DEVELOPMENT

- Dredge and Fill Activities
- Docks, Moorings, Bulkheads, Breakwaters
- Bridges, Causeways, Roads, etc.
- Canals, Levees, Salinity Structures, etc.
- Marina Siting
- Port Development and Operations
- Power Plant Siting
- Industrial Discharges and Operations
- Mining Discharges and Reclamation
- Urban Development and Public Works

	USACE	EPA	USFWS	NOAA/OCZM	NMFS	COAST GUARD	HUD	DOT	USDA	USGS	SEAGRANT	USAF/MacDill
- Boating and Navigation	*	+										
- Commercial and Recreational Fishing			-	+	o							
- Public Access to Shoreline			+	o			+					
- Habitat Management	o	o	*									
- Fish and Wildlife Management	o	o	+	o	o							
- Shoreline Parks and Marine Preserves			*	o	o							
- Protection of Water Quality	*	*	+	o	o	*						
- Protection of Water Quantity	-	+	o	o	o							
- Soil Conservation and Erosion Control	-	o	o	+								
- Pest and Aquatic Weed Control		*	+	o								
- Hazardous Waste Disposal		*										
- Protection of Air Quality		*										
- Dredge and Fill Activities	*											
- Docks, Moorings, Bulkheads, Breakwaters	+	o	o	o	o	o	+					
- Bridges, Causeways, Roads, etc.	+	o	o	o	o	o	+	-				
- Canals, Levees, Salinity Structures, etc.	+	o	o	o	o	o	+	-				
- Marina Siting	o	o	o	o	o	o	+					
- Port Development and Operations	*	o	o	o	o	*						
- Power Plant Siting	o	*	o	o	o	+	+					
- Industrial Discharges and Operations	*				*							
- Mining Discharges and Reclamation	*											
- Urban Development and Public Works	o	o	o	o	o	*	+					

Agency

USACE = U.S. Army Corps of Engineers  
 EPA = Environmental Protection Agency  
 USFWS = U.S. Fish and Wildlife Service  
 NOAA/OCZM = Office of Coastal Zone Management  
 NMFS = National Marine Fisheries Service  
 HUD = Housing and Urban Development

DOT = Department of Transportation  
 USDA = U.S. Department of Agriculture  
 USGS = U.S. Geological Survey  
 USAF/MacDill = U.S. Air Force/MacDill AFB

Authority

- \* Regulation/Enforcement
- o Review/Advisory
- + Planning/Policy Development
- Research/Education

## STATE GOVERNMENT

## ACTIVITY

RESOURCE UTILIZATION

- Boating and Navigation
- Commercial and Recreational Fishing
- Public Access to Shoreline

	DER	DNR	GAFNFC	DCA	DOT	DACS	MFC	ERC	GOPS	USF
- Boating and Navigation	-	+								
- Commercial and Recreational Fishing	*	*	-					-		
- Public Access to Shoreline	o	o	+	-				o	o	-
	+	-						+		

RESOURCE MANAGEMENT

- Habitat Management
- Fish and Wildlife Management
- Shoreline Parks and Marine Preserves
- Protection of Water Quality
- Protection of Water Quantity
- Soil Conservation and Erosion Control
- Pest and Aquatic Weed Control
- Hazardous Waste Disposal
- Protection of Air Quality

Agency	DER	DNR	GAFNFC	DCA	DOT	DACS	MFC	ERC	GOPS	USF
DER = Department of Environmental Regulation										
DNR = Department of Natural Resources										
GAFNFC = Game and Freshwater Fish Commission										
DCA = Department of Community Affairs										
DOT = Department of Transportation										
DACS = Department of Agriculture and Consumer Services										
MFC = Marine Fisheries Commission										
ERC = Environmental Regulatory Commission										
GOPS = Governors Office of Planning and Budget										
USF = University of South Florida										

RESOURCE DEVELOPMENT

- Dredge and Fill Activities
- Docks, Moorings, Bulkheads, Breakwaters
- Bridges, Causeways, Roads, etc.
- Canals, Levees, Salinity Structures, etc.
- Marina Siting
- Port Development and Operations
- Power Plant Siting
- Industrial Discharges and Operations
- Mining Discharges and Reclamation
- Urban Development and Public Works

Authority

- \* Regulation/Enforcement
- o Review/Advisory
- + Planning/Policy Development
- Research/Education

REGIONAL AGENCIES		SWFWMD	TBRPC	TPA	WCRSA	MPO
ACTIVITY						
<u>RESOURCE UTILIZATION</u>						
- Boating and Navigation		*	+	+	*	
- Commercial and Recreational Fishing		+	o	o		
- Public Access to Shoreline		+	o	o		
<u>RESOURCE MANAGEMENT</u>						
- Habitat Management		+	+	+	*	
- Fish and Wildlife Management		o	o	o		
- Shoreline Parks and Marine Preserves		+	o	o		
- Protection of Water Quality		+	o	o		
- Protection of Water Quantity		*	-	+		
- Soil Conservation and Erosion Control		o	o	o		
- Pest and Aquatic Weed Control		*	o			
- Hazardous Waste Disposal		o	o	o		
- Protection of Air Quality		o	o	o		
<u>RESOURCE DEVELOPMENT</u>						
- Dredge and Fill Activities		*	o	*		
- Docks, Moorings, Bulkheads, Breakwaters		+	+	+		
- Bridges, Causeways, Roads, etc.		o	o	*	+	-
- Canals, Levees, Salinity Structures, etc.		+	o	*	+	
- Marina Siting		o	+	o		
- Port Development and Operations		o	o	*		
- Power Plant Siting		o	o			
- Industrial Discharges and Operations		*	o	o		
- Mining Discharges and Reclamation		o	o	o		
- Urban Development and Public Works		*	*	o		

Authority

- \* - Regulation/Enforcement
- o - Review/Advisory
- + - Planning/Policy Development
- - Research/Education

Agency

- SWFWMD = Southwest Florida Water Management District
- TBRPC = Tampa Bay Regional Planning Council
- TPA = Tampa Port Authority
- WCRSA = West Coast Regional Water Supply Authority
- MPO = Metropolitan Planning Organizations

HILLSBOROUGH COUNTY

ACTIVITY	BOCC	EPC	DDC	CCPC	PARKS & REC.	MEAWC	HEALTH	W&W UTIL.	SSWCD	SHERIFF	HCC
<u>RESOURCE UTILIZATION</u>											
- Boating and Navigation	*				+					*	-
	+				+						
- Commercial and Recreational Fishing	*	o		o	*					*	-
	+			+	+						
- Public Access to Shoreline	*	o		o	*					*	-
	+			+	+						
<u>RESOURCE MANAGEMENT</u>											
- Habitat Management	*	*		o	*					-	-
	+	+		+	+						
- Fish and Wildlife Management	*	*		o	*					-	-
	+	+		+	+						
- Shoreline Parks and Marine Preserves	*	o		o						-	-
	+			+							
- Protection of Water Quality	*	*		o				*	+	-	-
	+	+		+				+	-		
- Protection of Water Quantity	*	*		o				-	*	-	-
	+	+		+				-	*		
- Soil Conservation and Erosion Control	*	*		o				-	+	*	-
	+	+		+				-	+	*	
- Pest and Aquatic Weed Control	*	o		o	*					-	-
	+			+	*						
- Hazardous Waste Disposal	*	*		o						-	-
	+	+		+							
- Protection of Air Quality	*	*		o			*			-	-
	+	+		+			*				
<u>RESOURCE DEVELOPMENT</u>											
- Dredge and Fill Activities	*	*	o	o						-	-
	+	+	+	+							
- Docks, Moorings, Bulkheads, Breakwaters	*	*	o	o						-	-
	+										
- Bridges, Causeways, Roads, etc.	*	*	o	o						-	-
	+	+	+	+							
- Canals, Levees, Salinity Structures, etc.	*	*	o	o						-	-
	+	+	+	+							
- Marina Siting	*	o	o	o						-	-
	+	+	+	+							
- Port Development and Operations	*	o	o	o						-	-
	+	+	+	+							
- Power Plant Siting	*	o	o	o						-	-
	+	+	+	+							
- Industrial Discharges and Operations	*	*	o	o						-	-
	+	+									
- Mining Discharges and Reclamation	*	*	*	o						-	-
	+	+	+	+							
- Urban Development and Public Works	*	*	o	o			o		+	-	-
	+	+	+	+			o		+		

Authority

- \* Regulation/Enforcement
- o Review/Advisory
- + Planning/Policy Development
- Research/Education

Agency

- BOCC = Board of County Commissioners
- EPC = Environmental Protection Commission
- DDC = Department of Development Coordination
- CCPC = City-County Planning Commission
- MEAWC = Mosquito and Aquatic Weed Control
- W&W UTIL = Water and Wastewater Utilities
- SSWCD = Soil and Water Conservation District
- HCC = Hillsborough Community College

## MANATEE COUNTY

ACTIVITY	BOCC	DPC	DLN&NR	PLANNING & DEV.	MPA	NAVIGATION DIST.	MCD	PARKS & REC.	HEALTH	PUBLIC UTIL.	SEWCD	SHERIFF
<u>RESOURCE UTILIZATION</u>												
- Boating and Navigation	*	o	o	*	*	*						*
	+	-	-	+	+	+						
- Commercial and Recreational Fishing	*	o	o									*
	+	-	-									
- Public Access to Shoreline	*	o	o									*
	+	+	+									
<u>RESOURCE MANAGEMENT</u>												
- Habitat Management	*	*	o	o								
	+	+	-	+								
- Fish and Wildlife Management	*	*	o	o								
	+	+	-	+								
- Shoreline Parks and Marine Preserves	*	o	o	o								
	+	-	-	+								
- Protection of Water Quality	*	*	*	o								*
	+	+	+	+								+
- Protection of Water Quantity	*	o	*	o								*
	+	+	+	+								+
- Soil Conservation and Erosion Control	*	*	+	o								+
	+	+	-	+								
- Pest and Aquatic Weed Control	*	o	-	o				*				
	+	-	-	+				+				
- Hazardous Waste Disposal	*	*	o	o								
	+	+	-	+								
- Protection of Air Quality	*	*	o	o								
	+	+	-	+								
<u>RESOURCE DEVELOPMENT</u>												
- Dredge and Fill Activities	*	*	o	o	o	o						
	+	+	-	+	+	+						
- Docks, Moorings, Bulkheads, Breakwaters	*	*	o	o	o	o						
	+	-	+	+	+	+						
- Bridges, Causeways, Roads, etc.	*	*	o	o	o	o						
	+	-	+	+	+	+						
- Canals, Levees, Salinity Structures, etc.	*	*	o	o		o						
	+	-	+	+		+						
- Marina Siting	*	o	o	o	o	o						
	+	-	+	+	+	+						
- Port Development and Operations	*	o	-	o	*	o						
	+	-	-	+	+	+						
- Power Plant Siting	*	*	o	o	o							
	+	+	-	+	+							
- Industrial Discharges and Operations	*	*	o	-	o							
	+	+	-	-	o							
- Mining Discharges and Reclamation	*	*	*	o	-	o						
	+	+	+	-	o							
- Urban Development and Public Works	*	*	o	-	o							
	+	+	-	-	o							

## Agency

BOCC = Board of County Commissioners  
 DPC = Department of Pollution Control  
 DLN&NR = Department of Land and Natural Resources  
 MPA = Manatee Port Authority  
 MCD = Mosquito Control District  
 SEWCD = Soil and Water Conservation District

## Authority

\* Regulation/Enforcement  
 o Review/Advisory  
 + Planning/Policy Development  
 - Research/Education

## PINELLAS COUNTY

ACTIVITY	BOCC	DEM	WENCA	PLANNING	MCAIR	PARKS	HEALTH	SEWER	ENG. & PUBLIC WORKS	SWCD	SHERIFF	SPJC
<u>RESOURCE UTILIZATION</u>												
- Boating and Navigation	*	*	o								*	-
- Commercial and Recreational Fishing	*	+				*					*	-
- Public Access to Shoreline	*	o	*	o	o	*					*	-
<u>RESOURCE MANAGEMENT</u>												
- Habitat Management	*	*	o	*	*							-
- Fish and Wildlife Management	*	*	o		*							-
- Shoreline Parks and Marine Preserves	*	o	o		*							-
- Protection of Water Quality	*	*	o		o		*					-
- Protection of Water Quantity	*	*	*	o								-
- Soil Conservation and Erosion Control	*	*	o							*		-
- Pest and Aquatic Weed Control	*	o		*								-
- Hazardous Waste Disposal	*	*	o									-
- Protection of Air Quality	*	*	o		o							-
<u>RESOURCE DEVELOPMENT</u>												
- Dredge and Fill Activities	*	*	*	o			*					-
- Docks, Moorings, Bulkheads, Breakwaters	*	*	*	o			*					-
- Bridges, Causeways, Roads, etc.	*	*	*	o			*					-
- Canals, Levees, Salinity Structures, etc.	*	*	*	o			*					-
- Marina Siting	*	o	*	o								-
- Port Development and Operations	*	o	*	o								-
- Power Plant Siting	*	o	o	o								-
- Industrial Discharges and Operations	*	*	o									-
- Mining Discharges and Reclamation	*	o	o									-
- Urban Development and Public Works	*	*	o	o			o	*				-

Authority

- \* Regulation/Enforcement
- o Review/Advisory
- + Planning/Policy Development
- Research/Education

Agency

- BOCC = Board of County Commissioners
- DEM = Department of Environmental Management
- WENCA = Water and Navigation-Control Authority
- MCAIR = Mosquito Control and Artificial Reef
- SWCD = Soil and Water Conservation District
- SPJC = St. Petersburg Junior College

## CITY OF TAMPA

ACTIVITY	URBAN ENVIRON. COORD.	PARKS	PUBLIC WORKS	SANITARY SEWER	POLICE	UNIV. OF TAMPA
<b>RESOURCE UTILIZATION</b>						
- Boating and Navigation					*	-
- Commercial and Recreational Fishing		*			*	-
- Public Access to Shoreline	o	*			*	-
<b>RESOURCE MANAGEMENT</b>						
- Habitat Management		*				-
- Fish and Wildlife Management		*				-
- Shoreline Parks and Marine Preserves	o	*				-
- Protection of Water Quality	o	*		*		-
- Protection of Water Quantity	o	*				-
- Soil Conservation and Erosion Control	o					-
- Pest and Aquatic Weed Control	o					-
- Hazardous Waste Disposal	o					-
- Protection of Air Quality	o					-
<b>RESOURCE DEVELOPMENT</b>						
- Dredge and Fill Activities	o					-
- Docks, Moorings, Bulkheads, Breakwaters	o					-
- Bridges, Causeways, Roads, etc.	o					-
- Canals, Levees, Salinity Structures, etc.	o					-
- Marina Siting	o					-
- Port Development and Operations	o					-
- Power Plant Siting	o					-
- Industrial Discharges and Operations	o		*			-
- Mining Discharges and Reclamation	o					-
- Urban Development and Public Works	o	*	*			-

Authority

- \* Regulation/Enforcement
- o Review/Advisory
- + Planning/Policy Development
- Research/Education

**CITY OF ST. PETERSBURG**

ACTIVITY	CITY OF ST. PETERSBURG							
	POLLUTION CONTROL	PLANNING	URBAN REDEVELOPMENT	PORT AUTHORITY	LEISURE SERVICES	PAINT	ENGINEERING	POLICE
<u>RESOURCE UTILIZATION</u>								
- Boating and Navigation								
	o							*
	+							-
- Commercial and Recreational Fishing								
					*		*	-
- Public Access to Shoreline								
	o		*					*
	+		+					-
<u>RESOURCE MANAGEMENT</u>								
- Habitat Management								
	o	o		*				-
	+			+				
- Fish and Wildlife Management								
	o			*				-
	+			+				
- Shoreline Parks and Marine Preserves								
	o			*				-
	+			+				
- Protection of Water Quality								
	*			*				-
	+	o		+				
	-	+		-				
- Protection of Water Quantity								
	o			*				-
	+			+				
- Soil Conservation and Erosion Control								
	o	o						-
	+	+						
- Pest and Aquatic Weed Control								
	o	o						-
	+	+						
- Hazardous Waste Disposal								
	*	o						-
	+	+						
- Protection of Air Quality								
	*							-
	+	o						
	-	+						
<u>RESOURCE DEVELOPMENT</u>								
- Dredge and Fill Activities								
	o	o				o		-
	+	+						
- Docks, Moorings, Bulkheads, Breakwaters								
	o					o		-
	+							
- Bridges, Causeways, Roads, etc.								
	o					o		-
	+							
- Canals, Levees, Salinity Structures, etc.								
	o					o		-
	+							
- Marina Siting								
	o							-
	+							
- Port Development and Operations								
	o		o					-
	+		+					
- Power Plant Siting								
	o							-
	+							
- Industrial Discharges and Operations								
	o					*		-
	+					+		
- Mining Discharges and Reclamation								
	o							-
	+							
- Urban Development and Public Works								
	o	o		*	o			-
	+	+		+	+			

## Authority

- \* Regulation/Enforcement
- o Review/Advisory
- + Planning/Policy Development
- Research/Education

PUWT = Public Utilities and Wastewater Treatment

APPENDIX-C

TAMPA BAY MANAGEMENT STUDY COMMISSION

The Honorable Jeanne Malchon, Chair  
Florida State Senate  
424 Central Avenue  
St. Petersburg, FL 33701  
(813) 823-2264

The Honorable Mary Figg, Vice-Chair  
Florida House of Representatives  
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Pinellas Suncoast Chamber of Commerce  
Hampstead Center  
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League of Women Voters  
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St. Petersburg, FL 33705  
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Mr. Robert C. Harnly  
St. Petersburg Power Squadron  
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St. Petersburg, FL 33703  
(813) 527-4598

Mayor Robert E. Hunt  
City of Palmetto  
516 Eighth Avenue  
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Mr. Robin Lewis  
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Tampa, FL 33684  
(813) 875-3614

Mr. David Maltby  
Florida Land Design &  
Engineering, Inc.  
308 South Boulevard  
Tampa, FL 33606  
(813) 253-2183

Mr. Richard Mussett  
Director of Planning  
City of St. Petersburg  
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St. Petersburg, FL 33701  
(813) 893-7153

Mr. Richard T. Paul  
Manager, Tampa Bay Sanctuaries  
National Audubon Society  
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Ms. Gloria Rains  
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Mr. Robert S. Richards  
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Ms. Sally Thompson  
Chairperson Hillsborough Environmental Coalition  
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Tampa, FL 33601  
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Mr. Rick Wilkins  
Environmental Protection Commission  
Hillsborough County  
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Tampa, FL 33601  
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**TAMPA BAY MANAGEMENT STUDY COMMISSION  
SUBCOMMITTEE ASSIGNMENTS**

**Objectives/Policies Subcommittee**

1. Senator Jeanne Malchon
2. Representative Mary Figg - Chairman
3. Bruce Belrose
4. Jake Stowers
5. Dr. William Fehring
6. Dr. Ernest Estevez
7. Beth Frierson
8. Richard Wilkins

**Planning/Management Subcommittee**

1. Bruce Belrose - Chairman
2. Beth Frierson
3. Richard Wilkins
4. Gloria Rains
5. Richard Mussett
6. Robert Harnly
7. David Maltby
8. Mayor Robert Hunt
9. Sally Thompson

**Science/Engineering Subcommittee**

1. Jake Stowers - Chairman
2. Dr. Ernie Estevez
3. Dr. Kent Fanning
4. Spence Autry
5. Robin Lewis
6. Richard Eckenrod
7. Dr. William Fehring
8. Richard Paul
9. Robert S. Richards

TAMPA BAY MANAGEMENT STUDY COMMISSION  
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U.S. Army Corps of Engineers  
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Marine Fisheries Commission  
University of South Florida  
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Mr. Norman Fedder  
Department of Transportation  
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## Position Statement

## Draft Tampa Bay 205(j) Water Quality Impact Study

In 1972 the Florida State Legislature passed what was known as the Wilson-Grizzle Bill (Section 403.086(1)(b), Florida Statutes). This bill stipulated that no domestic wastewater disposal facility constructed after 1972 could discharge any waste into Old Tampa Bay, Tampa Bay, Hillsborough Bay, Boca Ciega Bay, St. Joseph Sound, Clearwater Bay, Sarasota Bay, Little Sarasota Bay, Roberts Bay, Lemon Bay, or Punta Gorda Bay in addition to any bay, bayou or sound "tributary thereto" without providing at least advanced wastewater treatment (AWT). In essence, the area covered by the bill included all saline coastal bodies of water from the Anclote Keys south to Charlotte Harbor.

Advanced wastewater treatment, as defined in the Florida Administrative Code, Chapter 17-6, limited the annual average effluent concentration to 5 milligrams per liter (mg/l) of 5 day biochemical oxygen demand (BOD5) and total suspended solids; 3 mg/l total nitrogen; and 1 mg/l total phosphorus. This requirement was not based on site-specific water quality determinations, but was made in an attempt to reverse what was perceived by many to be deteriorating water quality in the area. No relief mechanism was provided other than a statutory variance.

In 1980 the Legislature modified the Wilson-Grizzle Bill such that the Florida Department of Environmental Regulation (DER) could grant relief for facilities if the applicant initiated a request for such relief and then demonstrated that AWT was not required to protect water quality. The modified Wilson-Grizzle Bill also expanded the "affected area" to include all freshwater tributaries which flow into the original Wilson-Grizzle area. This area was defined hydrologically as the Peace River and Tampa Bay Basins.

Then, in July of 1981, the Legislature repealed the statute requiring AWT for domestic wastewater treatment facilities constructed after 1972. The statute was replaced with a mandate requiring the DER to specify wasteload allocations on a case-by-case basis for domestic point sources. Also required was a survey on the overall impact of existing nonpoint sources discharging into the waters of the original Wilson-Grizzle area.

The purpose of the Tampa Bay 205(j) Water Quality Impact Study was to consider dissolved oxygen and nutrient impacts in the development of wasteload allocations for the various surface water dischargers in the Tampa Bay area. The ultimate uses of this document include long-term wastewater planning (e.g. 201 Facility Planning, Florida Construction Grants Program, N. Pinellas EIS) and permitting.

The Department of Environmental Regulation is to be commended for their effort in developing the Tampa Bay 205(j) Water Quality Impact Study as much has been learned regarding the sources, trends and severity of water

pollution problems in Tampa Bay. At the same time, however, it is recognized that the wasteload allocation process is a very difficult one, especially with regard to nonconservative pollutants such as nutrients.

Since the September 26, 1984, public meeting on the Draft Tampa Bay 205(j) Water Quality Impact Study held at the Tampa Bay Regional Planning Council, members of the Tampa Bay Management Study Commission and Council staff have carefully reviewed this document. Pursuant to Section 4(2) of a special legislative act creating the Tampa Bay Management Study Commission, which states that the Commission "may provide recommendations to the Tampa Bay Regional Planning Council concerning bay management issues which arise during the life of the Commission", the following represents the official position of both the Commission and the Council regarding this important document.

- Conceptually, we support the development of water quality based effluent limits (WQBEL), via the wasteload allocation process, for both the domestic and industrial discharges entering Tampa Bay. Since the repeal of the Wilson-Grizzle Bill in 1981, state law requires that WQBEL be established at levels that maintain the biological integrity of the Bay's aquatic ecosystems. Currently, the recognized best method for developing WQBEL is through the wasteload allocation process, which requires complex hydrological, biological and chemical modeling of the receiving waters under study. There is much to be gained from developing such a model for Tampa Bay, as it could eventually be used to predict both the short and long term effects of many types of management and regulatory decisions. In fact, without the development of such a model it is unlikely that we will ever truly comprehend the intricate workings of a complex estuarine ecosystem like Tampa Bay.
- In light of the extreme growth pressures facing the Tampa Bay region a scientifically defensible and legally enforceable wasteload allocation document will be necessary to protect the vital resources of the bay. Because the total wasteload on both regional and sub-regional sewage treatment facilities in the Tampa Bay area is expected to increase significantly over the next few decades, the careful development of WQBEL for Tampa Bay is of the utmost importance. However, time is of the essence since upper portions of the Tampa Bay estuary already exhibit symptoms of stress indicative of marine eutrophication.
- In its present form, we do not acknowledge the completeness of the Draft Tampa Bay 205(j) Water Quality Impact Study, or its validity as the sole basis for determining effluent discharge limits in Tampa Bay. Careful review of this document has raised many concerns regarding the assumptions, design, methodology and conclusions of the study. To base the determination of critical effluent limits on a model that is not yet satisfactorily calibrated and verified could potentially place the already stressed aquatic ecosystems of Tampa Bay in further jeopardy, and could lead to a perception of regulatory unfairness.
- Until all aspects of the Draft Tampa Bay 205(j) Water Quality Impact Study are amended to be scientifically justifiable from a resource based perspective it is recommended that the Department of Environmental Regulation, duly return to enforcing technology based effluent limits (TBEL), and regulating all domestic wastewater discharges to Tampa Bay

pursuant to Section 403.086(1)(b), Florida Statutes. At a minimum, to protect the biological resources of Tampa Bay, all dischargers should be encouraged, and provided assistance wherever possible, to upgrade treatment facilities so as to provide advanced wastewater treatment as defined by Chapter 17-6, Florida Administrative Code. In addition, alternatives to surface water discharges should be required wherever feasible or necessary.

- During this interim period, the Department of Environmental Regulation should continue to support and expend funds for the expansion and refinement of Draft Tampa Bay 205(j) Water Quality Impact Study. If federal 205(j) grant funds cannot be allocated for this purpose it is suggested that the Department seek a special legislative appropriation to complete the task. To replenish state spending for this purpose an alternative source of funding worthy of consideration would be a special surtax levied on those domestic and industrial dischargers utilizing the receiving waters of Tampa Bay. Based on 1982 effluent flows a surtax of \$3.00 per MGD would generate approximately \$200,000 per year which could be used for further research leading to the development of scientifically defensible WQBEL for Tampa Bay.
- Finally, it is recommended that the findings of this study not be reflected in the regulatory process until such time that the following problems are resolved:

Problem No. 1: VERTICAL DISSOLVED OXYGEN AVERAGING

Under 17-3.111 (10) and 17.3.121 (13), F.A.C., a water quality violation is presumed to occur when dissolved oxygen (D.O.) levels fall below 4 mg/l. There is no mention of vertical averaging. Enforcement of this criteria by DER is stringent and numerous examples of decisions on permit issuances can be cited where only bottom D.O.'s of less than 4 mg/l were used to require permit modifications, or deny a permit. It is inconsistent for one section of DER to apply vertical averaging, and another not to apply it.

The establishment of water quality criteria are largely to protect biological resources. The biological resources of Tampa Bay have been documented (e.g. Santos and Simon, 1980) to be severely impacted by seasonal anoxia, not unlike that reported for Chesapeake Bay (Officer et al 1984). Documentation of this problem goes back to the report of the Federal Water Pollution Control Administration (FWPCA) (1969). If the use of vertically averaged D.O.'s to manage water quality and benthic defaunation problems in Tampa Bay is a valid approach, it should be discussed in reference to appropriate scientific studies as noted above. If the use of vertical averaging is simply for convenience of modeling, and does not correctly predict events resulting in benthic defaunation, it should be clearly noted.

Problem No. 2: WATER QUALITY TARGETS

The rationale for the water quality targets used in the wasteload allocation study is not clearly documented in the DER draft report. Several different chlorophyll-a targets are suggested in the report, while many model runs seem to contradict the assumed relationships

between chlorophyll-a and dissolved oxygen depletion. There is not adequate documentation in the report of the linkage between water quality goals and resource use attainability (e.g., fisheries propagation).

In addition, the recommended chlorophyll-a criterion calculated in Section 8.1.3 is not based upon the same methods presented in Section 5.3, since the former relies upon a minimum D.O. concentration while the latter relies upon a diurnal range of D.O. Further, the use of either D.O. or chlorophyll-a changes to indicate a "significant" water quality impact seems inappropriate, since it is D.O. which is covered by existing water quality standards and is most closely related to resource use needs. Since the chlorophyll-a threshold (7 ug/l) was calculated from a D.O. criterion (0.5 mg/l), it seems incorrect to classify situations which contravene only the chlorophyll-a threshold as "significant" water quality impacts. In short, there are several questions which can be raised about the technical defensibility of the water quality targets adopted for the DER study. Further analyses of water quality targets in terms of the temporal and spatial requirements for resource use attainability are warranted.

#### Problem No. 3: MODEL CALIBRATION/VERIFICATION

One important area that should be addressed by independent local reviews of the DER study is the acceptability of the model calibration/verification results for the intended wasteload allocation analyses. Unfortunately, evaluations of goodness-of-fit for the water quality model are based entirely upon plots of simulated and recorded data at only four stations (two in Hillsborough Bay, one in Old Tampa Bay, and one at Sunshine Skyway) on three different days in July-August 1983. No model results are presented for the other five Bay stations monitored during the 1983 intensive survey. No tabular statistics (e.g., daily means, maximum, minimum) on simulated and recorded concentrations are presented to assist with evaluations of the plots in Figures 6.21 through 6.32. The discussion of the calibration/verification plots in the text provides very little insight into why certain water quality parameters and stations were apparently not simulated very well. For example, the calibration/verification plots indicate that the minimum dissolved oxygen at the Old Tampa Bay monitoring station (Courtney Campbell Causeway) was apparently undersimulated by 2 or 3 mg/l on each of the three survey dates. This is an important consideration because the apparent error is much greater than recommended water quality targets that are used to evaluate future discharges to Old Tampa Bay. Likewise, there are no comparisons of simulated and recorded chlorophyll-a presented for the single Old Tampa Bay station, meaning that there is no evaluation of how well the model simulates this important water quality parameter in Old Tampa Bay. Expanded model testing and the documentation of calibration/verification results would enhance the technical credibility of the wasteload allocation study.

#### Problem No. 4: ANALYSES OF BENTHIC POLLUTION SOURCES

It is apparent from the water quality model projections in the draft DER report that the benthic contribution (i.e., bottom sediment releases) of

oxygen demand, nitrogen, and phosphorus is one of the most important sources of pollution loadings on the Tampa Bay system, if not the dominant source. Although water quality model projections for conditions of no benthic fluxes are unfortunately not presented in the draft report for direct comparison with point and other nonpoint sources, Figures 8.7 and 8.8 provide considerable insight into benthic contributions. These figures summarize the impacts of reducing the assumed wet season benthic flux to the assumed dry season levels. These reductions in the benthic flux increase the minimum dissolved oxygen concentrations throughout Old Tampa Bay and Hillsborough Bay by 1.0 mg/l or more and reduce average chlorophyll-a by 10 ug/l throughout Old Tampa Bay proper. As an indication of the significance of benthic sources, these changes in water quality impacts resulting from a reduction in benthic flux alone are much greater than those projected for the secondary treatment scenario #1 under wet season conditions (i.e., Figures 8.9 and 8.10). The DER wasteload allocation study would be greatly improved by inclusion of the following analyses regarding benthic sources of pollution:

- A. Additional model sensitivity studies should be performed to quantify the significance of benthic sources during the dry and wet seasons. These model runs would involve "shutting off" the benthic fluxes and/or setting them at much lower levels that are typical of other estuaries in the eastern U.S. If it is determined from these model runs that benthic sources are responsible for the majority of the water quality impacts (e.g., more than 50% of the minimum dissolved oxygen and average chlorophyll-a), this suggests the need for further field studies to better define confidence intervals for assumed benthic flux rates. According to Figure 4.8 and Tables 4.13 and 4.14, the assumed benthic flux rates are typically based upon a single observation at seven sites and two observations at two sites, with six of the sites in Hillsborough Bay and only one site in Old Tampa Bay. In light of the attributed significance of pollutant contributions from benthic sources, the available database is rather sparse in comparison with the database used to characterize other pollution sources. In order to better define the existing contributions from benthic sources, it seems advisable to expand the monitoring database before making regulatory decisions about further conformance with water quality goals and required wasteload allocations.
- B. There is no attempt to quantify sediment denitrification rates in the bay. Sediment denitrification has been shown to be an important process affecting the nitrogen cycle in marine sediments. Field measurements should be made to determine representative denitrification rates, and additional model runs should be adjusted accordingly.
- C. There is no attempt to relate benthic contributions of nutrients and oxygen demand to the depth of the sediments studied. Without a knowledge of reactive sediment depth, and thus overall reactive sediment volume, benthic nutrient contributions cannot be adequately assessed. As a result of this lack of information there is no way to estimate how long a time period that excessively reactive sediments have been accumulating in Tampa Bay, or to assess the short and long

term trends in sedimentation and benthic flux rates.

D. If benthic sources are the most significant factor in determining the water quality impacts of future point source discharges, an evaluation of measures to manage this diffuse source is warranted.

E. It appears that sediment nutrient releases were generalized for the entire bay without taking into account the variable sediment types. Generalized sediment maps do exist and should be used.

Problem No. 5: INCOMPLETE MODEL EQUATIONS

The modeling approach excluded convective acceleration terms from the equations of motion. These terms have little effect on the computation of flood and ebb currents, but they have a large effect on computation of residual currents. Residual currents cause long-term water circulation patterns that control the net transport of dissolved and suspended waterborne constituents. It is possible that inclusion of convective acceleration terms could alter computed nutrient and dissolved oxygen budgets. A few key reruns of the model (with these terms included) should be considered to evaluate their impact.

Problem No. 6: HISTORICAL WATER QUALITY ANALYSIS

A good understanding of the normal year-to-year variation in certain parameters and the influence and meteorological events on water quality are necessary if we are to understand the eutrophication process in Tampa Bay, and man's influence on it. Examination of relevant water quality and meteorological data collected over the last several decades is more likely to lead to that understanding than examination of only 1980-81 data as done in the subject study. In addition, it is important to know, for example, if historical trends in chlorophyll-a values are increasing or decreasing, and what these values are. The analysis of Palick (1984) is the kind of synthesis needed to place projected water quality parameter values in perspective with historical values.

Problem No. 7: COMPARISON WITH OTHER ESTAURINE SYSTEMS

Considerable data on nutrients and eutrophication is available (see summary by Boynton et al, 1982) from other estuarine systems. The conclusions and in particular the recommended chlorophyll-a target value should be placed in perspective with the health or lack thereof of these other systems. In addition, the nitrogen cycling concept and the importance of nitrification in macrophyte communities in estuaries is discussed by Kemp et al (1982) in the same volume, and is relevant to the problems of Tampa Bay.

Problem No. 8: SEAGRASS MEADOW MAPPING

Other investigators have mapped the same grassbeds over several time periods and have observed no significant increase in total cover for any grass bed in Tampa Bay during the last 20 years, in contrast to the reported 14% increase in grass bed cover for middle and lower Tampa Bay. These other observations indicate a gradual loss of cover during the

last 20 years for the bay as a whole, including portions of the bay where DER reports an increase.

The cause for these discrepancies arises from both inaccurate mapping and from the use of too small a scale to accurately detect seagrass losses. A review of the literature (including Thompson 1978, Harris et al 1983, and Orth 1983) indicates that seagrass and other submerged vascular plants are typically mapped at a scale of 1:24,000 (1"-2000') or larger. The use of 1:80,000 as the mapping scale, such as in this study, produces inherent problems of accuracy. A simple comparison of the seagrass cover shown for the Piney Point to Beacon Key area on all five trend maps (4.3-4.7) indicates essentially no change between 1940-1983. In fact the seagrass cover has declined by about 70%. The DER was provided a map at the public meeting which was produced from a series made for the Florida Department of Transportation by Mangrove Systems, Inc. It appears that these maps and a 1:10,000 series of Hillsborough County produced by the Tampa Port Authority (both publicly available for review) were not examined by DER consultants or were ignored. In addition to scale and accuracy problems, entire areas of seagrass coverage disappear and reappear when in fact there were present all the time, or showed a gradual decrease in size.

The importance of accurate seagrass mapping lies in the fact that accurate historical maps show that seagrasses existed in deeper water, and that in many of those areas where seagrasses persist, the meadows have narrowed from the bay side (deeper water). This shallowing of the euphotic zone for submerged vascular plants is a classic response well documented in fresh water systems in which decreased light penetration occurs due to increases in turbidity, water color, and phytoplankton (chlorophyll-a) (Sheldon and Boylen 1977, Phillips et al 1978), and points to direct water quality linkage to seagrass losses in the bay, in contrast to the conclusions of the report.

#### Problem No. 9: COMPENSATION POINT FOR SEAGRASSES

The seagrass compensation point for the purposes of this study was assumed to be 1% of the surface irradiance (SI). This value is commonly used for phytoplankton but there is no scientific evidence to support this value for seagrasses.

As far back as Ostenfield (1905) it has been noted that the lower limit of seagrasses and other submerged freshwater and marine angiosperms often corresponds to the secchi depth or 5-18% SI depending on the location (Bachman and Barilotti, 1976; Drew and Jupp, 1976; Hulings, 1979; Spence, 1975; Bulthuis, 1983). Rice et al (1983) in studying the seagrasses in the Indian River noted light intensities of mean blade depth for healthy seagrasses ranged from 12-47% SI, never falling below 10% SI. More importantly, physiological studies, such as Williams and McRoy (1982) have shown that light dependent productivity peaks at approximately 65-70% SI, and that the half-saturation constant (1/2 maximum photosynthesis) ranges around 50% SI. Managing light levels to support healthy seagrass meadows should target this half-saturation value, not a compensation value. Managing seagrasses at the compensation point is like supplying humans with just enough oxygen to sleep and eat but not to work or produce offspring. How long would our

society survive at that level of oxygen? The same can be said for seagrasses receiving only the absolute minimum of light. Seagrasses will only persist at a site over time if they can offset normal vegetative losses through sexual and asexual reproduction, and store excess carbohydrates in times of abundant light (summer) to survive time of less abundant light (winter).

Targeting even a 10% SI level is probably not sufficient to protect seagrasses, and the use of 1% SI is totally unsupported by the scientific literature. An annual mean between 10-50% SI appears to be the most valid value to use for Tampa Bay, until more data is available.

Problem No. 10: EPIPHYTIC AND MACROALGAL STIMULATION BY NUTRIENTS AND COMPETITION WITH SEAGRASSES

Progressive eutrophication can eliminate seagrasses not only because of decreased light penetration due to phytoplankton, but also due to competition from increased epiphytic algae (Sand-Jensen 1977). These possible impacts were totally ignored.

Problem No. 11: PURPOSE OF STUDY

It is not clearly stated whether the study will merely be used as a planning document or whether it is intended as a regulatory or permitting tool. As it stands, since the study does not deal with water quality parameters other than D.O. and nutrients, the study could only legally be used to prohibit a discharge for D.O. and nutrient reasons, but could not be used to decide the issuance of a permit since many other water quality parameters must be examined.

Problem No. 12: OTHER REGULATORY RAMIFICATIONS

The study indicates nonpoint source pollution will result in major violations of water quality, even with the use of current best management practice stormwater controls, however, no solutions are proposed for the control of this excessive nonpoint source pollution. In light of these findings, it is appropriate to consider retrofitting of existing stormwater discharge facilities, which are currently exempt from any regulation, with retention/detention structures pursuant to Chapter 17-25, F.A.C.

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Senator Jeanne Malchon  
Chair  
Tampa Bay Management Study Commission

Councilwoman Saundra L. Rahn  
Chairman  
Tampa Bay Regional Planning Council

CITATIONS

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**-Proposed Mitigation Plan-  
and  
Position Statement**

**Tampa Harbor Alafia River and Big Bend Channel Deepening Project**

In the Draft Feasibility Report and Environmental Impact Statement the Army Corps of Engineers supported and economically justified the deepening of the Tampa Harbor Alafia and Big Bend Channels to a depth of 43 feet (plans 3 and 8). Although the state's response letter of July 9, 1984, expressed general support for the project, it also noted severe objections from various commenting agencies regarding the inadequacy of the proposed mitigation for the project's environmental impacts. At a state interagency workshop held on September 6, 1984, numerous alternative mitigation proposals for this project were discussed. At this meeting it was requested that the Tampa Bay Management Study Commission further review the various proposals and suggest other mitigative options where deemed appropriate. In response to this request the Commission convened in a special subcommittee meeting on November 5, 1984 to develop a recommended mitigation plan for the proposed Alafia-Big Bend Channel Deepening Project.

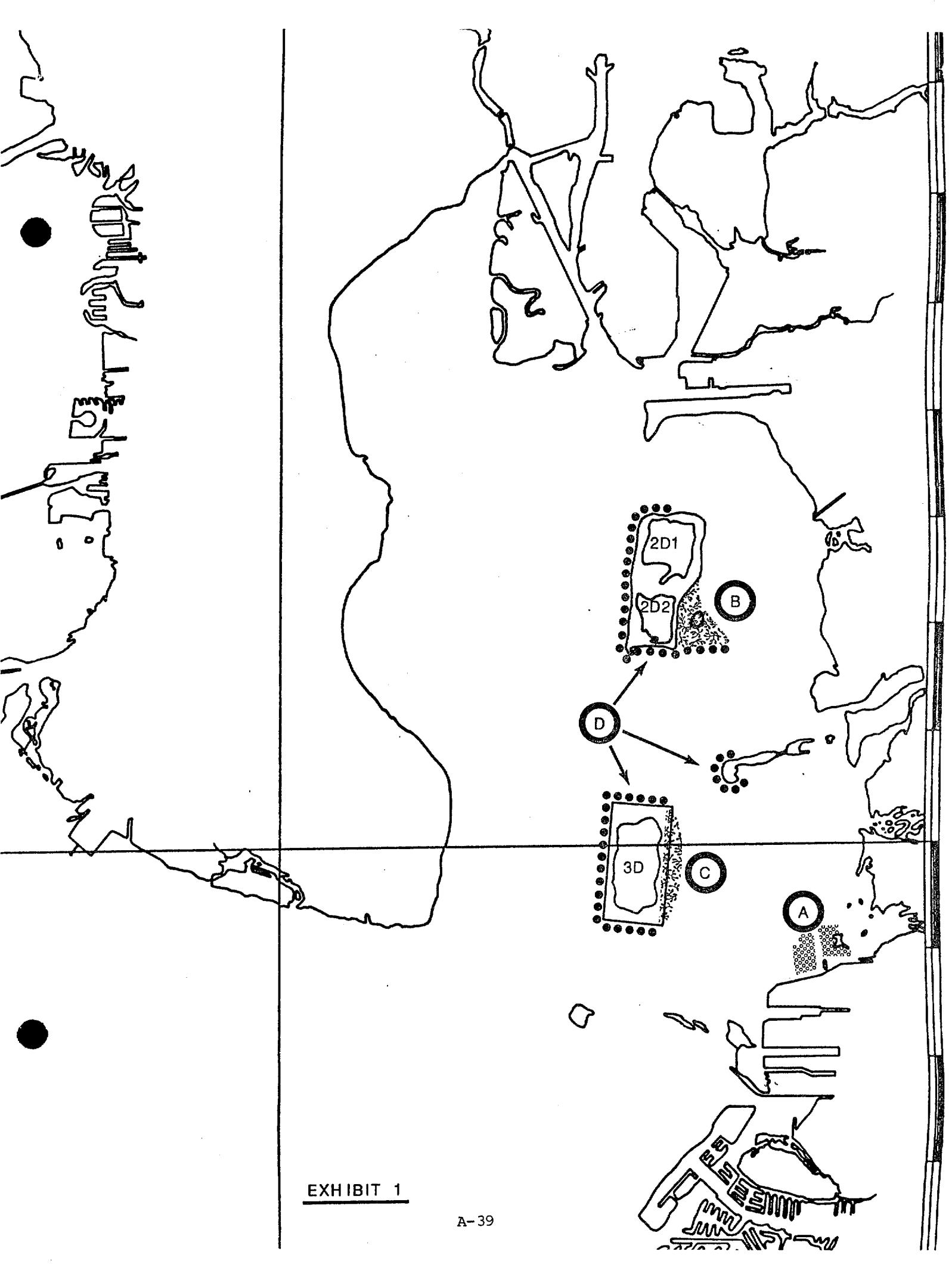
It should be noted that by recommending a mitigation plan for this project the Tampa Bay Management Study Commission does not sanction the authorization of chosen alternative plans 3 and 8. The Commission remains unofficially opposed to plan 8, the Alafia River Channel deepening and turning basin widening, on both environmental and economic grounds. However, it is the position of the Commission that if the project must proceed the mitigative options presented herein represent the most feasible and justifiable alternatives available. It should further be noted that this proposed plan represents mitigation for habitat loss only. There are severe water quality impacts associated with the project which have not, and are not likely to be, addressed under the present regulatory system. For this reason, the submittal of this plan does not in any way establish or imply mitigation policy of the Commission.

The following mitigative options are graphically depicted on attached Exhibit 1.

- A. To mitigate for the modification or destruction of 180 acres of productive bay bottom that will result from the deepening and enlarging of both channels, including 26 acres with depths of 6 feet or less, it is recommended that 40 acres of shallow bay bottom, with depths no deeper than -2.0 NGVD, be created by filling in two historic borrow holes adjacent to Port Redwing. The borrow holes are the source of localized water quality problems, and the filling of them represents a creative alternative to upland spoil disposal. It is suggested that at the detailed planning stage reasonable efforts be made to ensure the grain size compatibility of fill sediments with surrounding sediments.

- B. To insure the successful creation of salt marsh habitat with at least equivalent productivity to the acreage of modified bay bottom, and the 15 acres of established mangrove wetlands that will be lost in the enlarging of the Alafia River turning basin, it is recommended that 22.5 acres of smooth cordgrass (Spartina sp.) marsh be created adjacent to spoil disposal island 2D2, on the east. It is suggested that this area be filled, using generated spoil material, and graded to a final level of +1.0 NGVD. Smooth cordgrass sprigs should be planted on 3 foot centers at a minimum.
- C. To further insure the creation of productive intertidal habitat to mitigate the losses described above it is recommended, that an additional 7.5 acres of smooth cordgrass marsh be similarly created on the eastern fringe of spoil disposal island 3D.
- D. To provide an economically feasible disposal alternative, and to stabilize serious erosion problems on existing spoil disposal islands 2D1, 2D2, 3D and the western tip of Bird Island, it is recommended that the rock material generated in the deepening of the Alafia River Channel be deposited to provide rip-rap erosion protection for these areas. A rock jetty should be created to extend eastward from the southeastern tip of island 2D2 to provide wave energy protection for the created 22.5 acre salt marsh. Rip-rap protection should extend along the southern, western and northern sides of both islands 2D and 3D, and along western face of Bird Island. The design of this latter breakwater should be coordinated with the National Audubon Society during the detailed planning stages.
- E. To further insure the safety of the endangered Florida manatee, all practicable efforts should be made to limit the blasting that is to occur during the excavation of the Alafia River Channel between the months of April and October.
- F. Finally, it is recommended that further research on the impacts of upland spoil disposal, and the breaching of the confining layer during the deepening of the Alafia River Channel, on the local aquifers be performed in conjunction with the U.S. Geologic Survey and the Southwest Florida Water Management District. Studies should focus on the impacts of these actions under future projected consumptive use demands in the project area.

Attachment (Exhibit 1)



Tampa Bay Management Study Commission  
Senator Jeanne Malchon, Chair  
Representative Mary Figg, Vice-Chair

Mr. A. S. Autry	Mr. Roy R. Lewis
Mr. Bruce Belrose	Mr. David Maltby
Mr. Richard Eckenrod	Mr. Richard Mussett
Dr. Ernest Estevez	Mr. Richard T. Paul
Dr. Kent Fanning	Ms. Gloria Rains
Dr. William Fehring	Mr. Robert S. Richards
Ms. Beth Frierson	Mr. Jacob Stowers
Mr. Robert Harnly	Ms. Sally Thompson
Mayor Robert E. Hunt	Mr. Richard Wilkins

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