

Strengthening Connections to the Water

INTRODUCTION

Pinellas County is located on a peninsula, surrounded on three sides by water. Because of this location, Pinellas County has a strong connection to the water. Decades of development have led to environmental degradation within the County, especially to the surrounding waterways. With the Comprehensive Plan, Pinellas County has committed to be a leader in the protection and restoration of the waters in the County, including the dependent habitats and resources which are essential to this County's character, economy and quality of life.

Both residents and tourists rely upon the water for many things. Tourists come to Pinellas County to enjoy the beaches, fishing, boating, nature-watching, and other amenities that the County's waters have to offer. Residents depend upon the water for their quality of life. The waters of the County offer countless recreational opportunities for residents and bring a great deal of value to their everyday lives. Residents also depend upon the financial impact that tourism brings to the County, much of which is generated because of the quality of the surrounding waters. Both tourists and residents spend money on fishing charters, boat rentals, waterfront dining, sightseeing, and hotels, and have a fiscal impact in many other ways.

For these reasons, and many others, it is important for the County to protect and restore this vital resource and to strengthen the connections that people have to the water. If development and overuse negatively impact either water quality or access to the water, neither residents nor tourists will want to come to Pinellas County to spend time or permanently settle. The marine and coastal resources of Pinellas County are vital to both the quality of life for residents, and to the health of the local economy which is heavily driven by tourism. The protection and restoration of marine and coastal resources remains a high priority for Pinellas County, as these resources contribute to the diversity of both plant and animal life within and around the County. Below are detailed descriptions of a few of the vital resources connected to the marine environment in Pinellas County, including beaches and dune systems, sea grasses, manatees and sea turtles. For more information regarding water quality and pollution concerns with these resources, see the *Surface Water Management Element* of this Comprehensive Plan. For more information regarding boating trends and impacts on the marine environment, please see the *Coastal Management Element*.



Redington Shores County Beach Access Park

BEACHES AND DUNE SYSTEMS

Beaches and dunes in Pinellas County are some of the area's most valuable natural resources, providing habitat for several different coastal species, storm protection for the upland communities, and public open space for recreation. The beaches are also the foundation for the County's thriving tourism industry.

The earliest permanent settlement in Pinellas County avoided the string of barrier islands along the Gulf Coast. Inaccessible and mosquito-ridden, the islands were bypassed for more suitable home sites on the mainland. A look at these barrier islands today, however, demonstrates that these earlier inconveniences have been overcome, and with dramatic results. Intensively developed and enlarged by creating "new land" dredged from bay bottoms, the County's barrier islands have in most cases been transformed into linear cities and towns with very little undeveloped land remaining.

GEOLOGY

In northern Pinellas County most of the barrier islands rest on a limestone surface. The unconsolidated sediment comprising these islands is five to eight meters thick, overlying the Tampa Formation, a limestone bedrock of Miocene age. The Miocene strata dip to the south; consequently, in southern Pinellas County the barrier islands are underlain by the Hawthorne Formation, which overlies the Tampa Formation. Unconsolidated sediments atop the Hawthorne Formation in southern Pinellas County are much thicker relative to northern parts of the County.

BARRIER ISLAND ORIGINS

The barrier islands located along the Gulf coast of Pinellas County form a string of long, narrow strips of sand separated from the mainland by bays and estuaries varying from less than 30 meters to more than 600 meters in width. These islands are descriptively termed as barriers because they protect the mainland from the direct effects of major storms. Barrier islands are one of the most dynamic landscapes on earth. In fact, until approximately 4,000 to 5,000 years ago the shoreline of Pinellas County was tens to hundreds of kilometers to the west. As the sea level has gradually risen due to the continued retreat of the glaciers, the shoreline has retreated to its current location. One hypothesis advanced by the scientific community is that the barrier islands migrated landward as the sea level rose; in effect following the Pinellas shoreline's eastward retreat. Another explanation of current barrier island formation off Pinellas County is that submarine sand bars become subaerial barriers by upward accretion of sand and other deposits. An example of the later process is the recent formation of Shell Key.



Mullet Key

A third hypothesis to explain barrier island development in northern Pinellas County suggests that the barriers were initially located seaward of their present location and migrated landward as the sea level rose. Eventually the rate of sea level rise decreased and the landward migration of the barriers intercepted a source of Pleistocene sediment associated with an old marine terrace and/or the headland at Indian Rocks. As sea level rise decreased and sediment availability increased, the landward migration of the barriers slowed and stopped when they reached a preexisting topographic high. Once this happened, vertical accumulation of sediments and longshore progradation took part in barrier island development. This model indicates that the barrier islands in northern Pinellas County migrated to their present position 2,000 - 4,000 years ago.

All three hypotheses may account for the formation of Pinellas County's barrier islands. The coast is comprised of a variety of barrier island and inlet morphologies, which may have had multiple origins.

TRENDS IN EROSION AND ACCRETION

Trends in erosion and accretion have been measured in terms of mean high water shoreline changes and volumetric accretion and erosion. According to the Florida Department of Environmental Protection (FDEP) (formerly Florida Department of Natural Resources) Beach Restoration Plan, for the period from 1873 to 1950, the shoreline along most segments of Pinellas County's barrier islands receded. Since 1950, the shoreline has responded less uniformly, with some stretches continuing to recede and others exhibiting accretion, or an advance in the shoreline. In many instances, accretion since 1950 has been primarily attributed to corrective action (e.g., construction of shoreline protection structures and beach renourishment projects). Over this time period, from 1873 to the latter 1970's, erosion on Honeymoon Island, the beaches on the central and southern portions of Clearwater Beach Island, and on the beaches on Sand Key, Treasure Island, Long Key and Mullet Key has been severe. This poses a challenge for those species that depend upon the beaches and dune systems for their survival, such as migratory birds and sea turtles. For more information on the conditions of Pinellas County beaches, see the *Coastal Management Element* of this Comprehensive Plan.

DUNES

Natural dune systems used to extend throughout the length of Pinellas County's barrier islands. However, the primary dunes, which under natural conditions provide sand to the beaches, have been covered or destroyed along much of Pinellas County's barrier islands, and natural primary dunes of significance are found only on Caladesi Island, north Clearwater Beach Island, and portions of Treasure Island, Long Key and Mullet Key. Secondary dune systems can be found only on Caladesi Island and northern Clearwater Beach Island. Artificial dunes have been created on Clearwater Beach Island, on the northern



portion of Sand Key, throughout Treasure Island, on the southern tip of Long Key, and in the Madeira Beach portion of Sand Key. The creation of additional artificial dunes on the barrier islands is planned in the near future.

Please see the *Coastal Management Element* for maps showing the location of Pinellas County's sandy beaches and dunes, respectively.

Intensive development of the Pinellas County barrier islands began at the beginning of the twentieth century. In 1958, the Pinellas County Water and Navigation Control Authority established bulkhead lines to protect and preserve waterways from dredging, pumping or other alterations of the shoreline. Upon the urging of the Pinellas County Board of County Commissioners, the Florida Legislature established an aquatic preserve for Boca Ciega Bay. All remaining sovereign submerged lands in Pinellas County were subsequently added to the aquatic preserve system. These actions limited horizontal dredge and fill development on the barrier islands.

As shoreline development continued to encroach on the natural beach and dune system, the landward migration of the shoreline in certain areas and the occurrence of major storms posed a threat to structures. An effort was made to stabilize the unstable beaches through shoreline engineering. The strategies normally used to stabilize the shoreline include: beach renourishment, groins, jetties, and seawalls.

Much of the erosion and loss of beach in Pinellas County was the result of building upon the dunes and in the active beach zone. This interferes with the natural coastal processes causing the beach in many areas to recede. As the coastline advances, seawalls have been constructed in the active beach zone to protect threatened structures. Exposed seawalls accelerate beach erosion and often result in a steepened offshore beach profile. The steep profile increases storm-wave energy striking the shoreline, exacerbating erosion, and often resulting in the need to reinforce the coastal protection structure.

In more recent times, methods to stabilize the shoreline in Pinellas County have predominately utilized the "soft" engineering approach of beach (re)nourishment. This practice involves dredging sand from the ocean floor and pumping it onto the shoreline to create additional dune and beach areas. It is clear that as a result of past development activities and building practices on the municipal barrier islands, there will be a continual need for beach (re)nourishment. Beach (re)nourishment is expensive and the economic investment needed to maintain the beaches will continue into perpetuity. However, the beaches are one of the County's most valuable natural assets and the foundation for a significant sector of the economy - tourism. The beaches of Pinellas County are also a valuable social asset, providing extensive recreational benefits, as well as a valuable environmental habitat. Without a viable beach and dune system, sea turtles and migratory birds would not find suitable habitat within Pinellas County. Therefore, resource protection and restoration, and beach (re)nourishment activities continue to be the best available option to protect this valuable natural, social and economic asset.

WATER-DEPENDENT DEVELOPMENT

Pinellas County has seen the loss of a number of private marinas in recent years because the waterfront land on which they sit is more profitable as residential development. The loss of these marinas can result in the loss of water access, one of the area's main attractors. Both residents and tourists alike are drawn to Pinellas County because of the water. Boating, fishing, kayaking, canoeing, swimming and windsurfing are all popular recreational activities in Pinellas County and all are dependent upon access to the water. With the housing boom occurring in 2002-2005, many commercial enterprises that were dependent upon the water for their business were redeveloped as residential properties. Pinellas County has begun to research and explore the potential use of land use designations, overlays, and protections for those industries that are dependent upon the water for their survival so that they can remain in business despite pressures to redevelop. For more information on marina conversions, see the *Coastal Management Element*.

WATER AND NAVIGATION CONTROL AUTHORITY

The Water and Navigation Control Authority exercises locational restrictions and site-specific development controls to ensure development is undertaken in a manner that does not compromise the County's goals for protecting coastal and marine habitats and dependent species, including manatees.

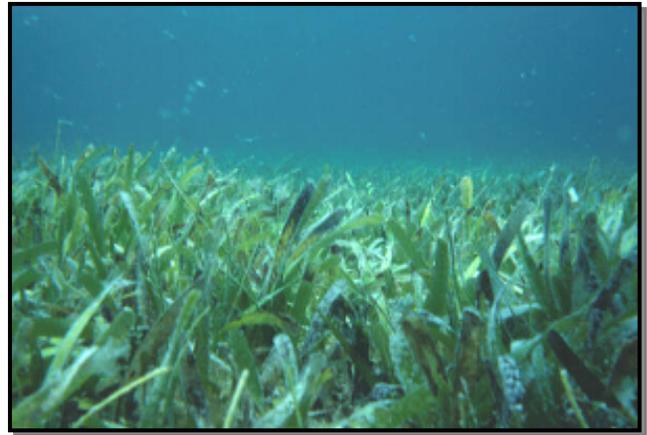
The Water and Navigation Authority (Section 166-241 to -364 of the Pinellas County Land Development Code) was created to protect, through sound management and the judicious issuance of permits, the natural resources of the County. The Water and Navigation Control Authority exercises locational restrictions and site-specific development controls to ensure development is undertaken in a manner that does not compromise the County's goals for protecting coastal and marine habitats and dependent species, including manatees. The Authority regulates all dredge and fill activity, the placement of seawalls, and the construction of commercial and private docking facilities, including boardwalks, in the waters of the County. In order to provide protection for habitats that have a high degree of ecological value, all proposed projects are reviewed for their impact on many natural resources, including wetland areas. The Authority may consider proposals for mitigation in the review of permit applications. The replacement requirements for legally impacted wetlands are based on square footage. At a minimum, one acre (or portion thereof) is required to be created for each acre that is adversely impacted. Each acre must contain sufficient wetland replants to reestablish the wetland habitat with 85 percent coverage within three years. The Authority's jurisdiction is Countywide in most cases, but the Authority does solicit municipal comments before applications for development are heard.

MARINE RESOURCES

SEAGRASSES

Seagrass meadows are an important link in the overall health of the marine resources of the County. The clarity of the Gulf of Mexico and Tampa Bay waters is one of the limiting factors for seagrass meadows because of their need for high light intensity. Water clarity is directly related to the ability of wetlands and stormwater treatment areas to filter out sediments and nutrients from runoff. The sediments and nutrients, which lead to excess algae production, reduce clarity and depth of sunlight penetration, thus limiting the depth to which seagrasses can grow.

Seagrasses are submerged flowering aquatic plants with true root systems and stems that live in marine and estuarine waters. Although they are vascular plants, seagrasses grow in underwater beds that resemble terrestrial meadows or grasslands. Seagrasses require high light intensities, as well as quiet coastal waters and estuaries. This places seagrass directly in the path of development and recreational use of coastal water. Seagrass loss is due mostly to filling of submerged areas



and to the reduction of water clarity. The historic trend of seagrass acreage decline in Tampa Bay seems to have reversed. Monitoring results indicate that water quality has generally improved in Tampa Bay since 1984. Improvement in water clarity is believed to be the primary reason for an increase of almost 4,000 acres of seagrasses in the Bay between 1982 and 1992. Since 1998, surveys have recorded an additional 2,000 acres of seagrasses in Tampa Bay. While there has been an overall increase, some portions of Tampa Bay, specifically the western portion of Old Tampa Bay, have continued to see a decrease in the coverage of seagrasses. Additional studies are required to explain this decline. The majority of the 2,000 acre increase has been located within Boca Ciega Bay. The most recent aerial surveys assess changes from 2002-2004 and show a slower, but continued recovery of 946 acres of seagrasses, or about four percent. Historically, the area of Tampa Bay extending from the Howard Frankland Bridge to Allen's Creek, known as Old Tampa Bay, contained extensive seagrass beds. However, development and recreational activities have had a particularly strong impact on this area and Old Tampa Bay was the only segment to see decreases in seagrass bed cover, with a documented loss of 636 acres, or 12 percent during this same two-year period. **Figure 24** shows the location of significant seagrass beds in the waters surrounding Pinellas County. Five of the seven known species of seagrasses native to Florida waters are found in the marine environment of Pinellas County. These include turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), widgeon grass (*Ruppia maritima*), and star grass (*Halophila engelmannii*). The dominant species are turtle and shoal grasses.

Seagrass plays a key role in the coastal marine community. It provides food and shelter for many of Florida's invertebrate population, and many species depend on seagrass meadows as

a nursery for juveniles. Areas of mixed grasses and algae are known to contain many times the number of living organisms as unvegetated sandy areas. These same meadows are known to support eight different species of game fish as juveniles. Seagrasses also help protect the shoreline by binding shallow coastline sediments and decreasing erosion by their physical interference with currents. Manatees are known to feed on seagrasses, particularly those growing in soft unconsolidated sediments. Seagrasses, at one time or another, have provided food and shelter to virtually every living species of sea life in the Tampa Bay area. Large numbers of birds (particularly wading birds) are known to frequent seagrass beds and make use of them as foraging grounds for food, while predators of all types also find seagrass beds an abundant food source.

Seagrasses also play a vital role in the marine environment of Pinellas County. A great deal of the future of marine fishing, both commercial and recreational, depends upon the existence of this coastal resource. Pinellas County currently has designated a number of protection zones for seagrass beds and has adopted associated protection measures and regulations to protect this natural resource. Seagrass Caution Areas are in place to alert boaters of the presence of seagrasses and the need to exercise caution in these areas. Combustion Motor Exclusion Zones are areas where combustion motors are not allowed in order to protect the seagrasses from propeller damage. The current seagrass protection areas are located in southern Pinellas County in the Shell Key Preserve, in areas around Fort De Soto, around Caladesi and Honeymoon Islands, and in the area surrounding the Weedon Island Preserve, as shown in **Figure 24**.

Seagrass Monitoring

In 1998, the Water Resources Monitoring Section (WRMS) of the Pinellas County Department of Environmental Management began monitoring seagrasses. WRMS staff monitor 11 permanent seagrass transects in Boca Ciega Bay and 14 permanent transects in waters on the western side of Pinellas County from Madeira Beach north to Tarpon Springs. Data collected include observations of water depth, percentage of seagrass cover, short shoot density, and relative epiphytic loading, as well as water quality samples for chlorophyll A, turbidity, and other water clarity indicators.

The seagrass program is designed to provide a cost-effective and technically defensible measurement of areal seagrass extent in the estuaries and their subregions, seagrass zonation in relation to depth, and changes in seagrass growth, zonation and distribution over time. The program was also designed to characterize the general health and condition of seagrass meadows in the Bay. In addition to Pinellas County, program participants include the City of Tampa Bay Study Group, the Environmental Protection Commission of Hillsborough County, Manatee County, and the Fish and Wildlife Research Institute of the Florida Fish and Wildlife Conservation Commission.

FIGURE 24
SIGNIFICANT SEAGRASS BEDS IN PINELLAS COUNTY

FIGURE 25
SEAGRASS PROTECTION AREAS

MANATEES

The coastal waters of west central Florida provide an important year-round home to *Trichechus manatus latirostris*, the West Indian (Florida) Manatee. There are several dozen manatees within Tampa Bay waters during the summer, but well over 300 during the winter months, evidencing the fact that manatees can travel long distances to reach warmer waters in the winter.

The number of manatees statewide appears to be holding steady or increasing slightly. In fact, record numbers of manatees were counted in Tampa Bay, Blue Spring and Brevard County during the 2007 annual synoptic survey conducted January 30 through February 1. Even so, manatees currently remain a protected species under the Federal Endangered Species Act. Unfortunately, manatee mortality throughout Florida remains a concern, with loss of habitat and injury by motorized watercraft being common threats. Therefore, managing the human-manatee interaction so that this docile inhabitant of Pinellas County waters can remain a part of the local culture and environment is important.



Location and Movement of Manatees in Pinellas County Waters

Habitat Preferences and Requirements

The West Indian (Florida) Manatee lives in freshwater, brackish water and the marine environment, moving easily between salinity regimes. Along the coast, manatees are generally found feeding in water depths of three to seven feet, but they remain close to deeper waters. They generally travel along the coastline in waters ranging from 10 to 16 feet in depth.

Manatees cannot endure temperatures below 66°F (19°C) for extended periods of time and will seek refuge in warmer waters. In the winter months, manatees congregate in larger groups near warm water canals, natural springs and outfalls, the latter often associated with local power plants. During the summer months, manatees may be found in small groups dispersed throughout nearshore waters, inlets and bays.

Manatees generally feed among seagrass beds, although they also enjoy marsh grasses, mangrove leaves, algae, hydrilla and water hyacinths. Pinellas County has significant seagrass beds, as depicted in **Figure 24**. Access to fresh drinking water is critical, and includes natural springs as well as stormwater outfalls. When calving, manatees seek out quiet, protected locations.

Sites of Preferred Use and Aggregation in Pinellas County Waters

In 1992, the Pinellas County Manatee Watch Line telephone line was first activated to collect information from the public on manatee sightings in Pinellas County waters. This data helps to track and document how manatees are using County waters. During winter months, November through March, manatees tend to congregate in warm water refuges. In summer months

manatees are more generally distributed along the coastline. **Figure 26** depicts areas of manatee concentration in Pinellas County waters.

A variety of data is available from the Florida Fish and Wildlife Conservation Commission's (FFWCC) Fish and Wildlife Research Institute (FWRI) aerial survey program on most of the Pinellas County shoreline, the exception being the Gulf coast north of The Narrows at Indian Shores. These data confirm that manatees congregate frequently in the seagrass beds in Pinellas County waters. FWRI also monitors manatee use patterns through radiotelemetry, where manatees are tagged with a tracking device that can map the movement of each tagged animal.



Seagrass beds provide important manatee habitat

Known freshwater outfalls, and other frequent sites of aggregation by manatees, are described further in the discussion of manatee habitat.

Manatee Travel and Seasonal Movement in Pinellas County

Manatee travel corridors are difficult to track, as they are based on radiotelemetry data associated with individual manatees. However, known travel patterns include the seasonal pattern of manatee migration in Tampa Bay and Pinellas County, reflective of seasonal temperature changes as previously described. Not all travel is associated with temperature changes, and manatees are also known to travel great distances to feed, get a drink of freshwater or to escape human harassment. It can be concluded from manatee sighting data and radiotelemetry records, however, that the Intracoastal Waterway represents an active travel corridor. In addition, it is obvious that the manatee aggregation sites represent destinations, and the entire coastline provides the corridor to travel from site to site.

Manatee Habitat in Pinellas County

The Pinellas County Department of Environmental Management has identified several important manatee habitat locations, following the initiation of its detailed data collection and analysis effort in 1992. Much of the data regarding these habitats has been collected through the Manatee Watch Line, and is therefore limited by the fact that it only reflects sightings reported by the public. What appears clear, though, is that most of the areas with heavy use by manatees are in areas where the potential for human interaction is high. Important manatee habitats in Pinellas County are depicted in **Figure 27** and are described below. For more information on the relationship between boating and manatees, see the *Coastal Management Element* of this Comprehensive Plan.

- **Coffee Pot Bayou** – Located in east St. Petersburg, this location is typified by freshwater springs, which manatees primarily use for drinking water.
- **Fort DeSoto Park/Tierra Verde** – The expansive seagrass beds provide prime feeding areas.

- **Spring Bayou/Whitcomb Bayou** – Located in Tarpon Springs, these bayous have freshwater springs that provide drinking water and warm water refuge during the winter.
- **McKay Creek** – Located in west Largo, this freshwater creek discharge provides drinking water. There are also seagrass beds located in the vicinity.
- **Boca Ciega Bay** – Portions of the bay have seagrass beds for feeding.

Several of these locations that have been identified as heavy manatee use areas also have boating restrictions in place. The City of St. Petersburg has designated Coffee Pot Bayou as an “Idle Speed, No Wake” zone. The City of Tarpon Springs has designated Spring and Whitcomb Bayous as “Idle Speed, No Wake” from November 15th through March 31st. Pinellas County also has various boating restrictions discussed later in the ‘Regulations and Enforcement Activities Supporting Manatee Protection’ section.



Coffee Pot Bayou

Manatee Mortality in Pinellas County

The Marine Mammal Pathobiology Laboratory at FWRI conducts necropsies on manatee carcasses brought in from all over the State. Their findings indicate that perinatal and other natural factors, in combination, are the leading cause of manatee deaths in Tampa Bay waters. Watercraft collision is the second leading known cause of death in Pinellas County waters. While propeller strikes used to account for the majority of boat-related deaths, recent data indicates that hull impacts actually occur more often. Between the years of 1998 and 2006, boats accounted for an average of 2.3 deaths annually in Pinellas County waters. In addition to the obvious impacts of watercraft, manatees also suffer from habitat loss, including hardening of shorelines, water quality degradation and impacts on feeding areas, as well as from physical impacts such as entanglement/involvement in crab traps, fishing line, and water control structures (Manatee Protection Strategies Task Force, 1998). For more information on manatee mortality, see the *Coastal Management Element*.

Programs and Actions to Protect Coastal Habitats and Dependent Species In Pinellas County

The Florida Manatee Recovery Team, an interagency group of manatee experts, developed a Florida Manatee Recovery Plan that was approved by the United States Fish and Wildlife Service (FWS) in 1989. In October 1989, the Florida Governor and Cabinet directed 13 “key” counties to develop Manatee Protection Plans based on mortality levels. Pinellas County, however, was not among the counties required to adopt a Manatee Protection Plan.

In March of 2002, the Florida Legislature amended Florida Statute 370.12 (2), the Florida Manatee Sanctuary Act, to require certain counties to develop Manatee Protection Plans. Once again, Pinellas County was not required to adopt a Plan.

FIGURE 26
AREAS OF MANATEE CONCENTRATION IN PINELLAS COUNTY

FIGURE 27
IMPORTANT MANATEE HABITATS IN PINELLAS COUNTY (WHOLE COUNTY)

FIGURE 28
IMPORTANT MANATEE HABITATS IN PINELLAS COUNTY (A)

FIGURE 29
IMPORTANT MANATEE HABITATS IN PINELLAS COUNTY (B)

FIGURE 30
IMPORTANT MANATEE HABITATS IN PINELLAS COUNTY (C)

FIGURE 31
IMPORTANT MANATEE HABITATS IN PINELLAS COUNTY (D)

Although the Board of County Commissioners has not been required to adopt a formal Manatee Protection Plan, the County has a long record of taking actions, and adopting policies and regulations, that serve to protect the County's coastal resources and dependent species, including manatees. When these actions, policies, regulations and programs are considered in their totality, they complement and help to achieve the purpose of State-mandated Manatee Protection Plans.

Due to the pace of development in Pinellas County, the Board of County Commissioners and residents began as early as the 1960s to recognize that unless the protection of the County's living resources was seriously addressed, much of what made the County a desirable place for residents and visitors could be forever lost. The following discussion provides an overview of the measures implemented since then, including those specifically directed at manatee protection, by Pinellas County, since the 1970s. Also addressed are activities that the County participated in, or enabled, which resulted in the protection of marine and aquatic habitat.

Potential Overlap between Manatee Use Areas and Boat Use Areas

Manatees feed in the numerous seagrass beds throughout the County, which also represent prime fishing spots for anglers. Manatees also travel throughout the County's waters between feeding areas, breeding locations, freshwater outfalls, etc. Therefore, manatees and boaters are constantly sharing the County's waterways. Where the overlap becomes critical is often in shallow waters where seagrass beds are located, and manatees have more trouble avoiding boats. The County's seagrass protection zones help to protect manatees in these prime-feeding areas.

With marinas, boat ramps, docks and boat use located throughout the entire peninsular County, and with the County's waters being a desirable destination for out-of-county boaters, the potential for overlap among boats and manatees exists throughout the County's coastal waters. The protection measures (speed restrictions, manatee-related signage, etc.) in place for the Intracoastal Waterway, for example, are one way that helps address concerns about manatee safety raised by the volume of boats in one of the County's primary waterways. For additional information on boat use in Pinellas County, see the *Coastal Management Element*.

Boating Regulations and Enforcement

Boating regulations that contribute to natural resource protection include such things as speed limits (idle speed no wake, and slow speed minimum wake), as well as combustion motor exclusion zones, no entry zones, and shallow water caution zones. Speed limits are used in the County's seagrass protection areas as well as in the Intracoastal Waterway (ICW). Establishment of the ICW slow speed zones, where high numbers of manatees have been reported through the Manatee Watch Line, is an important part of the County's manatee protection program.



Signage related to idle speed zones, no wakes zones, etc., must be permitted by the Florida Fish and Wildlife Conservation Commission (FWC), pursuant to 370.12, F.S. While many

speed zones were originally established to promote boater safety, they are now being established in many cases specifically to protect manatees, seagrasses or other marine resources. For example, the Coffee Pot Bayou idle speed zone was enacted specifically to protect manatees in that area. Combustion motor exclusion zones are now located around the Gulf Islands GEPark (Caladesi Island, Honeymoon Island, Three Rooker Bar and Anclote Key), Shell Key Preserve, including the Fort DeSoto area, and Weedon Island Preserve. Specific signage is used to designate these important seagrass protection zones as combustion motor exclusion zones, and enforcement in the exclusion zone is most often provided by the Marine and Environmental Land Units of the Pinellas County Sheriff's Office. The Units are specifically trained to deal not only with boating safety, but also with natural resource management and protection. The Marine and Environmental Lands Unit has 15 full time Marine Deputies with four supervisors and 15 patrol vessels stationed throughout the County. Several municipalities also have specially trained officers for marine enforcement, and the FWC Marine Patrol also has enforcement abilities.

In 2000, the Pinellas County Board of County Commissioners adopted Ordinance 00-93, significantly amending Chapter 130 of the Pinellas County Code. The amendments were intended to revise and clarify the County's boating regulations and restrictions. The revised language consolidated certain portions of the Code and established specific regulatory zones to restrict access and/or speeds in certain waters of the County. The intent of the revisions was to both protect the public and to protect the natural resources of the County. The Code provides the criteria for the establishment of the restricted zones, identifies the location of certain zones, and allows for penalties for violating provisions of the Code. The provisions of the Code can be enforced by any law enforcement officer, as well as any authorized County employee. These revisions to the Pinellas Code are significant as they enable a more comprehensive approach to marine regulation enforcement. Chapter 130 was updated again in 2004 to expand certain regulatory zones. The following section discusses each established zone. For more information on boating regulations, see the *Coastal Management Element*.

Land Acquisition and Management

The acquisition of coastal land to manage for environmental value is an effective tool for manatee habitat protection. Pinellas County currently owns and/or manages over 6,500 acres of coastal park and environmental lands and manages them for their public appreciation and natural resource value. Included in this list are Fort DeSoto Park, Boca Ciega Millennium Park, Wall Springs Park, Mariner's Point, Weedon Island Preserve, Shell Key Preserve and War Veterans' Park. Several municipalities have participated, or partnered, in coastal land acquisition projects such as the City of Oldsmar with the Mobbly Bayou Preserve acquisitions, the City of Clearwater with Cooper's Point, and the City of St. Petersburg with Clam Bayou. In addition, the State of Florida and the Southwest Florida Water Management District have been frequent partners with the County and cities in habitat protection. Some significant recent Pinellas County coastal acquisition and management projects include:

Weedon Island Preserve: In 1993, the State of Florida effectively turned over the management of Weedon Island to the County. Since that time, the County has worked to acquire and/or manage adjacent uplands and submerged lands in order to protect the natural resources, including its desirable manatee habitat.

Shell Key Preserve: In 1999, Pinellas County began purchasing land on the Shell Key Barrier Island in order to establish the Shell Key Preserve. The majority of Shell Key Preserve is now either owned by the State of Florida and leased to the County, or owned by the County. A small portion remains in private ownership. In March of 2000, the Board of County Commissioners approved a Management Plan for Shell Key which included seagrass protection strategies. This plan was accepted by the State of Florida in December of 2000 and revised in 2007. The Management Plan is currently being implemented and also includes designated combustion motor exclusion zones and shallow water caution zones that were posted in 2002. These measures in particular provide protection for the manatees while feeding in the surrounding seagrass beds.

Boca Ciega Millennium County Park: Dedicated April 7, 2001, Boca Ciega Millennium Park protects important natural habitat along the shores of Boca Ciega Bay.

Wall Springs County Park: In the past several years, over 120 acres of intact environmental land have been purchased by Pinellas County. These coastal tracts are adjacent to some of the most extensive seagrass beds in Pinellas County and represent a prime coastal feeding area for manatees.



Wall Springs County Park

Intergovernmental and Interagency Cooperation in Manatee Protection

Pinellas County is involved with a number of area agencies and groups for the purposes of manatee research, protection, and education. Several of those activities are summarized in the following paragraphs.

Manatee Protection Strategies Task Force

In 1997, the Tampa Bay Regional Planning Council's Agency on Bay Management (ABM) established the Manatee Protection Strategies Task Force, a workgroup tasked to explore recommendations for manatee protection in Tampa Bay. The Task Force members included representatives from the Florida Fish and Wildlife Research Institute (FWRI), Florida Department of Environmental Protection (FDEP) regulatory staff, the Florida Fish and Wildlife Conservation Commission (FFWCC) Bureau of Protected Species, Save the Manatee Club, Florida Power, Tampa Electric Company, Manatee and Hillsborough Counties, anglers, and citizens with local knowledge and experience. Pinellas County staff served as the co-chair. In July 1998 the final recommendations were presented to the ABM Natural Resources committee for approval.

Some of the implemented Manatee Protection Strategies Task Force recommendations include the speed zones and other boating regulations directed at the Weedon Island area from the Progress Energy Bartow Plant warm water discharge along the Weedon Island

Preserve. Regulatory signs have also been installed identifying the new boating regulations, and informational kiosks have been placed at heavily used boat ramps to identify the caution areas. The Pinellas County Sheriff Department's Marine Unit has been patrolling these waters since the signs were installed in March 2002.

Manatee Awareness Coalition

Once the Task Force completed their recommendations, it was apparent that someone needed to oversee the implementation of these recommendations. The Manatee Awareness Coalition (MAC) was subsequently established as a sub-group of the Task Force to oversee implementation of the speed zones, water education for boaters, education of homeowners, and to provide the *Minute for Manatees* at the Coast Guard Safe Boater courses.

Tampa Bay Regional Planning Council/Agency on Bay Management

The Agency on Bay Management serves as a broad-based forum for open discussion on the myriad of issues involving the Tampa Bay Estuary, and serves as a regional voice for the protection, restoration and wise use of Tampa Bay. Pinellas County staff has served as the co-chair of the Manatee Protection Strategies Task Force, a group responsible for developing manatee protection recommendations for Tampa Bay. Through the Agency on Bay Management, the Task Force was able to include representatives from recreational boating and fishing interests, commercial fisheries, industry, regulators, the academic and scientific sectors, as well as local, regional, state and federal governments.

Tampa Bay Estuary Program

The Tampa Bay Estuary Program is a partnership among Hillsborough County, the City of Tampa, the City of Clearwater, the City of St. Petersburg, the City of Tampa, Manatee County, the Florida Department of Environmental Protection, the Southwest Florida Water Management District, the United States Environmental Protection Agency and Pinellas County, directed at the protection and restoration of Tampa Bay. The culmination of this partnership was the development of a *Comprehensive Conservation and Management Plan (CCMP) for Tampa Bay* and formal commitments to its implementation by all of the partners. As a part of the planning process, goals and priorities were identified for Tampa Bay. Individual Action Plans were subsequently put together for Water and Sediment Quality, Bay Habitats, Fish and Wildlife, Dredging and Dredged Materials Management, Spill Prevention and Response and Public Education and Involvement. In particular, the Action Plans for Bay Habitats and for Fish and Wildlife directly support and affect local manatee and manatee habitat protection efforts. In association with its participation in the development of the CCMP, Pinellas County began the seagrass monitoring program throughout Tampa Bay and Clearwater Harbor in 1998. The County also helped to develop the Boaters Guide to Tampa Bay, a brochure containing a map of the Tampa Bay seagrasses and helpful boating information.

Each partner agency and government was also required to develop their own Action Plan, identifying their locally relevant strategies for achieving the CCMP goals. Pinellas County's Action Plan included such things as establishing speed zones to protect manatees and seagrass, and implementing projects in County Watershed Management Plans to remove nitrogen from surface waters into Tampa Bay. Both the CCMP and the resultant Action Plan priorities complemented many of the goals, objectives and policies already contained in the Pinellas County Comprehensive Plan, evidencing the County's history of commitment to coastal resource protection.

The Florida Fish and Wildlife Conservation Commission (FFWCC) and the Fish and Wildlife Research Institute (FWRI)

The Commission's Bureau of Protected Species Management is responsible for manatee protection efforts in Florida, and specifically provides guidance on manatee protection efforts in Pinellas County and Tampa Bay. The FWRI, a division of the FFWCC, is responsible for conducting scientific research on manatees. Their research focus includes population monitoring, photo-identification, aerial surveys, radiotelemetry and tracking, carcass salvage, and rescue of injured animals. These data were used by the Manatee Protection Strategies Task Force in identifying areas needing protection throughout Tampa Bay. FWRI, the County and other members of the Manatee Awareness Coalition work cooperatively on various boater education efforts directed at manatee protection.



The Southwest Florida Water Management District's (SWFWMD) Surface Water Improvement Program (SWIM)

The County has partnered with the SWFWMD on several occasions, through a shared funding process, to undertake coastal habitat restoration projects. Protecting and improving coastal habitats contributes to the protection of manatee habitat. Some examples include projects along Joe's Creek, Allen's Creek and Mobbly Bayou.

Coordination with Surrounding Local Governments

Since the Manatee Watch Line was first activated in 1992, the manatee sighting data has been requested by several surrounding local governments. This information has been used to help cities acquire grants for purchasing environmentally sensitive lands, and to determine impacts of new construction projects where manatees could potentially be harmed. There is potential for additional coordination with neighboring governments in the protection of Pinellas County's coastal habitats and resources, including coordination and cooperation in manatee protection activities.

Commitments to Education

Pinellas County Manatee Watch Line

In 1992, the Pinellas County Manatee Watch Line was first activated. This program tracks information regarding manatee sightings in Pinellas County waters reported by the public. The Watch Line logs an average of 450 reported sightings per year. Calls have been received from Pinellas County residents as well as tourists visiting from other states and countries, and it appears that the program is helping to raise awareness that manatees are in Pinellas County waters. Information from the Watch Line is also being used to identify locations in the County that are frequented by manatees. To help get the word out to the public about the Watch Line, public service announcements are broadcast on local television stations, brochures and magnets are distributed at environmental expositions, and the Watch Line is highlighted at numerous public speaking engagements on manatees. **Table 10** shows the



number of manatees sightings reported to the Manatee Watch Line in recent years. The manatee concentrations shown on **Figure 26** reflect the number of calls to the Watch Line.

Calls to the Watch Line have been received from Pinellas County residents as well as tourists visiting from other states and countries. The program has helped to raise awareness of manatees in Pinellas County waters. Watch Line results show areas heavily used by manatees include: Ft. DeSoto, Coffee Pot Bayou, McKay Creek, and Spring and Whitcomb Bayous in Tarpon Springs. Manatees are drawn to these areas for a number of reasons. Freshwater springs located in Coffee Pot Bayou and Spring and Whitcomb Bayous attract manatee seeking fresh drinking water. Seagrass beds in the Ft. DeSoto and McKay Creek areas are prime feeding spots. The success of the Watch Line in its early years can be attributed to the advertising campaign that the County had undertaken. In recent years, there has been little advertising of the Watch Line, which may have to do with the decline in manatee reports.

**TABLE 10
NUMBER OF MANATEE SIGHTINGS REPORTED TO THE MANATEE WATCH LINE,
1992 THROUGH 2006**

Year	Number of Manatee Sightings Reported
1992	461
1993	480
1994	521
1995	353
1996	409
1997	246
1998	112
1999	166
2000	151
2001	145
2002	122
2003	67
2004	91
2005	71
2006	91
TOTAL	3,486

Source: Pinellas County Department of Environmental Management, 2007.

Good Mate Marina Program

In partnership with the Center for Marine Conservation, Pinellas County is participating in the Good Mate Marina Program. The target audience is boaters and marina owners and operators. The goal of the program is to educate this audience on how their actions can impact the waters and wildlife around them, and to provide information and guidelines on how they can help protect the County’s waters and marine life. Specifically included as a part of the Program is education on manatee protection and awareness for marina owners, employees and boaters.

In-School Presentations and Speaker's Bureau

Pinellas County staff averages over 40 presentations on manatee protection during each year to boater groups, civic organizations, local schools and other community organizations.

Cooperation with Other Agencies

The County participates with several agencies, including the Agency on Bay Management, FWRI, the Tampa Bay Estuary Program, etc., in developing educational information directed at creating awareness of manatees in our local waters and how boater actions affect their survival.

Effectiveness of Existing Manatee Protection Programs and Measures

Pinellas County has an extensive and multi-faceted regulatory program that addresses a wide range of impacts to manatees and manatee habitat. Unique and fundamental to Pinellas County's coastal resource protection commitment is the countywide control over water-dependent development activities provided by the Water and Navigation Control Authority. In addition, specific to development in the unincorporated county, Pinellas County has zoning and land use restrictions over the location of water-dependent uses, and in particular, restrictive criteria related to the location of marinas aimed at natural resource protection. Most, if not all, of the local governments in the County also strictly control the location of marinas through their zoning codes and future land use maps. Effective development controls for marinas and related uses have been in place for a number of years in Pinellas County.

More problematic is the number of boats using County waters, all of which do not originate in this County. For this reason, increasing emphasis has been placed on participation in the regional forums for developing boater education, placing educational information at marinas, docks, and ramps, monitoring the effects of education, monitoring high manatee use areas, refining certain boating related ordinances to address habitat protection, restricting boat activity and boat speeds in known habitats, and working on enforcement.



Enforcement of existing boating restrictions, and ongoing boater education are the likely key to more effective management of manatee-human interactions.

FISHERIES

The important nursery habitats utilized by fish, crabs, and other marine animals continue to be largely protected through public ownership or strict development regulations. These fisheries are not only important for environmental sustainability, but are also the major contributor to the sustainability of the recreational and commercial fishing industries in the area. For those areas where development occurred prior to the enactment of more sophisticated regulations, particularly in respect to stormwater runoff and the past destruction of wetlands, problems will probably continue to persist until strengthened redevelopment standards catch up to the most effective development standards. However, through the County's progressive Watershed Management Planning process, some of these past problems are being addressed. Examples of this include restoration, habitat enhancement, and drainage improvements in the Allen's Creek Watershed Management Plan, the Lake Tarpon Watershed Management Plan, and the Lake Seminole Management Plan. In addition, the many cooperative efforts in which the County participates, such as the Surface Water Improvement and Management (SWIM) projects, the Pinellas Anclote River Basin Board Cooperative Funding projects, and the Department of Environmental Regulation-Pollution Recovery Trust Fund Projects, will continue to improve coastal habitats and aid in the understanding of any future actions that may be needed.

Almost all areas with water in Pinellas County are important to both commercial and recreational fisheries, with lakes, streams and bays being home to a wide variety of fish species. The areas where seagrasses are located (see **Figure 24**) are very important for trout, snook and shrimp populations.

Artificial reefs (see **Figure 32**) are home to large populations of grouper and several types of mackerel. The artificial reefs in Pinellas County include both inshore and offshore reefs. The inshore reefs were designed by Pinellas County Utilities as part of an environmentally sensitive coastal enhancement program in the 1990's. Marine biologists and engineers hoped these reefs would replace hard bottom habitats impacted by beach restoration projects. Inshore reefs can be found anywhere from 100 to 900 yards offshore from Sand Key in approximately 15 feet of water, having a height of three to five feet. This project was completed in April 2006, with a total of 29 reefs.



Pinellas County Utilities created thirteen artificial offshore reef sites, 3 to 38 miles offshore, in the Gulf of Mexico. Each reef's individual design has different sized openings for different sized fish. These openings attract bottom dwellers like grouper, snapper, and grunt. The height of the structures attracts migratory species like mackerel, amberjack, cobia, barracuda, and baitfish. The reef sites can have a base diameter of up to 100 feet and reach up to half the water's depth. Approximately two weeks after placing the reef material on the ocean floor, barnacles and algae form on the reef. Soon, sea urchins and small fish come to feed on the new reef. Within the year (typically between six and nine months), the reef begins to support coral growth. After a year of coral growth, several types of invertebrates, such as sea squirts, inhabit the reef.

The reef crew placed mooring buoys on several reef sites for boats less than 30 feet. Boaters can directly tie on to a line attached to these buoys. These buoys eliminate the danger of an anchor becoming entangled in a reef and provide an easier way to moor the vessel.

The artificial reefs were made up of a number of interesting items that would otherwise have been placed in a landfill, but were recycled for the betterment of the natural resources of the County. In 1995, the U.S. Army added 10 obsolete combat tanks to the St. Pete Beach reef, each marked with a yellow buoy. These reefs were added to the existing artificial reef, which was composed of portions from the former Corey Causeway Bridge and a 200-foot barge. The Rube Allyn reef consists of 600 tons of concrete bridge pilings cutoffs, light poles and culverts, and a barge formerly used to construct the artificial reefs in Pinellas County. This program allowed for the recycling of concrete and other materials that may otherwise have gone to a landfill with no useful purpose. The construction of artificial reefs has provided vital habitat for fishery resources, recycles obsolete materials, and has allowed for additional recreation opportunities for both residents and tourists through fishing and diving activities. For more information on the artificial reefs in Pinellas County, see either the Solid Waste Element of this Comprehensive Plan or visit the Pinellas County Utilities website, at www.pinellascounty.org/utilities.

FIGURE 32
ARTIFICIAL REEFS IN PINELLAS COUNTY

ARTIFICIAL REEFS IN PINELLAS COUNTY

SEA TURTLES

All of the sea turtles that nest on Florida's beaches, including Pinellas County, are protected by Florida Statutes (Chapter 370.12) and through the United States Endangered Species Act (ESA). The loggerhead (*Carretta carretta*) is listed as "threatened" under the ESA, while the leatherback (*Dermochelys coriacea*), the green turtle (*Chelonia mydas*), the hawksbill (*Eretmochelys imbricate*), and the Kemp's Ridley (*Lepidochelys kempii*) are listed as "endangered". Sea turtle nesting in the southeastern United States (of which Florida constitutes 90 percent), comprises the second largest nesting "assemblage" in the world. Florida plays an important role in the survival of sea turtle populations because it has the most diverse and abundant sea turtle population of any state or territory in the United States.



While Pinellas County does not contain any major sea turtle nesting areas, its extensive coastline makes it an important location for sea turtle nesting. Since the early 1990's, Pinellas County has provided funds to the Clearwater Marine Aquarium to survey the beaches daily, from Clearwater Beach down to St. Pete Beach, for turtle nests during the nesting season to help ensure that proper protection measures are carried out when nests are identified. Of the five species of turtles that are found in Florida, only the loggerhead nests regularly on Pinellas County beaches. Although small in quantity, the maintenance of Pinellas County's current sea turtle nesting distributions is important. Even small nesting populations add to the overall maintenance of the genetic diversity of sea turtles.

Marine turtle nesting and hatching occurs each year from May 1st through October 31st. Female turtles come ashore in the dark, dig a hole using their flippers, and lay 100 to 150 eggs at a time. During the course of a season, a single female lays three to eight nests. After a 45 to 70 day gestation period, hatchlings emerge from the nest at night and follow the moonlight reflecting off the Gulf. The Pinellas County Department of Environmental Management conducts a monitoring program to ensure that nests are not disturbed by nourishment activities. Daily early morning surveys are performed during the nesting season in search of nests. In 2006, surveys began 65 days prior to beach nourishment activities. Pinellas County contracts with the Clearwater Marine Aquarium (CMA) to monitor sea turtle nesting along all the nourished beaches, as the projects will be constructed during nesting season. Thus, preparations are made by relocating turtle nests from within the construction zone to areas outside of it. **Table 11** displays the number of sea turtle nests observed in Pinellas County during the last several years. For 2007, there was a significant decline in the number of sea turtle nests observed on the Pinellas County coastline. Because this data was taken before the end of 2007, it is not known for sure why only 36 nests were observed compared to over 100 nests in previous years. This abnormality is also being witnessed in other locales along the Gulf coast. Further research is necessary in order to determine what has caused the sudden decline in the number of sea turtle nests in the area.

TABLE 11
SEA TURTLE NESTS OBSERVED IN
PINELLAS COUNTY

Year	Number of Nests
1988	56
1989	92
1990	144
1991	175
1992	142
1993	105
1994	148
1995	138
1996	229
1997	223
1998	181
1999	233
2000	172
2001	279
2002	170
2003	195
2004	104
2005	101
2006	115
2007*	36

Source: Florida Marine Research Institute -data through 2001.
Clearwater Marine Aquarium data 2002-2006.

*As of October 2007.

Coastal armoring (seawalls, rock revetments, riprap, retaining walls, groins and jetties), coastal development, artificial beachfront lighting, and recreational activities all have a deleterious effect on sea turtle nesting. Artificial lighting can disorient nesting sea turtles and their hatchlings, drawing the turtles away from the water instead of towards it. The lighting can be confused for the moonlight, which the turtles are drawn to after hatching. Turtles may follow the lighting to roads or buildings instead of back into the marine environment.

Recreational use of the beaches is believed to be the greatest challenge to sea turtle nesting. Over the last couple of decades, beach nourishment projects have had a positive impact on sea turtles in Pinellas County. Portions of Sand Key had no dry beach, and thus no nesting habitat, prior to the project in the early 1980's. The number of nests in Pinellas County has steadily increased from 77 in 1993 to 195 in 2003. Belleair Shores, the municipality that was not nourished but benefits from longshore transport, had no dry beach and no turtle nesting in the early 1990's. In 2003, turtles laid 28 nests along this one mile-long beach community. By creating a wide beach along Sand Key, Pinellas County has created turtle nesting habitat. Since Pinellas County coordinates (re)nourishment projects countywide; all such projects are designed and implemented to protect the ability of sea turtles to nest.

PARTNERSHIP OPPORTUNITIES

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (SWFWMD)

In 1987, the Florida Legislature enacted the Surface Water Improvement and Management (SWIM) Act, which required the water management districts in the State to develop plans and programs to restore and protect surface water quality that is important in providing aesthetic and recreational pleasure to residents, habitat for native plants and animals, and safe drinking water. The SWFWMD identified ten water bodies, including Lake Tarpon and Tampa Bay, that were suffering from water quality degradation, and developed SWIM plans to outline programs and projects that would help to improve their water quality. Pinellas County works with the SWFWMD in the development and implementation of these plans for waterbodies within Pinellas County, to support the continued improvement of water quality for the residents and visitors of Pinellas County.

Tampa Bay is the highest ranked waterbody on the SWIM priority list for the SWFWMD. According to the SWFWMD, since 1950, approximately 50 percent of the natural shoreline of Tampa Bay has been lost to impaired water quality and development. Seagrass meadows also declined significantly between 1950 and 1980, only experiencing a rebound in the last decade due to water quality improvements and additional programs such as the Tampa Bay Estuary Program. Fifty-nine coastal restoration projects were completed in Tampa Bay through the SWIM program between 1989 and 2004, with 1,600 acres of coastal habitat being restored. In 2004 alone, 589 acres of coastal habitat were restored, setting a new record for the SWIM program. These projects include the Fort DeSoto water recirculation project and the habitat restoration of the Lancaster tract in the Allen's Creek watershed. Since 1990, 29 SWIM projects have received awards for excellence.

Lake Tarpon was also among the watersheds within the jurisdiction of the SWFWMD that received a SWIM plan. Following an algae bloom in 1987, the first SWIM plan for Lake Tarpon was developed in 1989. The plan focused on water quality studies, and water quality appeared to improve shortly after the algae bloom ended. However, in the 1990's, water quality again declined, and Pinellas County began developing the Lake Tarpon Watershed Management Plan. The SWFWMD has incorporated this plan into the 2001 revision of the Lake Tarpon SWIM plan, and began focusing on nutrients in the lake, recognizing that declining water quality is a primary concern for the lake. The plan identifies strategies to improve water quality through the reduction of nutrients entering and developing within the lake. Pinellas County continues to coordinate with SWFWMD to implement the strategies outlined in the Lake Tarpon SWIM plan in an effort to improve the water quality in the Lake. The built-out nature of the watershed complicates these efforts, however, and Pinellas County is currently implementing stormwater management projects in the watershed to capture nutrients before they enter the Lake and impair water quality. For more information on these two SWIM waterbodies, see the Surface Water Management Element of this Comprehensive Plan.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

The Office of Coastal and Aquatic Management Land Areas of the Florida Department of Environmental Protection (DEP) manages 5,000,000 acres of submerged land along 8,000 miles of Florida's coastline (Chapter 403, F.S.). Over the last two decades, DEP has developed management plans for a number of the aquatic preserves within their jurisdiction, to protect the natural habitats and functions of the aquatic preserves for both residents and visitors of the State. Pinellas County has two aquatic preserves (Pinellas County Land Development Code Section 58-376 to -396) that serve such functions as flood protection, habitat for native plant and animal species, and recreational enjoyment. The preserves are designated to preserve the submerged land of the County and Boca Ciega Bay, insofar as possible, in an essentially natural condition so that their ecological and aesthetic values may endure for the enjoyment of future generations. The preserves are protected from further sale or transfer and dredging and filling except when it is in the dominant interest of the general public. The Pinellas County Water and Navigation Authority maintain its jurisdiction over these areas as conferred by law. Pinellas County will coordinate with DEP in the future in the development and implementation of management plans for the two aquatic preserves designated by the State. Among the endangered and rare species within these two preserves are American alligators, bald eagles, manatees, roseate spoonbills, Atlantic loggerheads and brown pelicans. According to DEP, the main issues facing the management of these preserves include urbanization, stormwater runoff, recreational activities within the preserve, dredging, and loss of habitat. When management plans are developed for the preserves, they will address these issues as priorities.

Boca Ciega Bay Aquatic Preserve

Boca Ciega Bay (**see Figure 32**) was designated an aquatic preserve in 1969 in order to protect the area from the continued dredging and filling that was associated with the development of beach communities during the 1950's. This preserve runs along the southwest coastline of the County, and consists of 22,000 acres.

Pinellas County Aquatic Preserve

The Pinellas County Aquatic Preserve (**see Figure 33**) was designated in 1972 in an effort to ensure that the degradation seen by Boca Ciega Bay was not repeated elsewhere in Pinellas County. This preserve includes all state-owned submerged land within the boundaries of Pinellas County, including Lake Seminole and Lake Tarpon, totaling 336,265 acres. Spoil islands within the preserve are also managed by the State, as well as mangroves lining the waterfront.

FIGURE 33
AQUATIC PRESERVES IN PINELLAS COUNTY

AGENCY ON BAY MANAGEMENT

The Agency on Bay Management was established in 1985 as the natural resources committee for the Tampa Bay Regional Planning Council (TBRPC). This agency acts as a forum on issues affecting Tampa Bay, for a number of affected public and private agencies and interested stakeholders. Representatives include Pinellas County, Hillsborough County, the City of Tampa, recreational and commercial boating and fishing interests, scientific and industrial interests, Tampa Bay Estuary Program (TBEP), the SWFWMD, and local legislators. The Agency assisted with the establishment of the statewide SWIM program, the designation of Tampa Bay as part of the National Estuary Program, and develops the quarterly *Bay Soundings* publication to inform residents about the current conditions, programs and other efforts involving the Tampa Bay Estuary. The Agency has put together a number of workshops and task forces at the request of TBEP, in order to develop recommendations to guide TBEP in the development of their plans and programs.

TAMPA BAY ESTUARY PROGRAM

The Tampa Bay Estuary Program (TBEP) (see program's Pinellas County boundaries in **Figure 34**) was established in 1991 under the auspices of the Clean Water Act. Administered by the U.S. Environmental Protection Agency, the TBEP was charged with developing a Comprehensive Conservation and Management Plan (CCMP) directed at the restoration of Tampa Bay. This Plan, finalized in 1997, is the result of nearly six years of work by TBEP staff, local government administrative and environmental professionals (including Pinellas County staff), regional and state agencies, and citizen representatives. In 1998, TBEP changed its name from the Tampa Bay National Estuary Program to the Tampa Bay Estuary Program, in recognition of the reorganization of the agency as a truly regional alliance, following the adoption of an Interlocal Agreement and ancillary agreements among thirteen of the program's regional partners. These agreements pledged the willingness of all parties involved to achieve the goals of the recently adopted CCMP.



The Plan is an integrated and comprehensive plan, addressing Bay fisheries and wildlife habitat, water and sediment quality associated with atmospheric deposition, surface water runoff, wastewater, invasive species and toxic contamination.

Implementation of the Comprehensive Conservation and Management Plan (CCMP) presents both a challenge and an opportunity to the County, as well as to the region as a whole. Much of the implementation of the CCMP has fallen to the local governments who signed the implementing agreement. The opportunity to actually carry this Plan through to fruition, after being involved as an integral player in its development for over five years, is exciting; however, the financial implications are significant and one challenge has been to balance the commitment to the Tampa Bay Estuary Program with commitments to the County's other estuarine waters outside of the TBEP watershed. It is anticipated, however, that most of the same concepts and principles developed as part of the CCMP will be applicable to the County's entire watershed planning program.

In May 2006, TBEP released '*Charting the Course*', an update to the CCMP which assesses the goals and priorities of the CCMP and looks at the progress made by the program. The report also looks ahead to 2008 at updated Bay restoration and protection strategies. The recent update to the CCMP divides the issues of Tampa Bay into eight action plans: Water and Sediment Quality, Bay Habitats, Fishing and Wildlife, Dredging and Dredged Material Management, Spill Prevention and Response, Public Education and Involvement, Invasive Species and Public Access. These action plans were designed to accommodate the changing priorities in Tampa Bay and address additional scientific research that has become available.

In the 2006 update to the CCMP, TBEP also analyzed the impact that the program has had on the water quality of the bay in recent years. Algae levels in the Bay have decreased dramatically since 1980, due in large part to the increased treatment of wastewater and stormwater runoff. As of 2004, stormwater goals and nitrogen reductions were actually exceeded, but urban stormwater runoff and atmospheric deposition continue to be a cause for concern in regards to nitrogen levels within Bay waters. In terms of vegetation, an estimated 2,350 acres of marshes, mangroves and other vital habitats were restored in the period of 1996-2003. Seagrass populations have had mixed recovery in the bay, with about 26,078 acres present in 2002, a slight increase, but there was a significant decline in Old Tampa Bay, prompting the call for further research and the drafting of a separate plan to deal with those issues specific to that region.

FIGURE 34
TBEP BOUNDARIES IN PINELLAS COUNTY