

BOAT FACILITY SITING PLAN FOR MARTIN COUNTY

Growth Management Department

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SUMMARY

The goal of the Boat Facility Siting Plan (BFSP) is to locate boat facilities in a way that will reduce the number of manatees injured or killed by boats. However because recreational boating is extremely important to the economic interests of Martin County, this task must be performed in a balanced manner. Aerial survey data were analyzed to develop a relative index value allowing the comparison of manatee abundance in 52 segments of the coastal waterway. Four main areas stand out that have a relatively high abundance of manatees. These areas include: 1) the portion of the Indian River Lagoon that extends from the Ernest F. Lyons Bridge in the north, to the confluence of the St. Lucie River, Manatee Pocket, Great Pocket, and the St. Lucie Inlet, 2) Peck Lake, 3) Hobe Sound, and 4) the coastal waterways adjacent to the points where the C-23 canal, Bessey Creek, and Hidden River merge. Except for the area near the C-23 canal, each of these areas has extensive seagrass beds that attract manatees for foraging. Approximately 64% of the manatee carcasses whose deaths were attributed to impact with watercraft in the county were recovered within or adjacent to these four areas.

Analysis of boating activity patterns indicated that traveling offshore was one of the most popular destination among Martin County boaters. This is significant because manatees occur primarily in the coastal waterways. Boats traveling offshore have a reduced risk of hitting manatees once they clear the inlet. The analysis of boating activity patterns also found that the Intracoastal Waterway (ICW) was a popular destination for boaters in Martin County. The ICW is an area having a high level of overlap in use by boats and manatees. The ICW is the main north-south travel route through the county for boats and manatees. This route runs south from the Indian River Lagoon in St. Lucie County through Martin County to Palm Beach County.

The amount of overlap between boats and manatees in Martin County increases with proximity to the St. Lucie Inlet. The greatest amount of overlap between boats and manatees occurs in the ICW near an area known locally as the "crossroads." This area is defined by the confluence of the Indian River Lagoon, St. Lucie River, Manatee Pocket, and St. Lucie Inlet. The St. Lucie Inlet attracts boats because it is the only inlet in the county. Manatees are attracted to this area to exit and enter the lagoon and because of the extensive seagrass beds in the lagoon near the St. Lucie Inlet. Essentially all portions of the coastal waterway that exhibit a high level of boat use also have a high level of manatee use.

A screening methodology was used to identify desirable locations for the development of new boat facilities or the expansion of existing boat facilities. A scoring system was designed that provided an equal weighting to each of five categories, including: proximity to inlets, manatee abundance, manatee habitat, manatee mortality, and speed zones. A score for each of these categories was assigned to each of the coastal waterway segments that were defined during the analysis of manatee abundance. The procedure allows a score to be computed that characterizes the relative probability of impact to manatees if additional boat trips are generated from a given segment of the coastal waterway. A total score for each segment was calculated by adding the individual scores assigned to each of the five categories.

Results of the screening process revealed that 9 out of 52 segments of the coastal waterway in Martin County were classified as areas of low potential for impact to manatees. Of these areas, only the segments encompassing Manatee Pocket have existing boat facilities. The search to identify sites for the development of new boat

facilities also revealed that there are limited opportunities throughout the study area. Most of the shoreline has already been developed or is committed to conservation or other uses that would preclude development of boat facilities. Also, most potential sites identified in the analysis have existing plans that are not compatible with the development of additional boat facilities. Exceptions are the potential sites located within the City of Stuart. These sites, however, represent general areas for redevelopment rather than existing undeveloped parcels suitable for the development of new boat facilities.

Preferred locations for new boat facilities in Martin County are defined as sites that are located in Manatee Pocket and the Downtown City of Stuart on the north and south side of the Roosevelt Bridge and encompassing sites east and west of US 1. The geographic areas identified as preferred locations are depicted in Exhibits 8 and 10. The BFSP supports the expansion and redevelopment of marine industries in these general areas. The number of boats at each facility will be limited by site plan constraints, and local, state, and federal requirements to avoid and minimize impacts to natural resources. Future county owned/operated boat ramps and future marinas in Community Redevelopment Areas (CRA) (Port Salerno, Rio, Jensen Beach, Exhibits 9, 11, 12) are also defined as preferred areas. In addition, the S & S Investments Parcel 2 (Exhibit 13), Potential Site 7, Potential Site 8, and American Custom Yacht (Map 4h; Exhibit 13) are designated as preferred areas.

Conditional locations for boat facilities in Martin County are defined as sites located outside of the preferred locations where existing boat facilities are currently located, or where potential sites have been identified. These sites are identified in Exhibit 6 and Maps 4a-4h. A waterfront property not identified in Table 6 will be considered as a conditional site on a case-by-case basis, if its present or potential land use and zoning designation (e.g. waterfront general commercial or residential multi-slip dock) are in compliance with the Comprehensive Growth Management Plan and zoning provisions. Expansion or development at these sites will be conditional based on two evaluations: the rate of boat-related manatee mortality* in the county or in a specific geographic area under consideration, and impacts to natural resources. Expansion or development of boat facilities at conditional locations will be based on the review and approval by the local government and state and federal permitting agencies. The number of boats at each facility may be limited by site plan constraints.

Non-preferred locations are defined as sites located in areas that have not been identified as a preferred location or a conditional location. New boating facilities shall not be permitted at these locations unless it is determined that the facility will not generate daily powerboat trips for these facilities. Approval of the development plan at non-preferred locations shall be based on a review by the local government, Florida Department of Environmental Protection (DEP), and U.S. Army Corps of Engineers (COE). To be approved, the review should indicate that the site plan is designed to avoid and minimize impacts to natural resources.

The final section of the BFSP includes a number of policies dealing with manatee protection, habitat protection, and boat facility siting in Martin County.

* Manatee mortality--a predetermined annual boat-related mortality rate for the county averaged over the latest three year period.

INTRODUCTION

In 1989 the Governor and Cabinet of Florida gave the directive that Manatee Protection Plans (MPP) be prepared for each of 13 counties* known to have a high population of manatees. The Florida manatee is listed as an endangered species by the Florida Fish and Wildlife Conservation Commission (FWC) and U.S. Fish and Wildlife Service (USFWS). The MPP is to be adopted and implemented by a county, local government, or port authority and approved by the State. The purpose of the MPP is to reduce boat-related manatee mortality, protect manatee habitat, promote boating safety, and increase public awareness of the need to protect manatees and their environment.

The MPP is to include the following components: 1) a BFSP that inventories existing boat facilities and natural resources; 2) an evaluation of boat use and traffic patterns; 3) criteria on which proposed sites will be evaluated; 4) lists and maps of locations ranked by degree of suitability; 5) dock densities; 6) policies for the expansion of existing boat facilities; 7) boating speed zones; 8) provisions to protect water quality and submerged aquatic vegetation; and 9) a local education and awareness element.

Martin County is one of the key counties expected to develop a county-wide MPP. To assist Martin County, the FWC, which is formerly a division of the DEP entered into a contract with Florida Atlantic University to conduct a boating activity study, which was completed in 1996. In February 2000, the FWC agreed to provide funds to Martin County to prepare a county-wide BFSP. Martin County then subcontracted with Treasure Coast Regional Planning Council (TCRPC) to prepare the BFSP. This report is the result of TCRPC's contract with Martin County.

Martin County is located on the southeastern coast of Florida (Map 1). The study area for the BFSP features the main coastal waterways, including portions of the Indian River Lagoon, St. Lucie River, and Loxahatchee River. The BFSP does not consider the C-44 Canal west from the St. Lucie Locks and the portion of Lake Okeechobee within Martin County. The main navigation routes through the county are the ICW and St. Lucie Canal (C-44 canal). The ICW forms a north-south route through the county in the Indian River Lagoon. The C-44 canal extends from Lake Okeechobee in western Martin County to the South Fork of the St. Lucie River. The North Fork of the St. Lucie River originates in St. Lucie County and flows south to join with the South Fork near the City of Stuart, the largest municipality in Martin County. The St. Lucie River flows to the Atlantic Ocean through the St. Lucie Inlet.

The BFSP is an important component of the MPP. The BFSP indicates desirable locations for the development of boat facilities based on an evaluation of natural resources, manatee protection needs, and recreation and economic demands. An objective of the BFSP is to minimize the amount of interaction between manatees and boats and to reduce the number of manatees injured or killed by boats. However, because recreational boating is extremely important to the economic interests of Martin County this task must be performed in a balanced manner.

The BFSP is organized to present first a discussion of manatees and an analysis of manatee abundance in Martin County. An evaluation of boating activity patterns, and the identification of existing and potential sites for the development or expansion of boat

*The 13 key counties are: Brevard, Broward, Citrus, Collier, Dade, Duvall, Indian River, Lee, Martin, Palm Beach, Sarasota, St. Lucie, Volusia.

facilities follow this. Next, these sites are ranked and desirable locations are identified. Finally, policies are presented to explain how the BFSP is to be used and how preferred locations differ from non-preferred locations.

GENERAL BIOLOGY AND BEHAVIOR OF MANATEES

Several aspects of the biology and behavior of manatees affect the distribution of the manatee population in coastal waterways. Much of the following general discussion is derived from Reynolds and Odell (1991), which provides an excellent review of the information known about manatees. O'Shea et al. (1995) present a more technical treatment of manatee population biology. Only selected facts relevant to understanding the distribution of manatees in Martin County are described below.

The Florida Manatee (*Trichechus manatus latirostris*) is a large aquatic mammal reaching an average adult length of about 3 meters and weight of about 500 kilograms. The species may be found in any water over 1 meter deep connected to the coastal waterway system. Manatees live in both freshwater and saltwater. They sometimes move into the deep open waters of the ocean, but they are more frequently found in the coastal lagoons and estuaries. The primary range of the manatee along the Atlantic coast of Florida extends from the St. Johns River in northeastern Florida southward to the coastal waters near Miami.

Manatees are herbivorous, feeding on a wide variety of submerged, emergent, floating, and shoreline vegetation. In brackish or saltwater, they feed primarily on several species of seagrasses, including turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*) and shoal grass (*Halodule wrightii*). They may also eat certain species of algae, mangrove leaves, and seedlings. Freshwater or low salinity species that are commonly part of the diet of manatees also include native submerged aquatic vegetation, such as tapegrass (*Vallisneria americana*) and ruppia (*Ruppia maritima*). In freshwater, they also feed on exotic aquatic vegetation such as water hyacinth (*Eichhornia crossipes*) and hydrilla (*Hydrilla verticillata*). Manatees feed at all levels of the water column and may feed on vegetation overhanging the water and on the bank. They often spend 6-8 hours a day foraging. They may eat at any time of day or night. While foraging underwater, manatees can stay submerged for up to 20 minutes, but the average interval between coming to the surface for a breath is about 2-3 minutes.

Although not essential to survival, manatees are attracted to sources of freshwater. They will drink freshwater from sources that discharge into the coastal waterway. Manatees will often congregate at river mouths, floodgates, water treatment plants, and other sources of freshwater.

Another important consideration is that manatees are sensitive to water temperature. Severe cold weather at or below freezing for several days may kill manatees. When the water temperature drops below 68 F (20 C), manatees seek warm-water sites. Seasonal changes may stimulate long-distance migrations by individual manatees. During the winter, individuals may make shorter movements to and from natural and artificial warm-water sites following the passing of periodic cold fronts. Martin County does not have a significant warm-water discharge that attracts manatees. The warm-water discharge sites closest to the county are the Fort Pierce Utilities Power Plant located in St. Lucie County, and the Florida Power & Light Company Riviera Power Plant (PRV) located in Palm Beach County. Winter surveys conducted at the PRV revealed that as many as 60 to 277 individual manatees have been present at this warm-water site at one time (Reynolds 1994)

PATTERNS OF MOVEMENT BY MANATEES

The best source of information on the movement of individual manatees is available from the USGS Sirenia Project (National Biological Survey 1994). This study examined the results of tracking 63 manatees at various times between 1986 and 1993. Their results indicate that 34 of the 63 manatees tracked by satellite include Martin County in their range. By examining a summary of the general movement patterns for each of these manatees, 102 movements by 27 individuals traveling to or through Martin County have been documented with a good determination of the time of travel (Exhibit 1). Of the 102 movements, 55 were to the north and 47 were to the south. All of the movements in this sample were made between October and June. Eighty-two percent of all of the movements were initiated in December through March, 11% were initiated in October through early November, and 7% were initiated in late April through June. All of the movements in October and November were to the south. From December through March, 60% of the movements were to the south and 40% to the north. From April through June, 29% percent of the movements were to the south and 71% percent were to the north.

Manatees sometimes made several trips through Martin County in a relatively short period of time within the same season. For example, TBC-09 was tracked traveling south from Cocoa Beach to the Port Everglades Power Plant in late October to mid-November 1989. This manatee then traveled to the Banana River in early to mid-February 1990, but returned to Broward County in late February to mid-March 1990. Similar occurrences of back-and-forth movements within the same season are common in the data.

The results of the studies by the Sirenia Project are preliminary; however, the following generalizations concerning patterns of manatee movements are available:

- 1) Individual manatees often return to the same warm season site year after year;
- 2) Individual manatees may also return to a previously used warm-water site during the winter, but some manatees will travel during mid-winter to alternate sites;
- 3) There is considerable variation among individuals concerning the timing and extent of migration and the amount of time spent at warm-water sites;
- 4) The range of some manatees includes the entire eastern coast of Florida with seasonal movements of 525 miles;
- 5) Manatees have been found traveling at a rate of about 25 miles/day for several consecutive days when moving from one area to another;
- 6) Most long-range movements are seasonal, but some long-range movements and many short-range movements do not appear to be related to temperature;
- 7) Most manatees travel within the Intracoastal Waterway, but some individuals travel in the Atlantic Ocean near the coast;
- 8) The coastal waterway from the Indian River Lagoon to Biscayne Bay is considered to be a high-use area frequented by many manatees during the winter; and
- 9) Manatees often travel in deep water channels used by boats and vessels.

ABUNDANCE OF MANATEES

Mapped satellite telemetry data from the USGS Sirenia Project (National Biological Survey 1994) were examined to gain an understanding of the manatee movement patterns in Martin County. However, this data set is based on tracking a limited number of individuals. This is not considered the best source of information for analyzing manatee populations, and where manatees are most abundant in the coastal waterways of the county.

The most comprehensive source of information on the abundance of manatees in Martin County is from data collected during aerial surveys. The FWC conducted aerial surveys from fixed-wing aircraft flying at an altitude of 500 feet. Specific details of the methodology are described in Chapter 3 of the Manatee GIS Reference Guide included in the Atlas of Marine Resources (DEP, Florida Marine Research Institute 1998). Twenty-seven survey flights were flown from January 1986 to January 1987, and 40 survey flights were flown from August 1990 to June 1993. Data from five of the flights were incomplete because the survey had to be terminated prematurely due to bad weather. Data from these incomplete surveys were eliminated from the analysis (amemc: 6/18/86; amlc: 12/30/90, 9/24/91, 12/30/91, and 4/30/92). In another case, part of the survey route was flown on one day, and the remainder of the survey was flown several days later. In this case the data from the two days were combined and counted as one survey (amlc: 6/24/91 and 6/27/91). Therefore, data from a total of 62 aerial surveys were analyzed.

In 1974 and the inception of the manatee population counts using aerial surveys, the recognized manatee population was approximately 800. The most recent population survey conducted by the Florida Marine Research Institute in January 2001 revealed a count of 3,276. This indicated that the aerial surveys have become more sophisticated in determining the actual manatee population number in Florida.

Six hundred seventy manatee sightings were recorded in the coastal waterways of Martin County and give a reasonable, but not comprehensive, distribution of manatees. A comparison of the mean number of manatee sightings per survey in each month indicates that manatees were most abundant from December through March (Exhibit 2). These data provide a good estimate of how the relative abundance of manatees changes seasonally. In general, Martin County appears to have about two to four times more manatees from December through March than it does throughout the rest of the year.

The aerial survey data are also useful in identifying areas frequented by manatees. For this evaluation the coastal waterway in Martin County was divided into 52 segments, each approximately one mile in length. Some segments, primarily at the ends of canals and rivers were longer than one mile to accommodate the length of a well-defined section of the waterway.

Not all of the segments were sampled during each of the 62 aerial surveys. Therefore, in order to compare the number of manatees at different locations, a relative index of manatee abundance was developed by calculating the average number of manatees counted in each segment during each survey (Exhibit 3). Based on the overall averages, the following locations had the greatest relative abundance of manatees (Maps 2a-2h):

Segments 5-7. This area includes the portion of the Indian River Lagoon that extends from the Ernest F. Lyons Bridge in the north, to the confluence of the St. Lucie River, Manatee Pocket, Great Pocket, and the St. Lucie Inlet to the south. Manatees were most

abundant in this area from November through March. This area has extensive seagrass beds and includes part of the primary north-south travel corridor for manatees on the east coast of Florida. Also, this area is adjacent to the St. Lucie Inlet.

Segments 11-13. This area includes Peck Lake, a portion of the Indian River Lagoon located about four miles south of the St. Lucie Inlet. Manatees were most abundant in this area from October through March. This area has extensive seagrass beds and includes part of the primary north-south travel corridor for manatees on the east coast of Florida.

Segment 17. This area includes the north end of the water body known as Hobe Sound, a portion of the Indian River Lagoon located south of Bridge Road. Manatees were most abundant in this area from December through March. This area has extensive seagrass beds and includes part of the primary north-south travel corridor for manatees on the east coast of Florida.

Segment 44. This area includes the portion of the C-23 canal just west of the point where it flows into the North Fork of the St. Lucie River. Several small waterways are also part of this segment, including Bessey Creek and Hidden River. Manatees were relatively abundant in this area throughout the year, with the exception of September and October. Freshwater from the C-23 canal is possibly the main attractant to manatees in this area.

MORTALITY OF MANATEES

The FWC has maintained records of manatee mortality since 1974. In the 27-year period through 2000, a total of 130 dead manatees have been recovered in Martin County. The causes of death are for a variety of reasons, including: watercraft related (29%), flood gate/canal lock (21%), dependent calf (18%), and other (including natural) causes (10%). The cause of death of 22% of the manatees was undetermined.

Examination of the mapped distribution of the manatee recovery locations available from the FWC indicates that most of the mortality attributed to flood gates/canal locks occurred at the St. Lucie Lock at the C-44 canal. According to the COE, special sensors were installed on the flood gates at the St. Lucie locks in October 1998 to prevent injuries to manatees. Future monitoring will be necessary to insure that the sensor system is functioning properly.

The distribution of dependent calf recovery locations was scattered throughout the coastal waterways in the county. However the majority of recoveries in the upper reaches of the South Fork of the St. Lucie River were perinatal deaths. This suggests that this may be an important birthing area for manatees.

The primary concern with the manatee mortality data is that the cause of death of 38 (29%) manatees was attributed to collision with watercraft (years 1974-2000). One of the milestones in manatee protection was the posting of boat speed zones in Martin County. The posting started in December 1990 and was completed in July 1991, but for practical purposes, the completion date is considered December 31, 1991, so as to accommodate a learning period for the boater so that they are aware of the speed zones. The average annual rate of watercraft-related manatee mortality over a 9 year period during the pre-speed zone era (1983 through December 1991) was 2.22 (20 mortalities/ 9 years). From 1992 through December, 2000 (9 years) or the post-speed zone era, the annual rate of manatee mortality was 1.33 (12 mortalities/ 9 years). Even considering this reduction in average manatee mortality due to speed zone posting, continued manatee

mortality due to collision with watercraft is a major reason why increased protection measures are important for manatees.

Twenty four (63%) of the manatee deaths resulting from impact with watercraft in Martin County occurred from October through March (Exhibit 4). This coincides with the season in which satellite telemetry data indicates that most manatees travel through Martin County. The highest level of watercraft-related manatee mortality in Martin County has occurred in December and January. Thirteen manatee carcasses (34%) were recovered during these months, coinciding with the seasonal peak of manatee movements through Martin County.

The portion of the coastal waterway having the greatest level of watercraft-related manatee mortality is segment 7 (Maps 2a-2h, Exhibit 5). Seven manatee carcasses (19%) were recovered in this segment, which is formed by the confluence of the Indian River Lagoon, St. Lucie Inlet, Great Pocket, Manatee Pocket, and St. Lucie River. The adjacent segments 6, 7, 9, 33, 34, and 35, account for 16 (44%) of the manatee carcass recoveries in the county. Another area with relatively high watercraft-related manatee mortality is Peck Lake, where 5 (14%) of the manatee carcasses were recovered. These locations are not necessarily the locations where manatees were hit by watercraft, because injured manatees may have swam to these locations and died at a later time. In addition, dead individuals may drift from the point of impact for some distance before they are recovered. Nevertheless, the mortality data are generally constant with the aerial survey data in identifying the sections of the coastal waterway critical to manatees.

MANATEE HABITAT

Most locations in the coastal waterways of Martin County can be classified as one or more types of habitat for manatees. Manatee habitats types available in the county include: feeding areas, traveling corridors, freshwater attractants, and resting/protected areas. The most important of these habitats types are the feeding areas and freshwater attractants, because manatees congregate at these locations. The travel corridors are very important during seasonal long-distance movements by manatees, which occur primarily from December through March.

Long distance movements through the county are the result of manatees traveling to warm-water sites during cold weather. Martin County does not have a significant warm-water discharge that attracts manatees. The warm-water discharge sites closest to the county are the PRV located in Palm Beach County, and the Fort Pierce Utilities Power Plant located in St. Lucie County. However, manatees may travel through Martin County to reach more distant locations, such as the Port Everglades Power Plant in Broward County.

Seagrasses are the most important food source for manatees in the county. Seagrass beds occurring in Martin County are shown in Maps 3a – 3h. These seagrass maps are based on the analysis of aerial photographs taken in 1986, 1989, 1992, and 1996. The seagrass data was provided by the St. Johns River Water Management District and South Florida Water Management District. With the massive freshwater releases to the St. Lucie estuary in the spring of 2000, the aerial extent of seagrasses may have been greatly affected. However, this effect was not tracked for this analysis.

The most extensive seagrass beds occur in the Indian River Lagoon between the St. Lucie Inlet and the north county line. Significant seagrass communities also occur in the Great Pocket, Peck Lake, Hobe Sound and Jupiter Sound. Extensive seagrass beds also occur in

the adjacent waters of Jupiter Sound in Palm Beach County (Palm Beach County Department of Environmental Resources Management 1992). The presence of seagrass beds for feeding appears to be important in seven of the eight segments that had the greatest overall relative abundance of manatees based on the aerial survey data (Segments 5-7, 11-13, and 17).

The main freshwater flows to the coastal waterways in Martin County include the C-23 canal, which flows into the North Fork of the St. Lucie River; the C-44 canal, which flows into the South Fork of the St. Lucie River; and the North and Northwest Forks of the Loxahatchee River, which flow south into Palm Beach County. The C-23 canal corresponds with the location of Segment 44, which was one of two segments (17 and 44) having the greatest manatee abundance in the county (Exhibits 3 and 5). Although the C-44 canal provides freshwater to the St. Lucie River, it does not appear to attract manatees. Similarly, the North and Northwest forks of the Loxahatchee River do not attract large numbers of manatees.

The primary north-south travel route for manatees follows the ICW through Martin County. The primary travel route traverses the Indian River Lagoon from the north to the south county line. Generally, segments located along this travel route had a higher relative abundance of manatees than the segments that were not located along this route. The travel route also connects to the St. Lucie Inlet and is used by manatees to access the Atlantic Ocean.

Most of the finger canals, small basins and waterways connected to the Indian River Lagoon, St. Lucie River, Loxahatchee River, and the ICW are designated as resting/protected habitat. Manatees may use these areas because they are relatively free of heavy traffic by watercraft. Manatees will often give birth in quiet isolated waterways. In addition to being a freshwater attractant, Segment 44 may be attractive to manatees because of its qualities as resting/protected habitat (Maps 2a-2h).

CONCLUSIONS BASED ON THE MANATEE DATA

Manatees occur in all of the coastal waterways in Martin County throughout the year. However, there are certain times of the year when manatees are more abundant and tend to congregate at specific locations. The aerial survey data indicate that there are about two to four times as many manatees in Martin County in the winter than in other seasons. Telemetry data from the Sirenia Project indicate that most long-distance movements of manatees through Martin County were initiated from October through March, with the peak occurring in the four-month period between December and March. Individual manatees may make several north-south trips through Martin County within the same season. The mortality data are consistent with the telemetry data in that most manatee mortality was detected in December and January.

The aerial survey data were most useful in identifying areas where manatees congregate. Four main areas stand out that have a relatively high abundance of manatees. These areas include: 1) the portion of the Indian River Lagoon that extends from the Ernest F. Lyons Bridge in the north, to the intersection of the St. Lucie River, Manatee Pocket, Great Pocket, and the St. Lucie Inlet, 2) Peck Lake, 3) Hobe Sound, and 4) the coastal waterways adjacent to the points where the C-23 canal, Bessey Creek, and Hidden River merge. Except for the area near the C-23 canal, each of these areas has extensive seagrass beds that attract manatees for foraging. Approximately 64% of the manatee carcasses whose deaths were attributed to impact with watercraft in the county were recovered within or adjacent to these four areas.

Although there is not a primary warm-water refuge in Martin County, the aerial survey data indicate that manatees are, at least in part, using the C-23 canal and Bessey Creek area as temporary warm-water sites. Manatees travel through Martin County to reach warm-water refuges in other counties. The primary north-south travel route follows the ICW, which traverses the entire length of the Indian River Lagoon in Martin County. This travel route is important because it is part of the primary travel corridor for the entire East Coast population of manatees.

BOATING ACTIVITY PATTERNS

Schultz (1996) prepared a Boating Activity Study (BAS) for Martin County. The objective of this study was to develop a profile of boating activity patterns in the Martin County coastal waterways in the St. Lucie River system, ICW, and the Loxahatchee River estuary. The study is based on six different survey activities including: 1) a boater intercept survey at boat ramps; 2) on-water surveys; 3) boat storage facility inventories; 4) aerial surveys; 5) a mail survey of registered boaters; and 6) a shoreline boat/dock census. The results of these surveys that are most relevant to manatee protection are discussed below.

The BAS identified 10 boat ramps in the county (Exhibit 6). The most heavily used ramps were at Sandsprit Park near Manatee Pocket, followed by the Stuart Causeway Park ramp (formerly Jaycee Park) and the Jensen Beach Causeway Park ramps, which launch directly into the Indian River Lagoon. The other boat ramps were lightly used except on peak boating holidays.

The majority of boats using the ramps in 1996 were powerboats (87.7%), followed by personal watercraft (jet ski/wave runners) (9.4%). The outboard motor was the dominant source of power (79.7%), followed by the jet drive of personal watercraft (9.6%). Inboard and inboard/outboard motors powered only 8.7% of the boats using public ramps.

The ramp survey indicated that the primary activity on the water is recreational fishing (51.5%), followed by cruising (24.1%), personal watercraft use (8.7%), and land activities (5.9%). The ocean was the most popular destination (23.4%). Other important destinations included the Indian River Lagoon (22.6%), and the St. Lucie Inlet area (22.1%). The Martin County ICW, which includes Great Pocket, Peck Lake, and Hobe Sound, was the destination of 14.5% of the boats launching from ramps. Other destinations included the St. Lucie River system (11.4%) and the Jupiter/Loxahatchee area (1.7%).

A general conclusion of the ramp survey was that the waterbodies nearest to each ramp location were the primary destinations of the boaters using the ramp. Ramp users have a strong tendency to stay in the general area in which they launch. Only a small percentage of ramp users travel to farther destinations. The Sandsprit Park ramps are close to the St. Lucie Inlet and they are the busiest ramps in the study area. The Sandsprit Park ramps and the Broward Street ramp, which is also located on Manatee Pocket, had the greatest proportion of their users, about a third, go to the ocean.

The general pattern of summer ramp use was similar to winter ramp use. The dominance of outboard powerboats did not change summer to winter. Recreational and commercial fishing were proportionally more important in the winter than in summer. Cruising, swimming, diving, and water skiing increased in their proportions in the summer

compared to the winter. The Marine Industries Association indicated only a small percentage (~5%) of boats in wet or dry berthing were active on a busy weekend day.

The on-water surveys showed that winter weekend traffic was 24% greater on average than summer weekend boating activity. The ICW and the Loxahatchee River/Jupiter area had the greatest jump in average activity from summer to winter weekends. The dominant boat type identified in the on-water surveys was a 16-25 foot powerboat.

Results of the aerial surveys indicated that 16-25 foot boats accounted for 48% of all the boats observed from the air. This finding is consistent with the other surveys in this study. The 26-39 foot category of boats represented 30.4% of the boat traffic, and small outboard boats less than 16 feet in length accounted for 10.4% of the observations. Powerboats represented 87.5% of the boats in the aerial survey.

The BAS identified 28 marinas in the county. During the survey period from August 1995 to July 1996, the wet slip capacity was 63.2% occupied while the dry storage capacity was 77.4% full. Information on 1545 individual boats indicated that 61.8% were in dry berths and 38.2% were in wet slips. The average boat length in marinas was 25.9 feet. The marina survey indicated that 89.5% of the boats were powerboats, and 9.6% were sailboats. Motor types were inboard (34.6%), outboard (39.6%), and inboard/outboard (13.7%).

A comparison of wet and dry storage showed that larger boats are more prevalent in wet slips than smaller boats. Of the boats in 16-25 foot class, 16.9% were in wet slips and 73.7% were in dry storage. The average length of a boat in a wet slip was 32.4 feet compared to 22.3 feet for dry storage.

The mail survey indicated that the major storage location for registered boats is the home (73.2%). Of these, 42.8% were on a trailer and 30.4% were at a home dock. Other storage locations included marina wet slip (9.7%) and marina dry storage (11.7%). The mail survey results indicated that types of power were outboard (64.1%), inboard (17.9%), inboard/outboard (11.3%), and sail (3.8%). The average horsepower of outboard motors was 108, 262 for inboard motors, and 225 for inboard/outboard motors. The average length of a boat was 21 feet and the average cruising speed was 21.3 miles per hour. Regarding water related activities, the mail survey identified recreational fishing and cruising as the dominant boating activities. The St. Lucie Inlet was identified as the most frequent destination, followed by the St. Lucie River, Martin County ICW, and Indian River Lagoon.

Several of the findings in the BAS have important implications concerning the protection of manatees. The dominant boat type identified in Martin County during the on-water surveys was a 16-25 foot powerboat. The on-water surveys showed that winter traffic was 24% greater on average than summer weekend boating activity. This is important because the highest concentrations of manatees in Martin County also occur in the winter months.

The dominant boat type identified in Martin County during the on-water surveys was a 16-25 foot powerboat. Small powerboats have a great potential for impacting manatees because they can traverse relatively shallow waters frequented by manatees. Shallow waters could not otherwise be used by larger boats, which are restricted to deeper water in the channels. Since manatees also travel through deep water in channels, fast moving boats of all sizes have potential for striking and killing manatees.

Even though the boating activity and manatee data do not enable a quantitative analysis of the degree of overlap of patterns of use, the extent of overlap can be described in general terms. The ICW is an area having a high level of overlap in use by boats and manatees. The ICW is the main north-south travel route through the county for boats and manatees. This route runs south from the Indian River Lagoon in St. Lucie County through Martin County to Palm Beach County.

The amount of overlaps between boats and manatees in Martin County increases with proximity to the St. Lucie Inlet. The greatest amount of overlap between boats and manatees occurs in the ICW near an area known locally as the "crossroads." This area is defined by the confluence of the Indian River Lagoon, St. Lucie River, Manatee Pocket, and St. Lucie Inlet. The St. Lucie Inlet attracts boats because it is the only inlet in the county. Manatees are attracted to this area to exit and enter the lagoon and because of the extensive seagrass beds in the lagoon near the St. Lucie Inlet. Essentially all portions of the coastal waterway that exhibit a high level of boat use also have a high level of manatee use.

INVENTORY OF BOAT FACILITIES

Four sources were used to develop an inventory of boat facilities for Martin County. The inventory is based on information obtained from: 1) the Martin County Growth Management Comprehensive Plan (1990); 2) A Boater's Guide prepared by the Indian River Lagoon National Estuary Program (1995); 3) the BAS prepared by Shultz (1996); and 4) a drive-by field survey conducted in July 2000.

The inventory identified 58 boat facilities, including 49 commercial and private marinas and facilities offering boat services; and 9 public boat ramps (Exhibit 6)*. Most of the boat facilities in Martin County are concentrated in the following general locations: 1) along the west shore of the Indian River Lagoon near Jensen Beach; 2) on the St. Lucie River near downtown Stuart and the Roosevelt Bridge; 3) along Manatee Pocket in Port Salerno; and 4) along the west shore of the Jupiter Sound in southern Martin County, adjacent to the Martin and Palm Beach County line (Maps 4a-4h). The concentrations of boat facilities in Jensen Beach, Port Salerno and City of Stuart are in areas where commercial fishing villages were historically based.

The most detailed information about the capacity of marinas is contained in the BAS by Shultz (1996). Based on the analysis of 28 marinas, the total capacity of wet berths was 1018 slips, and the total capacity of dry storage spaces was 1515. However, these numbers represent only a sampling of the facilities in the county. Information on the county-wide capacity is incomplete because not all boat facilities cooperated with the survey. In addition, these numbers do not provide the number of boats stored at private residences, either on a trailer or at a private dock.

According to the latest information available from the Florida Department of Highway Safety and Motor Vehicles, 15,338 vessels were registered in Martin County in 1998-1999. The mail survey conducted as part of the BAS revealed that about 42.8% of the registered boats were stored on trailers at home, 30.4% at a dock at home, 11.7% in

* Comments from the public indicated that Exhibit 6 is not comprehensive and may have omitted some boat facilities.

dry storage at a marina, and 9.7% at a wet slip at a marina. These results emphasize the importance of boat ramps for boats stored on trailers.

The BAS identified nine public and one private boat ramps in Martin County (Exhibit 6). The ramps at Sandsprit Park, Jensen Beach Causeway Park, and Stuart Causeway Park (formerly Jaycee Park) were the busiest ramps in the county. The ramp identified as the Hobe Sound Public Ramp in the BAS has been replaced by a new facility several miles to the north. The new boat ramp is located at Jimmy Graham Park on the west side of the ICW along Gomez Road in Hobe Sound. Many of the boat ramps and associated parking have been improved since the time the BAS was prepared (Exhibit 6).

IDENTIFICATION OF POTENTIAL SITES

All of the existing boat facility sites identified in Exhibit 6 are considered to have potential for expansion or redevelopment of boat facilities. Even though an existing boat facility may appear to be built-out, the facility could possibly expand by purchasing and redeveloping adjacent property. For this reason it is impossible to rule out the potential for expansion and redevelopment at any existing facility.

A search was conducted to identify undeveloped sites and sites with a potential for redevelopment that could accommodate the development of new boat facilities. The search for undeveloped parcels was carried out by inspecting aerial photographs and maps (Experian 1998 Aerial & Map Atlas). Undeveloped parcels adjacent to the coastal waterway were mapped. These parcels were investigated by discussing the sites with representatives from local governments and by referring to local government comprehensive plans. Research on these parcels attempted to identify the zoning classification, plans for development, and environmental constraints. In addition, sites with a potential for redevelopment were identified through discussions with representatives from local governments.

Nine sites that are currently undeveloped or have redevelopment potential were identified as potential sites for new boat facilities (Exhibit 6, Maps 4a-4h). Five of the potential sites are located within the jurisdictional boundaries of Martin County, and four potential sites are located in the City of Stuart.

Potential site P1 is located on the west shore of the Indian River Lagoon in Jensen Beach. The parcel has been cleared and lies adjacent to the north side of Martin County's Indian Riverside Park. Site P1 is owned by Martin County and zoned Waterfront General Commercial and is leased to the U.S. Sailing Center, which operates small sailboats used for competition.

Potential sites P2 through P5 occur within the City of Stuart and are associated with the redevelopment plan for downtown Stuart. These sites represent general areas identified by the City rather than specific locations. The potential for redevelopment at these sites is discussed in the Stuart Community Redevelopment Plan prepared by Design Studios West (1998). Specific plans have not been proposed for the sites, but the intent of the redevelopment effort is to maintain marine industry jobs in these areas and establish a destination point for regional residents and tourists, building on Stuart's rich nautical heritage.

Site P6 is located in unincorporated Martin County on the east shore of the South Fork of the St. Lucie River, directly adjacent to the Palm City Bridge. This site is owned by Bassett Boat Company. Boat launch facilities, a travel lift, and boat ramp are built.

Potential sites P7 and P8 are located directly adjacent to and on either side of American Custom Yachts. Potential Site P10, near American Custom Yachts, has a land use of rural density (1 unit/ 2 acres), but there is a request to change this to waterfront commercial. These undeveloped parcels are located on the north and south side of the C-44 canal between the Florida Turnpike and I-95.

Potential site P9 is associated with an existing basin constructed adjacent to the South Fork of the St. Lucie River, up stream from the C-44 Canal. The basin is part of a proposed development known as Lost River. The 152-lot single family subdivision on 79 acres has been the subject of a pre-application meeting with the county's Development Review Committee. A lawsuit has been filed against Martin County concerning development restrictions.

CRITERIA FOR SCREENING SITES

The FWC has identified a number of factors to be considered in determining the suitability of sites for boat facilities. These factors include: 1) proximity to inlets; 2) proximity to the ICW; 3) proximity to popular boating destinations; 4) proximity to manatee aggregation sites; 5) water depth; 6) presence of seagrass beds; 7) extent of manatee use; and 8) amount of overlap in patterns of use by manatees and boats. In addition to these factors, other characteristics could be considered, including: 9) size of the parcel; 10) existing land use; 11) potential for redevelopment; 12) land use and zoning classification; 13) recreational needs; and 14) the importance of an area to the economic development of a community.

Some of the factors noted above, such as proximity to inlets, are a function of the general location of a given site. These factors are most appropriate to use in a general screening process to identify desirable locations for boat facilities. Other factors, such as zoning classification, depend on site-specific characteristics and specific plans for development. Whether or not dredging is required may depend on the number of slips proposed and where the slips are to be located. Similarly, impacts to seagrasses or mangroves may depend on whether wet slips or dry storage are proposed and their exact location. Technical evaluations based on specific site plan proposals are necessary in order to consider these factors. Issues related to factors that depend on a specific plan for development are better dealt with in policies governing the development of boat facilities, rather than a general screening process. These issues are dealt with in the policy section of this BFSP.

The following discussion explains the rationale for using five main factors in a general screening process to compute a score that characterizes the relative probability of impact to manatees if additional boat trips are generated from a given location. These factors include proximity to inlets, manatee abundance, manatee habitat, manatee mortality, and speed zones. These factors are useful because they can be applied to the entire coastal waterway and a clear connection can be made concerning potential impacts to manatees. However, this system of ranking sites is only appropriate for a general screening process. This process should be considered distinct from the permit review process administered by state agencies. The Bureau of Protected Species Management in the Office of Environmental Services of the FWC uses a different evaluation process when providing comments to the DEP and the Water Management Districts concerning impacts to listed species expected with regulated activities under the Environmental Resource Permit, sovereign submerged lands, and Florida Coastal Management authorities. Activities in surface waters and wetlands is regulated by Water Resources, Part IV, Chapter

373.414(a)2, Florida Statutes, implemented by DEP and the Water Management Districts.

Proximity to Inlets. The analysis of boating activity patterns revealed that traveling offshore was the most popular destination among Martin County boaters. This is important because manatees occur primarily in the coastal waterways. Boats traveling offshore have a reduced risk of hitting manatees once they clear the inlet. However, the farther a boat travels through the coastal waterway to reach the inlet, the greater the chances of it striking a manatee. For this reason, proximity to inlets should be used in a general screening process to select desirable locations for boat facilities. Sites located closer to inlets are more desirable for siting boat facilities than sites located farther away. The segments identified in the section dealing with the evaluation of manatee abundance are appropriate to use in this analysis, because they provide an approximate measure of distance to the closest inlet. Although the segments differ in the area of coastal waterway that they cover, their standard length of about one mile makes them convenient to use in this analysis. Proximity to inlets should be used in association with other factors to rank the desirability of individual sites for the development or expansion of boat facilities.

Localized boat trips within the estuary are another important activity, which should be independent of this criterion. A number of boat ramps and existing facilities allow boaters to enjoy localized trips. Thus, evaluation of sites to accommodate this usage should be considered.

Manatee Abundance. The best source of information on the abundance of manatees in Martin County is from aerial surveys conducted by the FWC (DEP 1998). Analyses of these data indicate that manatees are most abundant at specific locations in the coastal waterway. Manatee abundance should be incorporated into the screening process because boats traveling through or adjacent to areas of greater abundance have an increased risk of striking a manatee.

Manatee Habitat. Seagrass beds are one of the most important estuarine habitats for manatees. Seagrasses are a major source food for manatees. Freshwater vegetation in rivers and canals may also provide extensive forage for manatees. The maps of seagrass beds provided by the FWC (DEP 1998) indicate that seagrasses occur at various locations throughout the Indian River Lagoon (Maps 3a-3h). Areas with seagrasses have a greater potential to attract manatees than areas with little or no seagrasses. In addition, the presence of seagrasses can limit design options for the siting of new boat facilities, because seagrasses are protected by state and federal agencies. The presence of seagrass beds should be used in association with other factors to rank the desirability of an area for the development or expansion of boat facilities.

Manatee Mortality. In the period 1974-2000, 38 manatee deaths in Martin County were caused by collision with watercraft. The locations where these manatees were recovered are areas of concern. Since December 1990, speed zones have been in effect at some locations in Martin County. Sign posting for the speed zones was completed in July 1991, but for practical purposes, the completion date is considered December 31, 1991, so as to accommodate a learning period for the boater so that they are aware of the speed zones. For 9 years prior to this time, the rate of manatee mortality caused by collision with watercraft was 2.22 (20/9) deaths per year. For a 9 year period after the signs were posted, the rate has been 1.33 (12/9) deaths per year in Martin County. These findings indicate that the speed zones are a factor in the reduction of manatee mortality, considering the human population growth and the increase in number of registered boats. However continued diligence is necessary.

Although a manatee struck by a watercraft may drift or swim before being recovered, the recovery locations provided by the FWC are the best data available for estimating where manatees have an increased risk of being struck by a boat. Manatee mortality should be considered in the screening process, because boats traveling through areas with a history of manatee mortality have an increased risk of striking a manatee.

Speed Zones. The speed zone restrictions include idle speed/no wake (the minimum speed that will maintain steerageway of the vessel), slow speed/minimum wake (approximately 5-7 miles per hour), and 25 miles per hour maximum speed. These speed restrictions apply to various locations throughout the coastal waterway (Maps 4a-4h). In some areas, the channel is exempt from the speed restriction. Speed zones are only partially effective in reducing impacts to manatees. This is primarily for two reasons. First, not all boaters obey the speed zones. Given the ideal situation of 100% compliance with the law, manatees would receive a higher level of protection. Speed zone enforcement by law officers can help to protect manatees in this situation. The second reason channel exempt speed zones are only partially effective is because at certain times manatees travel across or within the channels. An increased level of enforcement will not eliminate impacts to manatees in this situation. Existing speed zones should be incorporated into the screening process. Areas in which the entire width of the waterway is idle or slow speed, channel included, should be counted as having a reduced risk of impact to manatees.

SCREENING METHODOLOGY

The methodology used to identify desirable locations for the development of new boat facilities or the expansion of existing boat facilities is based on the five main criteria for the general screening process described in the previous section. A scoring system was designed that provided an equal weighting to each of the five categories. A score for each of these categories consisting of a 1, 2, or 3 was assigned to each of the coastal waterway segments that were defined during the analysis of manatee abundance in the previous section of the report (Maps 4a-4h). A score of 1 indicates relatively lower potential for impact to manatees, a 2 indicates intermediate potential for impact to manatees, and a 3 indicates relatively higher potential for manatees. The procedure allows a score to be computed that characterizes the relative probability of impact to manatees if additional boat trips are generated from a given segment of the coastal waterway. A total score for each segment was calculated by adding the individual scores assigned to each of the five categories (Exhibit 7). The scores for each category were computed as follows:

Proximity to Inlets. The closest inlets to the coastal waterways in Martin County are the St. Lucie and Jupiter Inlets. Since each segment in the study area is about one mile in length (i.e. travel distance for a boat), the distance to each inlet can be approximated by counting the number of segments from the inlets. For example, Segment 1 is located at the Martin and St. Lucie County line. By counting the number of segments to the closest inlet, the St. Lucie Inlet, it can be determined that this segment is about 8 miles from the inlet. The maximum distance from any inlet following the coastal waterway in the study area is about 16 miles. In order to characterize relative distance to the inlet, segments within five miles of the inlet were classified as close to the inlet and received a score of 1. Segments ranging from six to 10 miles from the inlet were classified as intermediate and received a score of 2. Segments greater than 10 miles from the inlet were considered far from the inlet and received a score of 3.

Manatee Abundance. Analysis of aerial survey data provided by the FWC resulted in the calculation of relative index of manatee abundance values ranging from 0 to 1.1 for all the segments of the coastal waterway in Martin County. Segments with relative index of manatee abundance values ranging from 0 to 0.3 were classified as relatively low abundance and assigned a score of 1. Segments with relative index of manatee abundance values ranging from 0.4 to 0.7 were classified as intermediate and assigned a score of 2. Segments with relative index of manatee abundance values ranging from 0.8 to 1.1 were classified as relatively high abundance and assigned a score of 3.

Manatee Habitat. The seagrass maps (Maps 3a-3h) were visually inspected and the percent of each segment covered with seagrasses was estimated. Segments with 0 to 25 percent coverage of seagrasses were classified as low coverage areas and assigned a score of 1. Segments with 25 to 75 percent seagrass coverage were classified as intermediate and assigned a score of 2. Segments with greater than 75 percent seagrass coverage were classified as high coverage areas and assigned a score of 3. This method of scoring seagrasses only assesses the importance of seagrasses within the general area of the segment analyzed. The FWC and DEP typically apply a more detailed method of determining seagrass habitat value when evaluating the seagrass coverage at a specific location during the permit review process. Also, freshwater vegetation should be considered in a similar manner for the riverine and canal segments. However, maps of freshwater vegetation were not available for this analysis.

Manatee Mortality. Twelve manatees have died from impact with watercraft in Martin County since the speed zone signs were effective in December 1991. Using these 12 records, segments with no manatee mortality within them were classified as low mortality areas and assigned a score of 1. Segments with one record of manatee mortality were classified as intermediate and assigned a score of 2. Segments with two or more records of manatee mortality were classified as high mortality areas and given a score of 3.

Speed Zones. Various types of boating speed zones are present throughout the coastal waterway in Martin County (Maps 4a-4h). Segments with 100% of their area having the entire width of the waterway designated as idle or slow speed, channel included, were classified as low speed areas and assigned a score of 1. Segments with a portion less than 100% of their area designated as idle or slow speed were classified as intermediate and assigned a score of 2. Segments without any portion of their area designated as idle or slow speed were classified as high-speed areas and assigned a score of 3.

RESULTS OF THE SCREENING PROCESS

Applying the screening methodology to each of the 52 segments (Maps 4a-4h) in the Martin County coastal waterway resulted in total scores ranging from 5 to 11. The number of segments associated with each score was distributed as follows:

<u>Score</u>	<u>Number of Segments</u>	<u>Impact to Manatees</u>
5	2	Low
6	7	Low
7	16	Medium
8	14	Medium
9	9	Medium
10	2	High
11	2	High

For purposes of characterizing potential impact to manatees if additional boat trips are generated from a given area, segments with scores ranging from 5 to 6 were classified as areas of low potential for impact to manatees. Segments with scores ranging from 7 to 9 were classified as areas of medium potential for impact to manatees. Segments with scores ranging from 10 to 11 were classified as areas of high potential for impact.

Segments 16, 21, 24, 25, 27, 33, 34, 36, and 37 produced scores in the category of low potential for impact to manatees. Only two of these segments, 33 and 34, have existing boat facilities. Segments 33 and 34 encompass Manatee Pocket, which has one of the major concentrations of boat facilities in Martin County. The following boat facilities are located along Manatee Pocket (Maps 4a-4h)*:

Map Code	Boat Facility
28	A & J Boatworks
26	Hinckley Boatyard
23	Finest Kind Marina
29	Manatee Marina
24	Mariner Cay Marina
30	Mar-Tech Yacht Fitters
25	Chapman School
27	Pirates Cove Marina
22	Sailfish Marina
50	Stuart Yacht Sales
36	Broward Street Ramp
57	Sandsprit Park Ramps

Segments 6, 7, 12, and 17 had scores in the category of high potential for impact to manatees. Segment 7 corresponds with the crossroads area, and segment 6 is the portion of the Indian River Lagoon just north of the crossroads. The Marriott Marina (Map Code 15) is the only boat facility in these segments. Segment 12 corresponds with Peck Lake and includes the Loblolly Bay Marina (Map Code 31). Segment 17 corresponds with Hobe Sound and includes the Jupiter Island Club Marina (Map Code 48).

The remainder of the boat facilities and potential sites identified in Martin County (Exhibit 6)* occur in areas classified as medium potential for impact to manatees.

*This list is not comprehensive and may have omitted some existing boat facilities.

DISCUSSION

The identification of preferred locations for the development of future boat facilities is an important function of this BFSP. The screening process applied to Martin County is useful for identifying desirable locations for the development or expansion of boat facilities based on probability of impact to manatees. Results of the screening process revealed that 9 out of 52 segments of the coastal waterway in Martin County were classified as areas of low potential for impact to manatees. Of these areas, only the segments encompassing Manatee Pocket (Map 4b) have existing boat facilities. Manatee Pocket has one of the major concentrations of boat facilities in the county. Furthermore, the busiest boat ramps in the county are located at Manatee Pocket in Sandsprit Park. Manatee Pocket also has a variety of boat facilities, including wet slip marinas, dry storage, repair, maintenance, and sales facilities. However, there are no undeveloped sites for the development of new boat facilities in Manatee Pocket. The future development of boat facilities in Manatee Pocket would have to involve the expansion of existing facilities or the redevelopment of adjacent property.

The remaining segments identified during the screening process as having a low probability of impact to manatees are not desirable for development of boat facilities, because the shoreline has already been developed or is committed to conservation or other uses that would preclude development of boat facilities. Furthermore, these sites are spread out, which makes them less desirable than if boat facilities can be concentrated in a general area. A consideration of land use and zoning issues revealed that there are limited opportunities based on existing zoning and land use. The only other general area in Martin County that has a reasonable potential to accommodate additional boat facilities is the Downtown City of Stuart area on the north and south side of Roosevelt Bridge and encompassing sites east and west of US 1. This area includes potential sites P2 to P5 (Map 4g). These sites, however, represent general areas for redevelopment rather than existing undeveloped parcels suitable for the development of new boat facilities. Given the limited number of sites available for new facilities, opportunities for the expansion of existing facilities and redevelopment are necessary to accommodate future growth in Martin County.

Preferred Locations. The areas that appear to be most suitable for expansion and redevelopment are Manatee Pocket and Downtown City of Stuart on the north and south side of Roosevelt Bridge and encompassing sites east and west of US 1. These areas should be identified as preferred locations for future boat facilities, however any site must meet environmental permitting conditions.

The geographic areas identified as preferred locations are depicted in Exhibits 8 and 9. Both of these locations occur within existing CRA's (Design Studios West 1998, Glatting et al. 2000). These are locations where the City and the county should promote the expansion and redevelopment of marine industries. One benefit of redevelopment is that there will be opportunities for reconfiguring stormwater management systems, and this will ultimately improve water quality in these areas. Another benefit of concentrating new boat facilities in these areas is that the enforcement of speed zones can be more effective than if new facilities are spread throughout the county. Also, there are many existing channels in these areas, which will minimize the need for dredging. Furthermore, the habitat maps (Maps 3a-3h) do not show extensive seagrass beds in these areas. Another advantage from the preferred location for the Downtown City of Stuart is that localized trips in the North and South Fork of the St. Lucie River are possible from sites in this location.

In the case of expansion of existing or development of new private multi-family residential docks designed to accommodate the boats of more than one residence, if the site is located in a preferred location, then the total number of slips shall be determined by the site plan design, physical space limitation, environmental permitting criteria, and approval by the local government and permitting agencies.

The areas of Jensen Beach, Rio, and Port Salerno are CRAs within unincorporated Martin County. Each is on the water and an area with a long history of boating and fishing activities. The formal boundaries for each of these areas are given in Exhibits 9, 11-12 and these boundaries can only be modified through a statutory required public hearing process. For the Port Salerno CRA, its waterfront areas are included in the boundaries of Manatee Pocket and thus this CRA can be considered a preferred site. For the Rio CRA, the boundaries include waterfront areas, but the land use and zoning for marina redevelopment will be tightly regulated and any redevelopment will be encouraged according to sustainable principles. With these safe guards, the waterfront commercial areas of the Rio CRA will be considered as preferred sites. For the Jensen Beach CRA, the boundaries include waterfront commercial areas and existing marinas. Within the boundaries of this CRA, SunDance Marine as shown in Exhibit 12 is designated a preferred area for marina redevelopment. Any other area for potential marine development or redevelopment within the Jensen Beach CRA will be considered a conditional site. Any marina development or redevelopment, whether a preferred or conditional site, must meet natural resource evaluation and environmental permitting criteria required by DEP and COE.

The S & S Investment Parcel 2 or P10, P7, P8 and American Custom Yachts are also designated as a preferred area (Exhibit 13). These parcels are on the north and south side of the St. Lucie Waterway located between I-95 and the Florida Turnpike. Potential site P10 has an existing land use of rural density (1 unit per 2 acres) and is under review for conversion to commercial waterfront. We propose that these undeveloped areas be used for waterfront manufacturing and boat repair activities that will not generate daily boat trips typical of a marina with a boat barn.

As county owned/operated boat ramps reached their maximum handling capacity, additional county sponsored boat ramps will need to be sited. The Martin County Parks and Recreation Department has evaluation criteria for the siting of new boat ramps in addition to meeting all environmental and permitting requirements. These evaluation criteria insure that vehicular traffic congestion, parking requirements, compatibility with adjoining neighborhoods, projected usage of the site, reasonable access to the waterways, economic considerations, and land use and zoning patterns are all considered prior to any formal recommendation on a particular site to the BCC. Thus when these criteria for a site have been optimized to the extent possible, the site commented upon by the FWC, and accepted by the BCC, then the site will be considered a preferred site. Natural resource evaluations and permitting criteria must be fulfilled even if a site is preferred.

Conditional Locations. Sites where existing boat facilities*, including multi-family residential docks, are located currently should be considered conditional locations for expansion or redevelopment of boat facilities. Conditional sites are identified in Exhibit

*"existing boat facilities"--facilities with boat docks built and in use.

** manatee mortality--a predetermine annual boat-related mortality rate for the county averaged over the latest three year period.

6 and their locations are shown on Maps 4a-4h. The potential sites identified in Exhibit 6 and Maps 4a-4h are also considered conditional sites. A waterfront property not identified in Table 6 will be considered as a conditional site on a case-by-case basis, if its present or potential land use and zoning designation (e.g. commercial waterfront or residential multi-slip dock) are in compliance with the Comprehensive Growth Management Plan and zoning provisions. Expansion or development at these sites will be conditional based on two evaluations: the rate of boat-related manatee mortality** in the county or in a specific geographic area under consideration, and impacts to natural resources. Expansion or development of boat facilities at conditional locations will be based on the review and approval by the local government and state and federal permitting agencies. The number of boats at each facility may be limited by site plan constraints. Additional wet slips or dry storage for powerboats at conditional locations will be considered only if the average annual rate of manatee deaths attributed to watercraft for the preceding three years for which manatee mortality data are available is less than or equal to 1.33 or if the average annual rate of manatee deaths attributed to watercraft for the preceding three years for which manatee mortality data are available is less than 1.0 within 5 miles by water of the location. Also, the development plans must be designed to avoid and minimize impacts to natural resources to the extent practical. Any impacts to seagrasses, tidal marshes, or mangrove communities must be avoided or minimized. Expansion of boat facilities at conditional locations will be based on the review and approval by the local government and state and federal permitting agencies.

In the case of private multi-family residential docks designed to accommodate the boats of more than one residence, if the site is located in a conditional location, then the total number of slips shall be determined by the site plan design, physical space limitation, environmental permitting criteria, and approval by the local government and permitting agencies.

A "Survival Factor" developed by Meier is a method to index manatee mortality to boat registrations and the advent of boat speed zones for manatee protection. However, its use in evaluating sites is advisory only. See Appendix 1 for an explanation of this index.

Another factor to be considered in evaluating development plans relates to impacts to natural resources. The expansion or development plan must be designed to avoid and minimize impacts to natural resources to the extent practical. Any impacts to seagrasses, tidal marshes, or mangrove communities must be avoided or minimized. Expansion or development of boat facilities at conditional locations will be based on the review and approval by the local government and state and federal permitting agencies.

Non-preferred Locations. All other locations that have not been identified as a preferred location or a conditional location are considered non-preferred locations. New boating facilities should not be permitted at these locations unless it is determined that the facility will not generate daily powerboat trips. For example, a facility such as boat manufacturing facility, a boat repair facility, or a long-term storage area could be determined to be an acceptable use. Approval should be based on the condition that these facilities do not engage in activities that could impact manatees, such as short-term boat storage resulting in daily launches, or the high-speed testing of watercraft in the adjacent coastal waterway.

Single-family Locations. For single-family residential lots with existing water frontage, a limit of one dock per lot or easement or right-of-way to the water is the recommended threshold. This applies to the entire coastal waterway, regardless of the location of the site. Whether or not a dock may actually be constructed is to be determined by the rules

and regulations of the local government with jurisdiction and the state and federal permitting agencies.

Density Thresholds. Along with the location of a facility, the number of slips or dry racks that are maintained at a particular site is an important consideration. The number of trips generated from a facility is a function of the number of boats docked or stored at the location. In Martin County, new boat facilities will result from redevelopment in the preferred locations and expansion of existing facilities at conditional locations. Because of the limited opportunities for new development at these locations, thresholds should not be a primary constraint on commercial docking or storage facilities. Each facility will be limited by site plan constraints, including local, state, and federal requirements to avoid and minimize impacts to natural resources.

In the case of private multi-family residential docks designed to accommodate the boats of more than one residence, if the site is located in a preferred or conditional location, then the total number of slips shall be determined by the site plan design, physical space limitation, environmental permitting criteria, and approval by the local government and permitting agencies. At sites that are located in non-preferred locations and do not have an existing facility, then the construction of new multi-family residential docking facilities shall only be considered when such facility, by means of conservation easements or otherwise, will result in fewer boat docks than might otherwise be installed.

Boat Ramps. A high proportion of the boat trips originating in Martin County are from its boat ramps. The boating activity study found that the majority of boats using the boat ramps were powerboats, which have a great potential for impacting manatees. Martin County has a good distribution of public boat ramps located throughout the study area (Maps 4a – 4h), which provide reasonable access to all of the major water bodies. Most of the boat ramps have been improved recently and are in good repair. The main problem with using the ramps is the need for additional parking at some locations on weekends and holidays. The other concern is the traffic generated around these sites from increased use, which is difficult to adequately control.

When a need has been demonstrated in order to meet an acceptable level of service, additional public access should be provided by increasing the ramp lanes and increasing the parking spaces at existing ramps. This is preferable to developing ramps at new locations. Expansion of existing ramp facilities is more desirable because the potential impact on manatees can be monitored more easily with a fewer number of ramp locations. Speed zones and enforcement can be used more effectively if necessary to protect manatees when the facilities are concentrated.

There is currently a need to provide additional parking for the boat ramps at Sandsprit Park. These are the most important ramps in the county because they are closest to the St. Lucie Inlet and they are the busiest ramps in the county. Furthermore this is a preferred location for the development of boat facilities. The challenge for Martin County is to be creative in improving and expanding the parking at this facility. Two alternatives for increasing the parking should be evaluated. First, the existing uses at the park property should be evaluated to determine if additional parking could be provided. This is presently being done by the Martin County Parks and Recreation Department. Second, the concept of providing an auxiliary parking location should be examined. This would allow greater access to this premier boat launch facility. The potential benefit to manatees is that launches from this facility offer the most direct travel route in the county to the Atlantic Ocean. Once boats have passed through the coastal waterway and are in the

ocean, the threat to manatees is reduced. Also, the expanded use of the ramps at Sandsprit Park would facilitate the efficient placement and enforcement of speed zones.

There is a need to provide additional public boat ramps to accommodate growth and the need to minimize traffic congestion around the ramps. In order to meet these needs and when other county owned/operated ramps have reached their maximum handling capacity, future but undesignated "county owned/operated boat ramps" should be treated as a preferred site once the evaluation criteria for the site has been optimized. These evaluation criteria insure that vehicular traffic congestion, parking requirements, compatibility with adjoining neighborhoods, projected usage of the site, reasonable access to the waterways, economic considerations, and land use and zoning patterns are all considered prior to any formal recommendation on a particular site to the BCC. Natural resource evaluations and permitting criteria must be fulfilled even if a site is preferred.

Speed Zones and Enforcement. Perhaps the most important action needed to protect manatees in Martin County is to review new speed zones and improve enforcement in several key areas of the coastal waterways. However, this BFSP should not be coupled with the adoption of new speed zones.

The analysis of manatee mortality revealed that the crossroads, formed by the confluence of the Indian River Lagoon, St. Lucie Inlet, Great Pocket, Manatee Pocket, and St. Lucie River is a critical area for mortality (Map 2b). This general area (segments 6, 7, 9, 33, 34, and 35) accounted for 44% of the manatee carcass recoveries in the county. Except for near the shoreline, the current speed restrictions throughout most of this area is 25 miles per hour (mph) (Map 4b). The speed zones in this area should be reviewed, especially during the period when manatees are most abundant from November 15 to March 31. Besides protecting manatees, this action would enhance boater safety in this area. However, speed regulations are the responsibility of the State and not a local government function.

Seagrasses. Implementation of this BFSP will be effective in minimizing impacts to seagrasses, a prime food source and habitat for manatees. However there may be future projects in the county that are found to be in the public interest that could have an impact on seagrasses. Such projects could be related to bridge construction, placement of utility lines or pipelines, channel enlargement, etc. Because of this, seagrass restoration is encouraged.

POLICIES FOR SITING BOAT FACILITIES

In order for a site to be found acceptable for the development or expansion of boat facilities, it is necessary for a specific proposal to be reviewed by the local government, DEP, COE, USFWS, and SFWMD. The local government needs to make a determination if the development proposal is consistent with the comprehensive plan, land development regulations, and this BFSP. The state and federal agencies also need to determine if the development proposal is consistent with permitting criteria. An acceptable site for the development or expansion of boat facilities is one for which the specific proposal for the boat facility has been reviewed and found to be consistent with the BFSP, approved by the local government, and approved by the state and federal permitting agencies. The following policies should be used to determine if a specific proposal is consistent with this BFSP:

Policy 1. The siting of all boat facilities within unincorporated Martin County shall be consistent with the guidelines, methodologies, procedures, and policies established in this BFSP. This applies to the expansion of existing facilities or the development of new facilities. Other local governmental jurisdictions will be encouraged to adopt guidelines, methodologies, procedures, and policies consistent with this BFSP.

Policy 2. A specific site plan proposal shall be reviewed to determine if the site is located in an area designated as preferred, conditional, or non-preferred, as defined in the following policies. Limitations on development described in this BFSP shall apply to sites in these locations.

Policy 3. Preferred locations for new boat facilities in Martin County are defined as sites that are located in the Manatee Pocket and Downtown City of Stuart on the north and south side of Roosevelt Bridge and encompassing sites east and west of US 1, as identified and depicted in Exhibits 8 and 10. The BFSP supports the expansion and redevelopment of marine industries in these defined areas. The S & S Investments Parcel 2 or Potential Site 10, Potential Site 7, Potential Site 8, and American Custom Yacht are designated also as a preferred areas (Exhibit 13) and the county proposes that the undeveloped areas be used for waterfront manufacturing and boat repair activities. The number of boats at each facility will be limited by site plan constraints, and local, state, and federal requirements to avoid and minimize impacts to natural resources.

Policy 4. The areas of Port Salerno, Rio, and Jensen Beach (Exhibits 9, 11 12), areas with a long history of boating and fishing activities, are undergoing formal redevelopment through the Community Redevelopment Area process. The CRAs of Port Salerno and Rio, as depicted in Exhibits 9 and 11, are preferred sites. The area of SunDance marine in the CRA of Jensen Beach, as depicted in Exhibit 12, is a preferred area. Any other area for potential marina development or redevelopment within the Jensen Beach CRA is a conditional site. All marina development or redevelopment in the CRAs, whether preferred or conditional, must meet natural resource evaluation and environmental permitting criteria required by the DEP and COE.

Policy 5. Martin County will encourage land uses and site plans at preferred locations that enhance access to the coastal waterway and maximize the number of wet slips and dry storage racks at a given facility.

Policy 6. Martin County will encourage the DEP and SFWMD to develop ecosystem-planning initiatives for all preferred locations. A prime focus of this these

initiatives is to develop a coordinated and comprehensive approach to increasing the number of boat facilities, enhancing natural resources, and protecting manatees. Special attention should be given to enhancing stormwater management systems, determining adequate levels of enforcement for speed zones, and considering parking alternatives for boat ramps.

Policy 7. Conditional locations for boat facilities in Martin County are defined as sites located outside of the preferred locations where existing boat facilities are currently located, or where potential sites have been identified. These sites are identified in Exhibit 6 and Maps 4a-4h. A waterfront property not identified in Table 6 will be considered as a conditional site on a case-by-case basis, if its present or potential land use and zoning designation (e.g. commercial waterfront or residential multi-slip dock) are in compliance with the Comprehensive Growth Management Plan and zoning provisions. Expansion or development at these sites will be conditional based on two evaluations: the rate of boat-related manatee mortality* in the county or in a specific geographic area under consideration, and impacts to natural resources. Expansion or development of boat facilities at conditional locations will be based on the review and approval by the local government and state and federal permitting agencies. The number of boats at each facility may be limited by site plan constraints. Additional wet slips or dry storage for powerboats at conditional locations will be considered only if the average annual rate of manatee deaths attributed to watercraft for the preceding three years for which manatee mortality data are available is less than or equal to 1.33 or if the average annual rate of manatee deaths attributed to watercraft for the preceding three years for which manatee mortality data are available is less than 1.0 within 5 miles by water of the location. Also, the development plans must be designed to avoid and minimize impacts to natural resources to the extent practical. Any impacts to seagrasses, tidal marshes, or mangrove communities must be avoided or minimized. Expansion of boat facilities at conditional locations will be based on the review and approval by the local government and state and federal permitting agencies.

Policy 8. Non-preferred locations are defined as sites located in areas that have not been identified as a preferred location or a conditional location. New boating facilities shall not be permitted at these locations unless it is determined that the facility will not generate daily powerboat trips. Approval of the development plan at non-preferred locations shall be based on a review by the local government, DEP, COE, USFWS, and SFWMD. To be approved, the review should indicate that the site plan is designed to avoid and minimize impacts to natural resources to the extent practical. The only impacts to seagrass beds, tidal marsh, mangrove and other wetland communities allowed at non-preferred locations are those necessary for access to the site.

Policy 9. Single-family residential lots with water frontage are allowed one dock per lot or easement or right-of-way to the water. This applies to the entire coast line of Martin County, regardless of the location of the site. The permitting requirements apply from the local government, DEP, COE, USFWS, and SFWMD.

Policy 10. Private multi-family residential docks designed to accommodate the boats of more than one residence shall be allowed only at preferred and conditional locations. The total number of slips shall be determined by the site plan design, physical space

* manatee mortality--a predetermined annual boat-related mortality rate for the county averaged over the latest three year period.

limitation, environmental permitting criteria, and approval by the local government and permitting agencies.

Policy 11. As the need arises to increase public access to boat ramps, Martin County shall strive to meet an acceptable level of service by increasing the number of ramp lanes and increasing the number of parking spaces at existing ramps. In order to increase parking at a particular ramp, Martin County will evaluate if additional parking at the site is possible. When this approach is not feasible, the concept of providing an auxiliary parking location will be examined.

Policy 12. To accommodate population growth when existing ramp sites have reached their maximum development and traffic capacity, the County shall identify appropriate waterfront properties for developing new county owned/operated boat ramps. The Martin County Parks and Recreation Department has evaluation criteria for the siting of new boat ramps in addition to meeting all environmental and permitting requirements. These evaluation criteria insure that vehicular traffic congestion, parking requirements, compatibility with adjoining neighborhoods, projected usage of the site, reasonable access to the waterways, economic considerations, and land use and zoning patterns are all considered prior to any formal recommendation on a particular site to the BCC. Thus when these criteria for a site have been optimized to the extent possible, the site commented upon by the FWC, and accepted by the BCC, then the site will be considered a preferred site. Natural resource evaluations and permitting criteria must be fulfilled even if a site is preferred.

Policy 13. Martin County shall work with the FWC to review speed zones in the area of the crossroads, formed by the confluence of the Indian River Lagoon, St. Lucie Inlet, Great Pocket, Manatee Pocket, and St. Lucie River. This area has recorded watercraft-related manatee mortality. Martin County shall also work with the FWC Bureau of Marine Enforcement, Sheriff's Office, and other enforcement agencies to ensure the availability of adequate resources and personnel to enforce the speed restrictions, if enacted.

Policy 14. Martin County and FWC shall monitor manatee mortality caused by collision with watercraft in the county waterways. If the annual rate of mortality shows an increasing trend in areas where the entire width of the waterway is idle or slow speed, channel included, then additional law enforcement of the speed zones shall be considered in the appropriate areas prior to the approval of additional boat slips. If the annual rate of mortality shows an increasing trend in areas without full speed zones, then additional speed zones shall be considered in the appropriate areas prior to the approval of additional boat slips. The BFSP should be updated and modified every 7 years with the comprehensive plan as part of the Evaluation and Appraisal Report cycle.

LITERATURE CITED

- Design Studios West. 1998. Stuart Community Redevelopment Plan. City of Stuart, Stuart.
- Florida Department of Environmental Protection, Florida Marine Research Institute. 1998. Atlas of Marine Resources. CD-ROM, Version 1.2, St. Petersburg.
- Glattig Jackson Kercher Anglin Lopez Rinehart, Inc. and Williams, Hatfield & Stoner, Inc. 2000. Port Salerno Community Redevelopment Plan. Prepared for the Martin County Community Redevelopment Agency and Port Salerno Neighborhood Advisory Committee.
- Indian River Lagoon National Estuary Program. 1995. A Boaters Guide. Indian River Lagoon National Estuary Program, Melbourne.
- Martin County. 1990. Comprehensive Growth Management Plan. Martin County, Stuart.
- National Biological Survey. 1994. Atlantic Coast Manatee Telemetry 1986-1993 Progress Report. Volume I. Sirenia Project, Gainesville.
- O'Shea, T. J., B. B. Ackerman, and H. F. Percival (Eds.). 1995. Population Biology of the Florida Manatee. Information and Technology Report 1. National Biological Service, Washington D.C.
- Palm Beach County Department of Environmental Resources Management. 1992. Palm Beach County, Florida Estuaries Natural Resources Inventory and Resources Enhancement Study. Palm Beach County, West Palm Beach.
- Reynolds, J. E., III. 1994. Distribution and Abundance of Florida Manatees (*Trichechus manatus latirostris*) Around Selected Power Plants Following Winter Cold Fronts: 1993-1994. No. B93135-00139. Final Report prepared for Florida Power and Light Company, North Palm Beach.
- Reynolds, J. E., III and D. K. Odell. 1991. Manatees and Dugongs. Facts on File, Inc., New York.
- Shultz, R. R. 1996. Boating Activity Study for St. Lucie and Martin Counties. Final report. Prepared for the Bureau of Protected Species Management, Division of Marine Resources, Florida Department of Environmental Protection, Tallahassee.

Exhibit 1. Timing of long-distance manatee movements through Martin County based on satellite telemetry data (National Biological Survey 1994). PRV = Riviera Power Plant; PPE = Port Everglades Power Plant.

Manatee Number	Origin	Destination	Direction	Time of Movement
TBC-01	PRV	Brevard County	North	March 87
TBC-03	PPE	Sebastian River	North	Dec 88 to Early Jan 89
	Indian River	PPE	South	Mid-Nov 89 to Mid-Dec 89
	Sebastian	Lantana	South	Early Feb 91 to Mid-Feb 91
	Boca Raton	Vero Beach	North	Mid-Feb 91 to Late Feb 91
	Sebastian River	PPE	South	Mid-Dec 91 to Mid-Jan 92
	PPE	Cocoa Beach	North	Mid-Feb 92 to Early Mar 92
	Indian River	PPE	South	Jan 93 to Mid-Feb 93
TBC-04	Cocoa Beach	PPE	South	Late Dec 86 to Early Jan 87
	PPE	Sebastian River	North	Late Mar 87 to Early Apr 87
TBC-09	Broward Co.	Cocoa Beach	North	Early Feb 89
	Cocoa Beach	PPE	South	Late Feb 89 to Early Mar 89
	PPE	Banana River	North	Mid-Mar 89 to Late Mar 89
	Cocoa Beach	PPE	South	Late Oct 89 to Mid-Nov 89
	PPE	Banana River	North	Early Feb 90 to Mid-Feb 90
	Banana River	PPE	South	Late Feb 90 to Mid-Mar 90
	Vero Beach	Ft. Lauderdale	South	Early Oct 90
	PPE	Vero Beach	North	Mid-Dec 90 to Early Jan 91
	Sebastian	PPE	South	Mid-Jan 91 to Mid-Feb 91
	Lake Worth	Vero Beach	North	Late Feb 91
	Vero Beach	Pompano Beach	South	Early to Mid-Mar 91
	Brevard County	PPE	South	Late Oct 91
	PPE	Brevard County	North	Mid-Feb 92 to Late Feb 92
	PPE	Brevard County	North	Mid-Dec 92
	Brevard County	PPE	South	Late Dec 92
	PPE	PRV	North	Early Jan 93
	PPE	Indian River Co.	North	Early Mar 93 to Mid-Mar 93
TBC-10	Brevard County	Lake Worth	South	Jan 88
TBC-13	Brevard County	PRV	South	Jan 88 to Early Feb 88
	Boca Raton	Brevard County	North	Early Mar 88 to Mid-Mar 88
TBC-14	Brevard County	PPE	South	Mid-Jan 87
	PPE	Ft. Pierce	North	Mid-Feb 87
TBC-17	Banana Creek	Peck Lake	South	Nov 87 to Dec 87
TBC-20	Cape Canaveral	PPE	South	Early Dec 87
	PPE	Sebastian River	North	Mid-Jan 88
	Port Canaveral	PPE	South	Mid-Nov 89 to Early Dec 89
TBC-24	Brevard County	PPE	South	Mid-Nov 89 to Mid-Dec 89
	PPE	Banana River	North	Mid-Feb 90
	Banana River	Broward County	South	Mid-Dec 90
	PPE	Sebastian	North	Mid-March 91
	Banana River	PPE	South	Early Nov 91 to Mid-Nov 91
	PPE	Cocoa Beach	North	Mid-Feb 92 to Early Mar 92
	Banana River	PPE	South	Early Dec 92
	PPE	Banana River	North	Mid-Mar 93

Exhibit 1. Continued.

Manatee Number	Origin	Destination	Direction	Time of Movement
TBC-25	Cape Canaveral	PPE	South	Mid-Dec 89
	PPE	Banana River	North	Mid-Feb 90
TBC-26	Cape Canaveral	Dade County	South	Early Dec 89
	Dade County	Banana River	North	Mid-Feb 90
	Banana River	Dade County	South	Mid-Dec 90
	PPE	Vero Beach	North	Mid-Feb 91
	Ft. Pierce	Ft. Lauderdale	South	Early Jan 92
	Dade County	Cape Canaveral	North	Late Feb 92 to Early Mar 92
TBC-36	Brevard County	Willowby Creek	South	Mid-Dec 92
TBC-37	Ft. Pierce	Lake Worth	South	Early Dec 92
	Lake Worth	Ft. Pierce	North	Late Dec 92
	Vero Beach	Lake Worth	South	Late Jan 93
	Lake Worth	Martin County	North	Mid-Mar 93
	Martin County	Lake Worth	South	Late Mar 93
TBC-38	Brevard County	PPE	South	Late Nov 92 to Mid-Dec 92
TFP-02	PRV	Banana River	North	Late Mar 90
	Banana River	Jupiter Inlet	South	Mid-Apr 90
	PRV	Sebastian River	North	Mid-Apr 93
	Jupiter Inlet	Peck Lake	North	Mid-Jun 93 to Late Jun 93
TFP-03	Lake Worth	Vero Beach	North	Early Feb 92 to Early Mar 92
	Fort Pierce	Hobe Sound	South	Early Dec 92 to Mid-Dec 92
TFP-04	Lake Worth	Ft. Pierce	North	Early Mar 92
	Ft. Pierce	Lake Worth	South	Mid-Mar 92
TFP-05	Ft. Pierce	Miami	South	Late Dec 91
TFP-06	Ft. Pierce	PPE	South	Early to Mid-Feb 93
	PPE	St. Lucie County	North	Mid-Mar 93
TJX-01	Ft. Pierce	PPE	South	Mid-Dec 90
	PPE	Vero Beach	North	Late Dec 90 to Early Jan 91
	PPE	Titusville	North	Mid-Feb 92
TMI-01	PPE	Stuart	North	Early to Mid-Jan 91
	Sebastian River	PRV	South	Late Feb 91 to Early Mar 91
	PPE	Fort Pierce	North	Late Mar 93
	Ft. Pierce	Jupiter	South	Early Apr 93
	Jupiter	Indrio	North	Mid-Apr 93
TMI-02	Dade County	Brevard County	North	Mid-Apr 93 to Early May 93
TNC-01	Banana River	Dade County	South	Late Jan 88
	Dade County	Banana River	North	Early Feb 88
	PPE	Banana River	North	Mid-Jan 90
	St. Lucie Inlet	Banana River	North	Late Feb 91 to Mid-Mar 91
TPE-01	PPE	Banana River	North	Early Feb 89
	PPE	Banana River	North	Early to Mid-Jan 90
	Banana River	PPE	South	Early to Mid-Nov 90
	PPE	Wabasso	North	Early Feb 91
	Wabasso	PPE	South	Mid-Feb 91
	PPE	Wabasso	North	Late Feb 91
	PPE	Boynton Beach	North	Late Jan 92
	PPE	Banana River	North	Mid-Feb 92
	Brevard County	PPE	South	Late Nov 92 to Early Dec 92
	PPE	Brevard County	North	April 93

Exhibit 1. Continued.

Manatee Number	Origin	Destination	Direction	Time of Movement
TPE-03	PPE	Banana River	North	Early Jan 90 to Early Feb 90
	Ft. Pierce	PPE	South	Mid-Feb 91
	PPE	Banana River	North	Mid-Feb 91 to Mid-Mar 91
	Broward Co.	Sebastian River	North	Mid-Jan 93
	Sebastian River	PPE	South	Late Jan 93
	PPE	Brevard County	North	Mid-Mar 93 to Mid-Apr 93
TRB-01	PRV	Banana River	North	Mid to Late Feb 92
	Banana River	Jupiter Inlet	South	Early Feb 93
	Lake Worth	Banana River	North	Early Mar 93

Exhibit 2. Seasonal abundance of manatees in Martin County based on analysis of aerial survey data (1986-1987; 1990-1993) collected by the FWC. Manatee mortality attributed to the collision with watercraft (1974-2000) in Martin County based on data provided by the FWC. Refer to Exhibit 4 for information on manatee mortality.

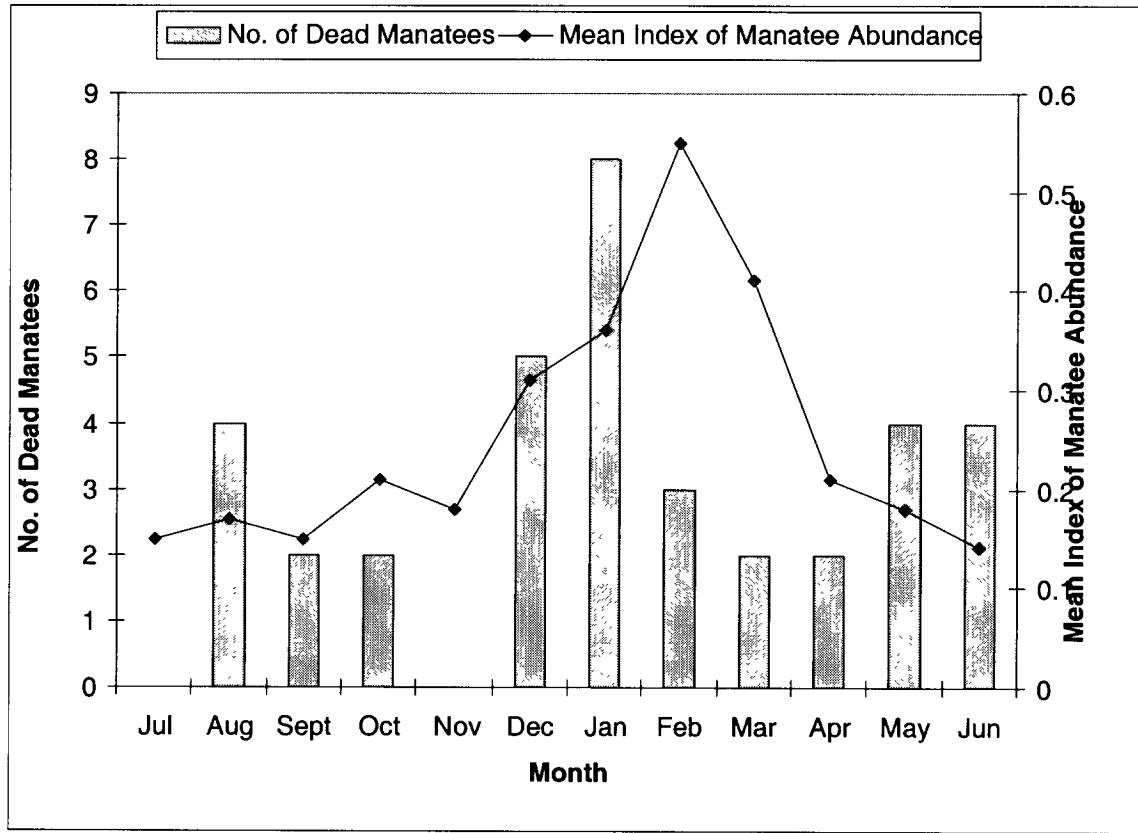


Exhibit 3. Relative index of manatee abundance. The values represent the average number of manatees counted during each aerial survey conducted by the FWC. The analysis is based on the data from 62 aerial surveys conducted from 1986 to 1993. The segments correspond to the locations identified on the maps in Exhibit 4. Dashes indicate that the segment was not included in the aerial surveys.

Segment	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall Average
1	0	0.4	0.2	0	0.1	0	0	0	0	0.3	0	0	0.1
2	0.2	0	0.5	0.4	0.4	0.5	0	0	0	0	0	0	0.2
3	0.3	0	0	0.2	0	0	0.2	0	0	0	0.2	0	0.1
4	0	0.2	0	0	0.1	0	0	0	0.5	0	0	0	0.1
5	0	1.8	0.5	0	0.5	0	1.2	0	1.0	0	0.7	0	0.5
6	0.7	0.6	1.2	0.4	0.7	0	1.0	0.6	0.7	0	2.0	2.4	0.9
7	1.2	1.4	1.5	0.6	1.4	0.7	0	0.2	0.2	0.3	2.2	1.0	0.9
8	0	0.6	0	0	0	0.5	0	0.4	0	0	0.2	0	0.1
9	0	0.2	2.2	0	0.1	0.2	0	0	0.2	0.3	0.5	0.6	0.4
10	0	0	0	0	0.1	0	1.4	0	0	0	0	0.4	0.2
11	0.5	1.0	0.8	0	0.1	0	0	0.2	0	0.7	0.7	0.8	0.4
12	1.0	0.6	0.8	0.4	0.2	0.5	0	1.2	0	1.0	0.2	0.4	0.5
13	0	1.2	0.3	0	0.9	0	0	0	0.5	4.6	0.2	0	0.6
14	0.3	0	0.8	0	0	0	0	0	0	0	0	0.4	0.1
15	0.7	2.0	0.2	0.4	0.2	0.3	0	0	0	0	0.2	0.8	0.4
16	0.7	0.4	0.3	0.4	0.1	0	0	0.2	0	0	0	1.0	0.3
17	3.1	5.0	1.0	0.2	0.4	0	0	1.0	0	0	0.5	2.0	1.1
18	0.7	2.2	0	0.4	0.2	0	0	0.2	0.2	0.7	0	0.4	0.4
19	0.3	1.0	0.5	1.8	0.1	0.3	0.6	0	0.2	0.3	0.2	0	0.4
20	1.3	1.0	0.5	0.4	0.4	0.2	0	0.4	0.5	0.7	0	0.8	0.4
21	0	0.4	0	0.6	0	0	0	0	0.5	0	0	0.4	0.2
22	0.7	0.6	0.3	0	0.2	0	0	0	0.2	0	0	1.8	0.3
23	2.6	0.4	0	0	0	0	0	0	0.2	0	0	0.6	0.3
24	0	1.0	0	0	0	0	0	0	0	0	0	0	0.1
25	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-

Exhibit 3. Continued.

Segment	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall Average
27	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-
33	0.5	0	2.6	0.6	0	0.5	0.2	0	0	0.3	0	0	0.4
34	0	0.6	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0.7	0	0.2	0.8	0	0	0.5	0	0	0.2	0.2
36	0	0	0	0	0	0	0	0	0	0	0	0.4	0
37	0	0.2	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0.7	0.2	0	0.5	0	0	0	0	0	0.1
40	0	0.3	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0.2	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0.2	0	0	0	0	0	0	0
43	0.2	0	0	0	0	0	0	0	0	0	0	0	0
44	1.0	1.0	1.2	0.7	1.2	1.2	1.5	2.3	0	0	2.0	1.0	1.1
45	0	0	0	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0.7	0	0	0	0	0	0	0	0	0.1
48	0	0	0.2	0	0	0	0	0	0	0	0	0	0
49	0	0	0.7	0	0	0.2	0	0	0.5	0	0	0	0.1
50	0	0	0.5	0	0	0	0	0	0	0	0	0	0
51	0	0	0.2	0	0	0	0	0	0.5	0	0	0	0.1
52	0	0.3	0.2	0.3	0	0	0	0.7	0	0	0	0	0.1
Overall Average	0.36	0.55	0.41	0.21	0.18	0.14	0.15	0.17	0.15	0.21	0.18	0.31	0.25

Exhibit 4. Manatee mortality attributed to collision with watercraft. Information from 1974 to 2000 provided by the FWC. The locations of segments and manatee carcass recoveries are shown in Maps 2a-2h.

Manatee Number	Year	Month	Segment	Location
1	1997	SEP	6	Indian River Lagoon; Sewall's Point, W of channel on sandbar
2	1989	MAY	7	Indian River Lagoon; Stuart, SE of Sewall's Point
3	1991	AUG	7	St. Lucie River; Port Salerno, 0.5 miles N of Manatee Pocket
4	1994	JUN	7	St. Lucie River; Port Salerno, 0.5 miles NW of Manatee Pocket
5	1979	FEB	7	St. Lucie River; Stuart, Sandsprit Park
6	1988	MAR	33	St. Lucie River; Stuart, Sandsprit Park
7	1989	DEC	33	St. Lucie River; Port Salerno, E shore of Manatee Pocket
8	1990	AUG	34	St. Lucie River; Port Salerno, Manatee Pocket at Manatee Marina
9	1991	MAY	33	Crooked Creek; Port Salerno, 0.6 miles upstream from Manatee Pocket
10	1990	DEC	7	Indian River Lagoon; Port Salerno, NW end of Jupiter Island
11	1986	OCT	7	ICW, Great Pocket; Port Salerno, near Rocky Point
12	1986	OCT	9	ICW, Great Pocket, Port Salerno, near Horseshoe Point Road
13	1997	DEC	11	Peck Lake; Hobe Sound, N end of Peck Lake
14	1988	MAY	12	Peck Lake; Hobe Sound, E shore
15	1981	FEB	12	Peck Lake; Hobe Sound, near ICW
16	1982	JAN	12	Peck Lake; Hobe Sound, on E side
17	1987	DEC	12	Peck Lake; Hobe Sound, near Loblolly Bay
18	1979	DEC	14	ICW; Hobe Sound, South Jupiter Narrows
19	1986	JAN	15	ICW; Hobe Sound, South Jupiter Narrows
20	1990	JAN	--	Atlantic Ocean; Jupiter Island, near shore
21	1995	JAN	--	Atlantic Ocean; Jupiter Island, on beach
22	1985	FEB	23	ICW, Jupiter Sound, near Conch Cove Marina
23	1997	APR	35	Willoughby Creek; Stuart, at N fork of the creek
24	1996	AUG	35	St. Lucie River; Stuart, near Willoughby Creek
25	1978	AUG	35	St. Lucie River; Stuart, near Whittaker Boat Works
26	1984	JAN	37	St. Lucie River; Sewall's Point, E bank, 0.5 miles N of Stuart Causeway
27	1979	MAR	44	C-23 Canal; Stuart, near Bessey Creek
28	1988	SEP	44	Bessey Creek; Stuart, in Hidden River Canal near creek
29	1985	JUN	46	South Fork St. Lucie River; Stuart, N of Palm City Bridge
30	1990	MAY	48	South Fork St. Lucie River; Palm City
31	1992	JUN	49	South Fork St. Lucie River; Palm City
32	1988	JUN	51	C-44 Canal; Palm City, E of St. Lucie Locks
33	1987	JAN	51	C-44 Canal; Palm City, E of St. Lucie Locks
34	1996	JAN	51	C-44 Canal; Tropical Farms, 0.25 miles W of St. Lucie Locks
35	1998	JAN	40	St. Lucie River; Rio, E bank of river
36	1999	APR	7	Port Salerno, at mouth of Manatee Pocket
37	1999	OCT	34	Manatee Pocket, southeast tributary
38	2000	AUG	46	Danforth Creek, north of creek mouth

Exhibit 6. Existing and potential boat facility sites. The information is based on the inventories by Martin County, Indian River Lagoon National Estuary Program (1995), Schultz (1996), and field surveys. Under type of facility, marinas and dry storage facilities are designated as: Public, if owned by a municipality, county, or state; Private, if privately owned and not open to the public; or Commercial, if privately owned and open to the public or other businesses. Map codes correspond with the index in Maps 4a-4h. Facilities identified with an asterisk are preferred locations for development or expansion of boat facilities. All other facilities are considered conditional locations. See the Discussion and Policy sections of the BFSP for a description of preferred and conditional locations.

Map Code	Boat Facility or Property Description	Type of Facility	Comments
	Existing Boat Facilities		
28	A & J Boatworks*	Commercial	formerly Salerno Boat Works
44	American Custom Yachts	Commercial	
2	Anchor's Aweigh Marine	Commercial	formerly Bailey Boat Company
55	Beach Water Sports	Commercial	
40	Blowing Rocks Marina	Commercial	
26	Hinckley Boatyard*	Commercial	
23	Finest Kind Marina*	Commercial	formerly Topside Marina
14	Freedom Marine*	Commercial	
9	Harbor Inn Docks*	Commercial	
38	Jupiter Hills Lighthouse Marina	Commercial	
48	Jupiter Island Club Marina	Private	
31	Loblolly Bay Marina	Private	
43	Lost River Marine	Commercial	
29	Manatee Marina*	Commercial	
47	Marina Bay Docks	Private	
24	Mariner Cay Marina*	Private	
37	Marriott Marina	Commercial	formerly Indian River Plantation Marina
30	Mar-Tech Yacht Fitters*	Commercial	

Exhibit 6. Continued.

Map Code	Boat Facility or Property Description Existing Boat Facilities Continued	Type of Facility	Comments
16	Martin County Marina	Commercial	
19	Monterey Motel and Marina	Commercial	
33	New Wave Runners	Commercial	
25	Chapman School*	Commercial	
7	Northside Marina*	Commercial	
10	Northside Marine Services*	Commercial	Permit issued 11/17/99 to expand existing 24-slip marina to 49 slips
34	Outboard Marine Corp.*	Commercial	
3	Outrigger Harbor Marina	Commercial	
39	Pelican Bay Yacht Club	Commercial	
5	Pelican's Nest Marina	Private	has a single ramp for neighborhood residents; unpaved parking
46	Pilots Cove Docks	Private	
27	Pirates Cove Marina*	Commercial	
21	Riverwatch Marina	Commercial	
22	Sailfish Marina*	Commercial	
15	Sailfish Point Marina	Commercial	
41	Seagate Marina	Commercial	
54	Seagreen Marina	Commercial	
12	Southpoint Anchorage*	Public	currently under development by the City of Stuart; will provide moorings and facilities for boats in the St. Lucie River; the city has plans to develop a City Marina at this location.
6	St. Lucie Marine*	Commercial	
20	Stella Marine	Commercial	
51	Steve Lazarus Yacht Sales*	Commercial	formerly Casa Rio Boat and Motor Sales

Exhibit 6. Continued.

Map Code	Boat Facility or Property Description	Type of Facility	Comments
	Existing Boat Facilities Continued		
4	Steve Lazarus Yachts	Commercial	
53	Stuart Harbor Dockage*	Commercial	
42	Stuart Yacht Builders	Commercial	
50	Stuart Yacht Sales*	Commercial	
1	Sundance Marine	Commercial	formerly Boat House Marina
52	The Allied Marine Group*	Commercial	has plans to construct a 12 x 50 foot boat ramp with access piers and 25 x 30 foot travel lift
13	Treasure Coast Boating*	Commercial	
11	Waterside Place Docks	Commercial	
18	Whiticar Boat Works	Commercial	
17	Bassett Boats	Commercial	Formerly Woods Cove Marine
	Boat Ramps		
36	Broward Street Ramp*	Public	single ramp with unpaved parking
32	Jensen Beach Causeway Park Ramps	Public	one 3-lane ramp on north side of causeway and one 2-lane ramp on south side of causeway; paved parking; recently improved
45	Jimmy Graham Park Ramp	Public	one ramp with two lanes; paved parking; new facility
49	Jonathan Dickinson State Park Boat Ramp	Public	single ramp with paved parking
56	Leighton Park Ramp	Public	one 3-lane ramps; paved parking; recently improved
58	Phipps Park Ramp	Public	single ramp with unpaved parking
57	Sandspruit Park Ramps*	Public	one 4-lane ramp and one 2-lane ramp; paved and unpaved parking; recently improved
35	Shepard Park Ramp*	Public	one 2-lane ramp; paved parking
8	Stuart Causeway Park Ramp	Public	formerly Jaycee Park; one 2-lane ramp; unpaved parking; recently improved

Exhibit 6. Continued.

Map Code	Boat Facility or Property Description Potential Sites	Type of Facility	Comments
P1	Potential Site (Indian Riverside Park)		Zoned Waterfront General Commercial; unincorporated Martin County; vacant owned by Martin County; adjacent to the proposed Indian Riverside Park which is the former site of the Florida Institute of Technology campus in Jensen Beach
P2	Potential Site (City of Stuart)		Zoned Business, Industrial, and Public Facilities; within the City of Stuart Community Redevelopment Area
P3	Potential Site (City of Stuart)		Zoned Business, Industrial, and Public Facilities; within the City of Stuart Community Redevelopment Area
P4	Potential Site (City of Stuart)		Zoned Business, Industrial, and Public Facilities; within the City of Stuart Community Redevelopment Area
P5	Potential Site (City of Stuart)		Zoned Business, Industrial, and Public Facilities; within the City of Stuart Community Redevelopment Area
P6	Potential Site (Bassett Boat Co.)		Zoned Waterfront Resort Commercial; unincorporated Martin County; Bassett Boat Co. has constructed a marine sales and service center
P7	Potential Site		Zoned General Commercial; unincorporated Martin County; adjacent to American Custom Yachts
P8	Potential Site		Zoned Small Farms; unincorporated Martin County; adjacent to American Custom Yachts
P9	Potential Site (Lost River Basin)		Zoned Waterfront Resort Commercial and Liberal Multiple Family; unincorporated Martin County; use of the site is currently the subject of a lawsuit with Martin County
P10	Potential Site (S and S Investment Parcel 2)		Present land use is Rural Density; proposed for Waterfront Commercial

Exhibit 7. Scoring of segments for potential impact to manatees. The segments are designated on Maps 4a-4h. Closest inlet codes are S = St. Lucie Inlet, J = Jupiter Inlet. See the text for an explanation of the scoring procedures. The total score for each site is determined by adding the values in each column. Higher scores indicate a higher potential for impact to manatees.

Segment	General Location	Closest Inlet	Proximity to Inlets	Manatee Abundance	Manatee Habitat	Manatee Mortality	Speed Zone	Total Score
1	INDIAN RIVER LAGOON	S	2	1	2	1	2	8
2	INDIAN RIVER LAGOON	S	2	1	2	1	2	8
3	INDIAN RIVER LAGOON	S	2	1	2	1	2	8
4	INDIAN RIVER LAGOON	S	1	1	2	1	2	7
5	INDIAN RIVER LAGOON	S	1	2	2	1	2	8
6	INDIAN RIVER LAGOON	S	1	3	2	2	2	10
7	INDIAN RIVER LAGOON	S	1	3	2	3	2	11
8	ST. LUCIE INLET	S	1	1	1	1	3	7
9	GREAT POCKET	S	1	2	3	1	2	9
10	GREAT POCKET	S	1	1	3	1	1	7
11	ICW/PECK LAKE	S	1	2	3	2	2	10
12	PECK LAKE	S	2	2	2	1	2	9
13	SOUTH JUPITER NARROWS	S	2	2	2	1	1	8
14	SOUTH JUPITER NARROWS	S	2	1	2	1	1	7
15	SOUTH JUPITER NARROWS	S	2	2	1	1	1	7
16	SOUTH JUPITER NARROWS	S, J	2	1	1	1	1	6
17	HOBE SOUND	J	2	3	3	1	2	11
18	HOBE SOUND	J	2	2	2	1	2	9
19	HOBE SOUND	J	2	2	2	1	2	9
20	HOBE SOUND	J	2	2	2	1	2	9
21	HOBE SOUND	J	1	1	1	1	1	5
22	JUPITER SOUND	J	1	1	3	1	2	8
23	JUPITER SOUND	J	1	1	3	1	2	8
24	LOXAHATCHEE RIVER, N FORK	J	1	1	1	1	2	6
25	LOXAHATCHEE RIVER, N FORK	J	1	1	1	1	2	6
26	LOXAHATCHEE RIVER, N FORK	J	2	1	1	1	2	7

Exhibit 7. Continued.

Segment	General Location	Closest Inlet	Proximity to Inlets	Manatee Abundance	Manatee Habitat	Manatee Mortality	Speed Zone	Total Score
27	LOXAHATCHEE RIVER, NW FORK	J	1	1	1	1	2	6
28	LOXAHATCHEE RIVER, NW FORK	J	2	1	1	1	2	7
29	LOXAHATCHEE RIVER, NW FORK	J	2	1	1	1	2	7
30	LOXAHATCHEE RIVER, NW FORK	J	2	1	1	1	2	7
31	LOXAHATCHEE RIVER, NW FORK	J	2	1	1	1	2	7
32	LOXAHATCHEE RIVER, NW FORK	J	2	1	1	1	2	7
33	MANATEE POCKET	S	1	2	1	1	1	6
34	MANATEE POCKET	S	1	1	1	1	1	5
35	ST. LUCIE RIVER	S	1	1	2	3	2	9
36	ST. LUCIE RIVER	S	1	1	1	1	2	6
37	ST. LUCIE RIVER	S	1	1	1	1	2	6
38	ST. LUCIE RIVER	S	2	1	1	1	2	7
39	ST. LUCIE RIVER	S	2	1	1	1	2	7
40	ST. LUCIE RIVER	S	2	1	1	2	2	8
41	ST. LUCIE RIVER	S	2	1	1	1	2	7
42	ST. LUCIE RIVER, N FORK	S	2	1	1	1	2	7
43	ST. LUCIE RIVER, N FORK	S	3	1	1	1	2	8
44	C-23 CANAL	S	3	3	1	1	1	9
45	ST. LUCIE RIVER, S FORK	S	2	1	1	1	2	7
46	ST. LUCIE RIVER, S FORK	S	3	1	1	1	2	8
47	ST. LUCIE RIVER, S FORK	S	3	1	1	1	2	8
48	ST. LUCIE RIVER, S FORK	S	3	1	1	1	2	8
49	ST. LUCIE RIVER, S FORK	S	3	1	1	2	2	9
50	C-44 CANAL	S	3	1	1	1	2	8
51	C-44 CANAL	S	3	1	1	2	2	9
52	ST. LUCIE RIVER, S FORK	S	3	1	1	1	2	8

Exhibit 8a. Manatee Pocket. Aerial photograph showing this preferred location for boat facilities in Martin County. The aerial photograph is a composite of several images taken in 1999-2000.

Exhibit 8b. Manatee Pocket. Street map of this preferred location for boat facilities in Martin County showing locations of key marinas in this area.

Exhibit 9a. Community Redevelopment Area of Port Salerno. The aerial photograph is a composite of several images taken in 1999-2000.

Exhibit 9b. Community Redevelopment Area of Port Salerno. Street map overlay showing this preferred location for boat facility in Martin County.

Exhibit 10a. City of Stuart. Aerial photograph showing this preferred location for boat facilities in Martin County. The aerial photograph is a composite of several images taken in 1999-2000.

Exhibit 10b. City of Stuart. Street map of this preferred location for boat facilities in Martin County showing locations of key marinas in this area.

Exhibit 11a. Community Redevelopment Area of Rio. The aerial photograph is a composite of several images taken in 1999-2000.

Exhibit 11b. Community Redevelopment Area of Rio. Street map overlay showing this preferred location for boat facility in Martin County.

Exhibit 12a. Community Redevelopment Area of Jensen Beach. The aerial photograph is a composite of several images taken in 1999-2000.

Exhibit 12b. Community Redevelopment Area of Jensen Beach. Street map overlay showing a preferred location for a boat facility in Martin County.

Exhibit 13a. Potential Sites P7 , P8, S & S Investments Parcel 2 or P10, and American Custom Yachts shown on an aerial photograph and are preferred locations for boat facilities in Martin County. The aerial photograph is a composite of several images taken in 1999-2000.

Exhibit 13b. Potential Sites P7, P8, S & S Investment Parcel 2 or P10, and American Custom Yachts shown in a street map format. These sites are preferred locations for boat facilities in Martin County.

Appendix 1. Survival Factor.

The Survival Factor as developed by Meier (personal communication) is a method to index manatee mortality from boat collisions with the advent of speed zones and growth in boating as measured by boat registrations. The boat speed zones for manatee protection were fully implemented by December 1991.

For Martin County, the analysis is as follows:

Before zones (all of Martin County):

1983 through December 1991

average deaths per year : $AD_{bz} \ 20/9 \text{ (deaths/years)} = 2.22$

average number of registered boats: $AB_{bz} = 10,316$

After zones implemented (all of Martin County):

1992 through December 2000

average deaths per year: $AD_{az} \ 12/9 \text{ (deaths/year)} = 1.33$

average number of registered boats: $AB_{az} = 13,786$

$$\text{(before zones) } AD_{bz} / AB_{bz} = (2.22 / 10,316)$$

Survival Factor: _____ = 2.23

$$\text{(after zones) } AD_{az} / AB_{az} = (1.33 / 13,786)$$

The numeric value of the Survival Factor suggests that the manatee is 2.23 time better off in Martin County since speed zones have been installed and as boating registrations have increased. A survival factor of less than 1.0 means that the manatee is worse off after speed zones were implemented.

ACKNOWLEDGMENTS

The Board of County Commissioners would like to acknowledge the participation of the following organizations and people in providing comments on drafts of this BFSP:

The Marine Industries Association of the Treasure Coast, Inc.

City of Stuart

Fish and Wildlife Conservation Commission

Realtor Association of Martin County

Ecological Associates, Inc.

Neighborhood Advisory Committees of Jensen Beach, Rio, Port Salerno, and
Hobe Sound

Jim Dragseth, private citizen

Pete Meier, private citizen

Michael Keifer, private citizen

Greg Burdick, private citizen

MAP INFORMATION

Map 1. Map showing the study area in Martin County

Maps 2a-2h. Maps showing relative abundance of manatees in the coastal waterways of Martin County. The coastal waterways are shown on the following series of eight aerial photographs. The manatee abundance values are derived from the overall averages provided in Exhibit 3. The 52 segments used to analyze the aerial survey data are displayed on the maps. Open circles in the waterways indicate manatee records from the FWC aerial surveys. Each open circle represents one or more manatees observed during the aerial surveys. Solid circles indicate the recovery locations of manatee carcasses whose death was attributed to collision with watercraft. The number next to each carcass recovery location corresponds to the manatee number in Exhibit 4.

Maps 3a-3h. Maps showing important habitat for manatees in Martin County. The shaded areas in the coastal waterways indicate seagrasses, which represent feeding habitat for manatees. The seagrass maps are based on the analysis of aerial photographs taken in 1986, 1989, 1992, and 1996. The seagrass data was provided by the St. Johns River Water Management District and South Florida Water Management District. A dashed line indicates the primary travel corridor for manatees through the county. Freshwater attractants are labeled.

Maps 4a-4h*. Maps showing existing land use, boat facilities, and manatee protection zones. Map codes for existing and potential boat facility sites correspond with Exhibit 6. Coastal waterway segments correspond with Exhibit 7. The Martin County land use is based on 1995 data obtained from the South Florida Water Management District. Four sources were used to develop an inventory of boat facilities for Martin County. The inventory is based on information obtained from: 1) the Martin County CGMP (1990); 2) A Boater's Guide prepared by the Indian River Lagoon National Estuary Program (1995); 3) the BAS prepared by Shultz (1996); and 4) a drive-by field survey conducted in July 2000. The boat speed regulatory zones in Martin County are described in Florida Law Section 68C-22.024 Florida Administrative Code (F.A.C.), and 68D-24.143 F.A.C.

*Note: For Maps 4a-4h, in the Marina/Boat Ramp Name legend, #25 Noll's Boat Yard is corrected to Chapman School and #26 David Lowe's Boatyard is corrected to Hinckley Boatyard.

Martin County

Exhibit 8a

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfisp_exhibit_8a

Sandsprit
Park

Sailfish
Marina

Finest Kind
Marina

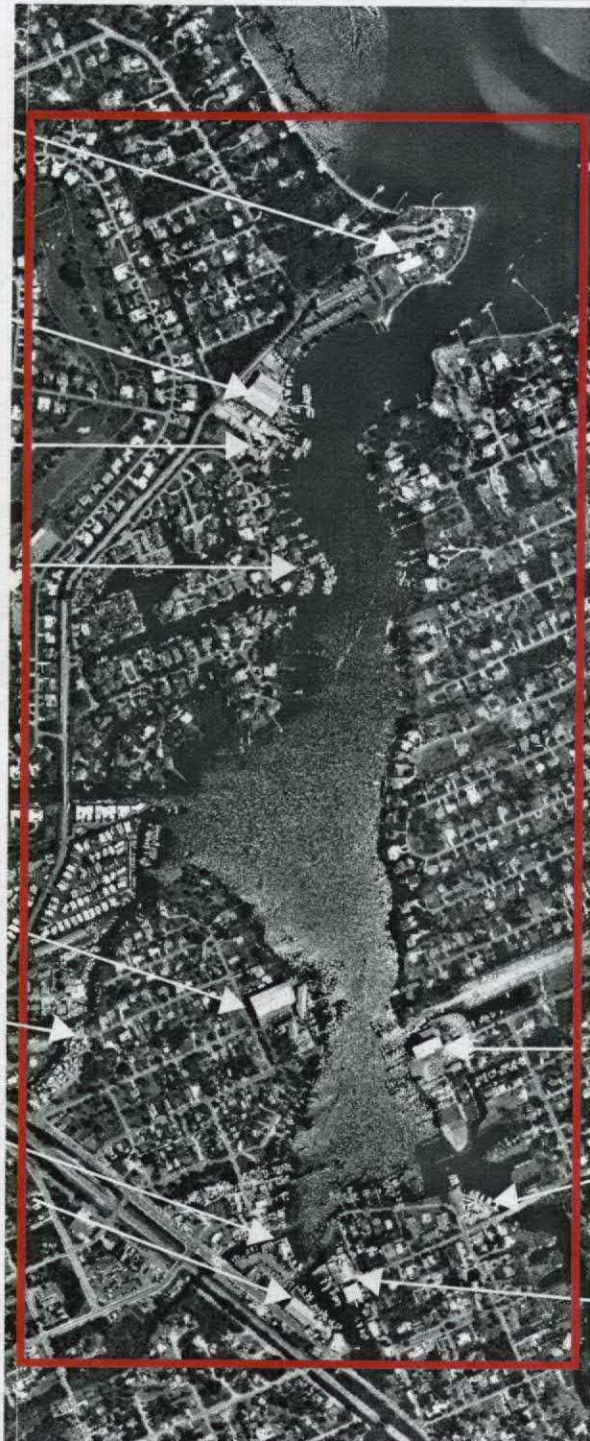
Mariner Cay
Marina

Pirates Cove
Marina

Chapman
School

Manatee
Marina

Mar-tech
Yacht Fitters



Note: See Figure 8b
for a corresponding
street map location
defined within the
red box.

Hinckley
Boatyard

Stuart Yacht
Sales

A & J
Boatworks

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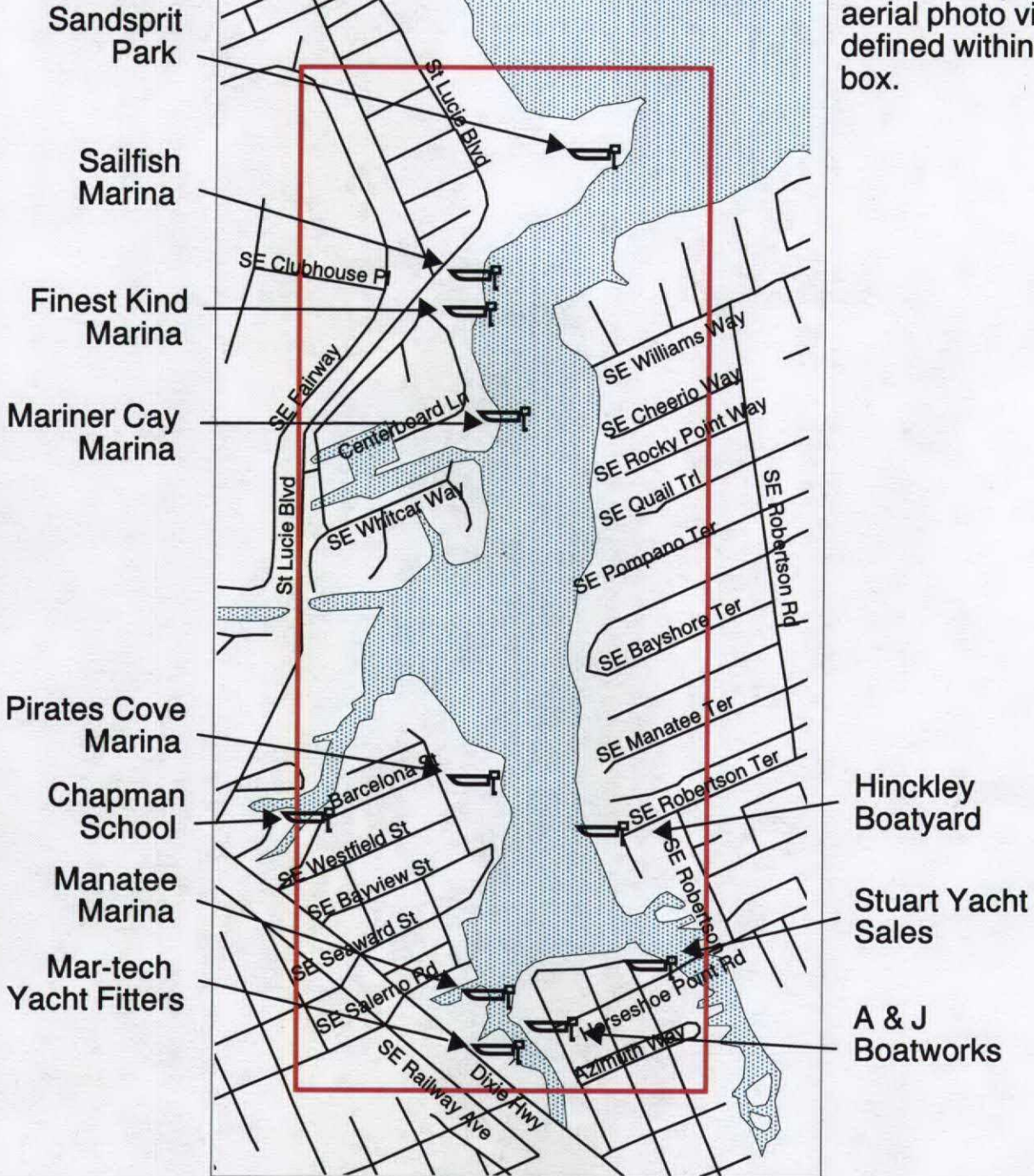
Exhibit 8a. Manatee Pocket. Aerial photograph showing this preferred location for boat facilities in Martin County. The aerial photograph is a composite of several images taken in 1999-2000.

Martin County

Exhibit 8b

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfsp_exhibit_8b

Note: See Figure 8a for a corresponding aerial photo view defined within the box.



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Exhibit 8b. Manatee Pocket. Street map overlay showing this preferred location for boat facilities in Martin County.

Martin County

Exhibit 9a

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfsp_exhibit_9a

Note: See Exhibit 9B for a corresponding street map location defined within the red outline



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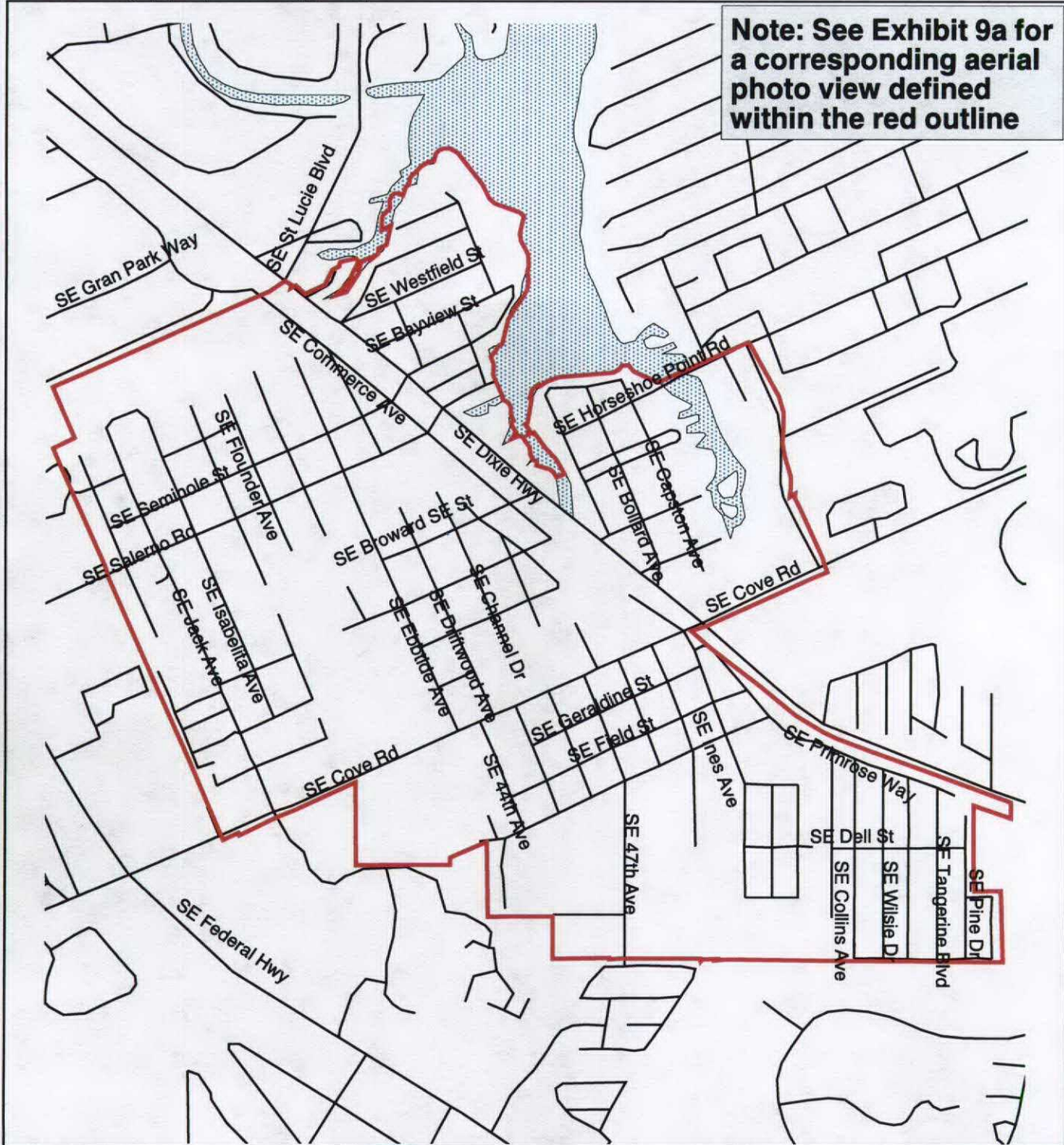
Exhibit 9a. Aerial photograph showing Community Redevelopment Area of Port Salerno. The aerial photograph is a composite of several images taken in 1999-2000.

Martin County

Exhibit 9b

AV Project: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/BFSP/bfsp_exhibit_9b

Note: See Exhibit 9a for a corresponding aerial photo view defined within the red outline



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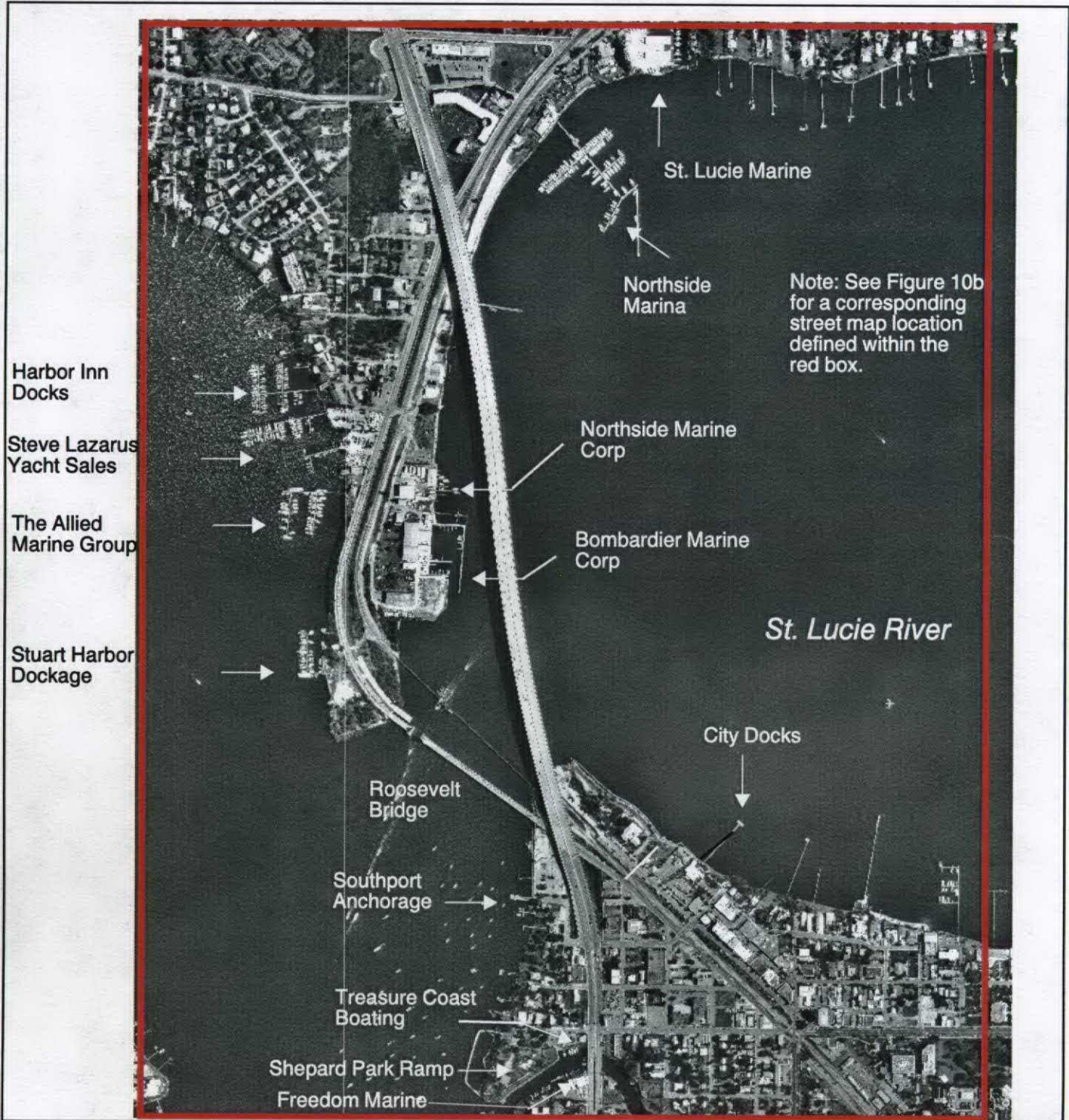


Exhibit 9b. Aerial photograph showing Community Redevelopment Area of Port Salerno. The aerial photograph is a composite of several images taken in 1999-2000.

Martin County

Exhibit 10a

AV Project: manatee_plan5bw.apr
 Plot Name: /data/gis/projects/plots/bfsp_exhibit_10a



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Growth Management Department
Environmental Division

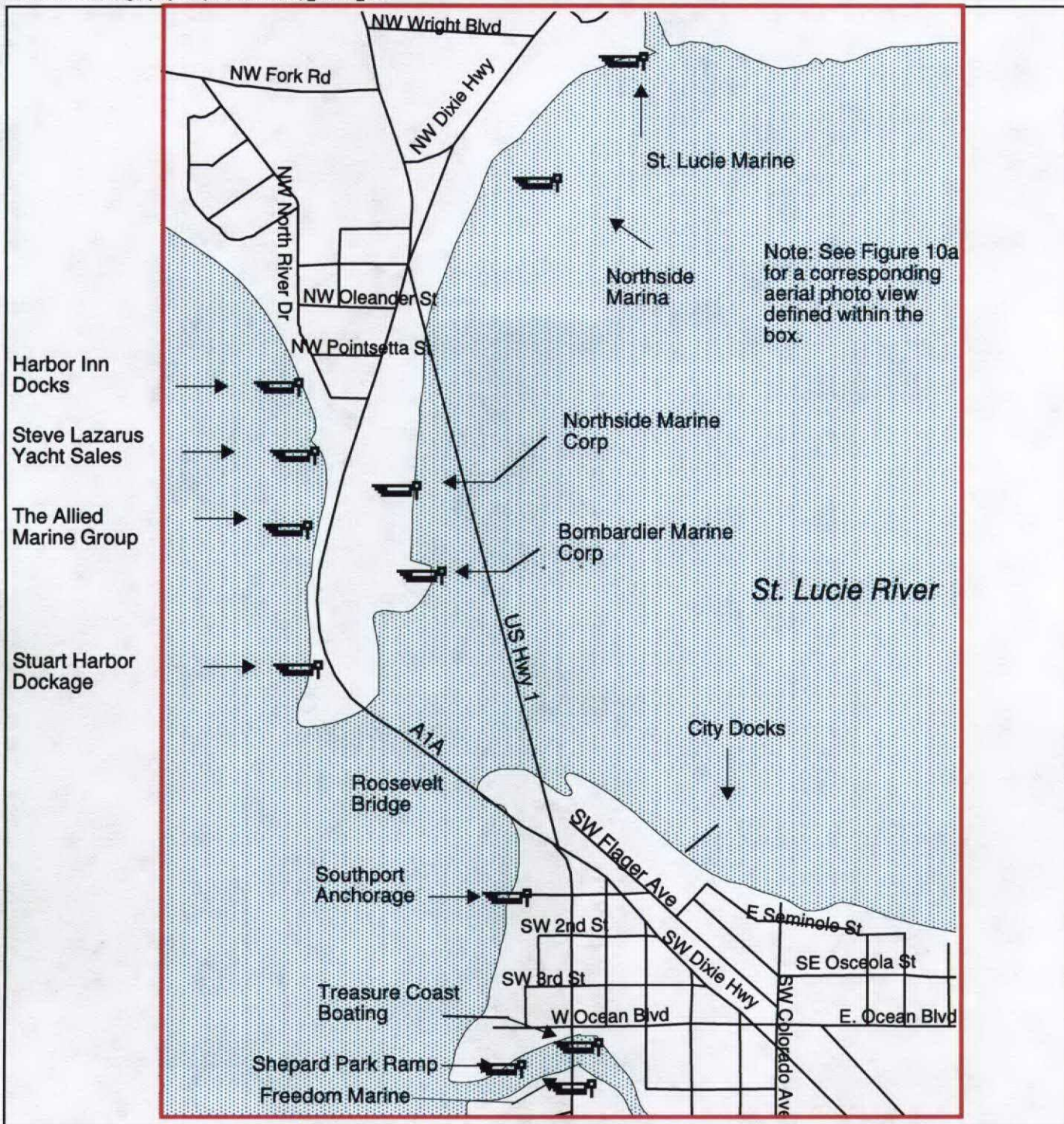


Exhibit 10a. City of Stuart. Aerial photograph showing this preferred location for boat facilities in Martin County. The aerial photograph is a composite of several images taken in 1999-2000.

Martin County

Exhibit 10b

AV Project: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/BFSP/bfsp_exhibit_10b



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Growth Management Department
Environmental Division



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Exhibit 10b. City of Stuart. Street map overlay showing this preferred location for boat facilities in Martin County.

Martin County

Exhibit 11a

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bsp_exhibit_11a



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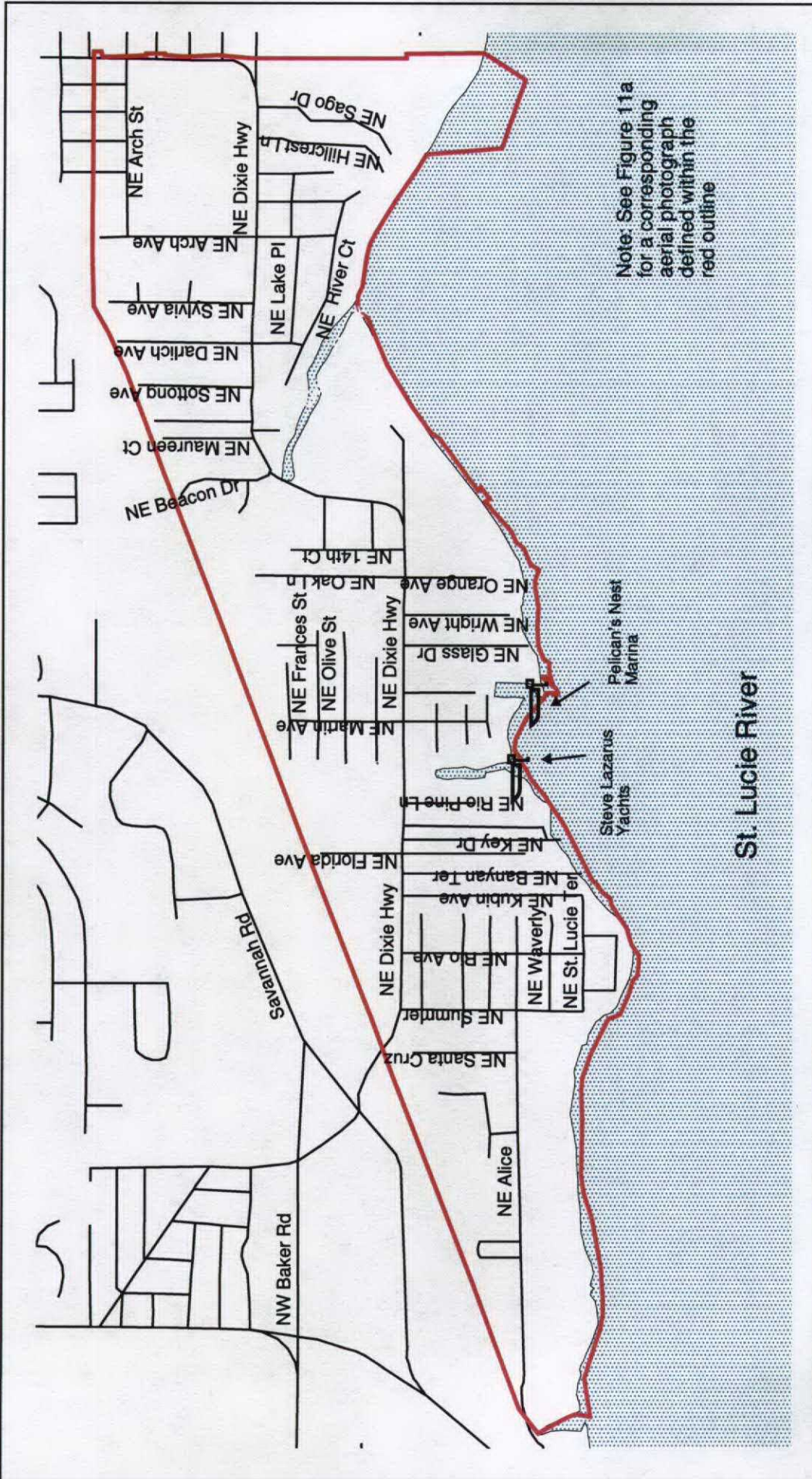
Growth Management Department Environmental Division

Exhibit 11a. Community Redevelopment Area of Rio. The aerial photograph is a composite of several images taken in 1999 - 2000.

Martin County

Exhibit 11b

AV Project: manatee_plan5bw.apr
 Plot Name: data/gis/projects/plots/bfsp_exhibit_11b



Growth Management Department Environmental Division



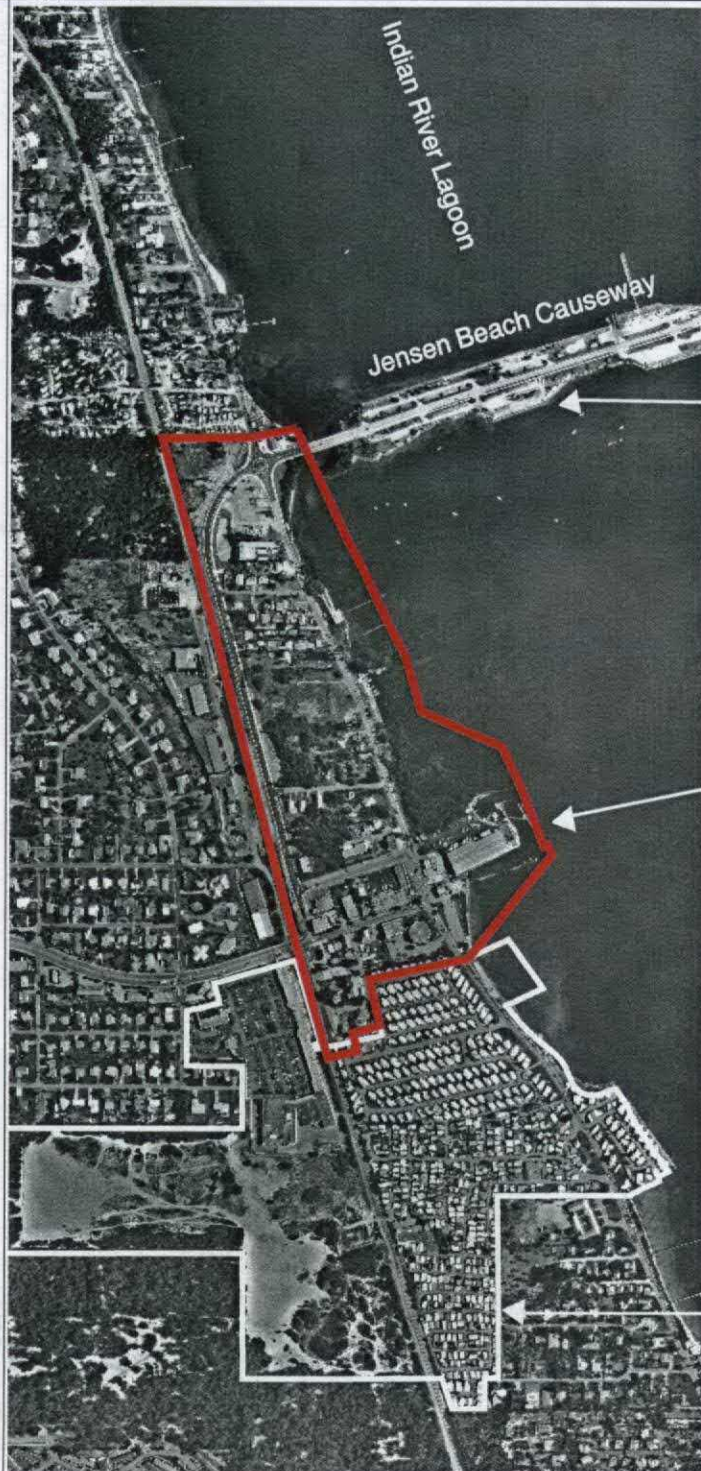
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Exhibit 11b. Community Redevelopment Area of Rio. Street map overlay showing this preferred location for boat facility in Martin County.

Martin County

Exhibit 12a

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfsp_exhibit_r_12a



Note: See Figure 12b for a corresponding street map location defined within the red outline.

Jensen Beach Causeway Boat Ramp

SunDance Marine

Town of Ocean Breeze Park (White Outline)

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Growth Management Department
Environmental Division

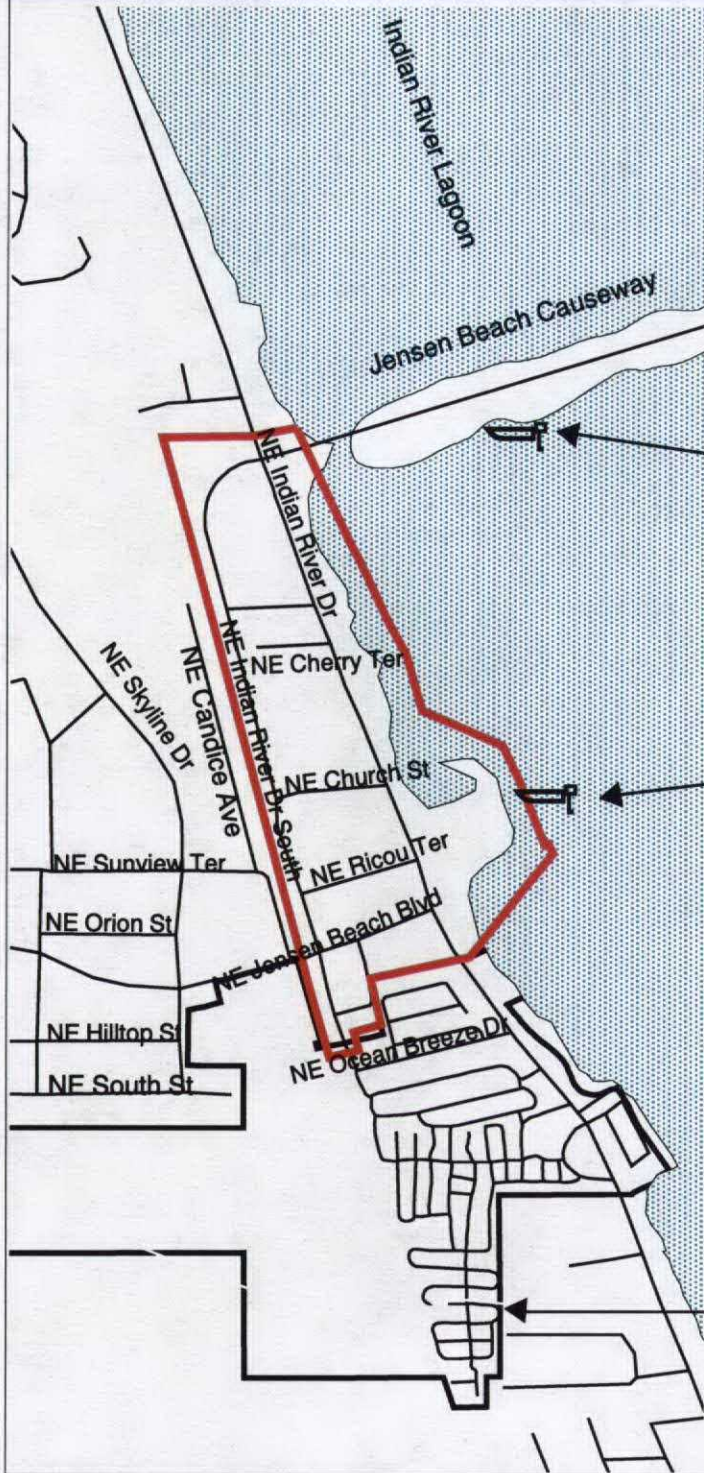


Exhibit 12a. Community Redevelopment Area of Jensen Beach. Aerial photograph is a composite of several images taken in 1999 - 2000.

Martin County

Exhibit 12b

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfsp_exhibit_12b



Note: See Figure 12a for a corresponding aerial photo view defined within the red outline.

Jensen Beach Causeway Boat Ramp

SunDance Marine

Town of Ocean Breeze Park (Black Outline)



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Environmental Division



Exhibit 12b. Community Redevelopment Area of Jensen Beach. Street map overlay showing this preferred location for boat facilities in Martin County.

Martin County

Exhibit 13a

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfsp_exhibit_13a

Note: See Figure 13b
for a corresponding
street map location
defined within the
red box.



Potential
Marina
Sites

American
Custom
Yachts



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Environmental Division



Exhibit 13a. C-44 Canal near Interstate 95 and Florida Turnpike. Aerial photograph showing this preferred location for boat facilities in Martin County. The aerial photograph is a composite of several images taken in 1999-2000.

Martin County

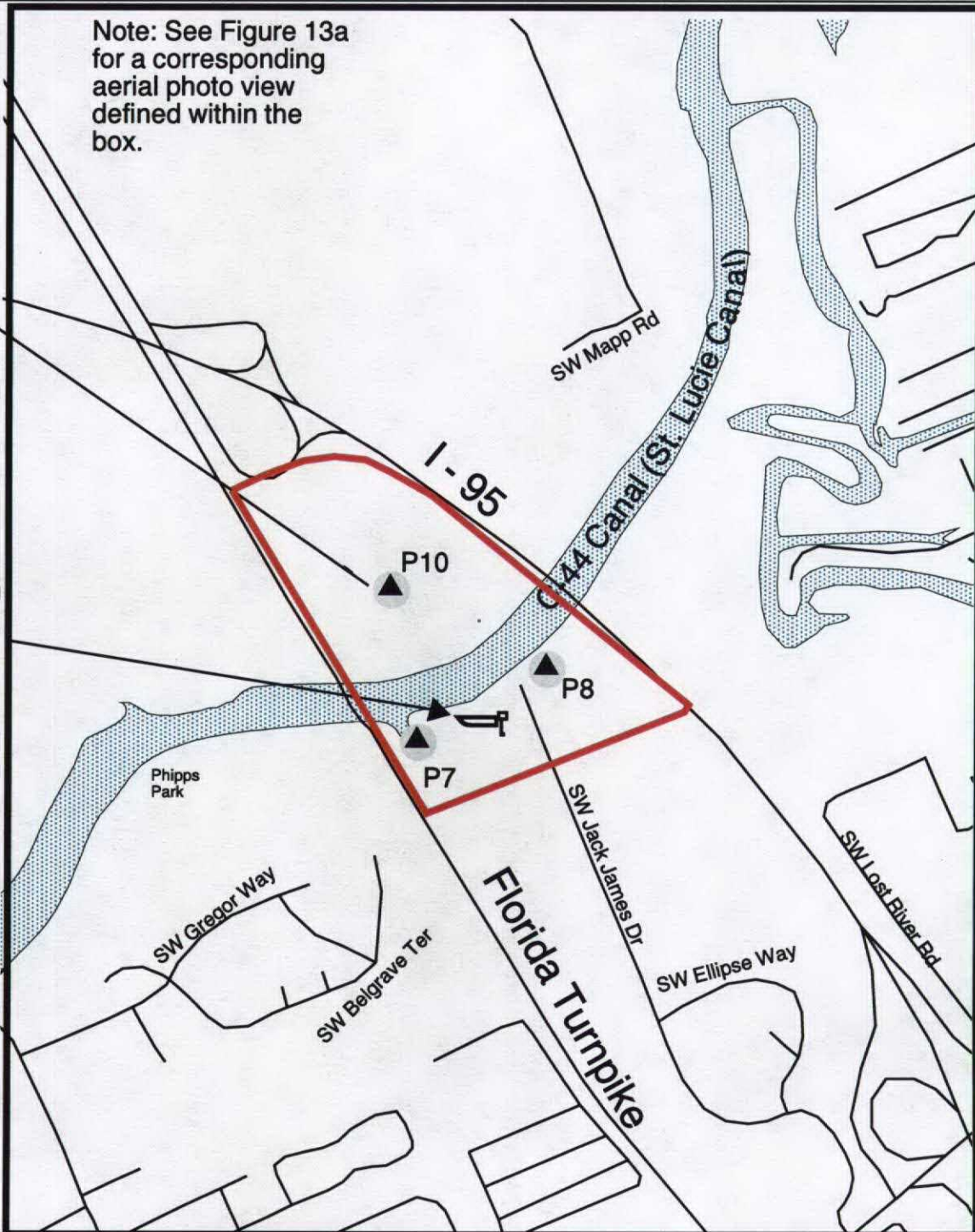
Exhibit 13b

AV Project: manatee_plan5bw.apr
Plot Name: /data/gis/projects/plots/bfsp_exhibit_13b

Note: See Figure 13a for a corresponding aerial photo view defined within the box.

Potential Marina Sites

American Custom Yachts



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

Exhibit 13b. C-44 Canal near Interstate 95 and Florida Turnpike. Street map of this preferred location for boat facilities in Martin County.

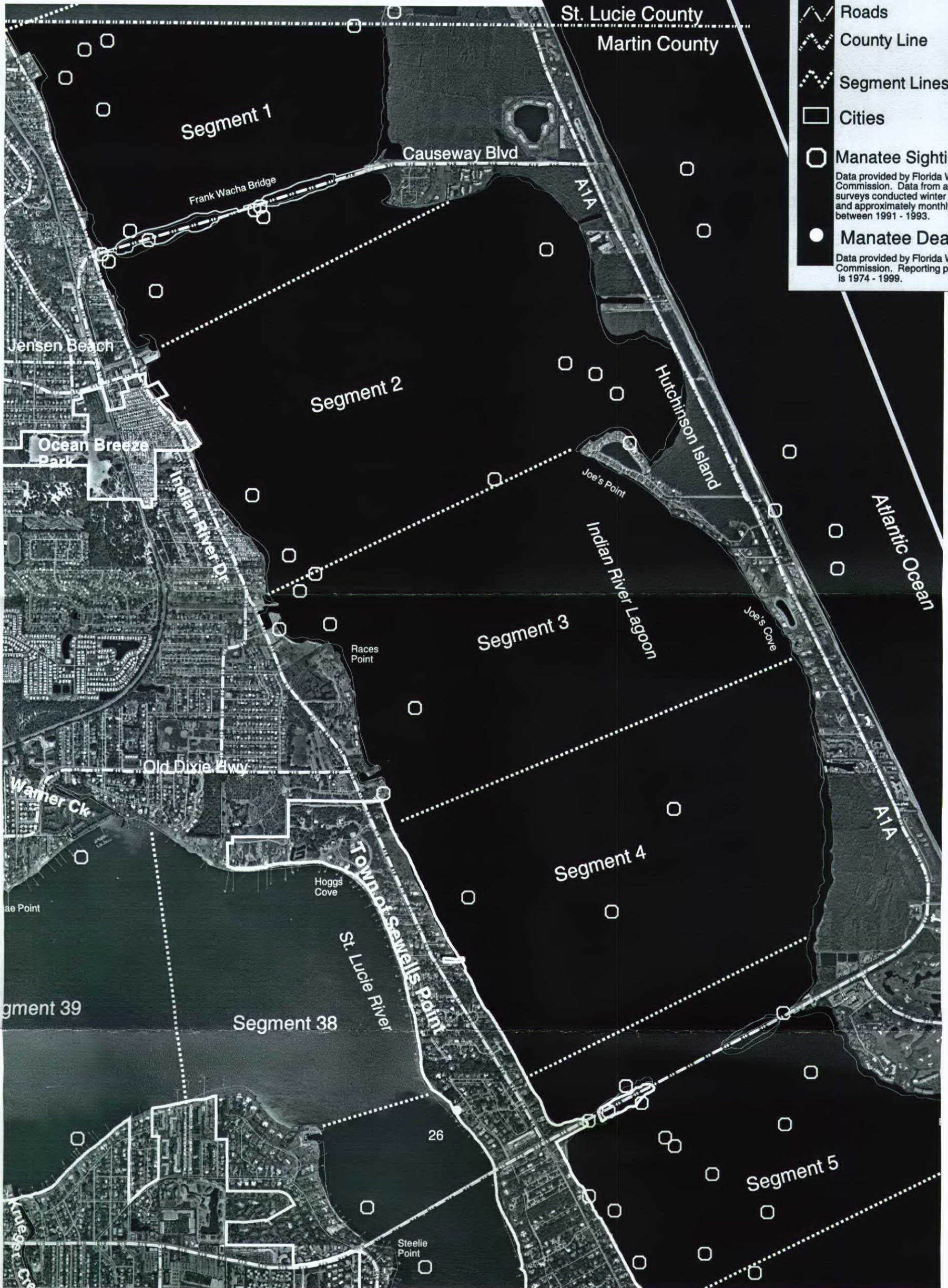
Martin County, Florida

Map 2a

0 0.5 1 Miles

Legend

-  Study Boundary
-  Roads
-  County Line
-  Segment Lines
-  Cities
-  Manatee Sightings
Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
-  Manatee Deaths
Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfisp_map2a

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Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 2b



Legend

- Study Boundary
- Roads
- County Line
- Segment Lines
- Cities
- Manatee Sightings
Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
- Manatee Deaths
Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.

AV Project File: manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/bfsp_map2b

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Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 2c



Legend

- Study Boundary
- Roads
- County Line
- Segment Lines
- Cities
- Manatee Sightings
Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
- Manatee Deaths
Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfisp_map2c

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Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 2d



Legend

- Study Boundary
- Roads
- County Line
- Segment Lines
- Cities
- Manatee Sightings
Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
- Manatee Deaths
Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.



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Study area image background from county wide 1995 orthophoto coverage.



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfsp_map2d

Martin County, Florida

Map 2e



Legend

- Study Boundary
- Roads
- County Line
- Segment Lines
- Cities
- Manatee Sightings
Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
- Manatee Deaths
Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfsp_map2e

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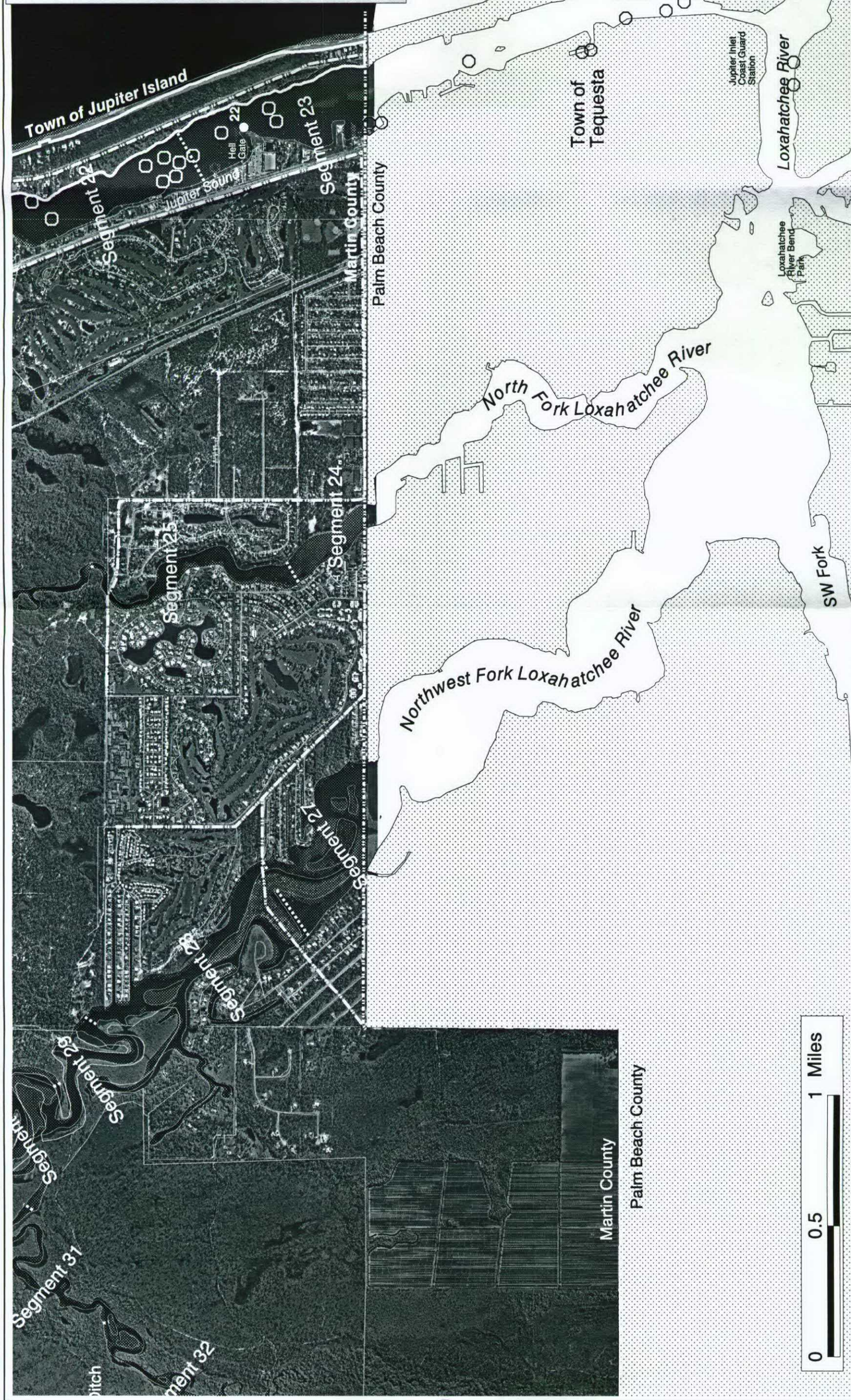
Study area image background from county wide 1995 orthophoto coverage.





AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/BFSP/brsp_map2f

Martin County, Florida Map 2f



Legend

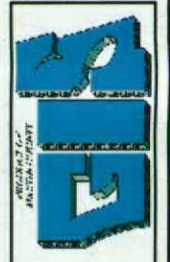
- Study Boundary
 - Roads
 - County Line
 - Segment Lines
 - Cities
 - Manatee Sightings
 - Manatee Deaths
- Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
- Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.



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 Environmental
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Study area image background from county wide 1995 orthophoto coverage.

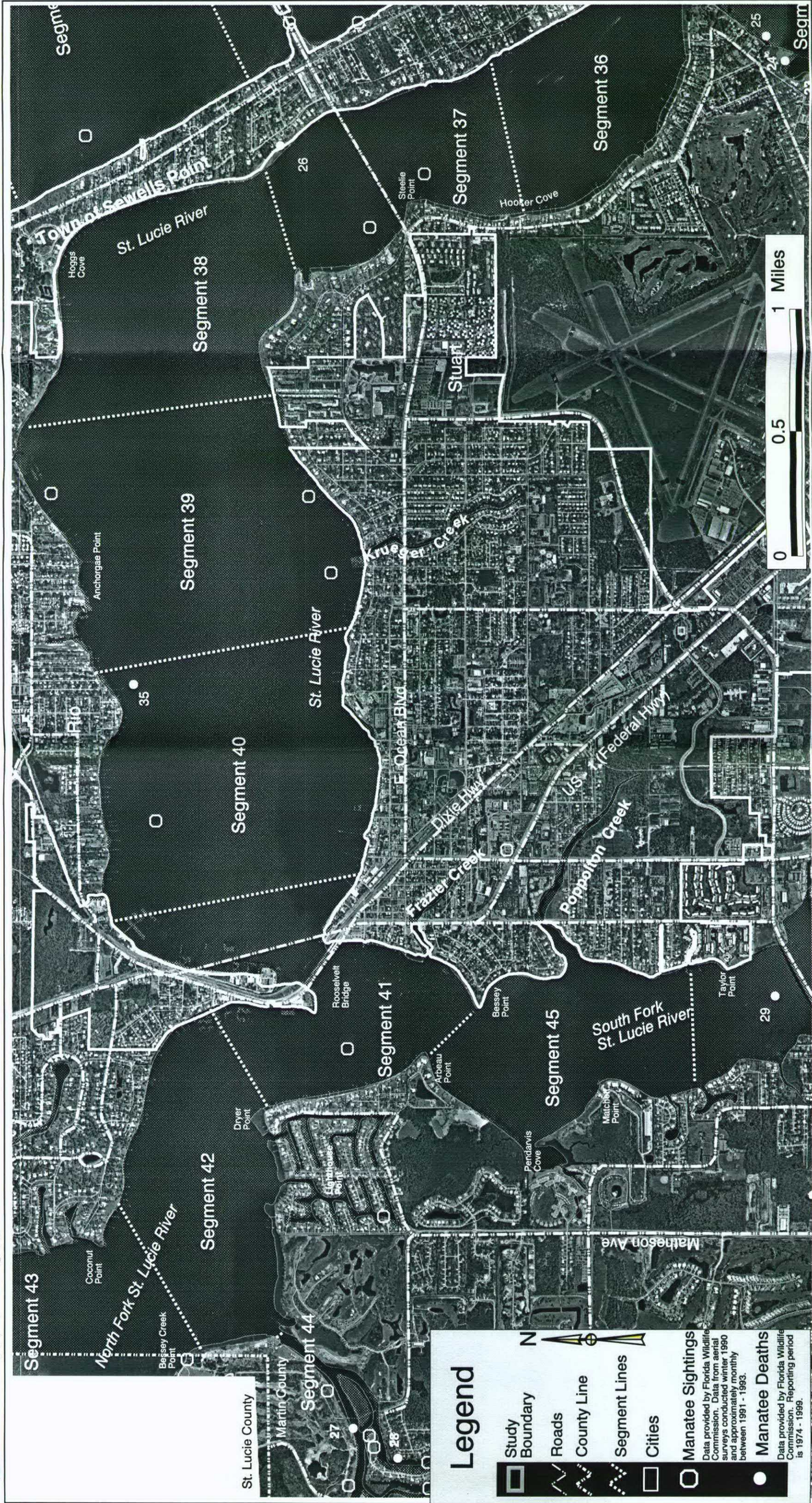
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Martin County, Florida Map 2g

AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/BFSP7bisp_map2g



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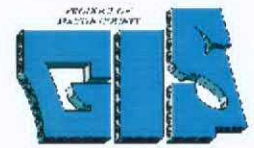
Study area image background from county wide 1995 orthophoto coverage.

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Martin County, Florida



AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/BFSP/bfsp_map2h

Map 2h



Legend

- Study Boundary
- Roads
- County Line
- Segment Lines
- Cities
- Manatee Sightings
Data provided by Florida Wildlife Commission. Data from aerial surveys conducted winter 1990 and approximately monthly between 1991 - 1993.
- Manatee Deaths
Data provided by Florida Wildlife Commission. Reporting period is 1974 - 1999.



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Study area image background from county wide 1995 orthophoto coverage.

Martin County, Florida

Map 3a

Legend

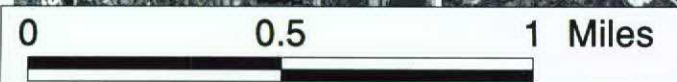
-  Study Boundary
-  Roads
-  County Line
-  Cities
-  Manatee Travel Route



Seagrass Composite Coverage for years 1986, 1989, 1992, 1994, and 1996*



* Data provided by:
St. Johns River Water Management District,
South Florida Water Management District
and Martin County

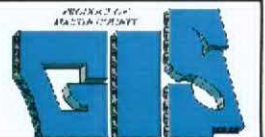


AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfisp_map3a

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Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 3b



Legend

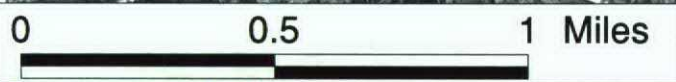
- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route

N

Seagrass
Composite Coverage for
years 1986, 1989, 1992,
1994, and 1996*

Seagrass Coverage

* Data provided by:
St. Johns River Water Management District,
South Florida Water Management District
and Martin County

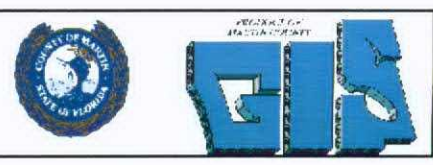


AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfsp_map3b

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Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 3c

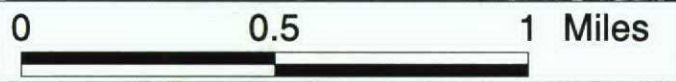


Legend

- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route

Seagrass
Composite Coverage for years 1986, 1989, 1992, 1994, and 1996*

* Data provided by:
St. Johns River Water Management District,
South Florida Water Management District
and Martin County



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfsp_map3c

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Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 3d



Legend

- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route



Seagrass
Composite Coverage for
years 1986, 1989, 1992,
1994, and 1996*



* Data provided by:
St. Johns River Water Management District,
South Florida Water Management District
and Martin County



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfsp_map3d

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Environmental
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Study area image background from
county wide 1995 orthophoto coverage.



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Martin County, Florida

Map 3e



AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/BFSP/bfsp_map3e



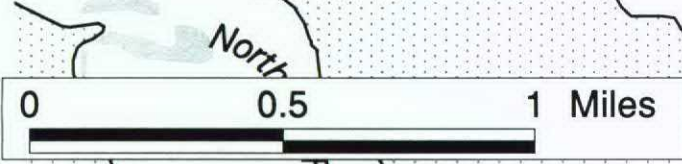
Legend

- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route



Seagrass
 Composite Coverage for
 years 1986, 1989, 1992,
 1994, and 1996*
 (Color Light Gray)

* Data provided by:
 St. Johns River Water Management District,
 South Florida Water Management District
 and Martin County



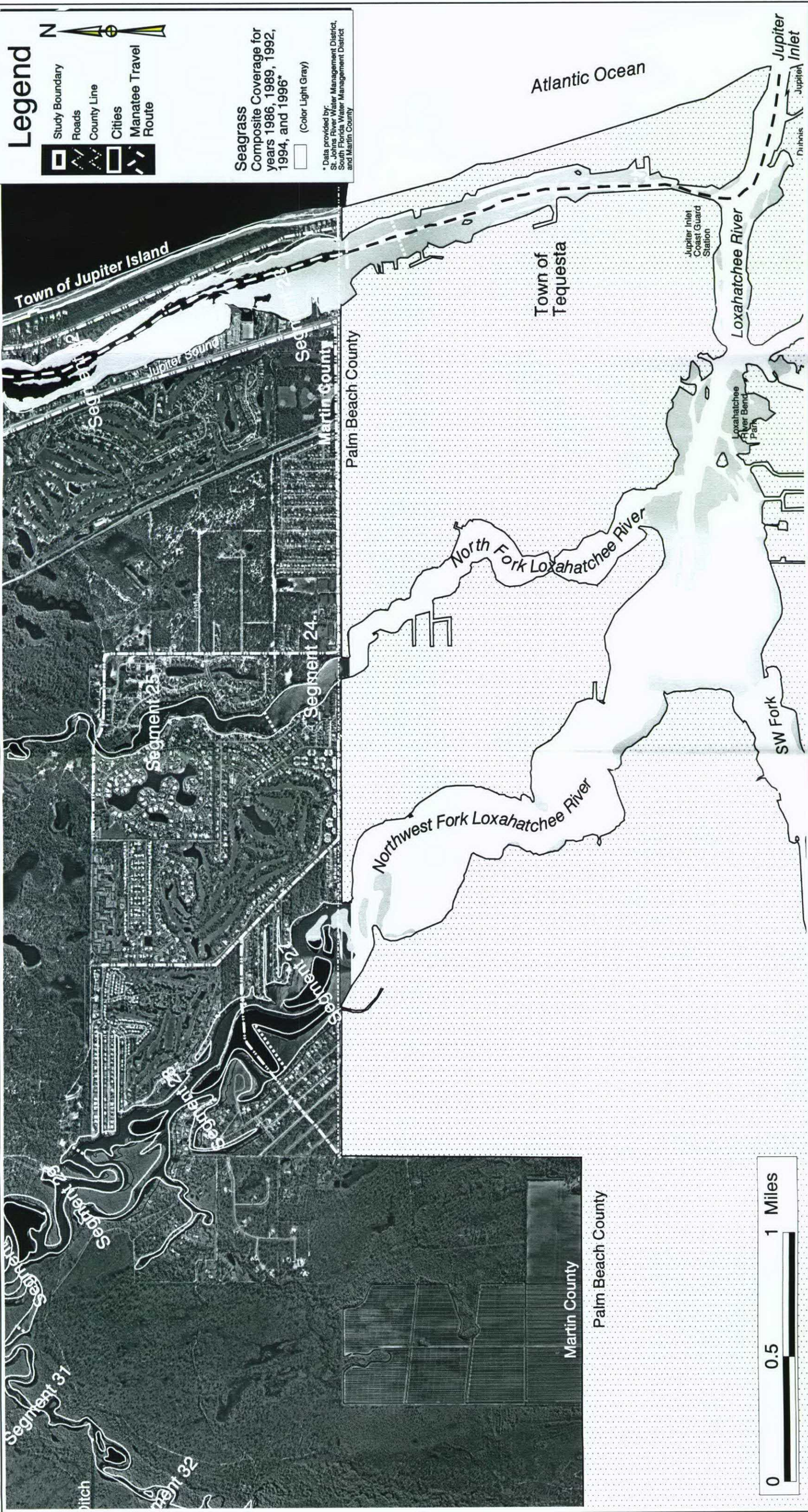
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GMD
 Environmental
 Division

Study area image background from county wide 1995 orthophoto coverage.

Martin County, Florida Map 3f

AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/pics/BFS/Plisp_map3f

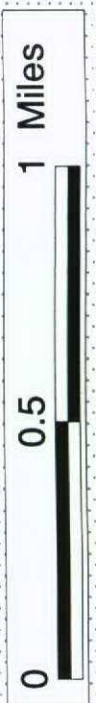


Legend

- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route

Seagrass Composite Coverage for years 1986, 1989, 1992, 1994, and 1996*
 (Color Light Gray)

* Data provided by:
 St. Johns River Water Management District,
 South Florida Water Management District,
 and Martin County



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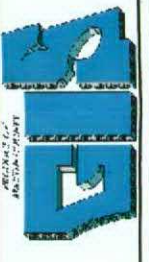
Study area image background from county wide 1995 orthophoto coverage.



GMD
 Environmental
 Division

Martin County, Florida Map 3g

AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/gis/SP/SP10sp_map3g



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Study area image background from county wide 1995 orthophoto coverage.



GMD
 Environmental
 Division

Legend

- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route

Seagrass
 Composite Coverage for
 years 1986, 1989, 1992,
 1994, and 1996*
 (Color Light Gray)

* Data provided by:
 St. Johns River Water Management District,
 South Florida Water Management District,
 and Martin County

Martin County, Florida

Map 3h



Legend

- Study Boundary
- Roads
- County Line
- Cities
- Manatee Travel Route

Seagrass
Composite Coverage for years 1986, 1989, 1992, 1994, and 1996*

(Color Light Grey)

* Data provided by:
St. Johns River Water Management District,
South Florida Water Management District
and Martin County



AV Project File: manatee_plan2bw.apr
Plot Name: /data/gis/projects/plots/bfisp_map3h

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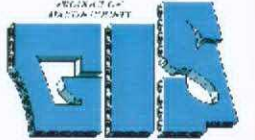


Study area image background from county wide 1995 orthophoto coverage.



Martin County, Florida

Map 4a



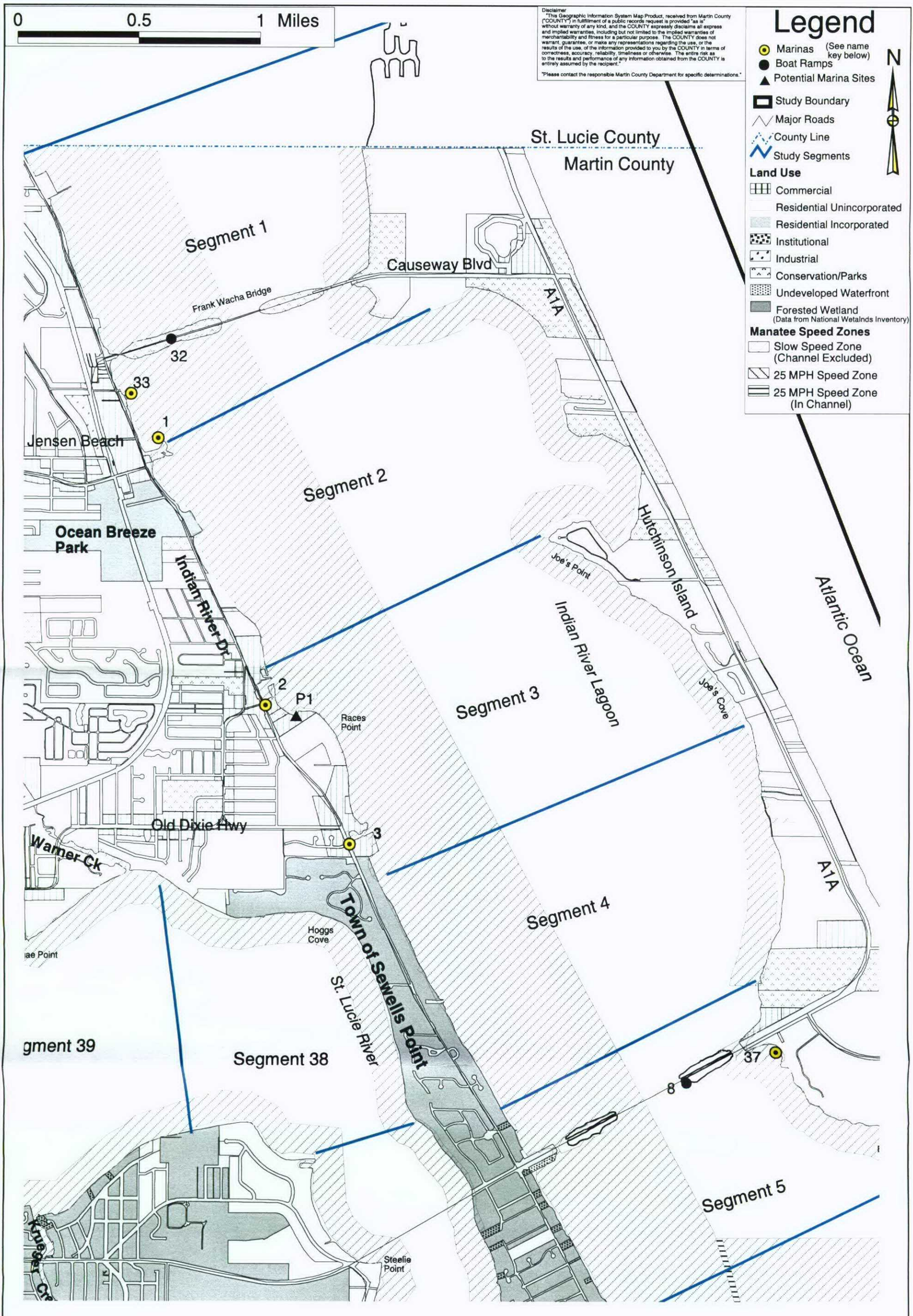
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Legend

- Marinas (See name key below)
 - Boat Ramps
 - ▲ Potential Marina Sites
 - ▭ Study Boundary
 - Major Roads
 - County Line
 - Study Segments
- Land Use**
- Commercial
 - Residential Unincorporated
 - Residential Incorporated
 - Institutional
 - Industrial
 - Conservation/Parks
 - Undeveloped Waterfront
 - Forested Wetland (Data from National Wetlands Inventory)
- Manatee Speed Zones**
- Slow Speed Zone (Channel Excluded)
 - 25 MPH Speed Zone
 - 25 MPH Speed Zone (In Channel)



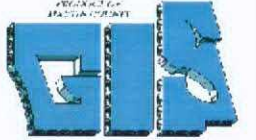
Marina / Boat Ramp Name															
1 SUNDANCE MARINA	9 HARBOR INN DOCKS	17 BASSETT BOATS	25 NOLL'S BOATYARD	33 NEW WAVE RUNNERS	40 BLOWING ROCKS MARINA	48 JUPITER ISLAND CLUB MARINA	55 BEACH WATER SPORTS	2 ANCHOR'S AWEIGH MARINA	10 NORTHSIDE MARINE SERVICES	18 WHITTICAR BOAT WORKS	26 DAVID LOWE'S BOATYARD	34 OUTBOARD MARINE CORP	41 SEAGATE MARINA	49 JOHNATHAN DICKINSON STATE PARK BOAT RAMP	56 LEIGHTON PARK RAMP
3 OUTRIGGER HARBOR MARINA	11 WATERSIDE PLACE DOCKS	19 MONTEREY MOTEL AND MARINA	27 PIRATES COVE MARINA	35 SHEPARD PARK RAMP	42 STUART YACHT BUILDERS	50 STUART YACHT SALES	57 SANDSPRIT PARK RAMP	4 STEVE LAZARUS YACHTS	12 SOUTHPORT ANCHORAGE	20 STELLA MARINE	28 A&J BOATWORKS	36 BROWARD STREET RAMP	43 LOST RIVER MARINE	51 STEVE LAZARUS YACHT SALES	58 PHIPPS PARK RAMP
5 PELICAN'S NEST MARINA	13 TREASURE COAST BOATING	21 RIVERWATCH MARINA	29 MANATEE MARINA	37 MARRIOTT MARINA	44 AMERICAN CUSTOM YACHTS	52 THE ALLIED MARINE GROUP	59 SEAGATE HARBOR/ LIGHTHOUSE POINT	6 ST LUCIE MARINE	14 FREEDOM MARINE	22 SAILFISH MARINA	30 MAR-TECH YACHT FITTERS	38 JUPITER HILLS LIGHTHOUSE MARINA	45 JIMMY GRAHAM PARK RAMP	53 STUART HARBOR DOCKAGE	60 PENDARVIS COVE PARK
7 NORTHSIDE MARINA	15 SAILFISH POINT MARINA	23 FINEST KIND MARINA	31 LOBLOLLY BAY MARINA	39 PELICAN BAY YACHT CLUB	46 PILOTS COVE DOCKS	54 SEAGREEN MARINA		8 ST LUCIE MARINE	16 MARTIN COUNTY MARINE	24 MARINER CAY MARINA	32 JENSEN BEACH CAUSEWAY PARK RAMP	47 MARINA BAY DOCKS			

Locations preceded with a "P" indicate potential marina sites



Martin County, Florida

Map 4b

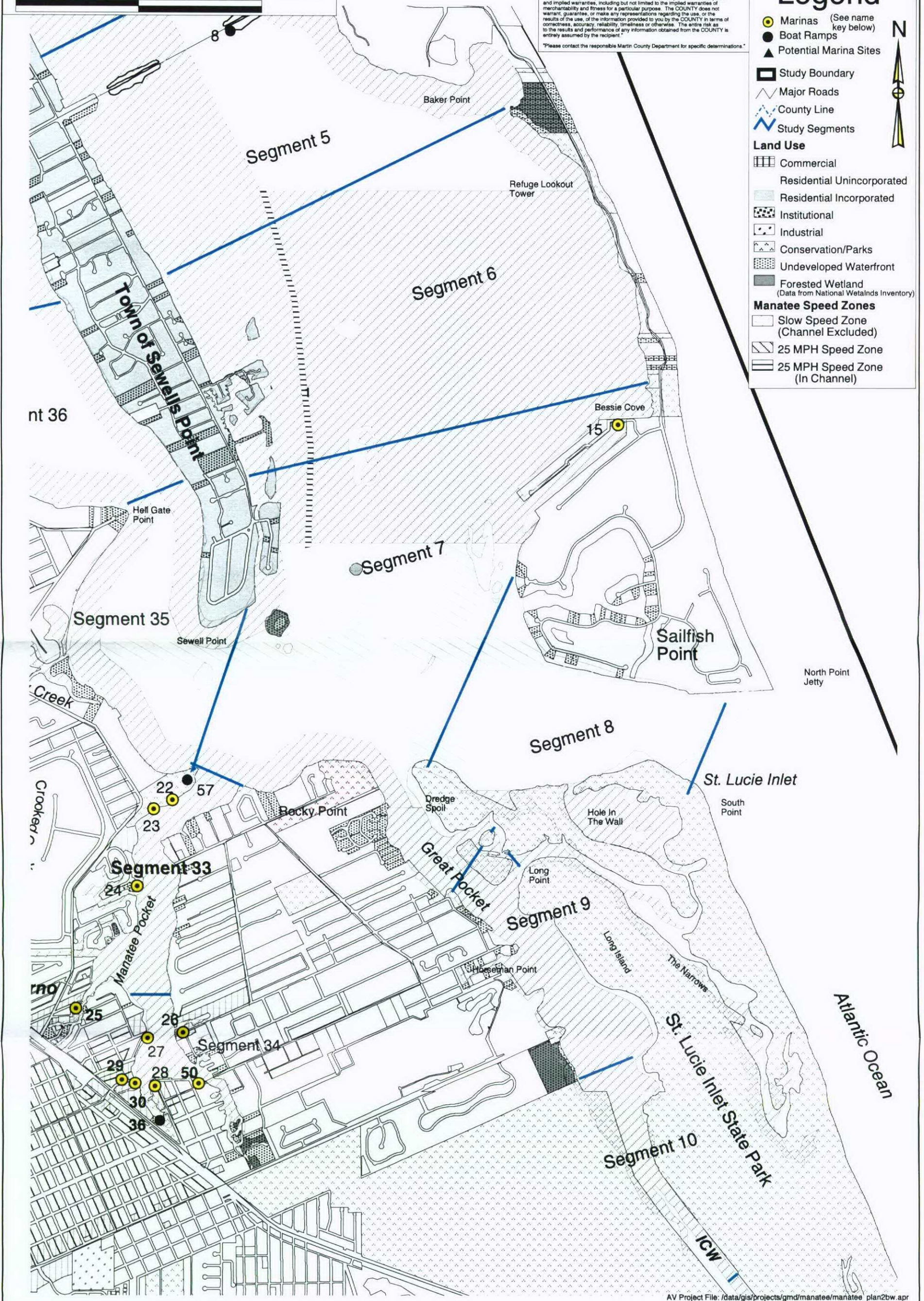


0 0.5 1 Miles

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- ▨ Residential Incorporated
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- ▨ Conservation/Parks
- ▨ Undeveloped Waterfront
- ▨ Forested Wetland (Data from National Wetlands Inventory)
- Manatee Speed Zones**
- ▨ Slow Speed Zone (Channel Excluded)
- ▨ 25 MPH Speed Zone
- ▨ 25 MPH Speed Zone (In Channel)



AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/BESPhfap_map4b

Marina / Boat Ramp Name

1 SUNDANCE MARINA	9 HARBOR INN DOCKS	17 BASSETT BOATS	25 NOLL'S BOATYARD	33 NEW WAVE RUNNERS	40 BLOWING ROCKS MARINA	48 JUPITER ISLAND CLUB MARINA	55 BEACH WATER SPORTS
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8 STUART CAUSEWAY PARK RAMP	16 MARTIN COUNTY MARINE	24 MARINER CAY MARINA	32 JENSEN BEACH CAUSEWAY PARK RAMP				

Locations preceded with a "P" indicate potential marina sites



Martin County, Florida

Map 4c

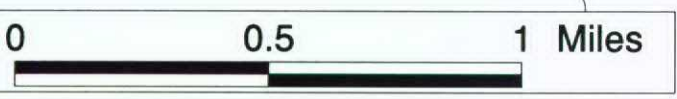
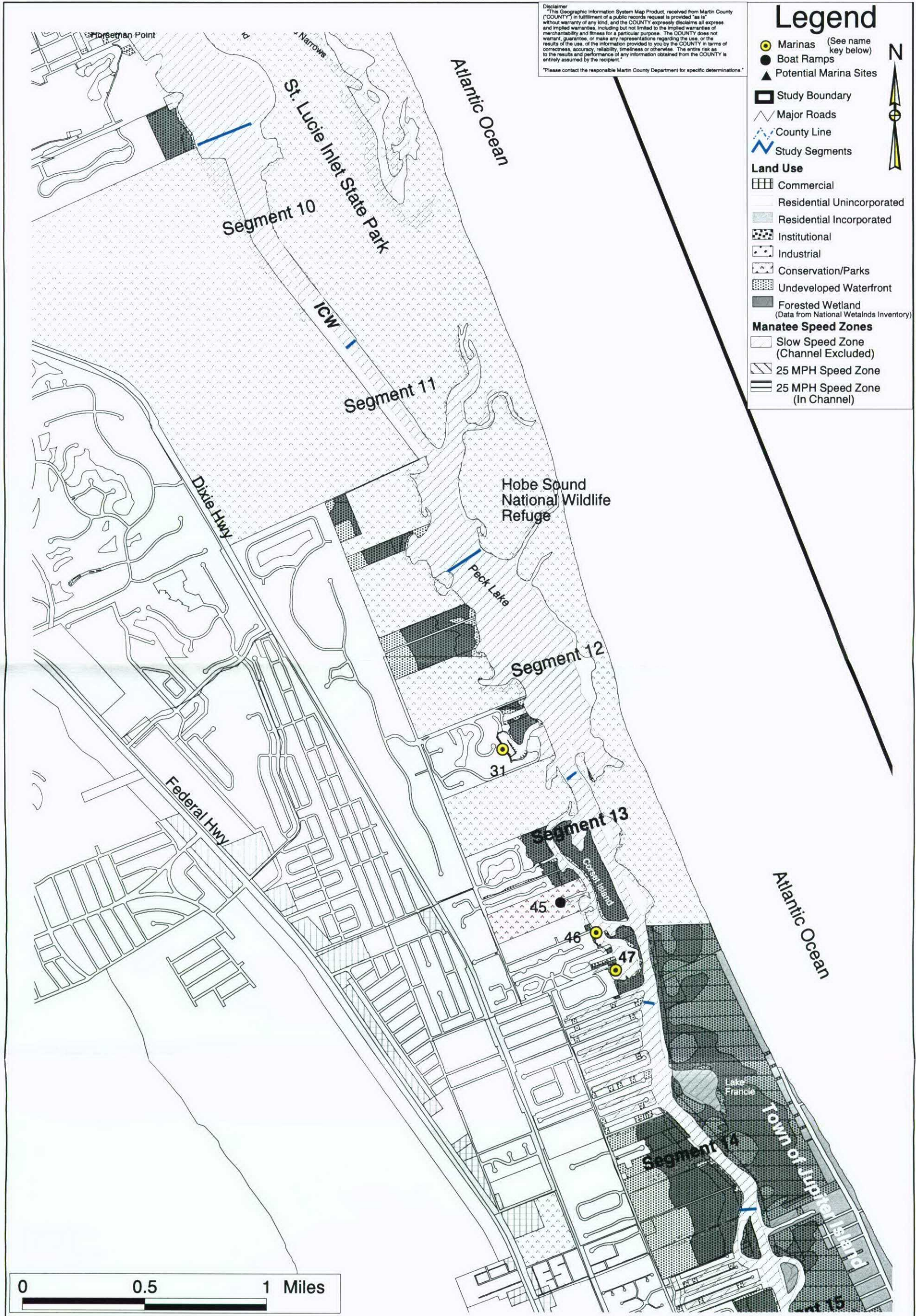


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Legend

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 - Boat Ramps
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 - Major Roads
 - County Line
 - Study Segments
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 - Residential Unincorporated
 - Residential Incorporated
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 - Industrial
 - Conservation/Parks
 - Undeveloped Waterfront
 - Forested Wetland (Data from National Wetlands Inventory)
- Manatee Speed Zones**
- Slow Speed Zone (Channel Excluded)
 - 25 MPH Speed Zone
 - 25 MPH Speed Zone (In Channel)



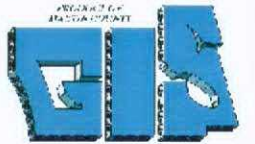
Marina / Boat Ramp Name					
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2 ANCHOR'S AWEIGH MARINA	10 NORTHSIDE MARINE SERVICES	18 WHITTICAR BOAT WORKS	26 DAVID LOWE'S BOATYARD	34 OUTBOARD MARINE CORP	41 SEAGATE MARINA
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8 STUART CAUSEWAY PARK RAMP	16 MARTIN COUNTY MARINE	24 MARINER CAY MARINA	32 JENSEN BEACH CAUSEWAY PARK RAMP	47 MARINA BAY DOCKS	48 JUPITER ISLAND CLUB MARINA
					49 JOHNATHAN DICKINSON STATE PARK BOAT RAMP
					50 STUART YACHT SALES
					51 STEVE LAZARUS YACHT SALES
					52 THE ALLIED MARINE GROUP
					53 STUART HARBOR DOCKAGE
					54 SEAGREEN MARINA
					55 BEACH WATER SPORTS
					56 LEIGHTON PARK RAMP
					57 SANDSPRIT PARK RAMP
					58 PHIPPS PARK RAMP
					59 SEAGATE HARBOR/ LIGHTHOUSE POINT
					60 PENDARVIS COVE PARK

Locations preceded with a "P" indicate potential marina sites



Martin County, Florida

Map 4d

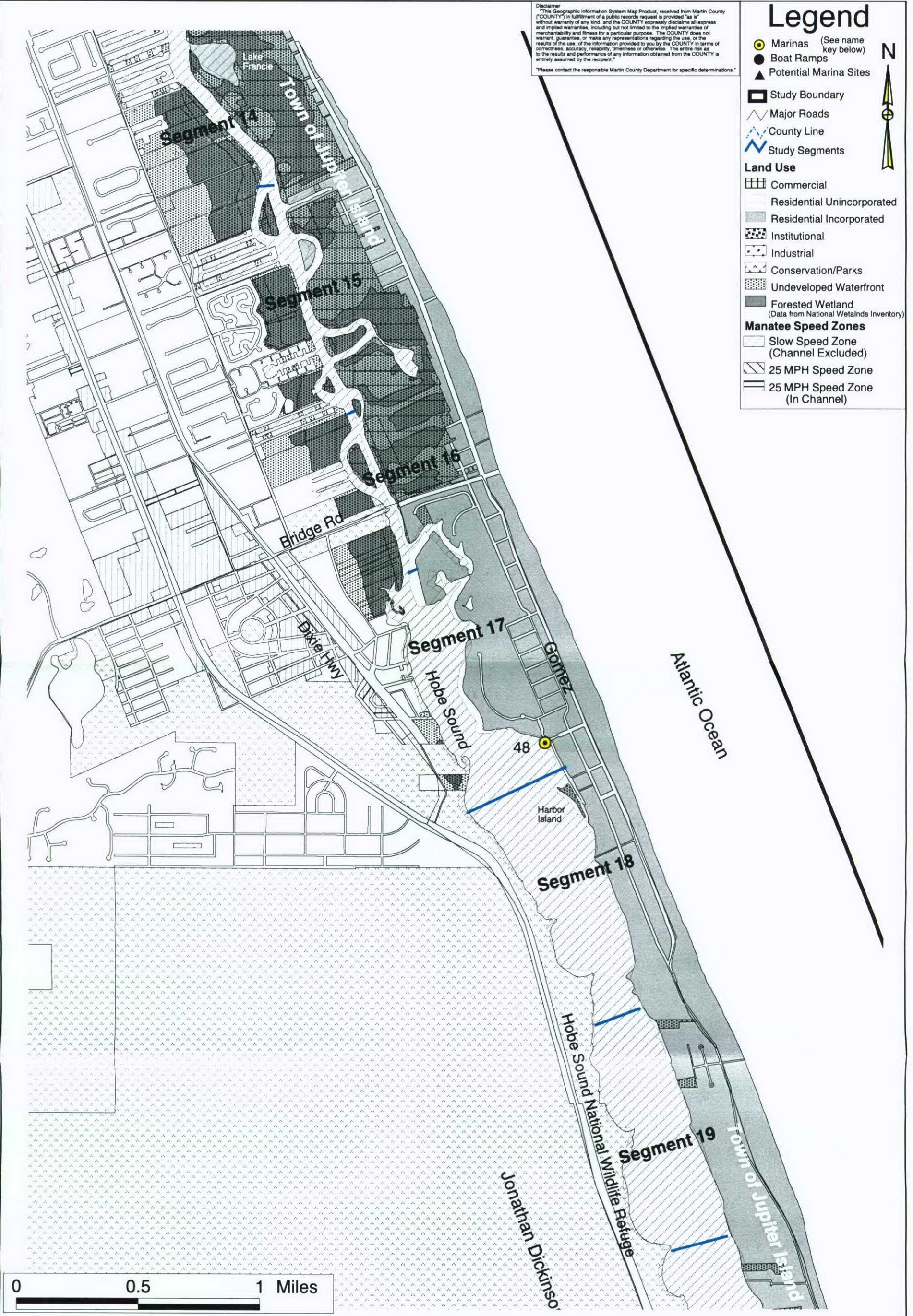


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Legend

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- ▭ Undeveloped Waterfront
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- Manatee Speed Zones**
- ▭ Slow Speed Zone (Channel Excluded)
- ▭ 25 MPH Speed Zone
- ▭ 25 MPH Speed Zone (In Channel)



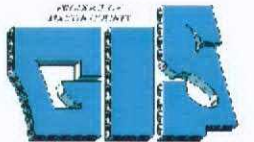
Marina / Boat Ramp Name					
1 SUNDANCE MARINA	9 HARBOR INN DOCKS	17 BASSETT BOATS	25 NOLL'S BOATYARD	33 NEW WAVE RUNNERS	40 BLOWING ROCKS MARINA
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7 NORTHSIDE MARINA	15 SAILFISH POINT MARINA	23 FINEST KIND MARINA	31 LOBLOLLY BAY MARINA	46 PILOTS COVE DOCKS	51 THE ALLIED MARINE GROUP
8 STUART CAUSEWAY PARK RAMP	16 MARTIN COUNTY MARINE	24 MARINER CAY MARINA	32 JENSEN BEACH CAUSEWAY PARK RAMP	47 MARINA BAY DOCKS	52 STUART HARBOR DOCKAGE
					53 SEAGREEN MARINA
					54
					55 BEACH WATER SPORTS
					56 LEIGHTON PARK RAMP
					57 SANDSPRIT PARK RAMP
					58 PHIPPS PARK RAMP
					59 SEAGATE HARBOR/ LIGHTHOUSE POINT
					60 PENDARVIS COVE PARK

Locations preceded with a "P" indicate potential marina sites



Martin County, Florida

Map 4e



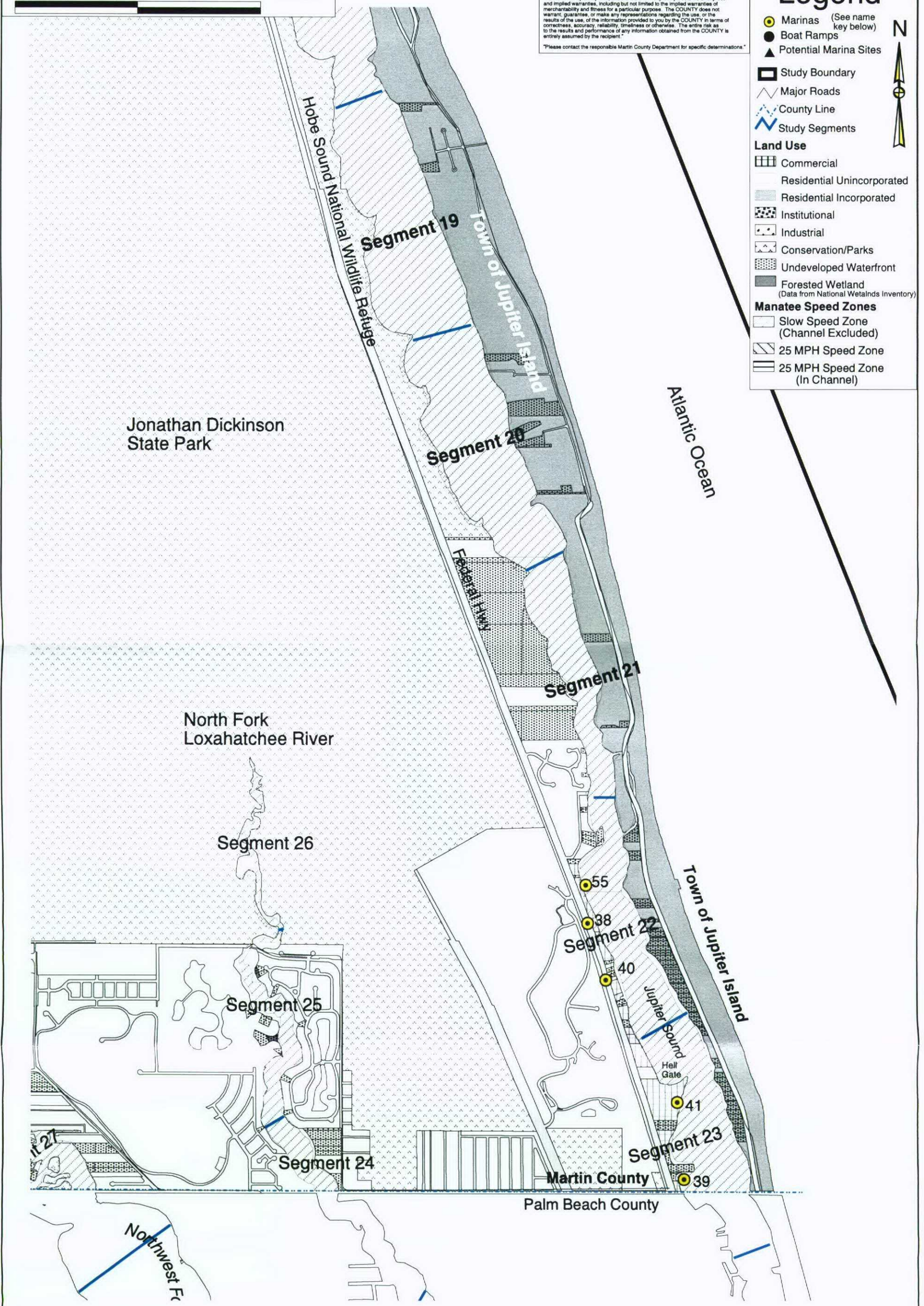
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- ▧ Undeveloped Waterfront
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- Manatee Speed Zones**
- ░ Slow Speed Zone (Channel Excluded)
- ▨ 25 MPH Speed Zone
- ▩ 25 MPH Speed Zone (In Channel)

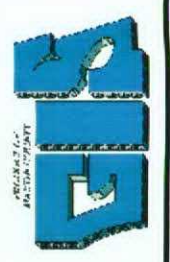
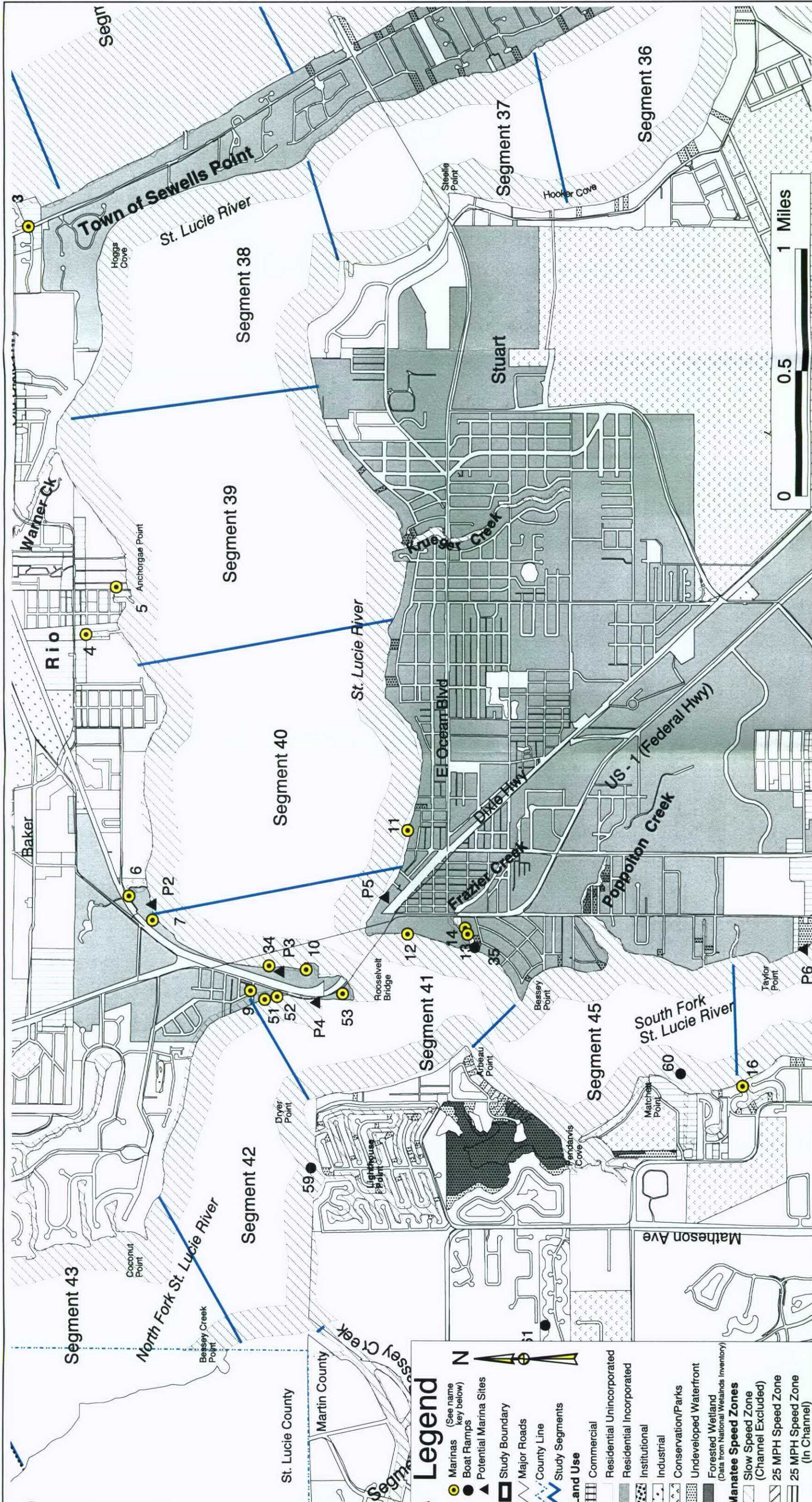


Marina / Boat Ramp Name															
1 SUNDANCE MARINA	9 HARBOR INN DOCKS	17 BASSETT BOATS	25 NOLL'S BOATYARD	33 NEW WAVE RUNNERS	40 BLOWING ROCKS MARINA	48 JUPITER ISLAND CLUB MARINA	55 BEACH WATER SPORTS	2 ANCHOR'S A WEIGH MARINA	10 NORTHSIDE MARINE SERVICES	18 WHITTICAR BOAT WORKS	26 DAVID LOWE'S BOATYARD	34 OUTBOARD MARINE CORP	41 SEAGATE MARINA	49 JOHNATHAN DICKINSON STATE PARK BOAT RAMP	56 LEIGHTON PARK RAMP
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Locations preceded with a "P" indicate potential marina sites

Martin County, Florida Map 4g

AV Project File: /data/gis/projects/gmnd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/BSP/plotsp_map4g



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Marina / Boat Ramp Name	Number
SUNDANCE MARINA	9
ANCHOR'S AWEIGH MARINA	10
OUTRIGGER HARBOR MARINA	11
STEVE LAZARUS YACHTS	12
PELICAN'S NEST MARINA	13
ST LUCIE MARINE	14
NORTHSHORE MARINA	15
STUART COUNTY MARINE	16
17 BASSETT BOATS	17
18 WHITTAKER BOAT WORKS	18
19 MONTEBEY MOTEL AND MARINA	19
20 STELLA MARINE	20
21 RIVERWATCH MARINA	21
22 SAILFISH MARINA	22
23 FINEST KIND MARINA	23
24 MARINER CAY MARINA	24
25 NOLL'S BOATYARD	25
26 DAVID LOWE'S BOATYARD	26
27 PRATES COVE MARINA	27
28 ARJ BOATWORKS	28
29 MANATEE MARINA	29
30 MAR-TECH YACHT FITTERS	30
31 LOBLOLLY BAY MARINA	31
32 JENSEN BEACH CAUSEWAY PARK RAMP	32
33 NEW WAVE RUNNERS	33
34 OUTBOARD MARINE CORP	34
35 SHWARD STREET RAMP	35
36 BREWSTER MARINA	36
37 MARRIOTT MARINA	37
38 JUPITER HILLS LIGHTHOUSE MARINA	38
39 PELICAN BAY YACHT CLUB	39
40 BLOWING ROCKS MARINA	40
41 SEAGATE MARINA	41
42 STUART YACHT BUILDERS	42
43 LOST RIVER MARINE	43
44 AMERICAN CUSTOM YACHTS	44
45 JIMMY GRAHAM PARK RAMP	45
46 PILOTS COVE DOCKS	46
47 MARINA BAY DOCKS	47
48 JUPITER ISLAND CLUB MARINA	48
49 JOHNATHAN DICKINSON STATE PARK BOAT RAMP	49
50 STUART YACHT SALES	50
51 STEVE LAZARUS YACHT SALES	51
52 THE ALLIED MARINE GROUP	52
53 STUART HARBOR DOCKAGE	53
54 SEAGREEN MARINA	54
55 BEACH WATER SPORTS	55
56 LEIGHTON PARK RAMP	56
57 SANDSPRIT PARK RAMP	57
58 PHIPPS PARK RAMP	58
59 SEAGATE HARBOR/LIGHTHOUSE POINT	59
60 PENDARVIS COVE PARK RAMP	60

Locations preceded with a "P" indicate potential marina sites.

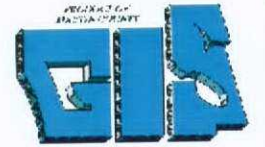


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Martin County, Florida

Map 4h

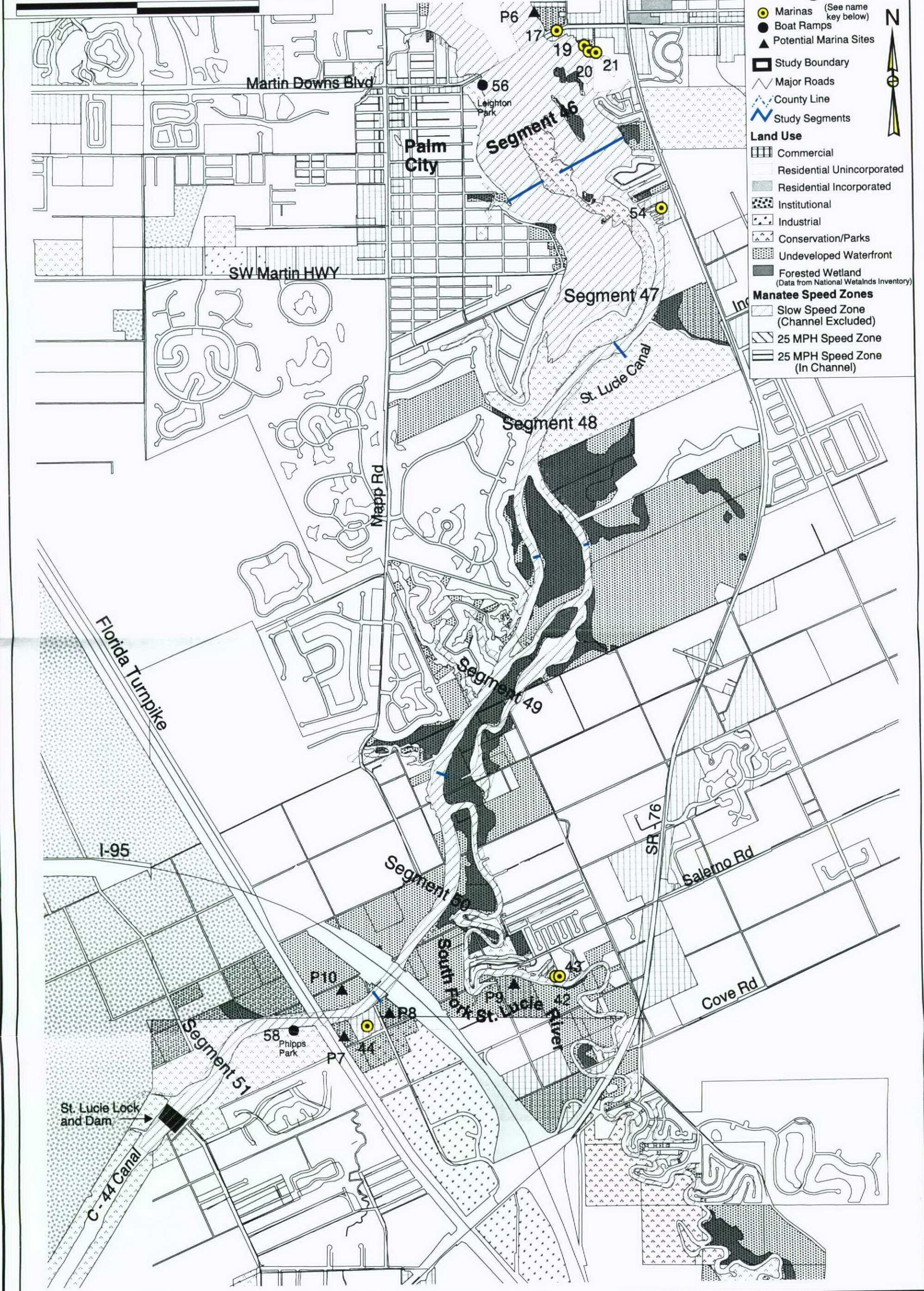
AV Project File: /data/gis/projects/gmd/manatee/manatee_plan2bw.apr
 Plot Name: /data/gis/projects/plots/BFSP/bfsp_map4h



0 0.5 1 Miles

Legend

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- 25 MPH Speed Zone
- 25 MPH Speed Zone (In Channel)



Marina / Boat Ramp Name

1 SUNDANCE MARINA	9 HARBOR INN DOCKS	25 NOLL'S BOATYARD	33 NEW WAVE RUNNERS	40 BLOWING ROCKS MARINA	48 JUPITER ISLAND CLUB MARINA	55 BEACH WATER SPORTS
2 ANCHOR'S AWEIGH MARINA	10 NORTHSIDE MARINE SERVICES	26 DAVID LOWE'S BOATYARD	34 OUTBOARD MARINE CORP	41 SEAGATE MARINA	49 JOHNATHAN DICKINSON	56 LEIGHTON PARK RAMP
3 OUTRIGGER HARBOR MARINA	11 WATERSIDE PLACE DOCKS	27 PIRATES COVE MARINA	35 SHEPARD PARK RAMP	42 STUART YACHT BUILDERS	50 STUART YACHT SALES	57 SANDSPRIT PARK RAMP
4 STEVE LAZARUS YACHTS	12 SOUTHPORT ANCHORAGE	28 A&J BOATWORKS	36 BROWARD STREET RAMP	43 LOST RIVER MARINA	51 STEVE LAZARUS YACHT SALES	58 PHIPPS PARK RAMP
5 PELICAN'S NEST MARINA	13 TREASURE COAST BOATING	29 MANATEE MARINA	37 MARRIOTT MARINA	44 AMERICAN CUSTOM YACHTS	52 THE ALLIED MARINE GROUP	59 SEAGATE HARBOR / LIGHTHOUSE POINT
6 ST LUCIE MARINE	14 FREEDOM MARINE	30 MAR-TECH YACHT FITTERS	38 JUPITER HILLS LIGHTHOUSE MARINA	45 JIMMY GRAHAM PARK RAMP	53 STUART HARBOR DOCKAGE	60 PENDARVIS COVE PARK
7 NORTHSIDE MARINA	15 SAILFISH POINT MARINA	31 LOBLOLLY BAY MARINA	39 PELICAN BAY YACHT CLUB	46 PILOTS COVE DOCKS	54 SEAGREEN MARINA	
8 STUART CAUSEWAY PARK RAMP	16 MARTIN COUNTY MARINE	24 MARINER CAY MARINA		47 MARINA BAY DOCKS		

Locations preceded with a "P" indicate potential marina sites