A. Introduction

Setting

The City of Jacksonville is located in Duval County, Northeast Florida (Map 1). The St. Johns River, with tributaries throughout Jacksonville, meanders north about 40 miles through Duval County before discharging into the Atlantic Ocean. Widths exceeding three miles in the southern reaches of the St. Johns River, including its tributaries, comprise about 76 square miles of streams and waterways. The setting also includes 16 miles of coastline along the Atlantic Ocean.

The Florida manatee, *Trichechus manatus latirostris,* inhabits the waters of Jacksonville year round. Few manatees are observed during winter (December, January and February). Manatees are observed from late March through November with highest concentrations occurring during spring and summer months (May, June, July and August). Florida manatees exhibit an array of activities in these waters including traveling, resting, feeding and cavorting (mating).

In 1989, Florida's Governor and Cabinet identified counties experiencing excessive watercraft-related mortality of manatees and mandated that these counties take positive measures to reduce this problem. Specifically, thirteen key counties - Brevard, Broward, Citrus, Collier, Dade, Duval, Indian River, Lee, Martin, Palm Beach, St. Lucie, Sarasota, and Volusia - were to develop manatee protection plans which would address the multitude of threats facing manatees. In 1999, the Bureau of Protected Species (BPSM) which was originally responsible for coordinating and assisting in the development of these plans, was moved administratively from Florida Department of Environmental Protection (FDEP), to Florida Fish and Wildlife Conservation Commission's (FWC). The Bureau was renamed later to the Imperiled Species Management Section (ISMS). As a result, data originally from FDEP is referenced in this report as coming from FWC. Also, data originally from Florida Marine Research Institute (FMRI) is referenced as coming from the same renamed as the Florida Wildlife Research Institute (FWRI). At this time all Key Counties have manatee protection measures. In 1999, four counties had State approved Manatee Protection Plans (MPPs) and two counties had locally approved plans. Lee County was in the final stages of State approval. As of December 2005, there were 11 counties in Florida with state-approved MPPs (Brevard, Citrus, Collier, Dade, Duval, Indian River, Lee, Martin, Sarasota, St. Lucie, and Volusia) with Palm Beach and Broward pending. In July 2000, the State rule implementing boat speed zones was adopted by the FWC in Duval County. As of April 2005, there are also United States Fish and Wildlife Service (USFWS) zones in the same general area as the FWC rule from Reddie Point and Sandfly Point to the Hart Bridge (referred to as the amended portion of the Lower St. Johns River Manatee Refuge).

During January to May 2006, there were 195 total deaths of manatees in Florida, of which, 39 were watercraft related. In 2005, 396 total manatee deaths were reported (79 watercraft related). In 2004, 276 total manatee deaths were reported (69 watercraft

related. In 2003, 380 total deaths (73 by watercraft). In 2002, 305 total deaths (95 by watercraft). In 2001, 325 total deaths (81 by watercraft). In 2000, 272 total deaths (78 by watercraft) and in 1999, 269 total deaths (82 by watercraft). Watercraft-related deaths include propeller hits, boat impact, propeller and boat impact combined, and barge impact (Florida Wildlife Research Institute, 2006).

The St. Johns River provides habitat for the manatee along with supporting tremendous recreational and industrial vessel usage. Boat traffic in the river is diverse; it includes port facilities for large industrial and commercial shippers, commercial fishing, sport fishing and recreational activity. Each month, about 175 large commercial ships enter and exit the mouth of the St. Johns River (U.S. Department of Transportation, United States Coast Guard, September, 1999). In 1998, 3,000 large commercial vessels used the Port of Jacksonville (USCG personal communication). This represents a significant economic factor for Duval County and the entire First Coast area. The Tax Collector's Office estimated 32,000 registered boaters in Duval County in 1997-98, with 37,000 registered boaters in 1988-89. This indicates a decline in boat registrations in Duval County between 1988 and 1998. Recent port statistics indicated that about 3,182 vessels use the Port each year. In addition to this, in 2004 there were 100 cruise ships passages to and from the Port. In 2005 the number rose to 172. This is an average of 270 vessels per month (Source data: JaxPort.com 2006). There was a marked difference between the 1999/2000 (fiscal year) data on registered vessels. It was during this time that the Department of Highway Safety & Motor Vehicles converted to a new FRVIS 2000 Computer System. Some transactions were processed on the old vessel system and some on the new Division of Motor Vehicles registration system. Therefore, all records did not always convert over from the old to the new system accurately. Additionally, vessel registrations were converted over from the set annual renewal period to a staggered birth/month system based on the owner's birth month. This meant that some vessels were registered more than once that year but paid a prorated tax amount (Personal Communication, Gail Christy-Jones 2004, Department of Highway Safety & Motor Vehicles, State of Florida). As a result, any large variations around 2000/2001 when the data is viewed on a calendar year basis rather than a fiscal year basis, are probably due to the conversion from the old to the new system. Only totals are discussed here but Appendix F provides more detailed information about commercial versus recreational vessel and boat dealer registrations.

Florida: Total registered vessels in the State of Florida increased by 7% from 880,077 (2000) to 943,611 (2001) and 2% from 943,611 (2001) to 961,719 (2002) and 2% from 961,719 (2002) to 978,225 (2003) and 0.5% from 978,225 (2003) to 982,907 (2004) and then 3% from 982,907 (2004) to 1,010,370 (2005). This represents a 13% increase or 130,293 vessels over the last 6 years. Commercial vessels represented an average of about 3% of total vessels per year, decreased by 2,191 vessels over the same 6 years.

Duval: Total registered vessels decreased by 2% from 34,483 (2000) to 33,763 (2001) and then increased by 0.7% from 33,763 (2001) to 34,008 (2002) and 0.4% from 34,008

(2002) to 34,142 (2003). Then decreased by 0.6% from 34,142 (2003) to 33,927 (2004) and then increased 0.4% from 33,927 (2004) to 34,071 (2005). This represents a 1.2% decrease or 412 vessels over the last 6 years. Commercial vessels represent an average of 2% of total vessels that decreased by 46 vessels over the last 6 years.

Clay: Total registered vessels to the south in Clay County increased by 17% from 9,727 (2000) to 11,710 (2001) and 4% from 11,710 (2001) to 12,197 (2002) and then 4% from 12,197 (2002) to 12,697 (2003) and 0.2% from 12,697 (2003) to 12,725 (2004) and then 1.8% from 12,725 (2004) to 12,954 (2005). This more likely represents a 10% increase or 757 vessels over the last 4 years and not a 27% increase (3,227 vessels) over 6 years that could be caused by data conversion mentioned earlier. Commercial vessels represent an average of 1.4% and decreased by 10 vessels over the last 4 years.

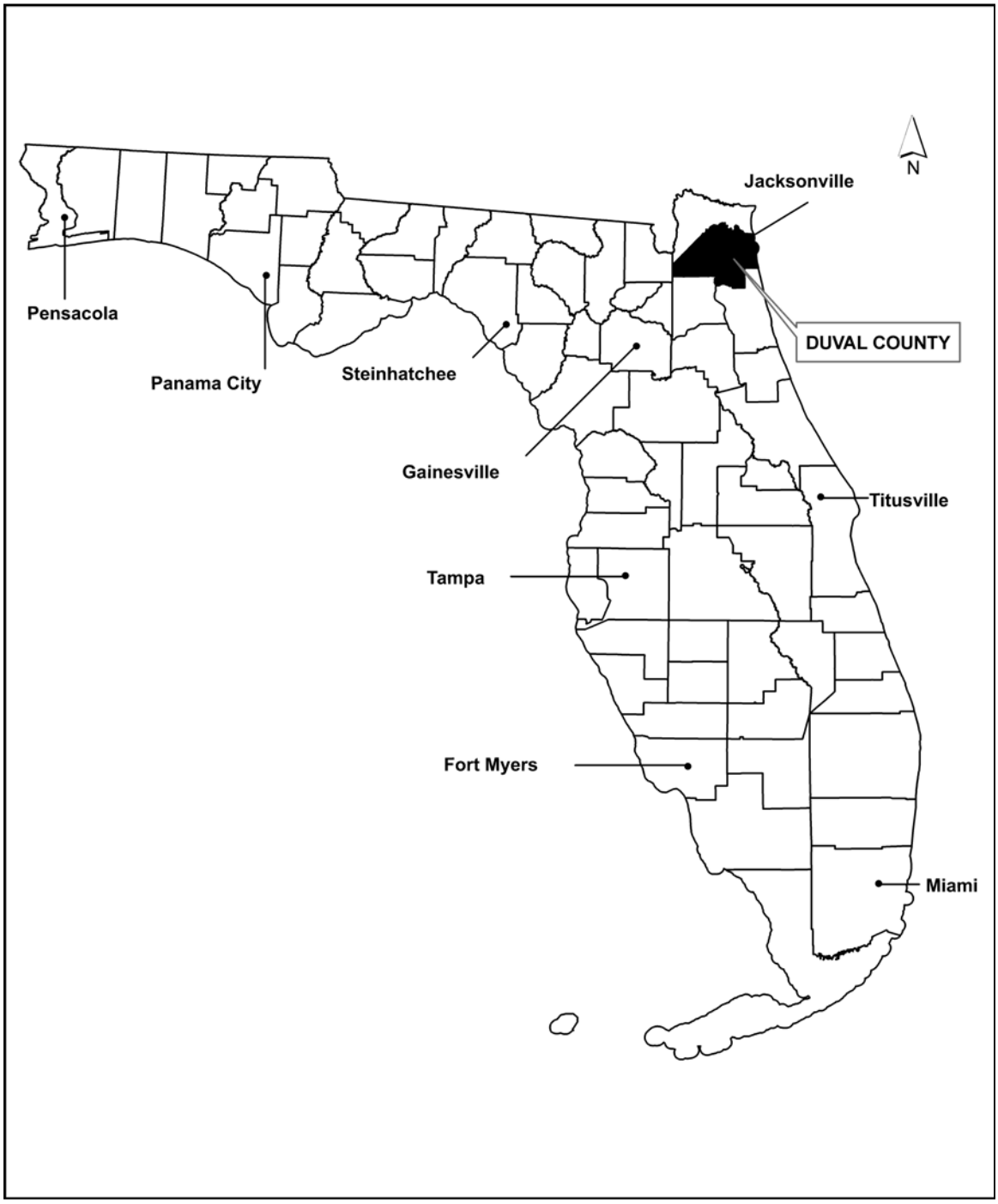
St. Johns: Total registered vessels to the south, in St. Johns County, decreased by 1% from 11,002 (2000) to 10,850 (2001) and increased by 3% from 10,850 (2001) to 11,183 (2002) and 2.5% from 11,183 (2002) to 11,467 (2003) and 2.4% from 11,467 (2003) to 11,750 (2004) and then 5.6% from 12,725 (2004) 11,750 (2004) to 12,443 (2005). This represents a 12% increase or 1,441 vessels over the last 6 years. Commercial vessels represent an average of 3% and decreased by a total of 70 vessels over the last 6 years.

Putnam: Total registered vessels to the south, in Putnam County, increased by 9.7% from 7,660 (2000) to 8,482 (2001) and 2.9% from 8,482 (2001) to 8,731 (2002) and then 1% from 8,731 (2002) to 8,812 (2003). Then decreased by 0.03% to 8,809 (2004) and then increased again by 2.6% from 8,809 (2004) to 9,047 (2005). This more likely represents a 6% increase or 565 vessels over the last 4 years and not a 16% increase (1,387 vessels) over 6 years that could be caused by data conversion mentioned earlier. Commercial vessels represent an average of 3.3% and decreased by 13 vessels over the last 5 years.

Nassau: Total registered vessels to the north, in Nassau County, increased by 20% from 4,164 (2000) to 5,182 (2001) and 4% from 5,182 (2001) to 5,395 (2002) and then 3% from 5,395 (2002) to 5,534 (2003) and 2% from 5,534 (2003) to 5,666 (2004) and then 4% from 5,666 (2004) to 5,876 (2005). This represents a 12% increase or 696 vessels over the last 5 years. Commercial vessels represent an average of 3.3% of total vessels that increased by 5 vessels over the last 5 years.

For vessel statistics by county see Appendix F. Source: DHSMV. Florida Vessel Owners: Facts and Figures 2006.

Increasing boating activity on the St. Johns River, and the significant number of manatees which have been reported using the river, make it critically necessary that a comprehensive management plan for the waters of Duval County be enacted to protect both manatee and human activity.



MAP 1. Site location of Duval County, Florida.

Purpose

The purpose of this plan is to provide protection to manatees at a level determined necessary and based upon a comprehensive understanding of manatee populations, habitat needs, and interactions with humans, in addition to understanding and acknowledging human recreational and commercial uses of Jacksonville's waterways. Information presented in this document includes a series of maps relating to specific locations surveyed throughout the St. Johns River and its tributaries (See maps section). The basic concept is to focus future Boat Facility development away from areas of high manatee use and high watercraft related mortality.

Objectives

The long-term general objectives of this plan are to assist in protecting manatees and their habitats to ensure their continued survival. These objectives are derived from the U. S. Fish and Wildlife Service. October, 2001. Florida Manatee Recovery Plan, *(Trichechus manatus latirostris)*, Third Revision and the Governor and Cabinet's 1989 desire to improve boating safety and manatee protection for Florida waterways. Specific objectives include: reducing the number of boat-related mortalities; protecting manatee habitat; promoting boating safety; and increasing public awareness of the need to protect manatees and their habitat. Also, goals, objectives and policies of the 2010 Comprehensive Plan are integral components to the long-term objectives in this plan.

Format

The Duval County Manatee Protection Plan was created to serve as a reference for planning future land and water development in Jacksonville, to the extent that such development may affect the Florida manatee. The City of Jacksonville's 2010 Comprehensive Plan includes policies that protect listed species and their habitat, as well as policies that address water quality, port facilities, and marina siting, incorporating relevant sections of the Manatee Protection Plan. Regulatory zones for boating activities in Duval County have been adopted by City Ordinance and will be enforced by the appropriate agencies.

B. Inventory and Analysis

Manatees

Distribution and Abundance: Information on Florida manatee distribution and abundance in Duval County is based upon historical and continuing aerial surveillance data from 1982 to date (Kinnaird and Valade 1983, Valade 1991, Brooks personal communication). Evidence from surveys conducted over several one to two-year periods by USFWS and FDEP respectively, along with earlier research on manatee abundance in northeast Florida, implies that manatee usage of Duval County waters exhibits seasonal migratory fluxes (Beeler and O'Shea 1988, Valade 1991). Historical aerial survey data show that numbers of manatees sighted increased as ambient water temperatures rose (>70°F), and decreased as ambient water temperatures fell (<70°F) in late winter (Kinnaird 1983, Valade 1991, Worthy et al. 2000, White et al. 2002).

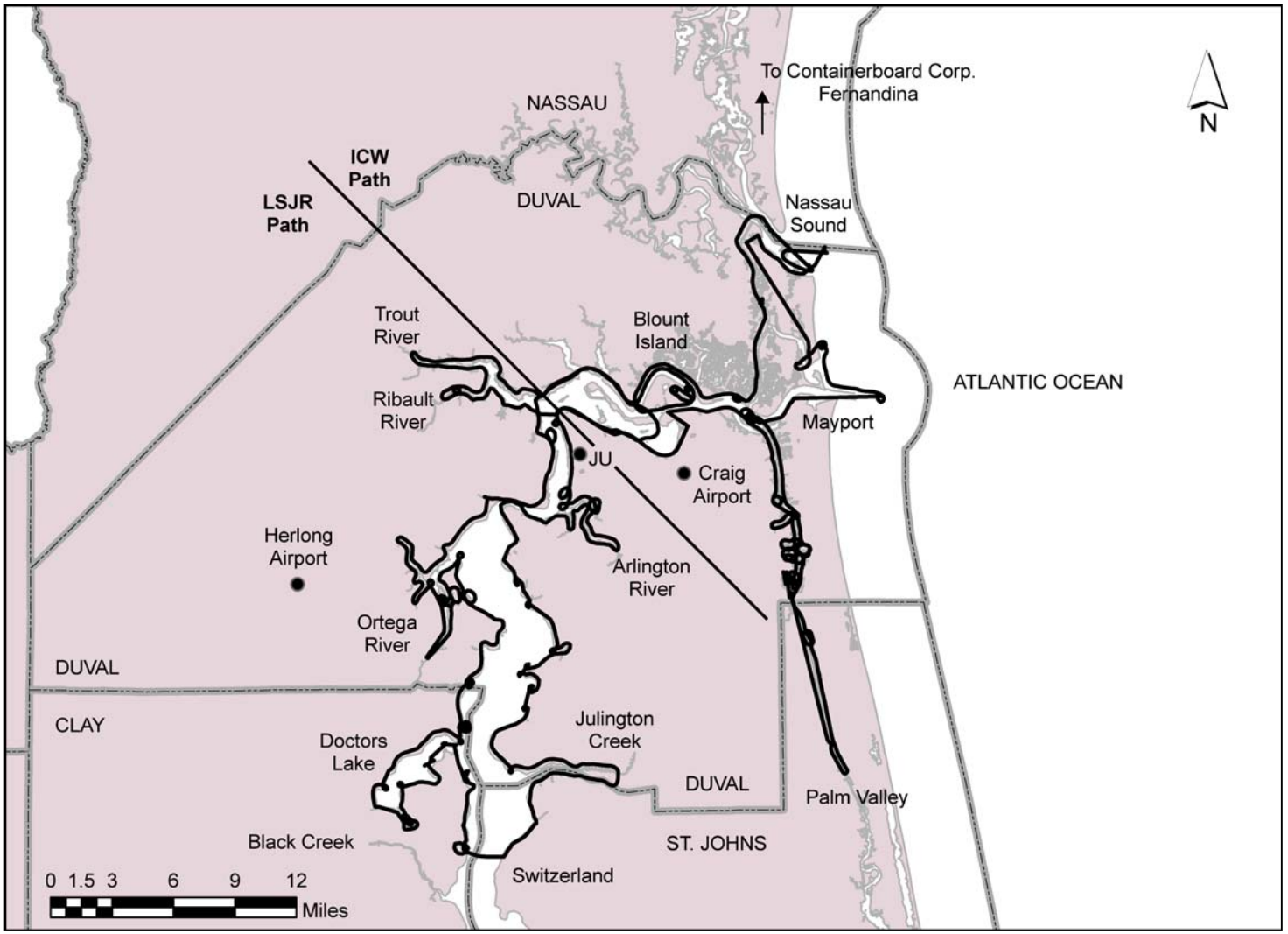
In a series of aerial surveys conducted by USFWS (1982-1983), the area of coverage included Duval County waters as well as the St. Johns River extent into Clay and St. Johns Counties (to the Shands Bridge). Also included in the coverage area was the Atlantic Intracoastal Waterway from Kings Bay, Georgia to Oak Hill, Florida. The St. Johns River portion of the survey yielded a total count of 425 manatees, 7% calves (23 aerial surveys). Highest sighting counts were recorded from the Buckman Bridge to Green Cove Springs. Kinnaird (1983) states that these results confirmed that percent bottom cover by submerged aquatic vegetation is the best predictor of manatee presence. Tape grass *Vallisneria americana* occurs most extensively south of the Buckman Bridge on both banks of the main river; while little aquatic vegetation other than: cordgrass *Spartina bakeri*, marsh grass *Spartina alterniflora*, black needlerush *Juncus roemerianus*, and floating mats of water hyacinth *Eichhornia crassipes* occurs north of the Fuller Warren Bridge or in the Intracoastal Waterway. The highest single-day count in this study of 48 manatees was recorded in May, 1993. The most frequent group configuration in this study was single or paired manatees.

The City of Jacksonville's Department of Parks, Recreation and Entertainment funded a similar study (1988-1990) limited to Duval County waters including the Intracoastal Waterway (Valade 1991). A total of 52 aerial surveys were conducted with 1,823 recorded manatee sightings, 4.9% calves. A peak single count of 99 manatees was recorded in October, 1988. As expected, manatee abundance increased during spring and peaked in late summer. The majority of sightings in this study indicated that the principal activity of manatees in all study areas of the main river system was traveling (Valade 1991).

FDEP conducted aerial surveys of the St. Johns River (1993-1994) using a helicopter in place of the fixed-wing aircraft used in other surveys of Duval County waters. Aerial surveys were performed in the lower reaches of St. Johns River and its tributaries (Clay County to Black Creek). A total of 919 manatees, 8.1% calves, were sighted (21 aerial surveys). The largest single-day count was 102 manatees (May, 1994).

Aerial surveys by Jacksonville University (March, 1994 - July, 2006) conform to current FDEP Manatee Aerial Survey Protocol. The latter mandates utilization of standardized methodology to allow for correlation of data with all current and existing surveys of Florida waters. Intensive bimonthly surveys are conducted in areas manatees are known to frequent – the Lower St. Johns River (LSJR), its tributaries and the Atlantic Intracoastal Waterway (ICW) from Nassau Sound to Palm Valley (MAP 2). A comparison of yearly means for the time periods 1994-1999 and 2000-2006 indicated no significant difference in numbers of manatees per survey with an average of 37-40 manatees/survey was observed in LSJR and 4-5 manatees/survey in the ICW. Means were slightly lower during 2000-2006 because of a decrease in sightings during 2000-2001, when there was a period of drought. There was a consistent mean of 21-22 surveys/year in LSJR and 19 surveys/year in the ICW over the study period. From 1994-July 2006, 514 bimonthly surveys, a total 11,391 manatee sightings were recorded, 7.5 % were calves (Table 1). During winter months, all natural and industrial warm water sources in Northeast Florida were also monitored. When water temperatures decrease (December through March), the majority of manatees in Duval County waters migrate south to Blue Springs and/or other warmer South Florida waters (White et al. 2002).

Historical manatee survey data from Jacksonville University indicate that manatees were observed feeding, resting and cavorting/mating in greater numbers south of the Fuller Warren Bridge relative to other waters in Duval County. Sightings in remaining waters consisted mostly of manatees traveling or resting. Preliminary data suggested that manatees use the ICW as a travel corridor during their seasonal (north/south) migrations along the east coast. These data indicated that manatees stay close to the shore, utilizing small tributaries for feeding. As Jacksonville University's aerial survey database was enlarged, more extensive conclusions regarding the stability of the Duval County manatee populations were possible. Satellite telemetry data also supported that most animals migrated into the LSJR from south Florida's east coast and that the ICW serves as a travel corridor for such migrations (Deutsch et al. 2003). Aerial survey counts of manatees are indices of abundance at the time of each survey. As a result, counts must be viewed as relative only to trends in general abundance, distribution countywide, and habitat use patterns (Irvine 1980). *Map Series A, Manatee Aerial Sightings*, provides graphical spatial distribution information about manatees. Seasonal distribution of manatees was not found to be significantly different between 1994-2006. *Map Series A,* shows manatee distribution from Spring 1994 through Spring 2006. Seasons were classified as follows: Winter (December-February), Spring (March-May), Summer (June-August), and Fall (September-November). Manatee observations were also reported by the public calling Jacksonville University's Manatee Hotline (904-256-7575). Hotline sightings are presented annually from 1994-2005 in *Map Series A, Manatee Aerial Sightings*. Shifts in total number of manatees sighted may be accounted for by fluctuations in other related factors such as air and water temperature, photoperiod, general shifts in Florida manatee distribution patterns (Valade 1991) and/or periods of prolonged above average salinity caused by low precipitation (White et al. 2002).



MAP 2. Study area with location of LSJR and ICW flight paths, Duval Co., FL. Diagonal line indicates the split between LSJR and ICW paths.

TABLE 1. Summary of the total number of aerial surveys, adults and calves observed, and Single Highest Day Counts (SHDC) by year (1994-July 2006).

Year		No. of surveys	Adults	Calves	Total	% Calves	SHDC Count	SHDC Date	Mean No./survey
LSJR	1994 [1]	19	783	67	850	7.89	113	9/6/94	45
	1995	22	583	36	619	5.82	76	7/20/95	28
	1996	21	706	92	798	11.53	124	7/15/96	38
	1997	23	1,113	89	1,202	7.4	136	8/18\97	52
	1998	26	775	82	857	9.57	125	9/11/98	33
	1999	20	804	87	891	9.76	127	9/28/99	45
	2000	20	294	28	322	8.7	67	5/3/00	16
	2001	18	454	17	471	3.61	85	6/4/01	26
	2002	23	796	28	824	3.40	106	5/14/02	36
	2003	23	1,018	68	1,086	6.26	150	6/25/03	47
	2004	18	836	88	924	9.52	160	5/20/04	51
	2005	21	848	76	924	8.23	170	6/22/05	44
	2006 [2]	15	583	62	645	9.61	116	6/2/06	43
Total		269	9,593	820	10,413	7.79 [3]	120 [4]		39 [5]
ICW	1994 [1]	12	74	7	81	8.64	21	5/12/94	7
	1995	23	79	6	85	7.06	21	5/30/95	4
	1996	23	84	11	95	11.58	16	5/16/96	4
	1997	24	73	10	83	12.05	20	4/21/97	3
	1998	18	46	3	49	6.12	19	6/12/98	3
	1999	14	32	4	36	11.11	12	6/21/99	3
	2000	21	54	3	57	5.26	13	5/3/00	3
	2001	17	77	2	79	2.53	23	4/27/01	5
	2002	22	109	1	110	0.91	28	4/30/02	5
	2003	18	82	1	83	1.20	23	5/14/03	5
	2004	18	92	11	103	10.68	23	5/20/04	6
	2005	20	111	6	117	5.13	29	7/6/05	6
	2006 [2]	15	71	3	74	4.05	19	4/21/06	5
Total		245	984	68	978	6.86 [3]	21 [4]		4 [5]

SHDC=Single Highest Day Count

[1] March to the end of December

[2] Untill July

[3] Mean % Calves

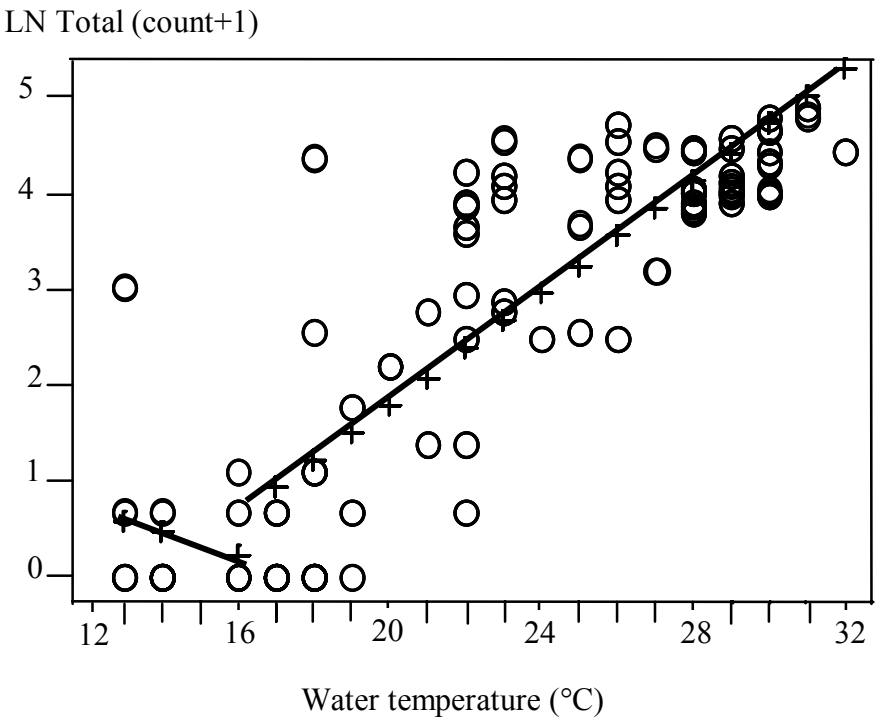
[4] Mean highest day count

[5] General Mean of total/survey counts

Estimates based upon mortality figures for 1976-1990 indicate a LSJR population of at least 150 individuals (Kinnaird 1983, Valade 1991). Based on mortality figures this number has not changed significantly for the period 1991-2006. However, information regarding Single Highest Day Counts of manatees recorded from aerial surveys (Table 1) indicates that potentially upward of 170 animals are possibly in Duval County during the height of the summer season. Moreover, numbers can increase to about 260 individuals when data from Clay County is included (Clay County Manatee Protection Plan 2002-2003 data). Evidence to date suggests that manatees sighted in Duval County do not form one discreet sub-population, but are a combination of several populations which winter in the coastal waters south of Jacksonville (Kinnaird and Valade 1983, Valade 1991). Historically, groups of manatees have been observed at local warm-water refugia during early winter and late spring only (Valade 1991). Small numbers of manatees remain in Northeast Florida in winter months and are observed at local warm-water out-falls. Exact numbers of manatees, locations, and the times they utilize out-falls required continual monitoring. Manatees frequently used the old Jacksonville Electric Authority's Southside Generating Station until it closed in October 2001 but little use was observed during the winter of 2003/2004.

Results support observations made in prior studies by Hartman (1979) and Valade (1991) that manatee abundance and distribution in LSJR was correlated with water temperatures and food resources. Abundance was greatest during the summer month when water temperature exceeded 17°C. Abundance was limited during the winter when water temperatures fell below 16°C (Figure 1). This threshold supports that reported in earlier studies by Allsopp (1969) and Irvine et al. (1981) of 19°C to 16°C limiting winter abundance. Also, Kinnaird (1983) mentioned a threshold water temperature of 20°C above which manatee abundance was significantly higher away from warm water sources. No water temperature threshold was determinable from the ICW data set because data was less robust than the LSJR data set and contained many zero values. Given more data over a longer time scale it would not seem unreasonable to assume that similar water temperature thresholds would hold for the ICW and LSJR. Photoperiod information was determined form "The Old Farmer's 2000-2006 Almanac" by Robert B. Thomas. Manatee abundance was highly correlated with increased day length from 10-14 hours/day. Since the photoperiod tends to peak prior to water temperature, it seems possible that manatees may be primarily influenced by photoperiod in receiving their seasonal migratory cue (Figures 2a, b, c for LSJR and Figures 3a, b, c for ICW).

Increased spring and summer sightings are attributed to an influx of animals from outside the study area. Some of these animals came from Blue Springs which is 170 Km further south in the Upper St. Johns River (USJR) and the rest are made up of south Florida east coast animals (Kinnaird 1983). Manatees in Duval County are a combination of the Atlantic Coast and USJR sub-populations that winter in the coastal waters south of Jacksonville (Kinnaird and Valade 1983, Valade 1991). Kinnaird (1983) mentioned the then current population of Blue Springs animals numbering some 35 in 1982/83. Ackerman (1995) mentions 88 identified manatees at Blue Springs in the winter of 1993/94.



LN Total (count +1) = 2.18 - 0.122 Wtemp. (negative slope)
LN Total (count +1) = -4.08 + 0.294 Wtemp. (positive slope)

FIGURE 1. Natural log of total (count +1) of manatees and water temperature (°C) in the LSJR, Duval Co., FL.

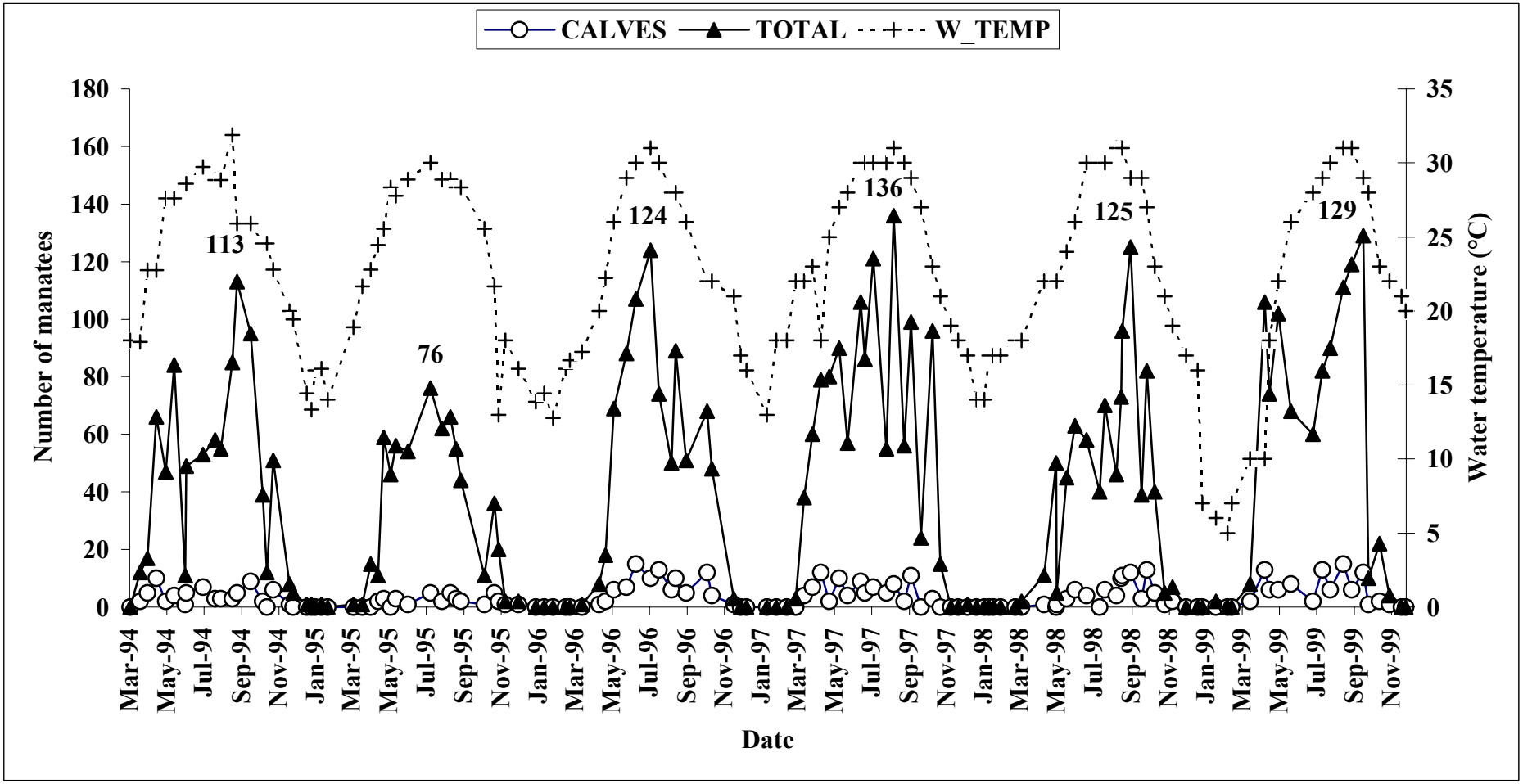


FIGURE 2a. Aerial sightings of manatees and water temperature in LSJR 1994-1999. Water temperature was measured at the Jacksonville University dock (NOTE: Figure 2b, shows 2000-August 2006 data; Figure 2c, shows 2000-August 2006 data and photoperiod information).

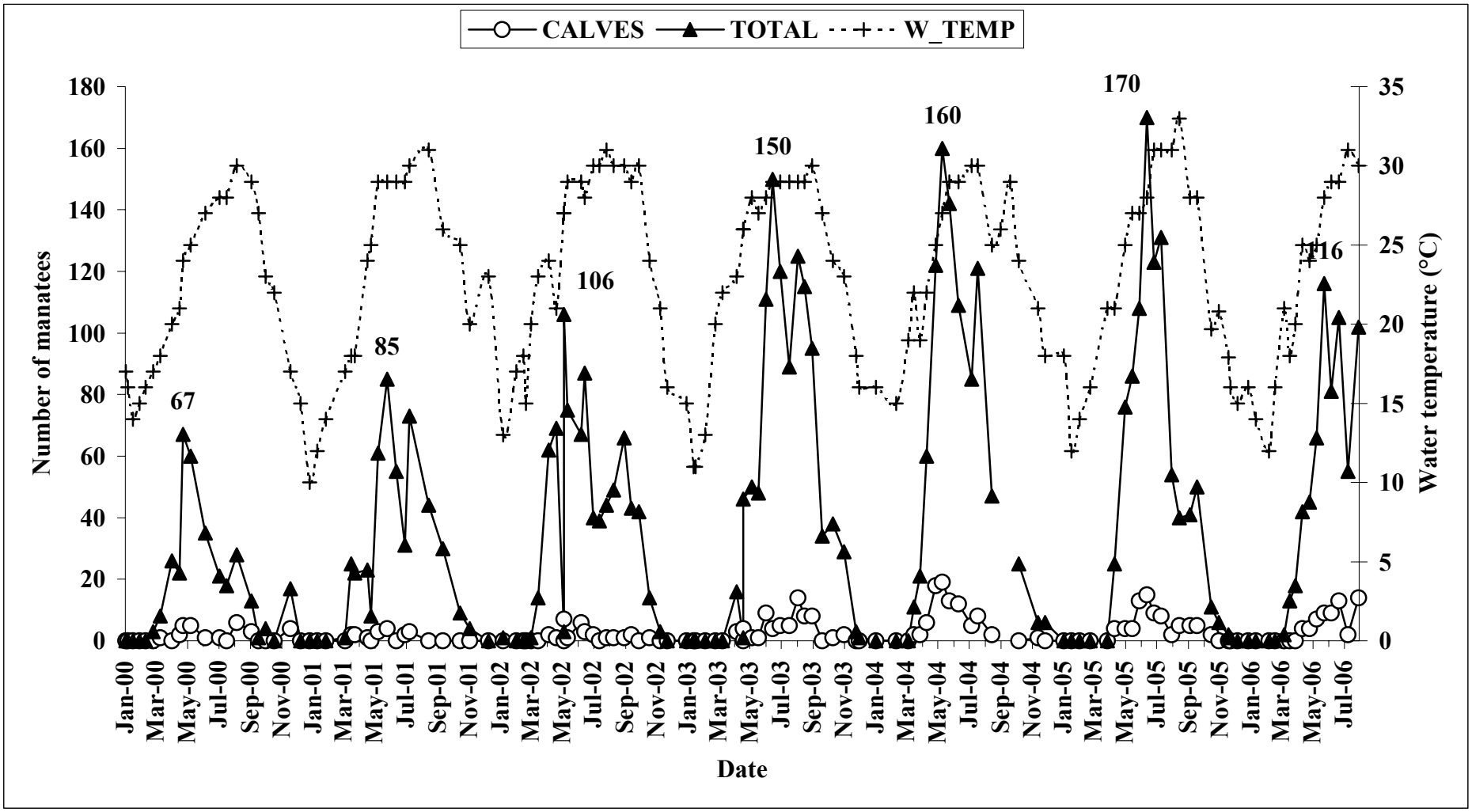


FIGURE 2b. Aerial sightings of manatees and water temperature in LSJR 2000-August 2006. Water temperature was measured at the Jacksonville University dock (NOTE: Figure 2a, shows 1994-1999 data; Figure 2c, shows 2000-August 2006 data and photoperiod information).

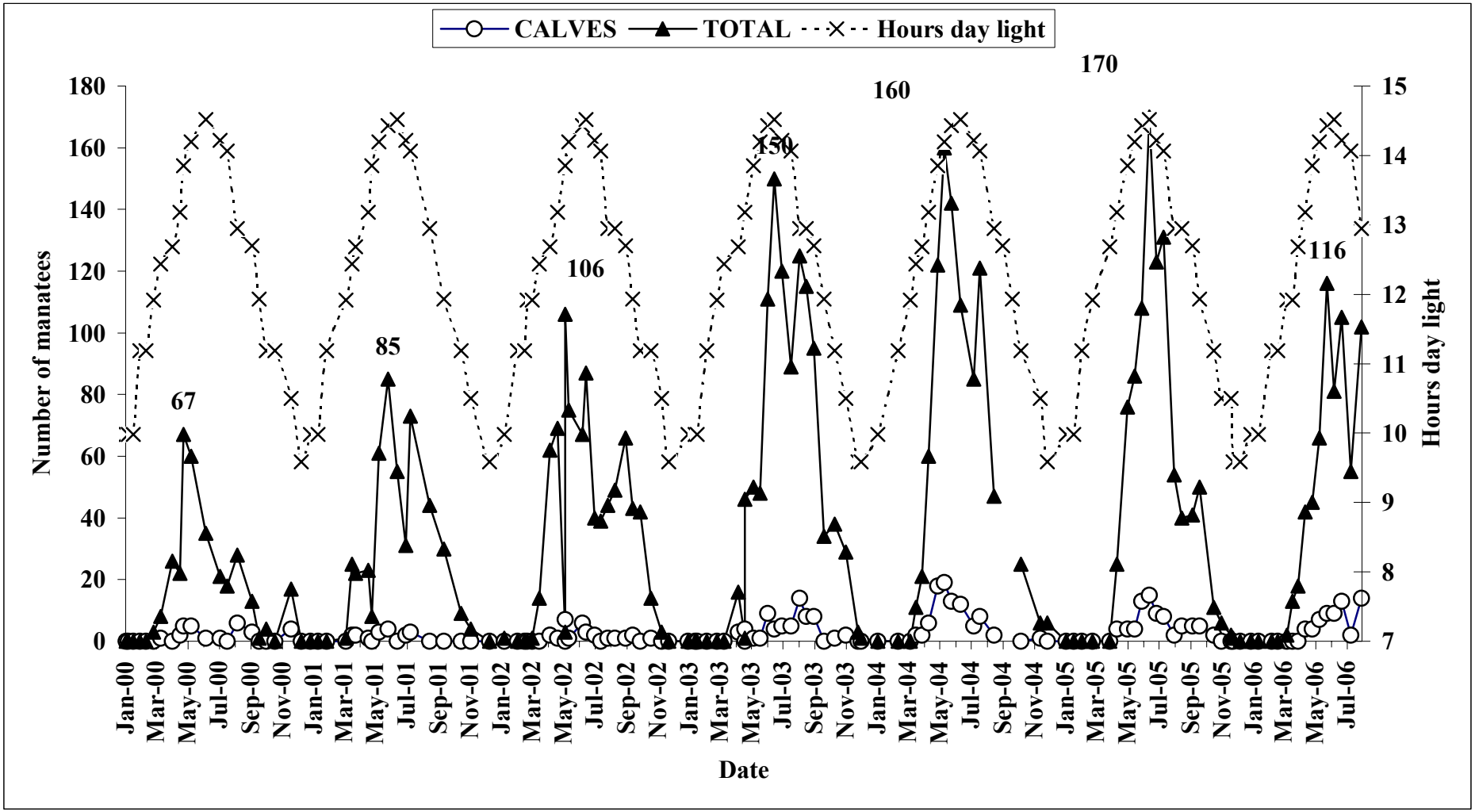


FIGURE 2c. Aerial sightings of manatees and photoperiod in LSJR 2000-August 2006. Photoperiod was determined from "The Old Farmer's 2000-2006 Almanac" by Robert B. Thomas (NOTE: Figure 2a, shows 1994-1999 data; Figure 2b, shows 2000-August 2006 data and water temperature information).

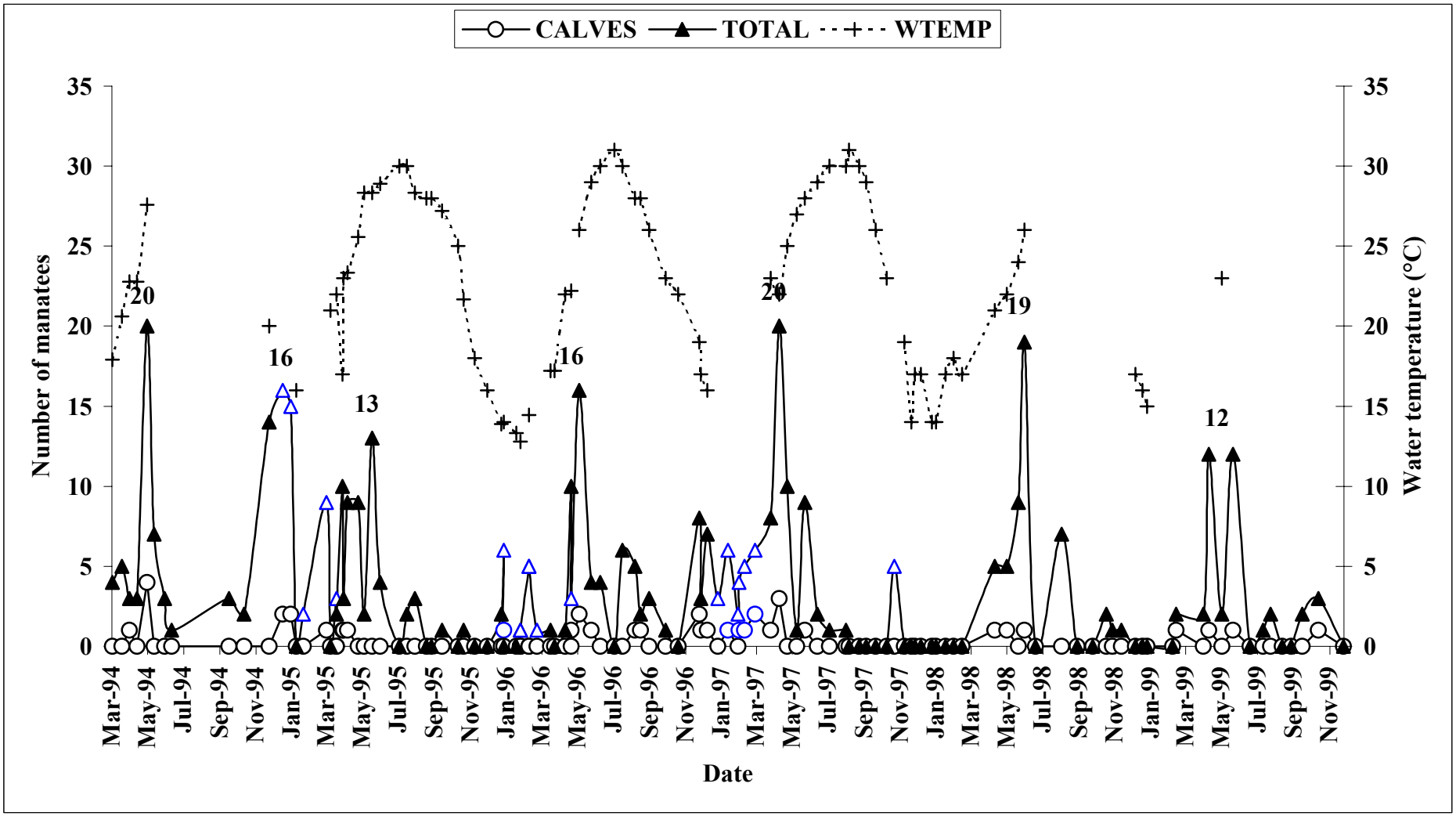


FIGURE 3a. Aerial sightings of manatees and water temperature in the ICW 1994-1999. (NOTE: Figure 3b, shows 2000-August 2006 data; Figure 3c, shows 2000-August 2006 data and photoperiod). Water temperature was measured at the Jacksonville University dock. Hollow triangles represent aerial sightings of manatees at Contained Corporation of America, Fernandina, Nassau Co., FL.

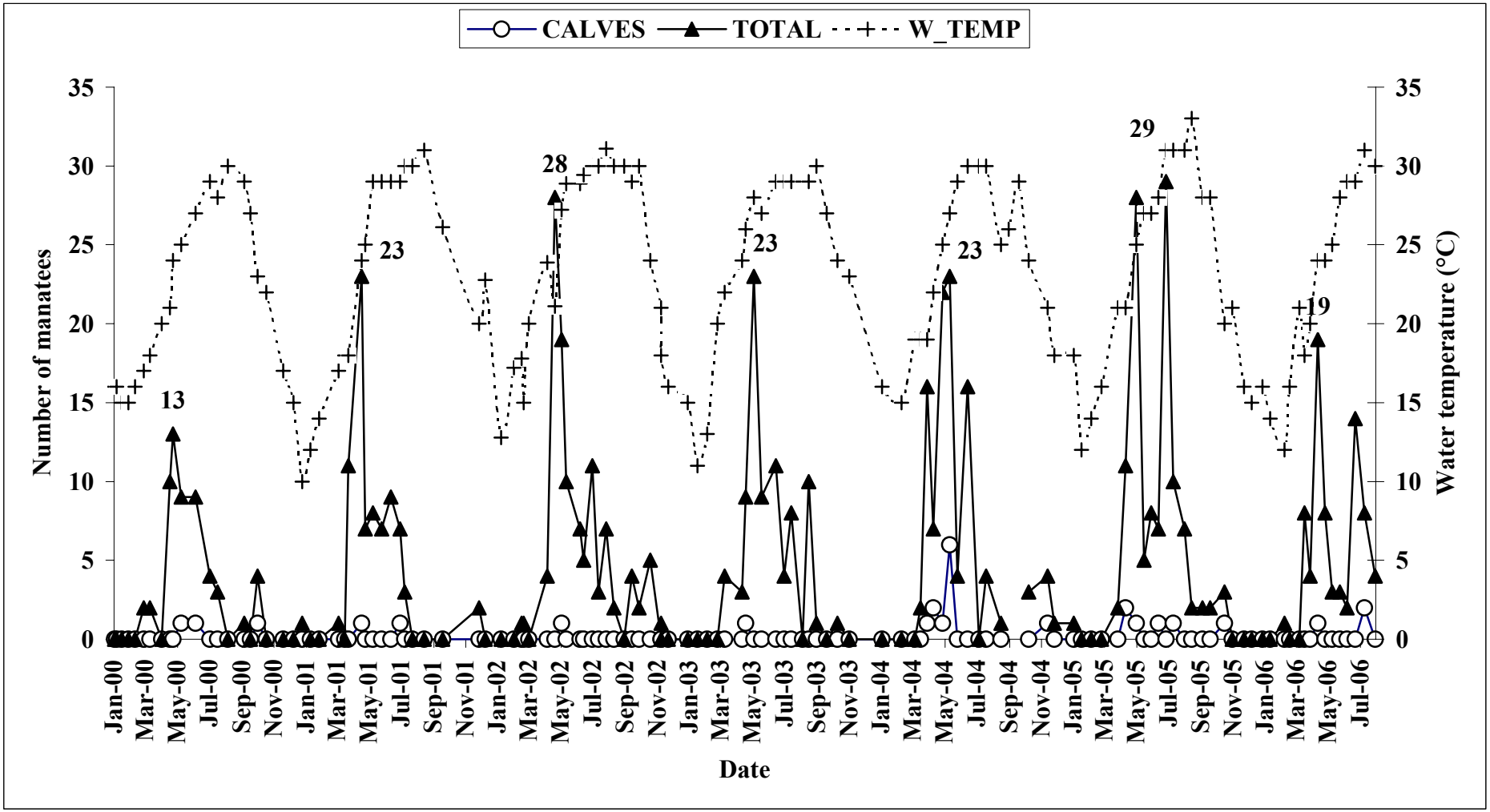


FIGURE 3b. Aerial sightings of manatees and water temperature in the ICW 2000-August 2006. Water temperature was measured at the Jacksonville University dock. (NOTE: Figure 3a, shows 1994-1999 data; Figure 3c, shows 2000-August 2006 data and photoperiod).

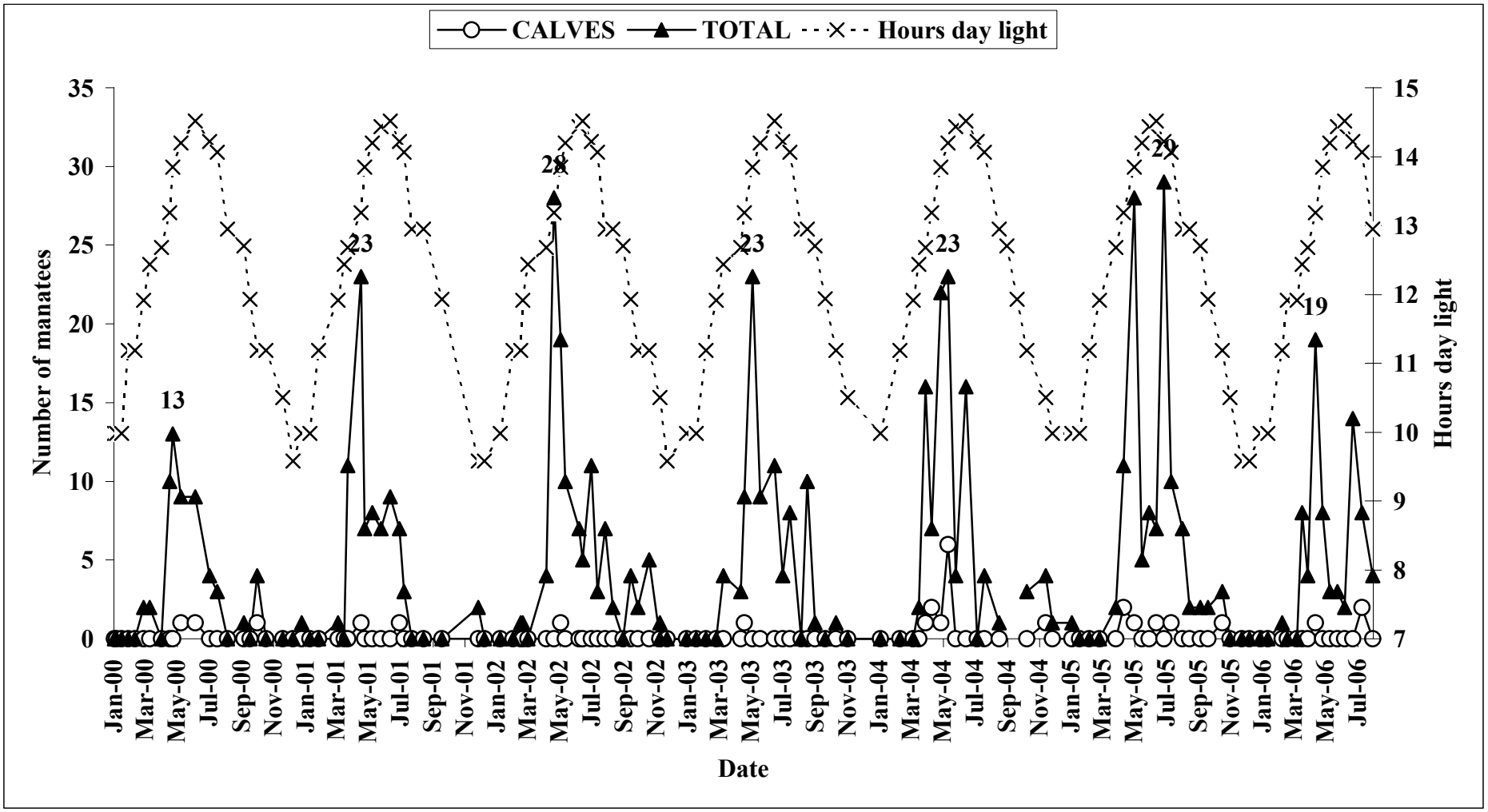


FIGURE 3c. Aerial sightings of manatees and photoperiod in the ICW 2000-August 2006. Photoperiod was determined from "The Old Farmer's 2000-2006 Almanac" by Robert B. Thomas. (NOTE: Figure 3a, shows 1994-1999 data; Figure 3b, shows 2000-August 2006 data and water temperature).

Although there are numerous other minor springs along the LSJR that may provide thermal benefits to manatees, Blue Spring (Volusia County) is the focus of the St. Johns River sub-population during the winter months. This population has shown growth over the years with 196 total manatees seen at Blue Spring during the winter of 2004/05 (Wayne Hartley, Park Ranger, Blue Spring State Park, personal communication).

On the east coast, there seems to be a core group of more than 100 manatees that use the Blue Spring warm-water refuge and tend to remain in the USJR area (Bengtson 1981). Most of the animals in the LSJR are part of the Atlantic Region sub-population that frequent Northeast Florida waters and ICW as based on the results of long-term radio tracking and photo-identification studies (Beck and Reid 1995; Reid et al. 1995; Deutsch *et al*. 1998); Deutsch *et al*. 2000). Deutsch et al. (2003) reported that the LSJR south of Jacksonville was an important area visited by 18 tagged manatees that were part of a 12-year study (1986-1998) of 78 radio-tagged and tracked manatees.

Manatees were distributed throughout LSJR and ICW waters in spring *(Map Series A)*. Highest concentrations of manatees occurred south of Fuller Warren Bridge (east and west banks) and Doctor's Lake in summer where substantial submerged aquatic vegetation exists *(Map Series C)*. During spring and summer, manatees with new calves were consistently seen in the upstream waters of tributaries, possibly these areas were more sheltered. In late summer and fall manatees tended to occur predominantly in the main stem of LSJR. Then by the late fall as day length decreased followed closely by the falling water temperature, manatees moved south out of Duval County for warmer south Florida waters.

Calf data: Data was limited and contained many zero count values, which made the analysis more challenging. The proportion that calves represented of the total number of manatees sighted ranged from 5.82 % to 11.53 % (LSJR) and 7.1 % to 12.1 % (ICW) from 1994-1999 and changed only slightly ranging from 3.40 % to 11.53 % (LSJR) and 0.91 % to 12.05 % (ICW) from 2000-2006 (Table 1). These proportions are still similar to those reported by Campbell and Irvine (1978) of 9.6 %, Valade (1991) 5 % and Kinnaird (1983) 7 % for LSJR, Duval County. The low percent values for 2000-2001 represent years of drought which provided poor conditions in which to rear calves because of low food availability (White et al. 2000).

Single Highest Day Counts (SHDC): For LSJR was reported to range from 76 to 136 manatees per survey from 1994-1999. At that time, SHDC had increased but was not statistically different from the 99 manatees per survey reported by Valade (1991). In 2000-2001, SHDC was lower (67 and 85 manatees per survey, respectively) because of the drought. However, since 2002 the counts have increased steadily ranging from 106 to 170 manatees in 2005 (Table 1). Increased counts may be attributed to observers having gained a better knowledge of the survey area and where manatees are likely to occur. In the ICW highest single day counts ranged between 12 to 21 manatees per survey (1994-1999) and 13 to 29 manatees per survey (2000-2005). The increased numbers probably mean that more

animals are moving into the area from south Florida rather than an actual increase in the Atlantic sub-population.

Behavior: Manatees engaged in traveling resting feeding and cavorting (mating) during all seasons in LSJR (Figure 4) and ICW (Figure 5). In LSJR manatees spent most of the time resting, followed by traveling and feeding and least time was spent cavorting. There was no difference between behaviors by season. In winter it was difficult to find manatees feeding because manatee abundance was low anyway. No manatees were observed cavorting in winter. Winter variances for resting and traveling animals was larger because of fewer sightings and resting animals congregated at power plants. In the ICW manatees engaged in traveling and resting predominantly with few feeding and cavorting. There was no difference between behaviors by season. Number of traveling manatees was lowest in winter because of low manatee abundance and the fact that those observed tended to be congregated at warm-water sources (high number resting). Significantly more manatees moved into the study area during spring and summer using the ICW (higher percent and smaller variance) lower numbers resting. Fall was associated with manatees beginning to move south out of the study area again (higher percentage than winter but larger variance because of fewer numbers than spring and summer). Fall was associated with manatees beginning to move south out of the study area again (higher percentage than winter but larger variance because of fewer numbers than spring and summer). Few manatees were seen feeding in winter, spring and summer because the ICW contains limited food sources for them. Also, it is possible than these manatees may have stopped to rest while traveling and appeared to be feeding. In fall no manatees were seen feeding suggesting that animals move south rapidly to avoid cold weather. The following data is also presented as an annual mean percent of manatees engaged in various behaviors (Figure 6 for LSJR, and Figure 7 for the ICW). When drought conditions prevailed (2000-2001) manatee behavior changed. In a separate analysis more manatees were observed traveling, perhaps in search of food, and fewer were seen resting and feeding (White et al. 2002). Also, box plots of manatee abundance by season in LSJR indicated that most seasons had higher numbers of manatee present and were significantly different from winter (Figure 8). In the ICW box plots of manatee abundance by season indicated that most seasons did not differ significantly from each other (Figure 9).

Data for manatees observed at warm-water refuges provided information on number of manatees using power plant effluents each year. For more information see the section entitled *Warm-Water Attractants*. In order to determine manatee density, cumulative counts from total per survey counts were made for different areas along the ICW (Table 2) and LSJR (Table 3). In a separate analysis there was no significant difference between years in the pattern of usage at these per determined areas. In addition, Jacksonville University has taken part in the annual state synoptic aerial survey effort. The FWC uses these surveys to obtain a general count of manatees statewide (Table 4). The FWC coordinates an interagency team that conducts the synoptic surveys from one to three times yearly (weather permitting). The synoptic surveys are conducted in winter and cover known wintering habitats of manatees in Florida (FWRI 2006).

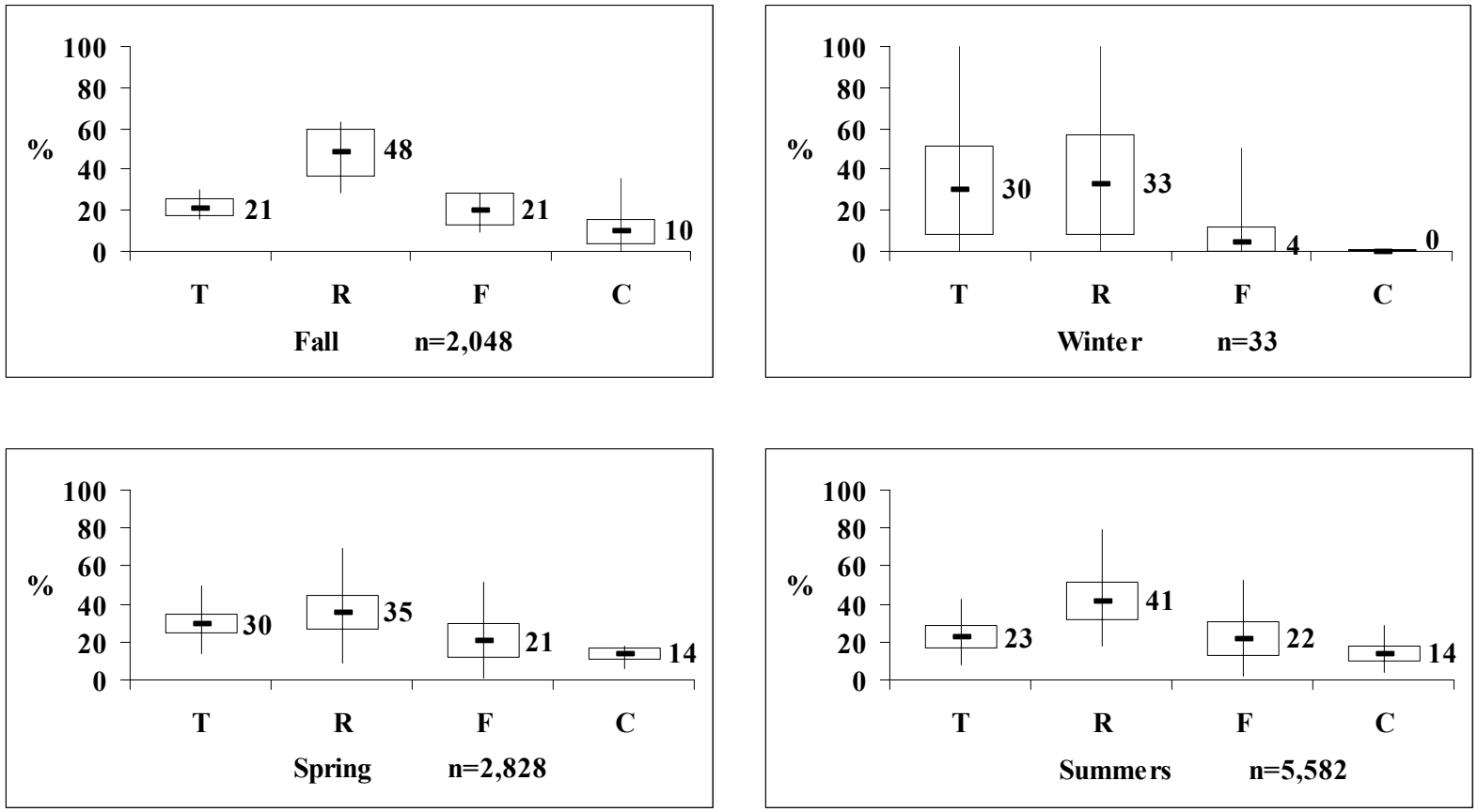


FIGURE 4. Seasonal means for percent of manatees engaged in Traveling (T), Resting (R), Feeding (F) and Cavorting (C) behaviors (horizontal lines) between March 1994-August 2006 in LSJR. Vertical lines show maximum and minimum counts. Boxes show 5% and 95% confidence intervals of the mean.

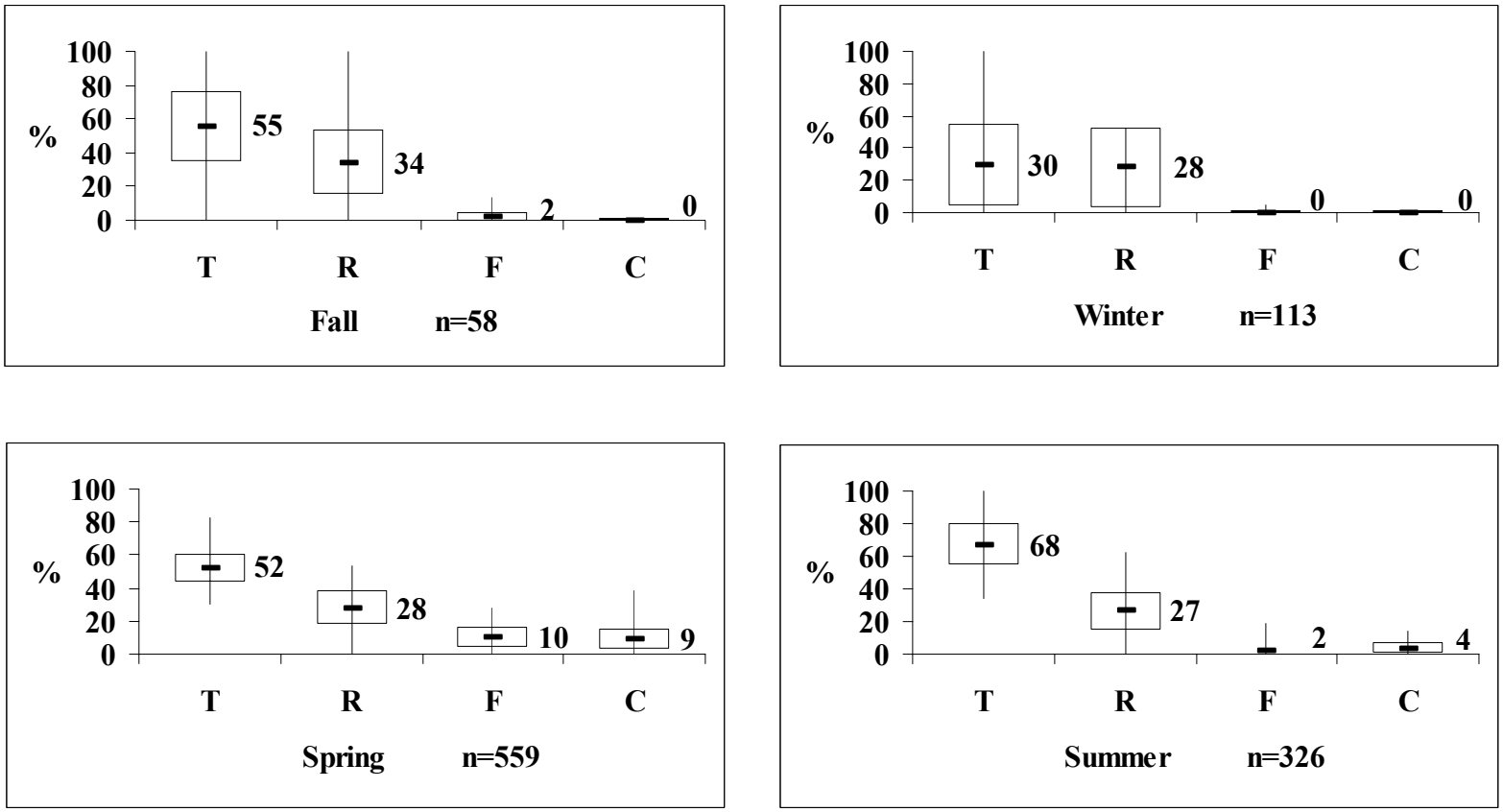


FIGURE 5. Seasonal means for percent of manatees engaged in Traveling (T), Resting (R), Feeding (F) and Cavorting (C) behaviors (horizontal lines) between March 1994-August 2006 in the ICW. Vertical lines show maximum and minimum counts. Boxes show 5% and 95% confidence intervals of the mean.

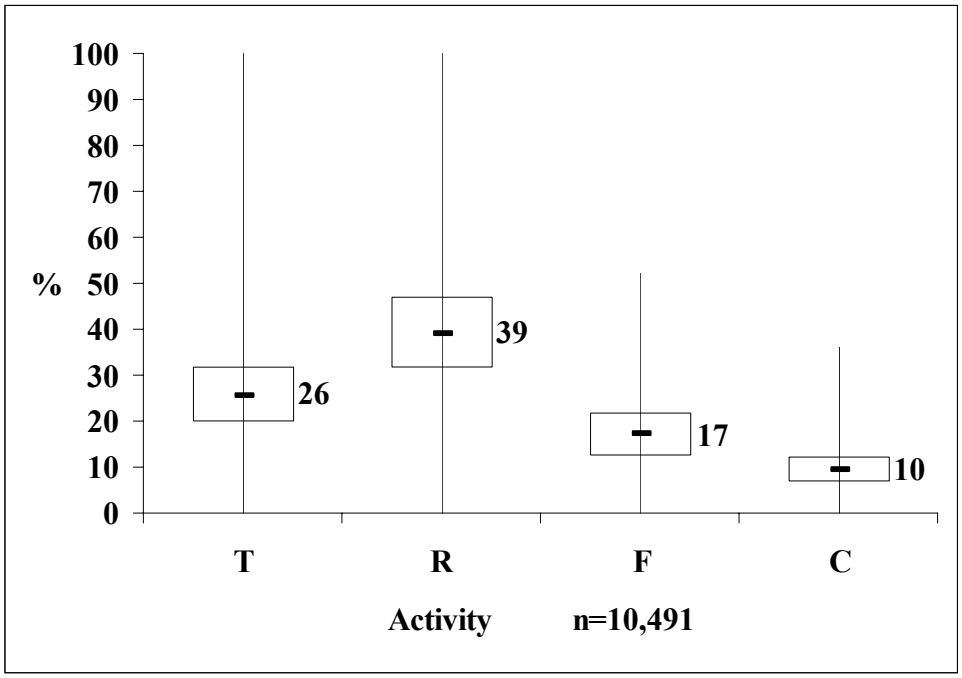


FIGURE 6. Annual mean percent of manatees engaged in Traveling (T), Resting (R), Feeding (F) and Cavorting (C) behaviors (horizontal lines) between 1994-August 2006 in LSJR. Vertical lines show maximum and minimum counts. Boxes show 5% and 95% confidence intervals of the mean.

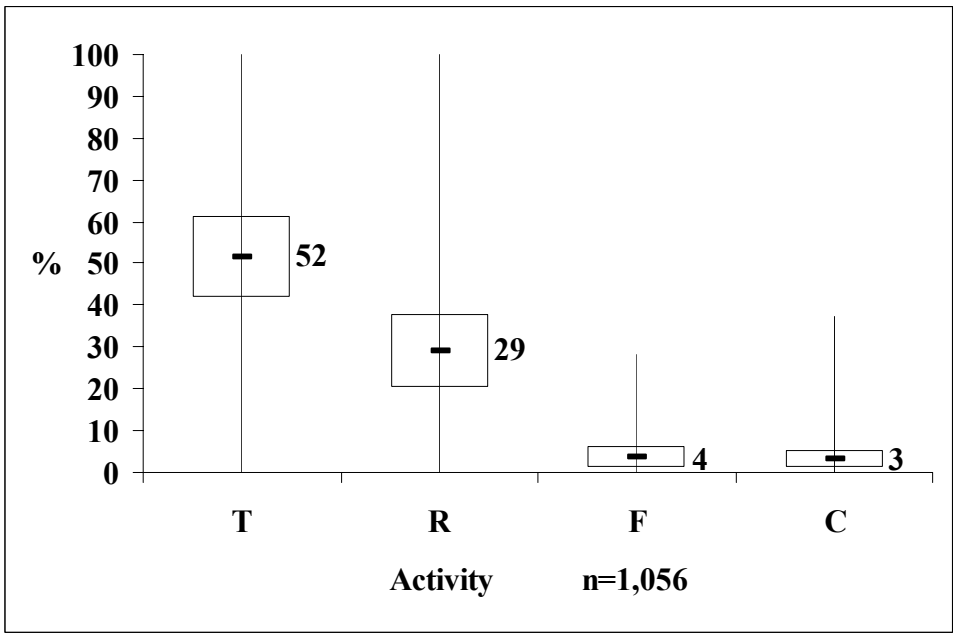


FIGURE 7. Annual mean percent of manatees engaged in Traveling (T), Resting (R), Feeding (F) and Cavorting (C) behaviors (horizontal lines) between 1994-August 2006 in the ICW. Vertical lines show maximum and minimum counts. Boxes show 5% and 95% confidence intervals of the mean.

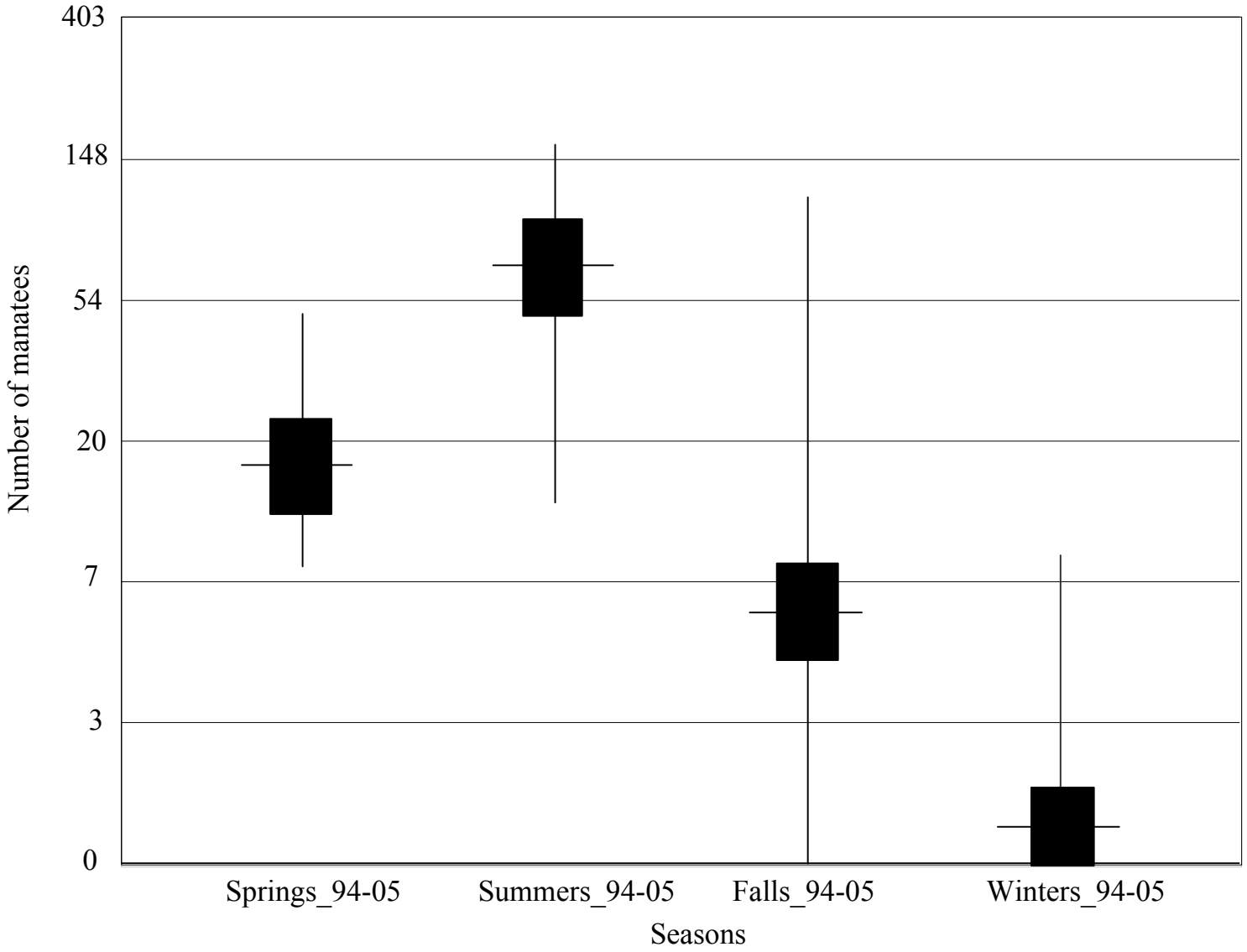


FIGURE 8. Mean counts of manatees in the LSJR by season (horizontal lines) 1994-2005. Vertical lines show maximum and minimum counts. Boxes show 95% confidence intervals of the mean. Y-axis converted from Ln (count + 1) scale.

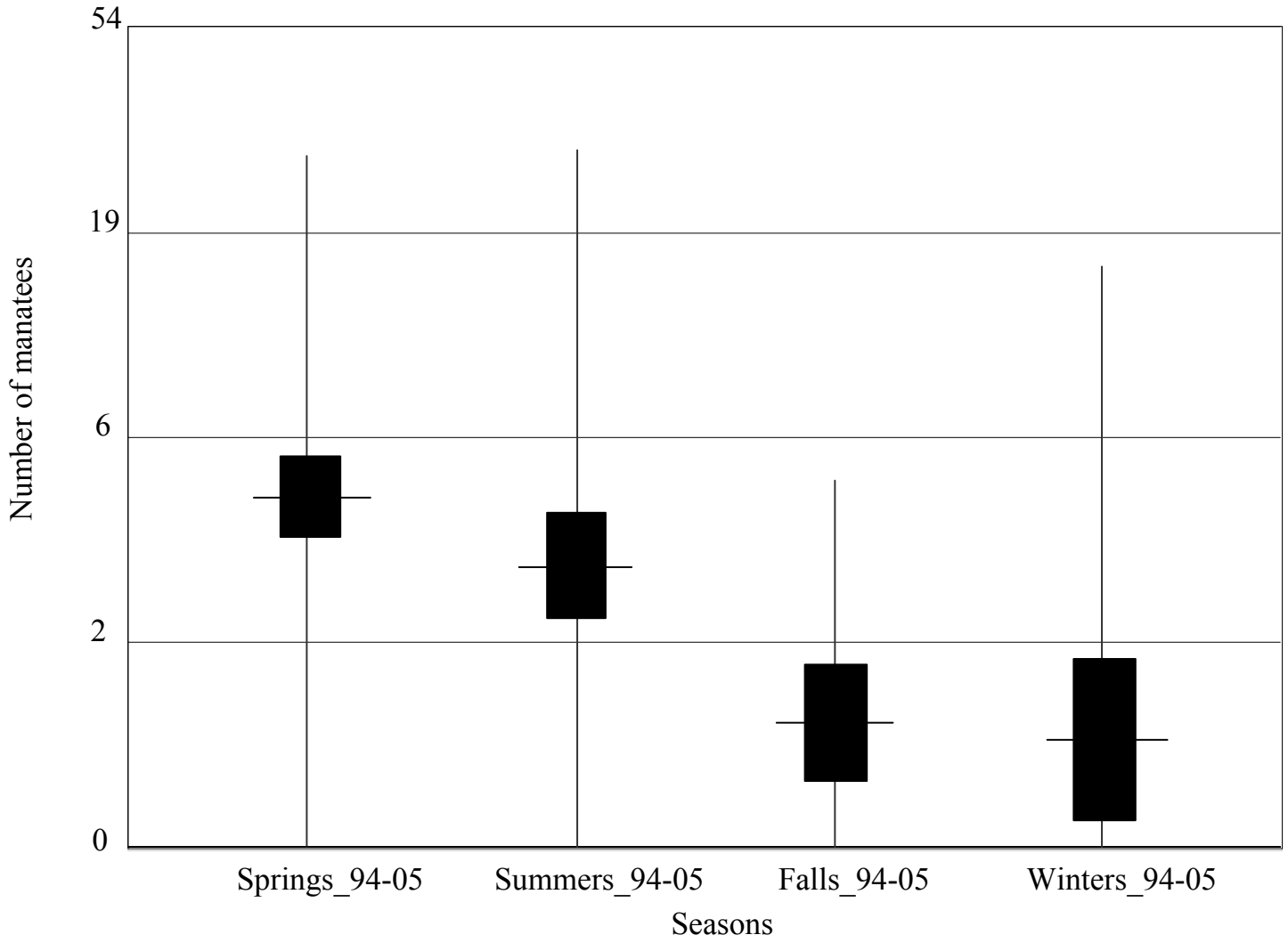


FIGURE 9. Mean counts of manatees by season in the ICW 1994-2005 (horizontal lines). Vertical lines show maximum and minimum counts. Boxes show 95% confidence intervals of the mean. Y-axis was converted from Ln (count + 1) scale.

TABLE 2. Total aerial sightings of manatees in Lower St. Johns River, Duval Co., FL. (March 1994-August 2006).

LOCATION	ADULTS*	CALVES*	TOTAL*
Quarantine Island	54	2	56
Dames Point	18	1	19
Trout River	232	18	250
Arlington River	39	4	43
Pottsburg Creek	2	1	3
Miller Creek	25	2	27
Downtown	94	9	103
San Marco	136	3	139
Ortega River	162	17	179
Sadler Point	153	13	166
Pirates Cove	53	3	56
NAS/JAX	206	12	218
Mulberry Cove	136	12	148
Rudder Club	616	66	682
Club Continental	1042	94	1136
Doctors Lake	1722	160	1882
SJR south of Dr.Lake	1164	102	1266
Julington Creek	142	15	157
Durbin Creek	31	3	34
Mandarin Point	1064	85	1149
Plummers Point	308	27	335
Beauclerc Bluff	295	20	315
Goodbys Creek	142	12	154
Christopher Point	817	78	895
Point La Vista	178	5	183
Lions Club Boat Ramp	9	0	9
JEA - Southside	56	8	64
Jefferson Smurfit	11	2	13

*** These numbers indicate total per survey counts of manatees.**
Individual manatees may migrate to other areas between flights.
Source Jacksonville University 2006.

TABLE 3. Total aerial sightings of manatees in the Intercoastal Waterway, Duval Co., FL. (March 1994-August 2006).

LOCATION	ADULTS*	CALVES*	TOTAL*
Nassau Sound	23	0	23
Sawpit Creek	44	0	44
ICW North of Fort George River	64	0	64
Sisters Creek	26	3	29
Fort George Inlet	6	0	6
Mayport	14	0	14
St. Johns Bluff	38	0	38
Blount Island	157	9	166
Mill Cove	61	2	63
Atlantic Blvd. Bridge to SJR confluence	48	1	49
Beach Blvd. Bridge to Atlantic Blvd.	75	5	80
JTB Bridge to Beach Blvd. Bridge	96	4	100
Palm Valley Bridge to JTB Bridge	185	14	199
Container Corporation, Fernandina	67	9	76

***These numbers indicate total per survey counts of manatees. Individual manatees may migrate to other areas between flights. Source Jacksonville University 2006.**

Note:No manatees were seen at Container Corp. of America in 1998-2002 since the introduction of a diffuser array on the effluent warm water discharge.

TABLE 4. Florida manatee synoptic aerial survey counts 1991-2006.

Year	Date	East	West	Total
1991	Jan 23–24	687	580	1,267
1991	Feb17–18	828	650	1,478
1992	Jan 17–18	904	940	1,844
1995	Jan 21–22	669	787	1,456
1995	Feb 06–07	917	906	1,823
1996	Jan 09–10	1,223	1,054	2,277
1996	Feb 18–19	1,452	1,178	2,630
1997	Jan 19–20	906	1,335	2,241
1997	13-Feb	797	918	1,715
1998	Jan 29–30	1,110	908	2,018
1999	6-Jan	842	1,023	1,865
1999	23-Feb	900	1,123	2,023
1999	6-Mar	960	1,400	2,360
2000	Jan 16–17	634	1,012	1,646
2000	Jan 26–27	1,138	1,085	2,223
2001	Jan 05–06	1,559	1,741	3,300
2002	1-Mar	864	894	1,758
2003	9-Jan	1703	1140	2,843
2003	Jan 21–22	1813	1314	3,127
2003	Jan 26–28	1,705	1,311	3,016
2004	20-Feb	1,198	1,307	2,505
2005	26-Jan	1,594	1,549	3,143
2006	Feb 13-15	1,639	1,474	3,113

Source: FWRI 2006.

Mortality Information: Information about manatee mortality from FWCC/FWRI is illustrated in Tables 5-9 and Figures 10-12. The total of State wide deaths documented for July 2006 were 253, of which 57 were watercraft-related. Other causes included other human (2), perinatal (48), cold stress (15), other natural (30), flood gate (1), undetermined (90) and unrecovered (10). Watercraft and undetermined causes of death were the most significant for 2006 followed by the perinatal category (Table 5). Watercraft deaths for the key counties totaled 48 (July 2006). Other causes of death for the key counties included other human (2), perinatal (39), cold stress (12), other natural (23), flood gate (1), undetermined (67) and unrecovered (5) (July 2006) (Table 6a).

The total of State-wide deaths documented for 2005 were 396, of which 79 were watercraft-related. Other causes included other human (8), perinatal (89), cold stress (30), other natural (81), flood gate (6), undetermined (99) and unrecovered (4). Watercraft deaths for the key counties totaled 58. Other causes of death for the key counties included other human (5), perinatal (73), cold stress (28), other natural (50), flood gate (2), undetermined (76) and unrecovered (3) (Table 6b).

In a ranking of total mortality by "Key" County (1991-July 2006 indicated that Duval County ranked 5th (5.51%) among the rest in terms of percent of total deaths. Ranked from the highest 1st was Lee County (24.31%), 2nd was Brevard (24.03%), 3rd was Collier (11.87%) and 4th was Volusia (6.27%) (Table 7).

In a ranking of watercraft caused mortality by "Key" County (1991-July 2006) indicated that Duval County ranked 4th (7.98%) among the rest in terms of percent of total watercraft deaths. Ranked highest 1st was Lee County (22. 12%), 2nd was Brevard (21.60%), 3rd was Collier (10.99%) and 5th was Volusia (7.13%) after Duval (Table 8).

In a comparison of monthly means for watercraft caused mortality of manatees in Florida between 1983-1993 (Figure 10a) showed a more flat trend and 1994-2005 (Figure 10b) shows a decreasing trend. In a review of total and watercraft mortality for the State (Figure 11) watercraft mortality was running at about 25% of total deaths over the last 17 years. Total deaths have continued to increase and the large spike in 1996 was a result of a toxic red tide algae bloom in south Florida that killed 154 manatees over the course of a few weeks (FWRI 2006 data).

TABLE 5. Causes of mortality in the State of Florida 1974-July 2006.

Year	Watercraft	Flood Gate Canal Lock	Human	Perinatal	Cold Stress	Natural	Undetermined	Unrecovered	Total/Yr.
2006*	57	1	2	48	15	30	90	10	253
2005	79	6	8	89	30	81	99	4	396
2004	69	3	4	72	50	24	51	3	276
2003	73	3	7	71	47	102	67	10	380
2002	95	5	9	53	17	59	65	2	305
2001	81	1	8	61	31	34	107	2	325
2000	78	8	8	59	14	37	60	8	272
1999	82	15	8	54	5	37	61	7	269
1998	66	9	6	53	10	13	71	4	232
1997	54	8	8	61	4	42	61	4	242
1996	60	10	0	61	17	101	154	12	415
1995	42	8	5	56	0	35	53	2	201
1994	49	15	5	46	4	33	37	3	192
1993	35	6	6	39	2	22	34	2	146
1992	38	5	6	48	0	20	45	1	163
1991	53	9	6	53	1	13	39	0	174
1990	47	3	4	44	46	21	40	1	206
1989	50	3	5	38	14	18	39	1	168
1988	43	7	4	30	9	15	23	2	133
1987	39	5	2	30	6	10	22	0	114
1986	33	3	1	27	12	1	39	6	122
1985	33	3	3	23	0	19	32	6	119
1984	34	3	1	25	0	24	40	1	128
1983	15	7	5	18	0	6	28	2	81
1982	20	3	1	14	0	41	29	6	114
1981	24	2	4	13	0	9	62	2	116
1980	16	8	2	13	0	5	15	4	63
1979	24	8	9	9	0	4	18	5	77
1978	21	9	1	10	0	3	34	6	84
1977	13	6	5	9	0	1	64	16	114
1976	10	4	0	14	0	2	22	10	62
1975	6	1	1	7	0	1	10	3	29
1974	3	0	2	0	0	0	2	0	7
Total	1,442	187	146	1,248	334	863	1,613	145	5,978

*** = untill July**

Source: FWC/FWRI 2006.

TABLE 6a. Causes of manatee mortality for Florida's Key Counties, July 2006.

County	Watercraft	Flood Gate	Human	Perinatal	Cold Stress	Natural	Undetermined	Unrecovered	Total
Brevard	13	1	0	12	6	8	18	1	59
Broward	6	0	0	1	0	1	5	0	13
Citrus	2	0	1	2	0	0	1	0	6
Collier	1	0	0	1	1	1	3	0	7
Dade	1	0	0	0	0	1	1	0	3
Duval	5	0	0	1	1	0	2	1	10
Indian River	0	0	0	0	0	1	2	0	3
Lee	13	0	0	5	2	8	18	1	47
Martin	4	0	0	4	0	0	5	0	13
Palm Beach	0	0	0	1	1	0	3	0	5
Sarasota	2	0	0	4	0	1	2	0	9
St.Lucie	0	0	0	2	0	0	3	0	5
Volusia	1	0	1	6	1	2	4	2	17
Total	48	1	2	39	12	23	67	5	197

Source: FWCC/FWRI 2006

TABLE 6b. Causes of manatee mortality for Florida's Key Counties, December 2005.

County	Watercraft	Flood Gate	Human	Perinatal	Cold Stress	Natural	Undetermined	Unrecovered	Total
Brevard	6	0	2	26	6	6	11	0	57
Broward	2	0	0	1	1	1	4	0	9
Citrus	6	0	0	9	0	0	3	0	18
Collier	4	0	0	7	10	1	12	1	35
Dade	1	0	2	1	0	0	1	0	5
Duval	4	0	0	2	2	0	6	0	14
Indian River	5	0	1	4	1	2	3	0	16
Lee	11	2	0	10	3	23	23	2	74
Martin	1	0	0	3	2	1	2	0	9
Palm Beach	6	0	0	1	1	0	0	0	8
Sarasota	3	0	0	1	0	14	2	0	20
St.Lucie	1	0	0	0	1	0	6	0	8
Volusia	8	0	0	8	1	2	3	0	22
Total	58	2	5	73	28	50	76	3	295

Source: FWCC/FWRI 2006

TABLE 7. Florida manatee mortality, 1991- July 2006.

County	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*	# Total	% of Total
Brevard	38	31	30	42	40	57	62	47	46	49	52	50	42	65	57	59	767	24.03
Broward	3	9	4	4	5	6	3	7	15	4	9	10	8	6	9	13	115	3.60
Citrus	5	9	8	5	6	6	5	4	8	6	10	9	10	7	18	6	122	3.82
Collier	14	19	18	13	10	70	21	14	19	35	31	13	37	23	35	7	379	11.87
Dade	7	10	5	11	14	7	14	9	12	8	11	9	9	7	5	3	141	4.42
Duval	19	8	5	6	7	10	10	13	9	11	6	14	19	15	14	10	176	5.51
Indian R.	4	1	-	2	5	10	7	5	6	10	5	7	6	6	16	3	93	2.91
Lee	18	19	17	33	31	145	43	31	33	44	51	58	81	51	74	47	776	24.31
Martin	9	8	3	7	6	6	6	8	9	6	7	9	6	5	9	13	117	3.67
Palm Bch.	6	3	5	3	6	7	6	5	7	9	8	14	12	9	8	5	113	3.54
Sarasota	5	1	5	6	12	8	3	4	13	11	5	16	22	7	20	9	147	4.61
St. Lucie	1	4	4	2	2	4	2	1	2	2	4	4	0	1	8	5	46	1.44
Volusia	10	5	5	6	10	9	9	15	12	13	27	13	14	13	22	17	200	6.27
Total	139	127	109	140	154	345	191	163	191	208	226	226	266	215	295	197	3,192	100.00

*** = July**

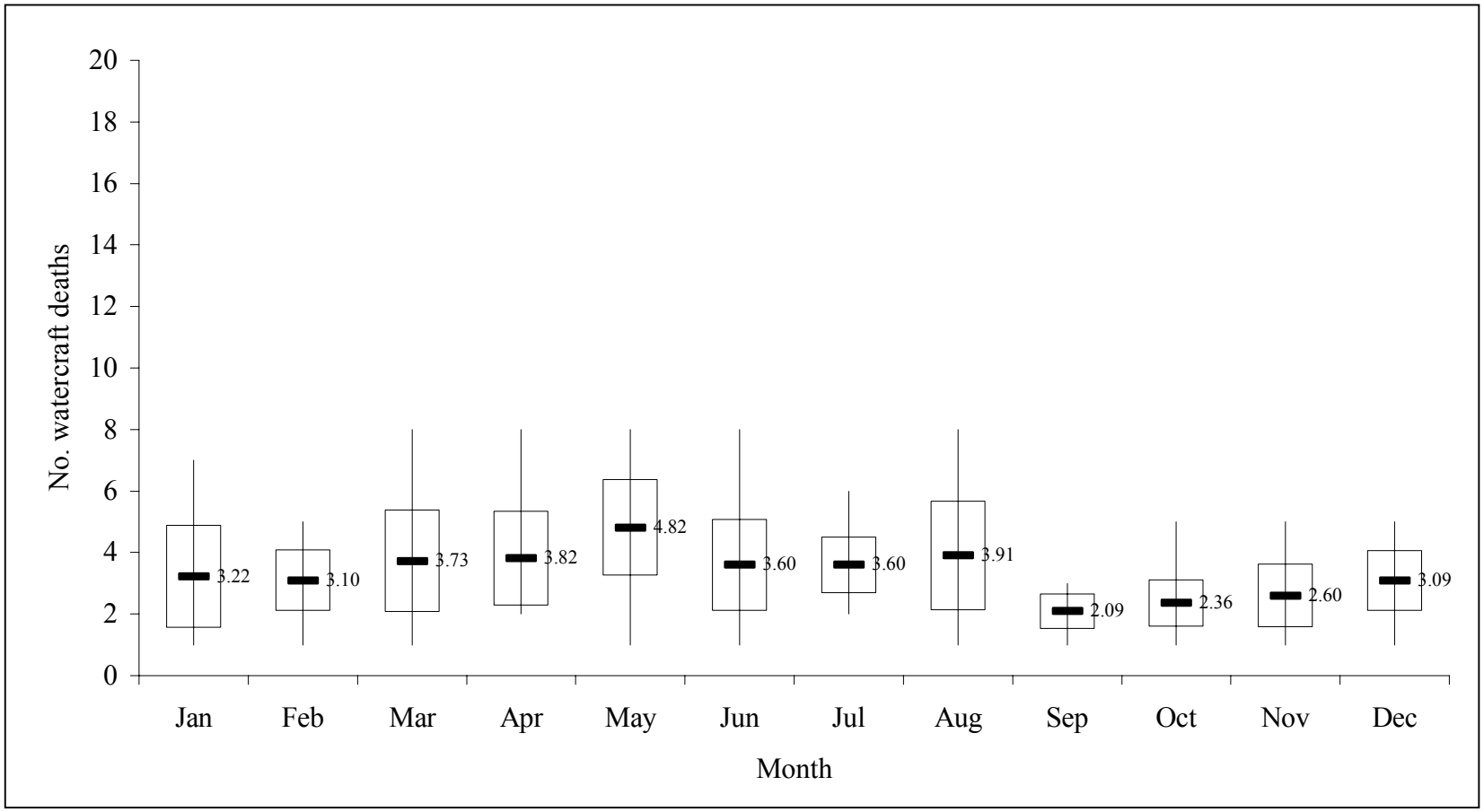
Source: FWCC/FWRI 2006.

TABLE 8. Watercraft caused mortality in Florida's Key Counties, 1991- July 2006.

County	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*	# Total	% of Total
Brevard	13	7	9	9	6	13	12	9	12	13	7	17	8	11	6	13	165	21.60
Broward	2	2	2	3	0	1	0	2	5	2	4	3	5	1	2	6	40	5.24
Citrus	0	3	1	2	0	2	1	2	4	1	1	3	3	1	6	2	32	4.19
Collier	5	4	5	4	4	5	4	7	10	5	8	6	7	5	4	1	84	10.99
Dade	0	4	0	1	2	0	5	2	1	2	5	1	2	2	1	1	29	3.80
Duval	9	2	2	2	3	3	2	3	2	4	1	10	4	5	4	5	61	7.98
Indian R.	1	0		0	1	4	1	3	1	4	1	2	1	1	5	0	25	3.27
Lee	7	2	5	10	8	14	9	9	10	13	23	13	9	13	11	13	169	22.12
Martin	2	1	0	1	1	2	3	1	2	1	1	2	1	1	1	4	24	3.14
Palm Bch.	1	0	3	2	2	3	1	2	2	3	3	6	5	3	6	0	42	5.50
Sarasota	1	0	2	2	0	1	2	0	4	5	2	4	1	2	3	2	31	4.06
St. Lucie	1	1	1	0	0	1	0	0	0	1	1	1	0	0	1	0	8	1.05
Volusia	3	1	0	1	1	2	1	8	5	4	11	3	2	3	8	1	54	7.07
Total	45	27	30	37	28	51	41	48	58	58	68	71	48	48	58	48	764	100.00

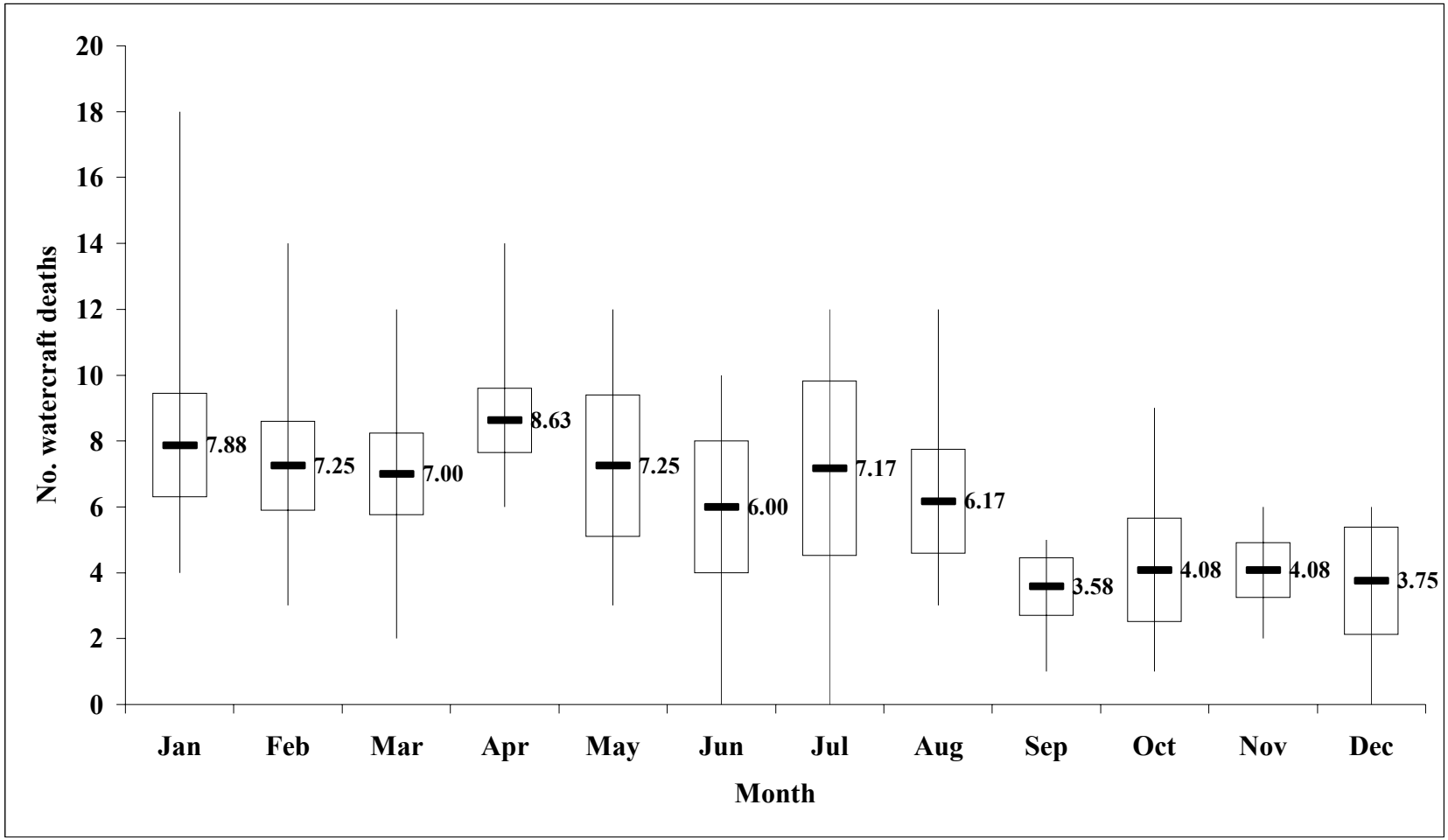
*** = July**

Source: FWCC/FWRI 2006.



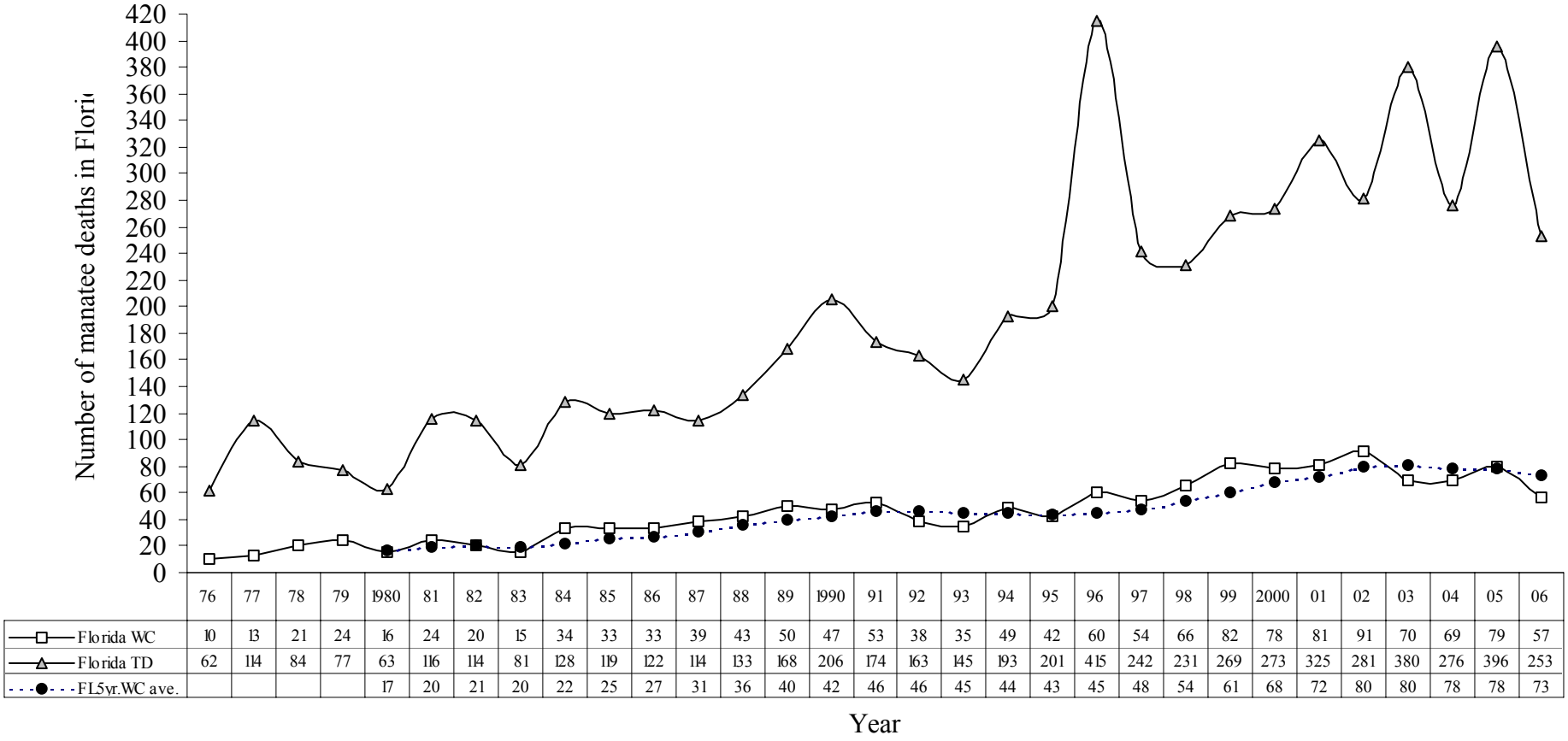
Source data: FWRI 2006.

FIGURE 10a. Watercraft caused mortality of manatees in Florida compared for the years 1983-1993. Mean monthly counts of manatees (horizontal lines). Vertical lines show maximum and minimum counts. Boxes show 95% confidence intervals for the mean.



Source data: FWRI 2006.

FIGURE 10b. Watercraft caused mortality of manatees in Florida compared for the years 1994-2005. Mean monthly counts of manatees (horizontal lines). Vertical lines show maximum and minimum counts. Boxes show 95% confidence intervals for the mean.



	76	77	78	79	1980	81	82	83	84	85	86	87	88	89	1990	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05	06
Florida WC	10	13	21	24	16	24	20	15	34	33	33	39	43	50	47	53	38	35	49	42	60	54	66	82	78	81	91	70	69	79	57
Florida TD	62	114	84	77	63	116	114	81	128	119	122	114	133	168	206	174	163	145	193	201	415	242	231	269	273	325	281	380	276	396	253
FL5yr.WC ave.					17	20	21	20	22	25	27	31	36	40	42	46	46	45	44	43	45	48	54	61	68	72	80	80	78	78	73

Florida WC = Florida watercraft mortality.
Florida TD = Florida total mortality (all causes).
FL5yr.WC ave. = Florida five year running average of watercraft deaths of manatees.
(Source: FWRI 2006).

FIGURE 11. Watercraft and total manatee mortality in Florida 1976–July 2006.

In 2006, there were a total of 10 reported deaths of that 5 were watercraft, 1 perinatal, 1 cold stress and 2 undetermined and 1 verified but unrecovered as of **July** 2006 (FWCC, FWRI 2006). The mean for the five-year running average for watercraft mortality was **3.53 (range 2-5)** deaths since 1980 (Figure 12). For additional information regarding the mean 5 yr. running average of watercraft deaths since 1980 see Table 9 and for a breakdown of causes of manatee mortality in Duval County refer to Table 10.

In 2005, there were a total of 14 reported deaths of that 4 were watercraft, 2 perinatal, 2 cold stress and 6 undetermined. The mean for the five-year running average of watercraft mortality was **3.45 (range 2-5)** deaths since 1980. In a review of total and watercraft mortality for the County watercraft mortality was running at about 31% of total deaths over the last 17 years.

In 2004, there were 15 reported deaths total of which 5 were watercraft, 4 perinatal, 1 cold stress and 5 undetermined (FWC, FWRI 2006). The mean for the five-year running average for watercraft mortality was **3.40 (range 2-5)** deaths since 1980. County, State and Federal agencies met November 9th to discuss the five watercraft deaths in Duval County during 2004 and how Duval County should respond to these incidents. It was noted that two of the deaths occurred in the Intracoastal Waterway where Duval County does not have jurisdiction to regulate boat speed or operations. Rules in the ICW are made by the state, not the county.

As a result of the meeting, the following is a list of Duval County's continuing efforts to protect the manatee contained in a letter outlining actions by Council Woman Lynette Self on December 8th 2004:

1. Law enforcement initiatives. The City is working with the Jacksonville Sheriff's Office (Marine Unit) to build a docking facility in the downtown area near Metropolitan Park. The Sheriff has already added one officer to the Marine Unit, and in December two more marine patrol officers will be added. These additions will help the County regulate boater activity, and keep the boating public informed about manatee protection and speed zones. This facility will also offer docking space to the FFWCC officers. JSO continues to work with FWC, USCG, and the FWS through a joint task force that evaluates enforcement on the river, and how we can continually improve.

2. Comprehensive Plan improvements. Duval County updated the comprehensive plan with text changes in regards to our MPP. Our comprehensive plan now mirrors our MPP regarding manatee protection.

3. MPP reissuance. Dr. Quinton White, a consultant with the City, is working with the FWC, Jacksonville's Planning & Development Department and attorneys to update the MPP. This will provide up-to-date terminology as well as manatee counts. This

group is also working to correct any perceived inconsistencies with the boating facilities siting plan.

4. Reducing Goodby's Creek speed zone to idle immediately. The Jacksonville City Council has already passed legislation to implement the idle speed zone in Goodby's Creek. While this is a condition of the boat ramp permit issued by the Corps of Engineers, the county has been proactive in creating the zone, and is now working to permit the signs to mark the zone. We will install regulatory signs as soon as FWC approves the speed reduction in this area and issues the necessary permits. This measure will enhance manatee protection in an area where one of the watercraft-related deaths occurred.

5. Enforcement of environmental permits. As we discussed, there may be a correlation between dredging projects or boat facilities construction and manatee deaths. We explored the connection between compliance with the manatee protection provisions of construction and dredging permits and manatee mortality. This is an issue that will be further discussed during the MPP update. Wally Esser with the SJRWMD volunteered to follow up on permits that were in place when the manatee deaths occurred near dredging and construction locations over the last year. He stated he would try to provide information such as the kind of barges that were in the water, etc.

6. Additional protection zones. Duval County is also actively exploring the need for motorboat speed zones on Cedar Creek. We are working with the JSO to report to the Waterways Commission on the best placement for signage if the zone were adopted.

7. Ortega River anomalies. Discussion ensued concerning the possible existence of warm water springs in the Ortega River. FDEP's Jim Mather will report to the Jacksonville Waterways Commission on December 9, 2004, regarding his Department's preliminary study of the water temperature in the Ortega River near Timuquana Road.

8. Signage improvements. Duval County is working with FWC to update the signage on Florida Department of Transportation's bridges in the downtown area. The County is exploring simplifying and clarifying the language, and the possibility of lighting the signs.

9. Inspection trip. A boat trip will be scheduled in the near future on the ICW. Even though Duval County cannot regulate boat speeds and operation on the ICW, this part of our waterways is crucial. All agencies will be invited.

(Above information from letter dated December 8, 2004 by Council Woman Lynette Self).

In 2003, there were a total of 19 reported deaths of that 4 were watercraft, 4 perinatal, 3 cold stress, 2 other natural, 5 undetermined and 1 verified but unrecovered. The mean for the five-year running average for watercraft mortality was **3.34 (range 2-5)** deaths since 1980.

In 2002, there were a total of 14 reported deaths of that 10 were watercraft, 1 perinatal, and 3 undetermined. The mean for the five-year running average for watercraft mortality was **3.30 (range 2-5)** deaths since 1980. In 2002 deaths spiked to 10 watercraft deaths. The reasons for this were attributed to the change in boating and traffic patterns caused by tremendous dredge and construction activities in and around the Port of Jacksonville and Wonder Wood Connector (ICW). A couple of dead manatees were located out at the coast (this had never before occurred). In addition, the nature of the injuries indicated large vessels were most likely to have been involved (Data from FWRI necropsy reports).

In 2001, there were a total of 6 reported deaths of that 1 watercraft, 1 perinatal, 2 cold stress and 2 undetermined. The mean for the five-year running average for watercraft mortality was **3.27 (range 2-5)** deaths since 1980.

In 2000, there were a total of 11 reported deaths of that 4 were watercraft, 2 perinatal, 2 cold stress and 3 undetermined. The mean for the five-year running average for watercraft mortality was **3.31 (range 2-5)** deaths since 1980 (Figure 12). Information for 1999-1982 is as follows:

TABLE 9. Mean 5 yr. ave.of watercraft deaths (1982-1999) Duval Co., FL.

Year	Mean 5 Yr. ave. Watercraft deaths	Range
1999	3.34	2-5
1998	3.38	2-5
1997	3.42	2-5
1996	3.48	2-5
1995	3.55	2-5
1994	3.55	2-5
1993	3.54	2-5
1992	3.48	2-5
1991	3.37	2-5
1990	3.18	2-4
1989	3.1	2-4
1988	2.98	2-4
1987	2.8	2-4
1986	2.63	2-3
1985	2.53	2-4
1984	2.44	2-4
1983	2.5	2-4
1982	2.67	3-3

Source data: FWCC/FWRI 2006. (See Figure 12).

Watercraft-caused mortality in Duval County remained between 4-5 deaths per year between 2000-June, 2006 except for a low of 1 (2001) and a record high 10 (2002). Watercraft-caused mortality in Duval County was lower 2 to 3 deaths per year since 1990-1999 except for a high of 9 (1991). In 1991 deaths spiked to 9 watercraft deaths (Figure 12). The reasons for this were never determined, however, events coincided with extensive maintenance dredging work being carried out at the time. It is possible that a similar event to the 2002 spike could have occurred. The same type of dredging activity is scheduled to occur in 2007, it will be necessary to closely monitor activities to avoid another spike in manatee deaths. The increase from 2-3 (1990's) to 4-5 (2000's) watercraft deaths may be due to an increase in the number of animals coming into the area combined with increases in vessel traffic. More animals and more vessel traffic would potentially lead to more encounters between the two. *Map Series B, Duval County Manatee Mortality 1994-2006,* shows the location of each recovered manatee.

Alternate methods offered over the years for possible reduction in watercraft-caused Florida manatee mortality are analyzed in the January 1996 revised Florida Manatee Recovery Plan:

> *In the past, propeller guards have been examined as a possible solution to recreational watercraft-related manatee mortality. They have also been considered for improving human safety and protecting seagrass beds. While new designs are developed periodically, their effect on vessel speed and steerage have discouraged general use. Broad use of propeller guards should reduce propeller manatee injuries; however, it may only marginally reduce overall injuries and deaths if the impact of a propeller guard on a fast-moving boat is as injurious to manatees as the wounds from propellers. Nevertheless, as new designs are developed, they should be tested and evaluated as a means of mitigating manatee injuries and deaths. Once efficient and effective guards are available, incentive-based programs should be explored to encourage greater use of propeller guards (USFWS 1996).*

In 2001, the Florida Legislature appropriated $200,000 in the Marine Resources Conservation Trust Fund (MRCTF) to fund research projects that directly address the problem of collisions between manatees and watercraft and seek to reduce collisions using technological solutions. Section 370.0603 F.S., provides, in part, that "The Marine Resources Conservation Trust Fund within the Florida Fish and Wildlife Conservation Commission shall serve as a broad-based depository for funds from various marine-related activities and shall be administered by the commission for the purposes of funding for marine research." Technological solutions proposed under the Florida Manatee Avoidance Technology Grant Program should be consistent with Florida Statutes, the federal Endangered Species Act, and the federal Marine Mammal Protection Act, and should not cause an unauthorized take of manatees.

Topics Eligible for Funding: Topics eligible for funding through the Florida Manatee Avoidance Technology Grant Program include, but are not limited to, the following:

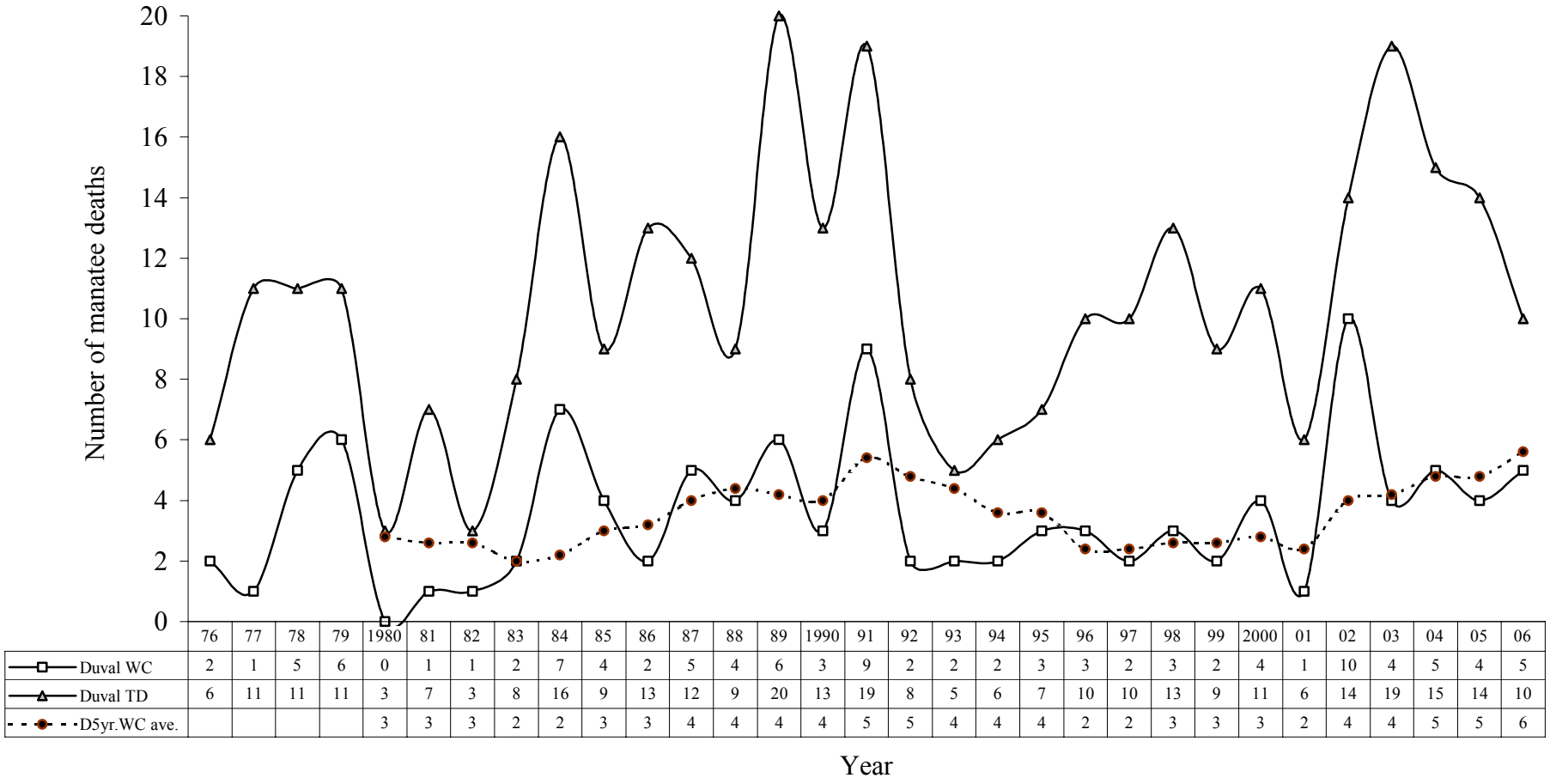
1. Technology designed to alert manatees to the presence of oncoming watercraft so the animals can modify their behavior to avoid collisions.

2. Technology designed to alert boaters to the presence of manatees to enable boaters to avoid manatees without changing the behavior of the animals.

3. Hull or propulsion-system design or technology which may reduce the risk of manatee-watercraft collisions or minimize injuries to the animals in the event of a collision; other technology designed to reduce the risk of manatee-watercraft collisions or minimize injuries to the animals in the event of a collision.

4. Research on manatees to obtain data required for avoidance technology development—can be studies about manatee hearing, sound production, and responses to boat noise including, but not limited, to behavioral and anatomical approaches—total annual funding in this category limited to $50,000.

(For additional information: http://www.floridamarine.org/features/view_article.asp?id=13206)



	76	77	78	79	1980	81	82	83	84	85	86	87	88	89	1990	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05	06
Duval WC	2	1	5	6	0	1	1	2	7	4	2	5	4	6	3	9	2	2	2	3	3	2	3	2	4	1	10	4	5	4	5
Duval TD	6	11	11	11	3	7	3	8	16	9	13	12	9	20	13	19	8	5	6	7	10	10	13	9	11	6	14	19	15	14	10
D5yr.WC ave.					3	3	3	2	2	3	3	4	4	4	4	5	5	4	4	4	2	2	3	3	3	2	4	4	5	5	6

Duval WC = Watercraft deaths of manatees.
Duval TD = Total deaths of manatees (all causes).
D5Yr.WC ave. = Five year running average of watercraft deaths of manatees.
(Source: FWRI 2006).

FIGURE 12. Watercraft and total manatee mortality in Duval County, Florida 1976-July 2006.

TABLE 10. Causes of manatee mortality in Duval County, Florida. 1976-July 2006.

Year	Watercraft	Human	Perinatal	Cold Stress	Other Natural	Undetermined	Unrecovered	Total/Year
1976	2	0	0	0	0	4	0	6
1977	1	0	1	0	0	9	0	11
1978	5	0	0	0	0	5	1	11
1979	6	1	1	0	0	1	2	11
1980	0	0	1	0	0	1	1	3
1981	1	0	0	0	1	5	0	7
1982	1	0	1	0	0	1	0	3
1983	2	0	0	0	0	5	1	8
1984	7	0	0	0	6	3	0	16
1985	4	0	0	0	2	3	0	9
1986	2	0	0	2	0	8	1	13
1987	5	0	2	3	1	1	0	12
1988	4	0	0	2	2	1	0	9
1989	6	1	3	4	2	4	0	20
1990	3	3	0	4	0	3	0	13
1991	9	2	4	0	1	3	0	19
1992	2	0	1	0	3	2	0	8
1993	2	0	2	0	0	1	0	5
1994	2	1	1	1	1	0	0	6
1995	3	0	0	0	1	3	0	7
1996	3	0	0	1	2	4	0	10
1997	2	0	3	1	0	4	0	10
1998	3	0	3	2	0	5	0	13
1999	2	0	1	1	1	4	0	9
2000	4	0	2	2	0	2	1	11
2001	1	0	1	2	0	2	0	6
2002	10	0	1	0	0	2	1	14
2003	4	0	4	3	2	5	1	19
2004	5	0	4	1	0	5	0	15
2005	4	0	2	2	0	6	0	14
2006*	5	0	1	1	0	2	1	10
Total	110	8	39	32	25	104	10	328

* = July 2006.

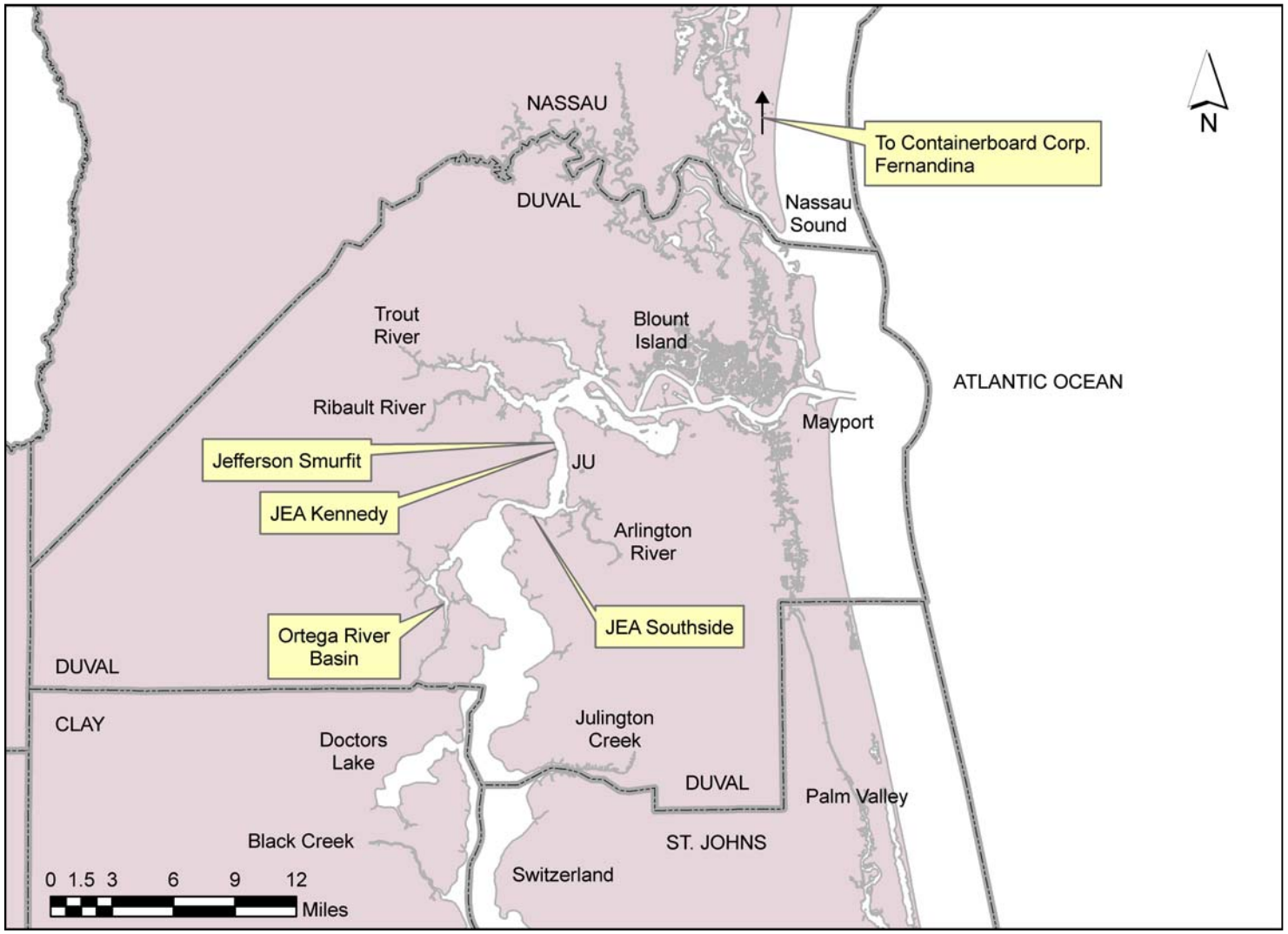
Source FWCC/FWRI 2006.

Warm-Water Attractants: Because manatees are sensitive to cold temperature conditions, they are attracted to warm water source like the effluent produced from power plants and natural springs. As of October 2001, there were not more warm water industrial outfalls in Duval, Clay, Nassau or St. Johns Counties. Historically, groups of manatees have been observed at Duval County warm water refugia during the early winter and late spring (Valade 1991). Although, The LSJR in Duval County provided relatively few warm-water attractants for manatees, known warm-water discharges were from three power generating stations and two paper mills (MAP 3). Area power plants include: St. Johns River Power Park and Southside and J.D. Kennedy Generating Stations. Seminole Kraft and Jefferson Smurfit Containerboard Corporation are the two paper mills in Duval County. Also, Container Board Corporation of America, Fernandina, Nassau County provided warm water that attracted manatees. Each of these areas provides warm-water refuges for manatees in the winter months and during periods of cold weather.

Published studies of manatees utilizing warm-water outfalls in Duval County are limited to two reports (Kinnaird and Valade 1983) by USFWS and researchers (Valade et al. 1984) in conjunction with Jacksonville University (JU). These studies were conducted prior to the opening of St. Johns River Power Park in 1987. Since the Power Park came on line, manatee usage of warm-water out falls at Southside and J.D. Kennedy Generating Stations has declined. No study at that time addressed the potential impacts on manatees since the change in power plant operations in 1987. Kinnaird (1983) reported seeing up to 13 animals in the warm water out-falls of two generating stations and one industrial plant in Jacksonville. Moreover, Kinnaird and Valade (1983) maintain that these aggregations were unstable and consisted of transient animals. Numbers sighted at industrial warm water sources in this study did not exceed 29 animals per survey.

Since 1994-2004, The Jacksonville Electric Authority (JEA) notified Jacksonville University (JU) when there was a change in operations at a given generating plant. JU routinely monitored Southside and J. D. Kennedy Generating Stations when they were operating. Data collected included: number of manatees, percentage of adults and calves, scar patterns (sketched for identification), effluent water temperature at the outfall, and ambient river-water temperature. Information in the form of photographs and video footage was also collected. The latter information helped to document the nature of Florida manatee usage and behavior at generating stations in Jacksonville. In addition, there was a significant reduction in other power plant operations when St. Johns River Power Park came on line. Consequently, it was necessary to monitor warm-water discharges on a continual basis because manatee movement patterns in Duval County for the next several years were likely to be affected.

During winter, manatees remaining in the area assembled in groups at warm water out falls. Jacksonville Electric Authority's Southside (JEASS) and Kennedy Generating Stations (JEAKS) and Jefferson Smurfit's paper mill are located within a 7-mile radius. Plants operated intermittently during cold spells and manatees were seen move between them. (Figures 13-15).



MAP 3. Location of power plants and other warm water sources in the study area. As of October 2001, there were not more warm water sources in Duval, Clay, Nassau and St. Johns Counties, except for Ortega basin identified in 2003.

In 1994, total daily count varied from 0-21 animals at JEASS between 11/29 to 12/14. These animals moved to JEAKS, which came on line when the JEASS plant went off line. Total daily count varied from 0-21 animals between 12/15 to 12/24. On 12/29, a total of 15 animals were recorded by aerial survey at JEASS, zero at JEAKS.

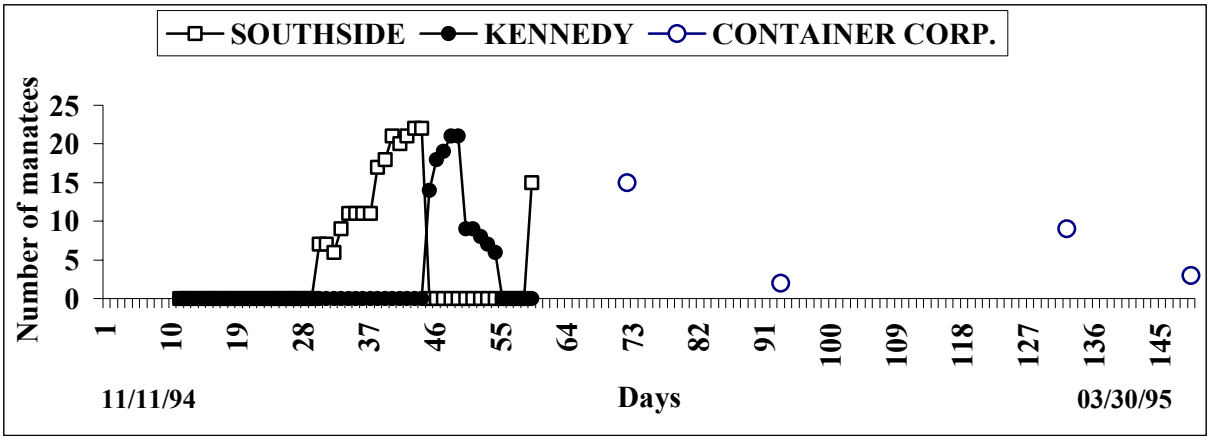


FIGURE 13. Numbers of manatees observed during ground surveys at JEA's Southside and Kennedy generating stations, Jacksonville, Duval Co., FL. and aerial surveys at Container Corporation of America, Fernandina, Nassau Co., FL 1994-1995.

In 1995, total daily count varied from 0-9 animals between 11/11 to 11/19 at JEASS. A total of 2 animals were observed at JEAK on 12/24, zero at JEASS.

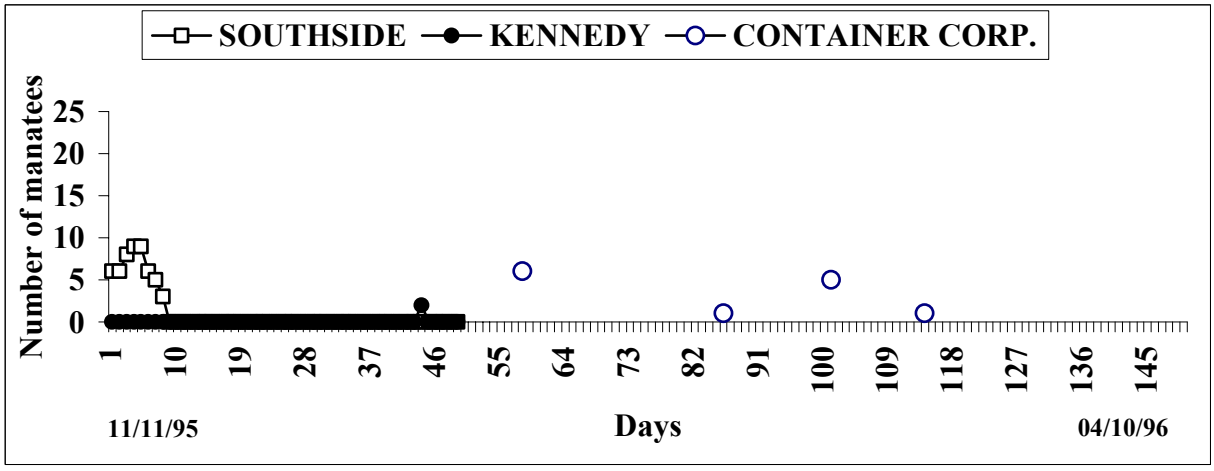


FIGURE 14. Numbers of manatees observed during ground surveys at JEA's Southside and Kennedy generating stations, Jacksonville, Duval Co., FL. and aerial surveys at Container Corporation of America, Fernandina, Nassau Co., FL 1995-1996.

In 1996, total daily counts varied from 0-19 animals between 11/11 to 11/22 at JEASS. A total of 3 animals were seen at JEAK from 11/29 to 11/30, zero at JEASS.

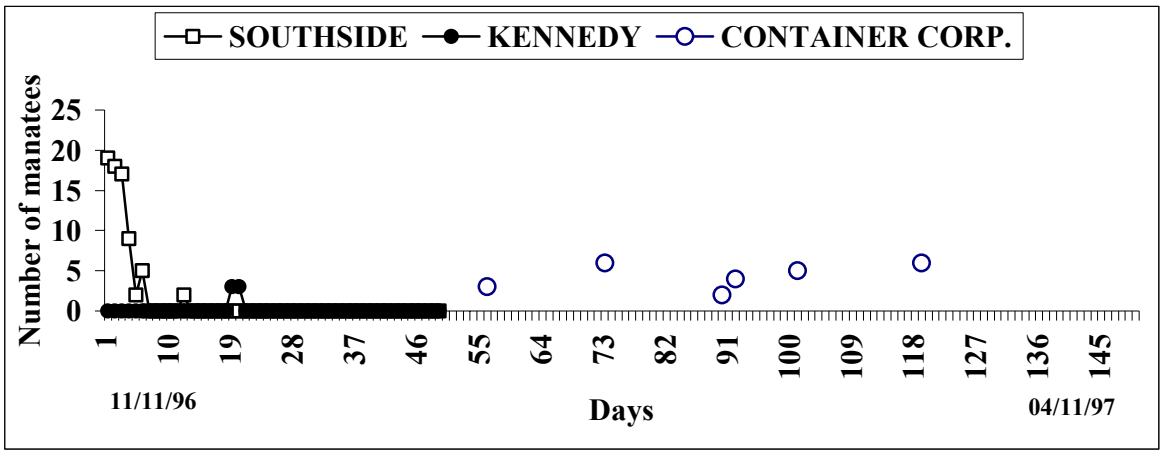


FIGURE 15. Numbers of manatees observed during ground surveys at JEA's Southside and Kennedy generating stations, Jacksonville, Duval Co., FL. and aerial surveys at Container Corporation of America, Fernandina, Nassau Co., FL 1996-1997.

In 1997, no manatees were observed at JEASS or JEAK. Although manatees have been seen at Jefferson Smurfit's, none were observed there during the monitoring period using aerial surveys. The reason for manatees congregating at these plants was in part due to Jacksonville Electric Authority (JEA) conducting on site testing of power plant facilities in November. In 1997, JEA refrained from testing their plants at this critical time of year. As a result, manatees moved out of the area and were not drawn to thermal sources.

In 1998, JEASS and JEAKS sites were monitored daily between 11/1 to 12/3. Total daily count varied from 0-6 animals (3 adults were observed on 11/6, 1 adult and calf on 11/9, and 4 adults and 2 calves on 11/13). No manatees were observed at JEAKS.

A winter aggregation of manatees was monitored in Nassau County from January to April (1995-1998). In 1995, total daily counts by aerial survey varied from 2-15 manatees at the warm-water out fall at Container Corporation of America, Fernandina, Florida. In 1996, a daily total of between 1-6 manatees was recorded. In 1997, daily total varied from 2-6 manatees. In 1998 and 1999, no manatees were observed. The number sighted at Container Corporation of America, did not exceed 15 animals in 1994 or 6 in 1995/96. In 1997, Containerboard Corporation installed diffusers on their thermal effluent pipe and no manatees were sighted to date (Figures 13-15).

In 1999, the same sites were monitored between 11/11/99 to 2/3/2000. Total daily count at JEASS varied from 0-16 between 11/11/99 to about 12/25/99. No manatees were observed

between 12/26/99 to 1/24/2000, then 1 adult was observed on 1/25/2000. Total daily count varied from 0-16 at JEAKS and manatees were generally observed between 11/10/99 to 12/12/99. No manatees were seen between 12/12/99 to 1/25/2000. Then a single adult was recorded 1/26/2000 (Figure 16).

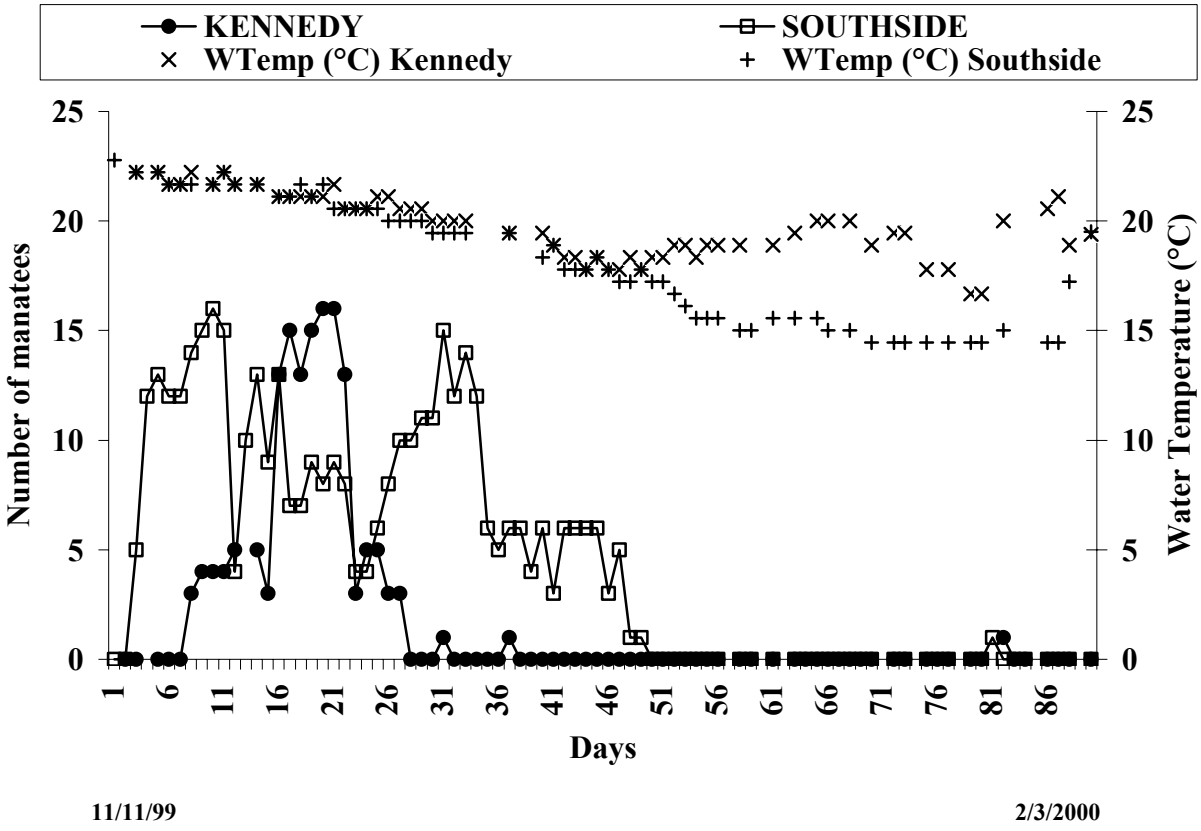


FIGURE 16. Numbers of manatees observed during ground surveys at JEA's Southside and Kennedy generating stations, Jacksonville, Duval Co., FL. 1999-2000.

In 2000, the same sites were monitored between 11/03/00 to 3/31/2001. Total daily count at JEASS varied from 0-29 between 11/03/00 to about 1/24/01. This represents the highest count at JEASS since monitoring began in 1994. Relatively lower numbers of manatees were observed between January to March 2001. Sea World of Florida rescued 4 manatees (3 manatees about 1/3/01 and 1 manatee on 1/24/01). JEAK was not operational and occasional animals observed seemed to be just passing through on their way to JEASS (Figure 17).

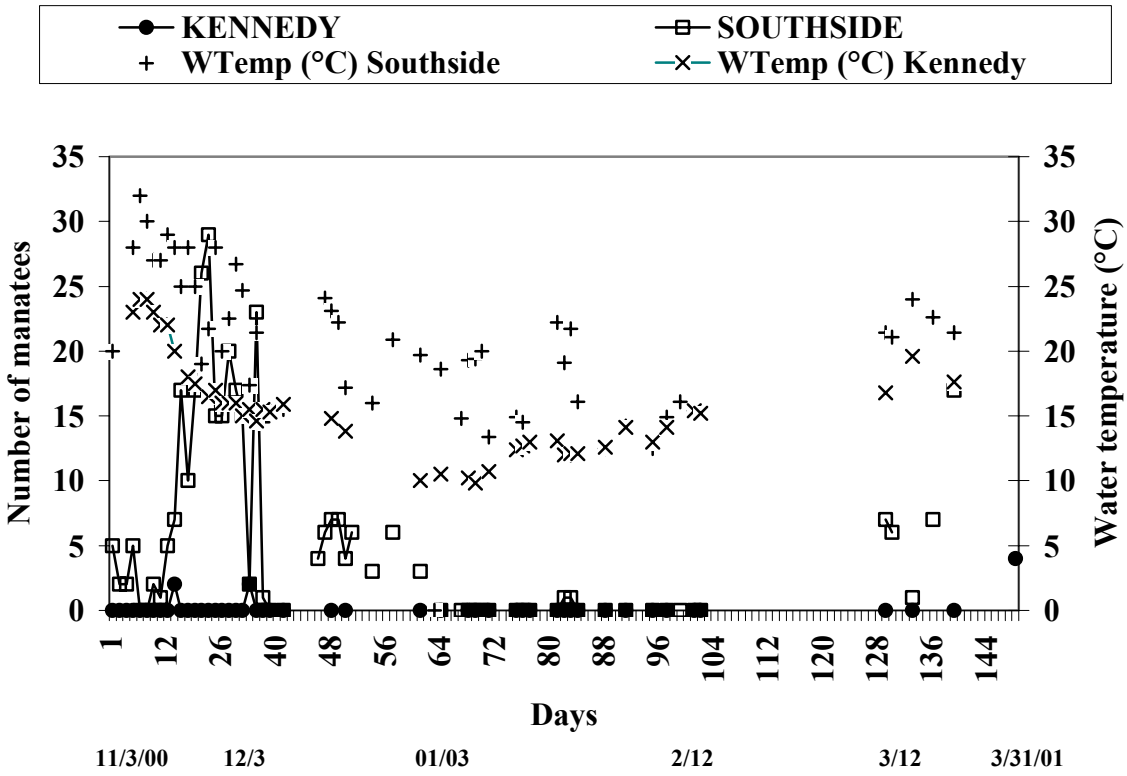


FIGURE 17. Numbers of manatees observed during ground surveys at JEA's Southside and Kennedy generating stations, Jacksonville, Duval Co., FL. 2000-2001.

JEASS officially closed down Oct 31st 2001. Total daily count at JEASS varied from 0-5 between 11/15/01 to about 2/18/02. Five manatees were observed in mid November. No manatees were seen between mid November to January. Then from 0-2 manatees were seen in the first week of February during the colder weather. On 01/5/02 FWC/Sea World and JU attempted to rescue a manatee but it did not show. JEAK was again not producing warm water effluent and was monitored with less frequency. No animals were observed at JEAK between 11/29/01 to 2/18/02 (Figure 18).

In winter of 2002, it was not possible to gain access to the monitoring sites at JEASS because construction activities associated with dismantling of the power station caused JEA to have concerns about health safety, insurance and liability issues. As a result, JEA undertook monitoring for manatees themselves using their own personnel. In spite of the plant being shut down in October 2001, manatees congregated at the site but did not remain. Also, JEA installed a retaining gate to prevent manatees moving into the old discharge pipes. No animals were seen at JEASS after December 3rd 2002 (Figure 19).

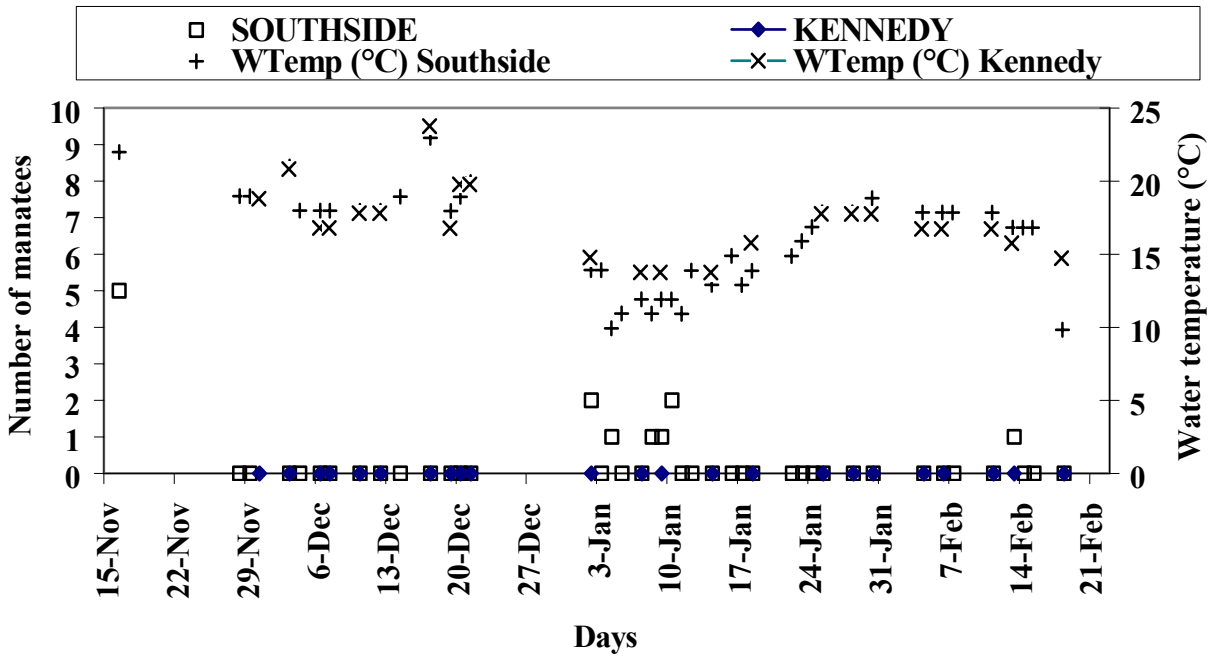


FIGURE 18. Numbers of manatees observed during ground surveys at JEA's Southside and Kennedy generating stations, Jacksonville, Duval Co., FL. between November 15th 2001 to February 20th 2002.

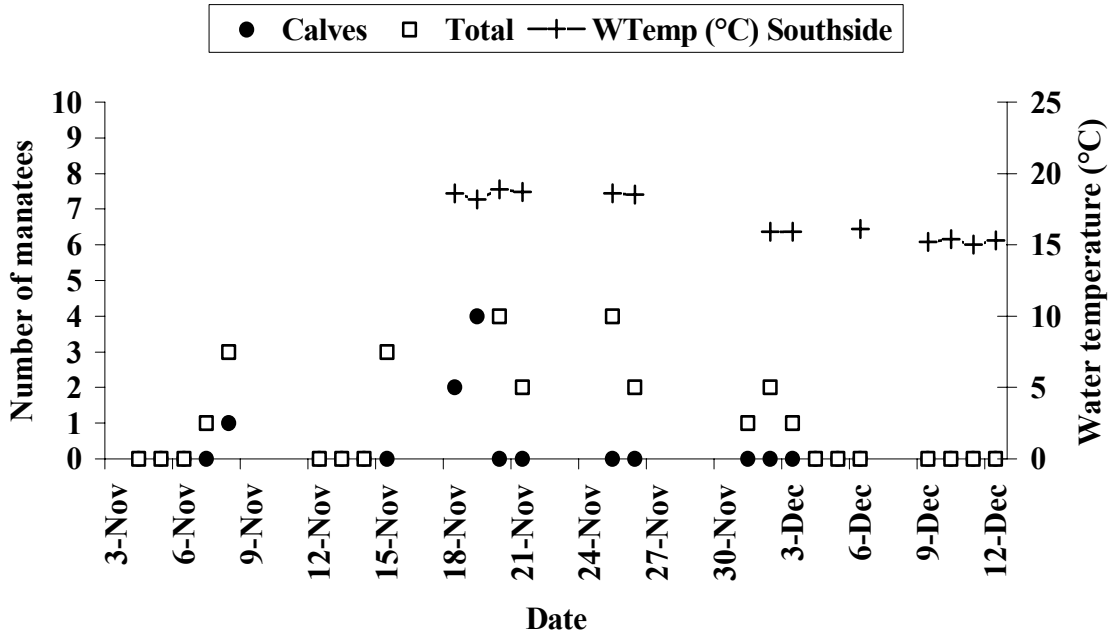


FIGURE 19. Numbers of manatees observed during ground surveys at JEA's Southside generating station, Jacksonville, Duval Co., FL. between November 3rd 2002 to December 11th 2002.

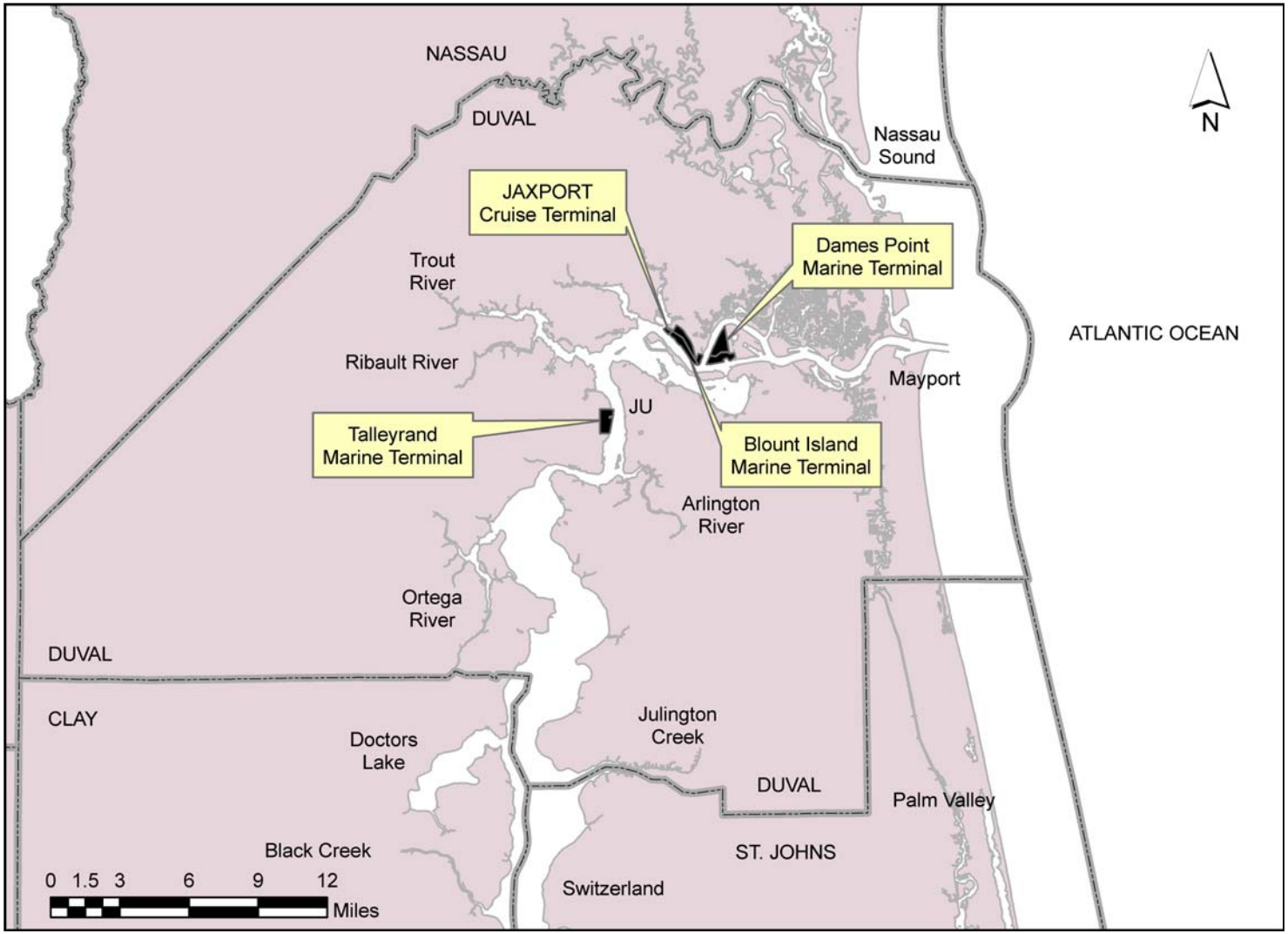
In 2003, no manatees were reported by JEASS until 2 adults and 2 calves were seen 04/15/2003 and 4 adults were seen on 05/05/2003. In winter 2004 no manatees were reported at the site. JEA continued to undertake monitoring for manatees themselves using their own personnel during the winter. In 2004/2005 no manatees were reported at the site. The SSJEA plant was completely dismantled and the site proposed for redevelopment. During the winter of 2005/2006 no manatees were observed at JEASS.

Manatees frequently used Southside Generating Station until it closed in October 2001 but little use was observed during the winter of 2003/2004. Although there are numerous other minor springs along the St. Johns River that may provide thermal benefits to manatees, Blue Spring (Volusia County) is the focus of the St. Johns River sub-population during the winter months (196 total manatees seen at Blue Spring during the 2004-2005 winter) (Wayne Hartley, Park Ranger, Blue Spring State Park, personal communication).

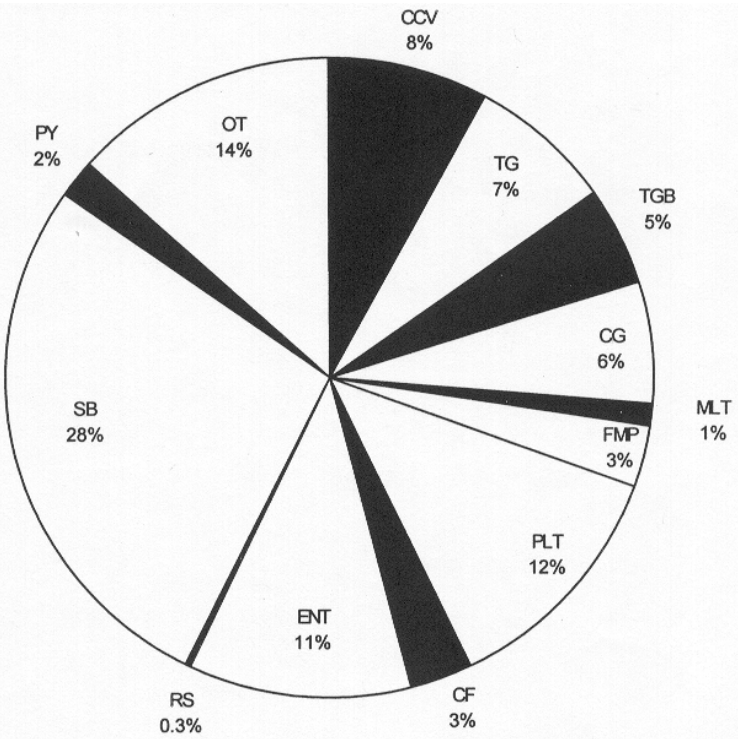
Ortega Farms Basin: In 2003, FDEP identified a warm water source in the Ortega River as a result of having to rescue six manatees from the Ortega Farms Basin just north of Timuquana Road Bridge, Jacksonville. After studying the area (Latitude: 30°15.043 N; Longitude: 81° 42.837 W), FDEP determined that a significant thermocline (17-24°C) and halocline (0.3-13 ppt) existed starting at about 4-5 meters water depth. FDEP hypothesized that the most likely reason for the phenomenon could be attributed to exothermic breakdown of detritus or a seep from a spring that vented ground water (Jim Mayer, FDEP, personal communication). In winter 2004/05 and 2005/06, no manatees were observer during aerial surveys in the vicinity of this site.

Characteristics of Commercial Vessel Traffic in LSJR: Since 1978 the Port of Jacksonville was equipped with a 38 ft. deep channel and roughly 3 miles of modern wharf facilities. In 2002, the channel was deepened 41 ft. The success of the port is due, in part, to 24-hour, 7 day-a-week access with no bridge restrictions (except for cruise ships greater than 180 ft. in height). Its strategic location in the southeastern corner of the nation's transcontinental transportation network allows for quick and easy transfer of goods and materials between rail cars, truck chassis, and ships (Jaxport Annual Report 1998; JaxPort.com 2006). The majority of commercial shipping activities are concentrated in 3 marine terminals on 1,400 acres: (1) Blount Island Marine Terminal is 9 miles west of the river mouth. (2) Talleyrand Docks & Terminal is 24 miles west of the river mouth and (3) Dames Point Terminal is about 10 miles west of the river mouth. The port handles 8.4 million tons of raw materials, automobiles, linerboard, paper products, scrap materials, and general consumer goods are imported and exported through these facilities each year, and since 2004 cruise passengers (MAP4). The Dames Point Terminal is still under construction and will consist of 158 additional acres, supported by two 1,200 ft. berths and 6 Post-Panamax container cranes to handle bulk cargo (e.g. limestone and granite) (JaxPort.com 2006). The Port of Jacksonville also includes numerous private commercial docking facilities that handle large quantities of petroleum products. Manatees cross through the port facilities on their way to areas of preferred habitat in the St. Johns. Manatee deaths from human-related causes represent one-third of total manatee deaths in the county. Human-related causes of mortality are primarily a result of watercraft collisions, crushings, and/or propeller strikes.

A study characterizing commercial shipping vessel activities was conducted by Jacksonville University (August, 1994) to determine the number and type of shipping activities occurring in Duval County waters. The study was modeled after National Marine Fisheries Service (Hain 1993) that provided information about ship traffic and the Atlantic Right Whale. Direct monitoring of shipping vessel activity was conducted over 30 consecutive days. Watches extended from 6:00 A.M. to 6:00 P.M. at two specific locations on the river (1) Oyster Shell Fish Camp (Mayport) and (2) Talleyrand Avenue (JEA Kennedy Generating Station). From data regarding the total number of commercial container vessels entering the mouth of the river (Mayport observation point) and the total number of commercial container vessels docking at Talleyrand Avenue, the number of ships using the Blount Island terminal (between the river mouth and Talleyrand) may be determined by simple calculation. Observers recorded vessel traffic on data sheets whenever a vessel passed the observation point. Each entry was categorized under thirteen different vessel types. Information gathered included: date, time, vessel type, name, country, incoming or outgoing, tide, and weather conditions. For ships passing the Talleyrand station, an additional category was added to determine the number of ships that did not dock at the Talleyrand facilities, continuing farther upriver instead (LSJR: Figures 20 & 21). For the ICW, Figures 22 & 23 depict calendar year north-south vessel traffic patterns in the Atlantic Intracoastal Waterway. Data was provided by FDOT and USACOE 1995, for Sister's Creek Bridge and Palm Valley Bridge openings, respectively.



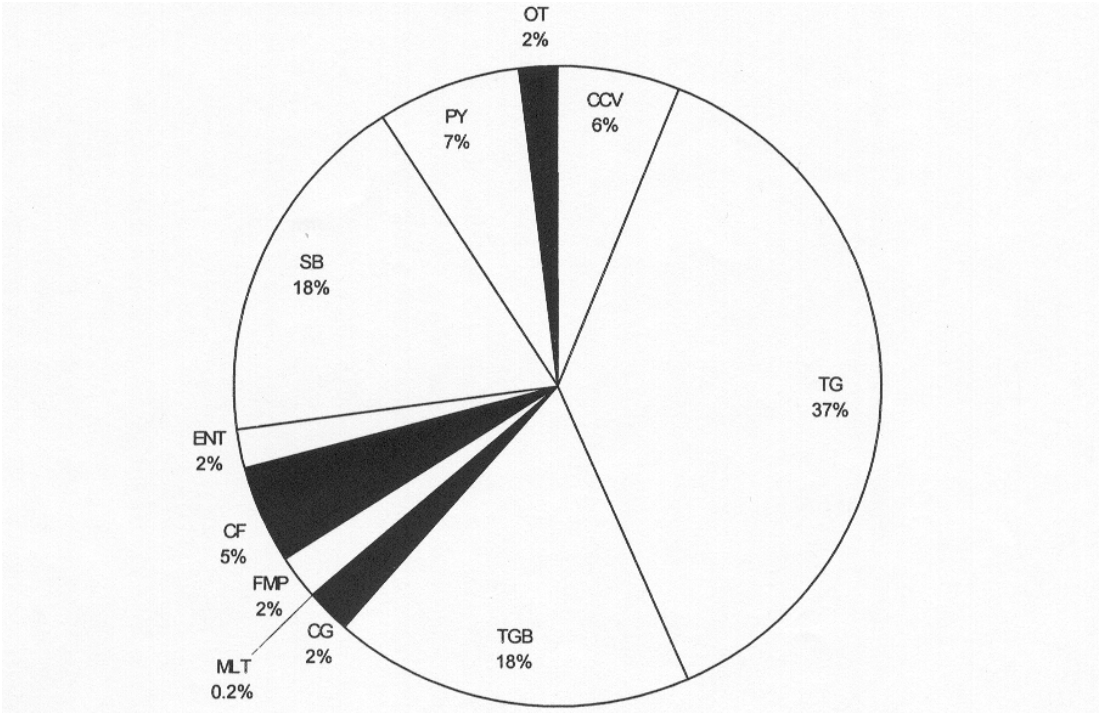
MAP 4. Location of port facilities in Duval Co., FL.



Key	Vessel type	Total Number	Average number per day
CCV	Commercial Cargo vessel	125	4.1
TG	Tug boat	114	3.8
TGB	Tug boat/Barge	83	2.8
CG	Coast Guard	93	3.1
MLT	Military	17	0.6
FMP	Florida Marine Patrol	52	1.7
PLT	Pilot boat	196	6.5
CF	Commercial fishing	53	1.8
ENT	Entertainment vessel	183	6.1
RS	Research vessel	5	0.2
SB	Shrimp boat	440	14.7
PY	Private yacht (50 ft.+)	32	1.0
OT	Other	217	7.2
TOTAL		1,610	53.6

Source Jacksonville University - August 1994.

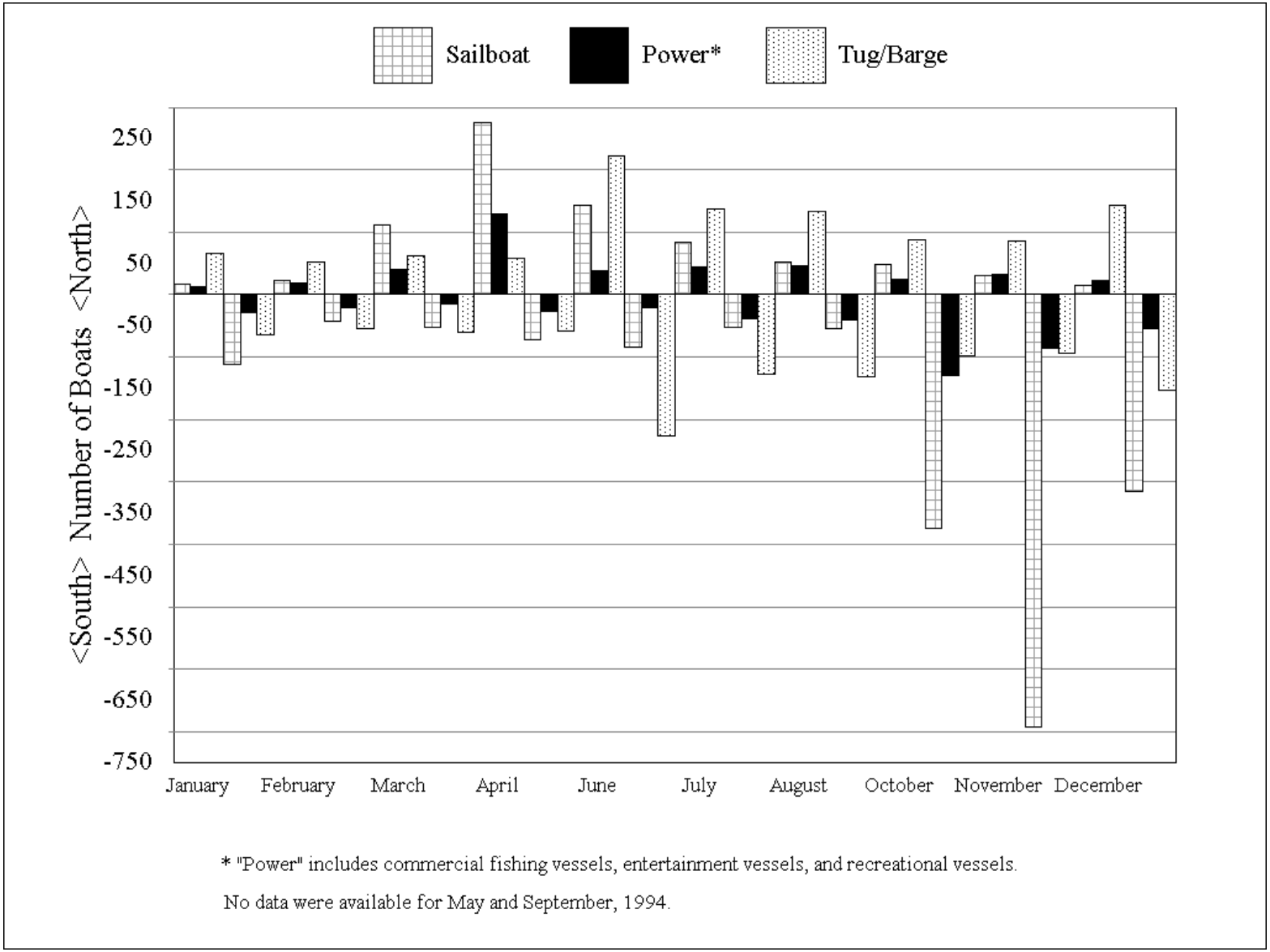
FIGURE 20. Types of commercial vessels using Mayport. Pie chart values represent percent of the total number of vessels observed.



Key	Vessel type	Total Number	Average number per day
CCV	Commercial Cargo vessel	67	2.2
TG	Tug boat	404	13.5
TGB	Tug boat/Barge	200	6.7
CG	Coast Guard	17	0.6
MLT	Military	2	0.1
FMP	Florida Marine Patrol	20	0.7
PLT	Pilot boat	0	0
CF	Commercial fishing	59	2.0
ENT	Entertainment vessel	23	0.8
RS	Research vessel	5	0
SB	Shrimp boat	199	6.6
PY	Private yacht (50 ft.+)	79	2.6
OT	Other	24	0.8
TOTAL		1,094	36.6

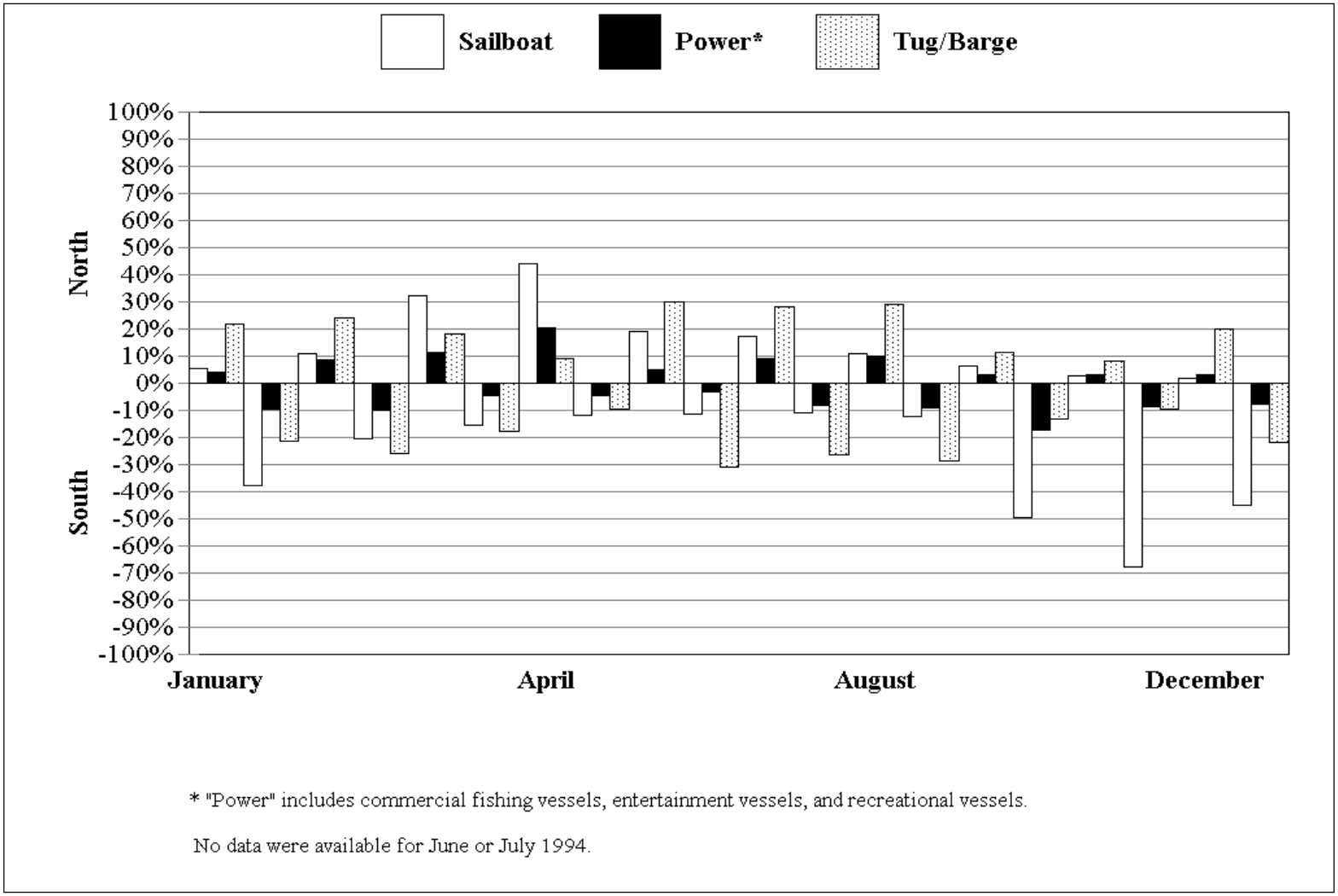
Source Jacksonville University - August 1994.

FIGURE 21. Types of commercial vessels using Talleyrand. Pie chart values represent percent of the total number of vessels observed.



Source data: Palm Valley Bridge and The Army Corps of Engineers.

FIGURE 22. Vessel traffic north and south of Palm Valley Bridge (1994), ICW, Duval Co., FL.



Source data: Sister's Creek Bridge and The Florida Department of Transportation.

FIGURE 23. Vessel traffic north and south of Sister's Creek Bridge (1994), ICW, Duval Co., FL.

Characterization of Recreational Boat Activity in LSJR: Few studies have been completed which provide a comprehensive view of recreational boat activity on the St. Johns River. The University of North Florida conducted a survey of recreational boat patterns in the St. Johns River in 1991. Results of the survey indicated that recreational boat activity occurs throughout the entire river. Information about high-use areas of the St. Johns River by recreational boaters needs to be better defined. Additional information was provided by a survey of boat ramps conducted by Jacksonville University (Winter 1993 through Summer 1994). In order to obtain a more comprehensive overview of recreational uses of the St. Johns River, surveys of boat ramps need to be conducted year-round.

During three months of boat ramp surveys conducted by Jacksonville University in 1994, interviews were randomly conducted at each of 51 boat ramps in Duval County. A list of boat ramps used in this study may be found in the *Boat Facilities Siting Criteria* section of this report. Interviewers were randomly assigned to each ramp station for a set time of 1.5 hours. Interviewers asked a series of pre-determined questions to each boat captain departing and/or arriving at the boat ramp (Figure 24).

Preliminary results (Figure 25) indicated that the primary purpose of 1,196 recreational boaters on the LSJR was *"recreational fishing*", (61.6%). *"recreational cruising"* represented the second most frequent purpose of boat trips (18.5%).

The primary destination of 1,196 boaters surveyed was the *"Large Jetties"*, (9.3%), which are a popular fishing location (Figure 26). The second most popular destination was *"Julington Creek"* (7.36%).

BOAT CAPTAIN INTERVIEW DATA FORM

1) Interviewer_____ 2) Date_____Time_____
3) Departure Time_____ 4) Return Time_____
5) Ramp Code_____ (See boat ramp information sheet)

6) Captain's Name_____ No. of people in party_____
7) Residency of Captain_____

8) Boat Registration No._____

9) How often does he/she use ramp:
Summer (May to Sept)_____ Fall (Oct/Dec)_____
Winter (Jan/Feb)_____ Spring (Mar/Apr)_____

10) Number of WEEKDAY ramp usage_____ WEEKEND usage_____

11) Purpose of boat trip (circle all that apply)

(RF) Recreational fishing	(CF) Commercial Fishing
(SK) Skiing	(TR) Travel (cruising)
(DV) Diving	(SW) Swimming
(LA) Land Activity (picnic, restaurant, parks)	
(OT) Other_____	

12) Primary destination (circle one or specify)

(AN) Atlantic N of inlet	(JC) Julington Creek
(AS) Atlantic S of inlet	(DL) Doctor's Lake
(AJ) Atlantic Jetties	(RA) SJR S of Buckman Bridge
(PC) Pablo Creek	(RB) Buckman to Fuller Warren
(SC) Sister's Creek	(OR) Ortega River
(FG) Ft. George	(RC) Fuller Warren to Matthews
(CC) Clapboard Creek	(AR) Arlington River
(BR) Broward River	(TR) Trout River
(NR) Nassau River	(RD) Matthews to Dames Pt.
(SJ) St. Johns County	(RE) Dames Pt. to SJR mouth

13) (OT) Other_____

14) Type of vessel (circle)
a) Power/Sail b) 20ft or less c) 20-30 ft. d) 30 ft.+

15) Is boat equipped with
_____(NH) No head
_____(PP) Porta-potty
_____(HH) Head with holding tank.

16) How do you empty holding tank ?
_____(CS) Commercial pump out (Marina, etc.)
_____(PF) Private pump-out facility or
_____(OL) Outside 12 mile limit
_____(OT) Other

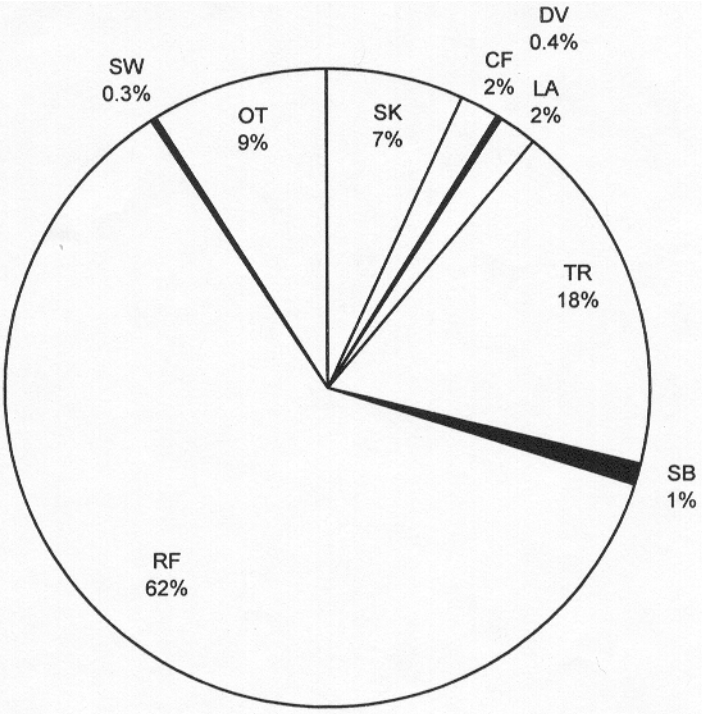
17) Comments_____
_____

18) Interview Status: _____(C) Questionnaire Complete _____(R) Refused Interview
_____(L) Language Barrier _____(Q) Questionable Interview

19) Vehicle License Plate No._____

Source Jacksonville University-Winter, 1993-Summer, 1994.

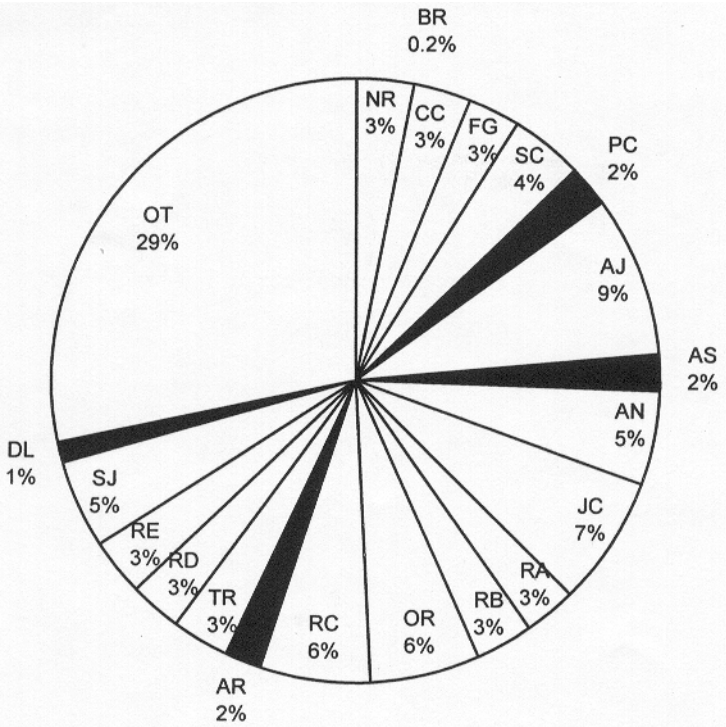
FIGURE 24. List of survey questions used by researchers in conducting interviews with boat captains at boat ramps in Duval Co., FL.



Key	Vessel type	Total Number
SK	Skiing	79
CF	Commercial fishing	19
DV	Diving	5
LA	Land activity	20
TR	Cruising	222
SB	Sailing race	9
RF	Recreational fishing	737
SW	Swimming	3
OT	Other	103
TOTAL		1,196

Source Jacksonville University-Winter'93-Summer'94.

FIGURE 25. Primary purpose of trip for boat captains interviewed at boat ramps in Duval Co., FL. Pie chart values represent percent of total number of captains interviewed (N=1,196).



Key	Primary destination	Total number	Key	Primary destination	Total number
NR	Nassau River	35	RA	South of Buckman Bridge	22
BR	Broward River	2	RB	Buckman to Downtown	31
CC	Clapboard Ck.	36	OR	Ortega River	69
FG	Ft. George	33	RC	F. Warren to Mathews	69
SC	Sister's Ck.	45	AR	Arlington River	24
PC	Pablo Ck.	28	TR	Trout River	33
AJ	Large Jetties	111	RD	Mathews to Dames Pt.	36
AS	Ocean (South)	25	RE	Dames Pt. To Inlet	35
AN	Ocean (North)	56	SJ	St. Johns County	55
JC	Julington Ck.	88	DL	Doctor's Lake	17
OT	Other	346			
TOTAL					1,196

Source Jacksonville University - Winter '93 - Summer '94.

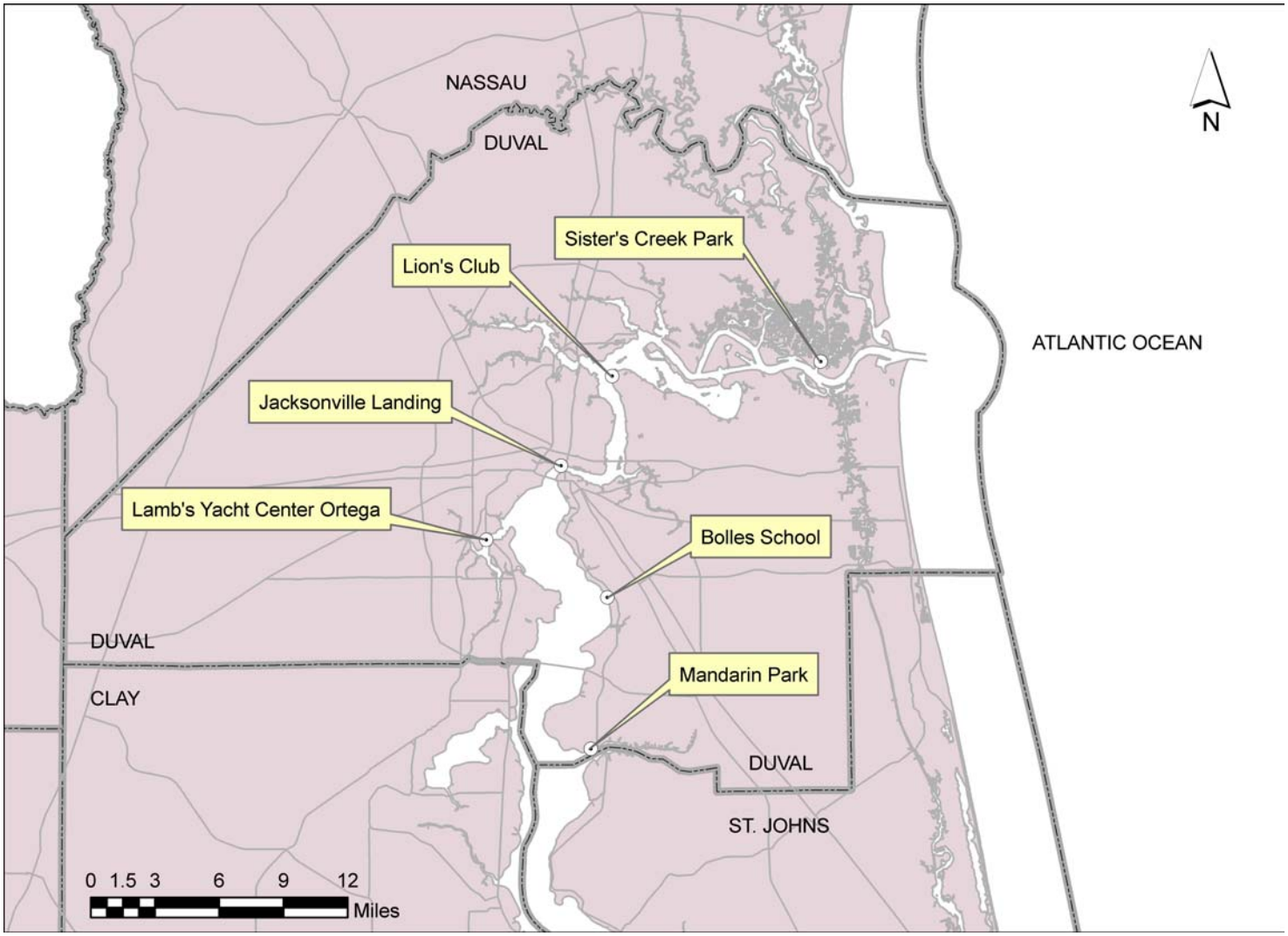
FIGURE 26. Primary destinations of boat captains interviewed at boat ramps in Duval Co., FL. Pie chart values represent percent of total number of primary destinations recorded (N=1,196).

Vessel Compliance Studies LSJR: A vessel compliance study was conducted for 34 days in June/July 1999. Locations surveyed for vessels that were in the manatee zone included Bolles School, Jacksonville Landing, Lions Club Boat Ramp, Mandarin Park and Ortega River (MAP 5). Results pooled over all sites indicated that 85 % of vessels were in compliance with existing MPP speed zones regulations.

In April 2000, FWC adopted the state rule implementing "new" boat speed zones in Duval County. Subsequently, a vessel compliance study was conducted for 26 days in July 2002. Locations surveyed for vessels that were in the manatee zone included Jacksonville Landing, Lions Club Boat Ramp and Sister's Creek Park Boat Ramp. Results pooled for all locations indicated that 46 % of vessels were in compliance with existing MPP speed zones. Lower compliance values were most likely attributed to a significant learning curve for vessel operators in light of the new regulations and an absence of law enforcement since September 11th 2001. In addition, significant construction activities around the ICW near Wonderwood Expressway may have caused localized changes in vessel traffic patterns which may have been responsible for causing some of the watercraft mortalities experienced in 2002.

In 2003, similar compliance studies were conducted for 34 days during May–July. Locations included Bolles School, Jacksonville Landing, Lions Club Boat Ramp and Sister's Creek Park Boat Ramp. Only vessels that were in the manatee zone were observed. Results pooled over all the sites indicated that 78 % of vessels were found to be in compliance (Table 11). Education and increased enforcement presence are key requirements for better compliance.

Acoustical Study LSJR; For this study, underwater acoustical recordings of hopper dredging activities were conducted with the full cooperation and assistance of B&B Dredging. The noise from their 100 m long hopper dredge, "*Columbia*" was recorded while it performed maintenance dredging in the St. Johns River during August, September and October 2004. Jacksonville University researchers assisted in recording dredging activities in the vicinities of Dames Point Bridge, Talleyrand, Hart Bridge and Bartram Island. The following recommendations were made: Mitigation techniques suggested to abate noise radiation include; ship quieting technologies, reducing propeller cavitations, insulating and elevating the slurry pipeline, and minimizing the number and distance of transects back and forth to pump out stations. With respect to the effects on boat noise a direct mitigation would be to attach a low intensity, directional alarm (in a noise bandwidth above the masking frequencies) to the bows of slow and fast moving vessels (Edmund R. Gerstein and Joseph E. Blue, Leviathan Legacy Incorporated, Draft Final Report to Jacksonville Waterways Commission, Contract N0. 8548, September 2005).



MAP 5. Location of vessel compliance study sites in Duval Co., FL. (1999-2003).

TABLE 11. Results from compliance studies in Duval Co., FL., (2000-2003).

Year	Site	# Days	Number Compliant	Number Non-compliant	Total	Percent Compliant	Percent Non-compliant
1999	Bolles	34	3	26	29	10	90
1999	Landing	34	1125	50	1175	96	4
1999	Lions Club	34	62	81	143	43	57
1999	Mandarin	34	54	27	81	67	33
1999	Ortega	34	106	55	161	66	34
1999	Total		1350	239	1589	85	15
2002	Landing	26	455	380	835	54	46
2002	Lions Club	26	79	139	218	36	64
2002	Sister's Ck.	26	225	356	581	39	61
2002	Total		759	875	1634	46	54
2003	Bolles	34	17	39	56	30	70
2003	Landing	34	785	69	854	92	8
2003	Lions Club	34	161	255	416	39	61
2003	Sister's Ck.	34	795	125	920	86	14
2003	Total		1758	488	2246	78	22

Source: Jacksonville University, 2003.

1999 studies conducted June/July

2002 studies conducted July

2003 studies conducted May/June/July

Natural Resources

The St. Johns River is a major natural resource for Duval County, flowing north for over 360 miles from Central Florida. It drains approximately 10,000 square miles (1/6 of the total area of the State of Florida), creating an estuary as it turns east in Duval County to empty into the Atlantic Ocean. The river is important ecologically and economically to Jacksonville.

Geographically, Duval County is dominated by the St. Johns River and characterized by sandy barrier islands, inlets, sounds, rivers and extensive coastal marshlands. The river provides access to both Commercial and Naval ports. Fort George Inlet is an important network of tidal creeks, channels and waterways that receive daily tidal inundation. Nutrient exchange between ocean and river-transported detritus makes saltwater marshes a significant area of primary production and provides an invaluable nursery habitat for commercial and recreational fish species. Marshes and coastal hammocks located on the uplands are part of the Atlantic flyway that provides winter stopover areas for migratory birds.

Submerged Aquatic Vegetation: Submerged aquatic macrophytes found in the LSJR are primarily freshwater and brackish-water species. Commonly found species include: *Vallisneria americana, Ruppia maritima, Potamogeton pectinatus* and *Ceratophyllum demersum. V. americana* and *R. maritima* are submerged grasses which form extensive submerged grass beds when conditions allow. *V. americana* is a freshwater species that tolerates brackish conditions, while *R.. maritima* is a brackish-water species. Manatees consume from 4-11% of their body weight daily (Bengston 1981; Best 1981; Lomolino 1977).

Distribution of submerged macrophytes in Duval County is limited to waters south of the Fuller Warren Bridge (Kinnaird 1983b). Submerged aquatic vegetation in the tannin-rich LSJR is found exclusively in 4 ft. or less of water depth due to poor sunlight penetration. Rapid growth occurs in late winter and spring when water temperatures are ideal for plant growth (high plant biomass). In mid-summer, heat stress causes plant mortality that results in a reduction in biomass and coverage area. The tape grass beds recover annually by recruitment and the cycle continues (Thayer et al. 1984). Submerged vegetation provides nurseries for a variety of marine life, helps to prevent erosion, and reduces turbidity by trapping sediment. Sunlight is vital for good growth of submerged grasses. Sunlight penetration may be reduced because of increased turbidity, pollution from upland development and/or disturbance of soils. Deteriorating water quality has caused a reduction in the amount of viable, submerged vegetation. This leads to erosion and further deterioration of water quality. *Vallisneria Americana* or Tape grass grows well from 0-12 ppt and can tolerate waters with salinities up to 15-20 ppt for short periods of time. Growth becomes limited above about 10-12 ppt based on analyses of high-estuarine distribution (Twilly and Barko 1990). The availability of tape grass decreased significantly in the

County during 2000-2001 because low precipitation caused higher than usual salinity values -compare 1999, with 2000-2002 (Figure 27). Salinity data was recorded at the JU dock on a weekly basis.

In 2003, environmental conditions returned to a more normal precipitation pattern. As a result, we recorded lower salinity values that favored tape grass growth. In 2004, salinities were initially higher than in 2003 but decreased significantly after August with the arrival of heavy rainfall associated with four hurricanes that skirted Florida (Charley, Francis, Ivan and Jeanne).

Map Series C, Dock line & Submerged Vegetation: shows the delineation of submerged tape grass beds in Duval Count relative to the contour of docks extending into the river from private residences. This data was collected in 1997 by Jacksonville University with GIS software and GPS technology, and aerial video photography. In addition, also presented is a set of maps depicting the extent of submerged tape grass beds in Duval County for the years 1998 (Dobberfuhl 2002) and 2001 (Dobberfuhl, unpublished). Locations of submerged vegetation were determined by using three methods: (1) aerial photography interpretation, (2) hydroacoustic mapping, and (3) groundtruth transects (Dobberfuhl 2002). Graphic depiction of tape grass beds and all other map series were generated in ArcGIS using information provided by the St. Johns River Water Management District (SJRWMD).

In addition, updated information relating to the condition of grass beds in Duval, Clay and St. Johns Counties (Table 12) was also provided for the years 1998 to 2004 (D. Dobberfuhl, unpublished data, SJRWMD). The "Total % Cover" may be greater than 100% because the transects were performed using the line-intercept method wherein continuous patches of each species were identified and recorded. Many of these patches overlapped, resulting in greater "Total %. Cover" figures. In general, the data shows a decline in vegetative indices during years of drought conditions followed by recovery.

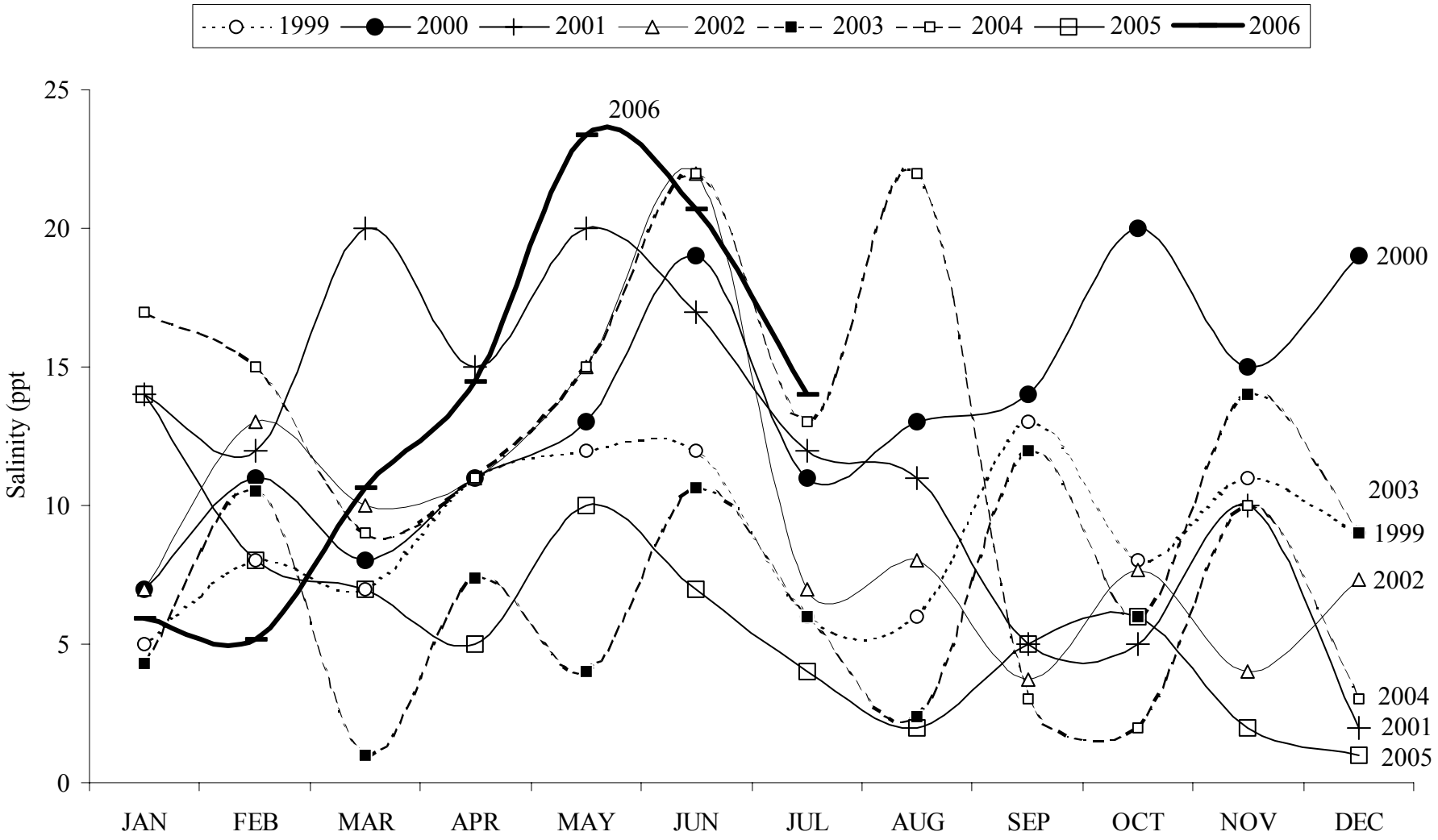


FIGURE 27. Mean monthly salinity recorded at the Jacksonville University dock, Duval Co., FL 1999-July 2006.

Duval County: The percent of bottom that was bare was greatest during the years 2000 to 2002, during and immediately following the drought (range 76-87%). Prior to the drought it was less bare 40% (1998) as well as, after the drought 48% (2003), 33% (2004) and 35% (2005).

A similar effect was expressed in the percent of grass beds comprising specifically of *Vallisneria americana.* Predominance of tape grass was less during the drought (range 8-19%) during 2000-2002 as expected. Before and after the drought, it was significantly higher at 50% (1998), 46% (2003), 57% (2004) and 40% (2005).

Bed length in Duval County waters was lowest at the end of the drought years 28 m (2002) versus the other years in the study (range 58-75 m).

The diversity index was lowest between 2000-2003 (range 0.33-0.38) and highest in 1998 (0.67), 2004 (0.57) and 2005 (0.59).

The total percent coverage including all observed species was lowest during drought years 2000-2002 (range 15-27%) versus pre and post drought years 60% (1998), 59% (2003), 87% (2004) and 61% (2005).

TABLE 12. Grass bed data from St. Johns River Water Management District.

County	Year	Percent bare	Percent tape grass	Bed length (m)	Diversity (x100)	Total % cover
Duval	1998	39.56	50.25	75.86	0.67	60.44
	2000	86.75	8.14	58.27	0.33	15.11
	2001	75.75	19.44	63.57	0.38	27.14
	2002	79.66	15.89	28.22	0.15	22.34
	2003	47.57	46.39	61.88	0.35	59.20
	2004	33.33	56.75	64.64	0.57	87.45
	2005	35.33	40.39	62.64	0.59	61.04
Clay	1998	44.98	50.11	100.25	0.55	55.02
	2000	58.46	34.86	92.76	0.54	50.25
	2001	35.15	52.33	110.53	0.88	83.72
	2002	42.20	51.57	38.42	0.48	71.00
	2003	20.39	71.57	102.93	0.59	96.85
	2004	16.07	72.49	109.19	0.92	120.52
	2005	56.58	30.82	84.97	1.12	55.49
St. Johns	1998	47.46	46.52	73.40	0.64	52.54
	2000	45.62	41.19	80.60	0.74	64.43
	2001	38.28	45.71	72.30	1.01	84.08
	2002	41.73	46.56	61.45	0.81	82.46
	2003	39.38	49.55	70.21	0.83	82.81
	2004	32.02	53.19	77.65	0.94	95.49
	2005	49.89	39.62	66.46	0.80	60.52

Source: D. Dobberfuhl, unpublished data. SJRWMD 2006.

Note: This area of the LSJR experienced drought conditions in the 2000 to 2002 time period that resulted in higher numbers in the "percent bare" column and some lower values for indices in the other columns.

Class II Waters - Shellfish Propagation or Harvesting: Duval County contains four areas designated as Class II Waters. These waters lie within the boundaries of the Nassau River - St. Johns River Marshes Aquatic Preserve. The four areas are fully described in 17-302.600, Classified Waters, Florida Administrative Code. Management of shellfish harvesting in these waters is the responsibility of the Department of Agriculture and Consumer Services' (DOACS) Division of Aquaculture. The responsibility was transferred from FDEP to DOACS around 1999. *Map 6, Class II Waters,* identifies these waters in Duval County.

Aquatic preserves: The Nassau River - St. Johns River Marshes Aquatic Preserve, a State designation created in 1969 by the Board of Trustees of the Internal Improvement Trust Fund and subsequent acts by the Trustees and the State Legislature, is located in Northeast Jacksonville *(Map 7*, *Aquatic Preserve).* Specifically, Chapter 160-21 and 160-20 of the Florida Administrative Code control activities conducted in State-sovereignty submerged lands. Additionally, the intent of these acts and codes states "all sovereignty lands within the preserve shall be managed primarily for the maintenance of essentially natural conditions...the propagation of fish and wildlife and public recreation including hunting and fishing are deemed appropriate by the board and the managing agency." The FDEP is responsible for managing the Aquatic Preserve.

Freshwater Sources: Freshwater sources entering St. Johns River, Duval Co., can be divided into natural and man-made sources. Natural sources other than tributaries of the river itself include springs; the United States Geological Survey and St. Johns River Water Management District keep records of natural springs in the St. Johns River. Information on record to date indicates that no significant-sized springs have been identified in Duval County other than those that are small and superficial in nature.

Man-made freshwater sources include wastewater treatment plant discharges and storm water discharge points. At present, there are roughly 200 permitted wastewater discharges in Duval County. Most of these discharge into various tributaries in Jacksonville and are indistinguishable from the tributaries themselves as far as "freshness". Discharges into the tributaries are generally small, less than 1 million gal/d. Larger discharges, greater than 1 million gal/d., discharge into the mainstream of the river. Freshwater discharges are generally continuous and often serve as attractants to manatees.

Wetlands and Emergent Vegetation: Wetlands provide extremely beneficial functions including: maintaining water quality by filtering sediments and other pollutants, providing habitat for fish and wildlife, ensuring flood control, and contributing to recreational opportunities. Removal or destruction of natural vegetation disrupts natural filtration processes that protect water quality. Poor water quality damages many levels in the food web, which in turn affects fish and wildlife with commercial, recreational, or endangered species value, such as the manatee. Wetlands that are contiguous to tributaries and primary river channels are just as much a part of the river as the water itself.

Emergent wetlands are dominated by saltmarsh grasses, *Juncus roemerianus* (Black Needlerush) and *Spartina alterniflora* (Saltmarsh Cord Grass). Manatees have been observed feeding on both types of vegetation in Duval County.

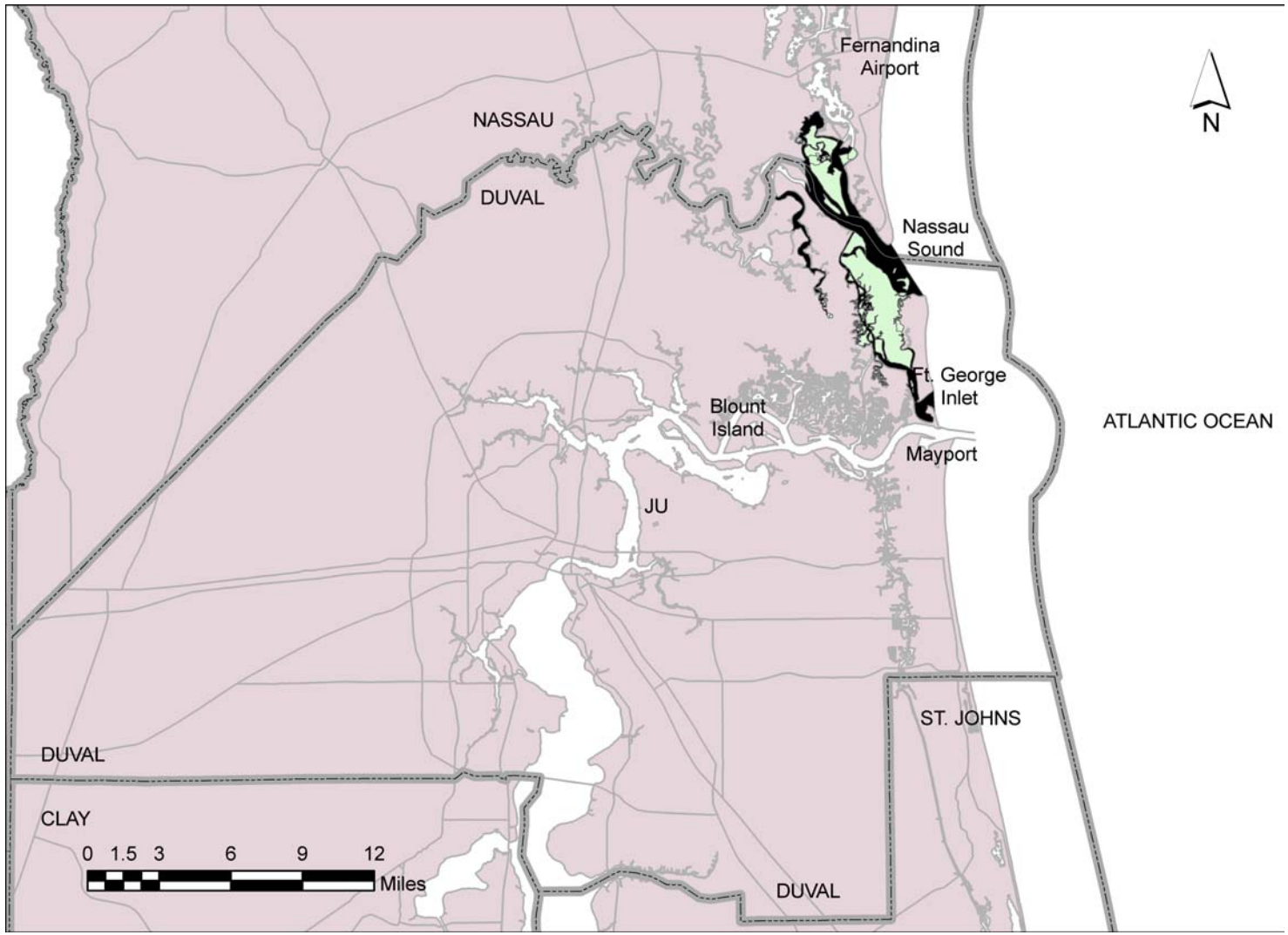
Site-specific water quality monitoring: The City of Jacksonville is mandated to maintain surface water quality monitoring programs as follows:

1. The 2010 Comprehensive Plan

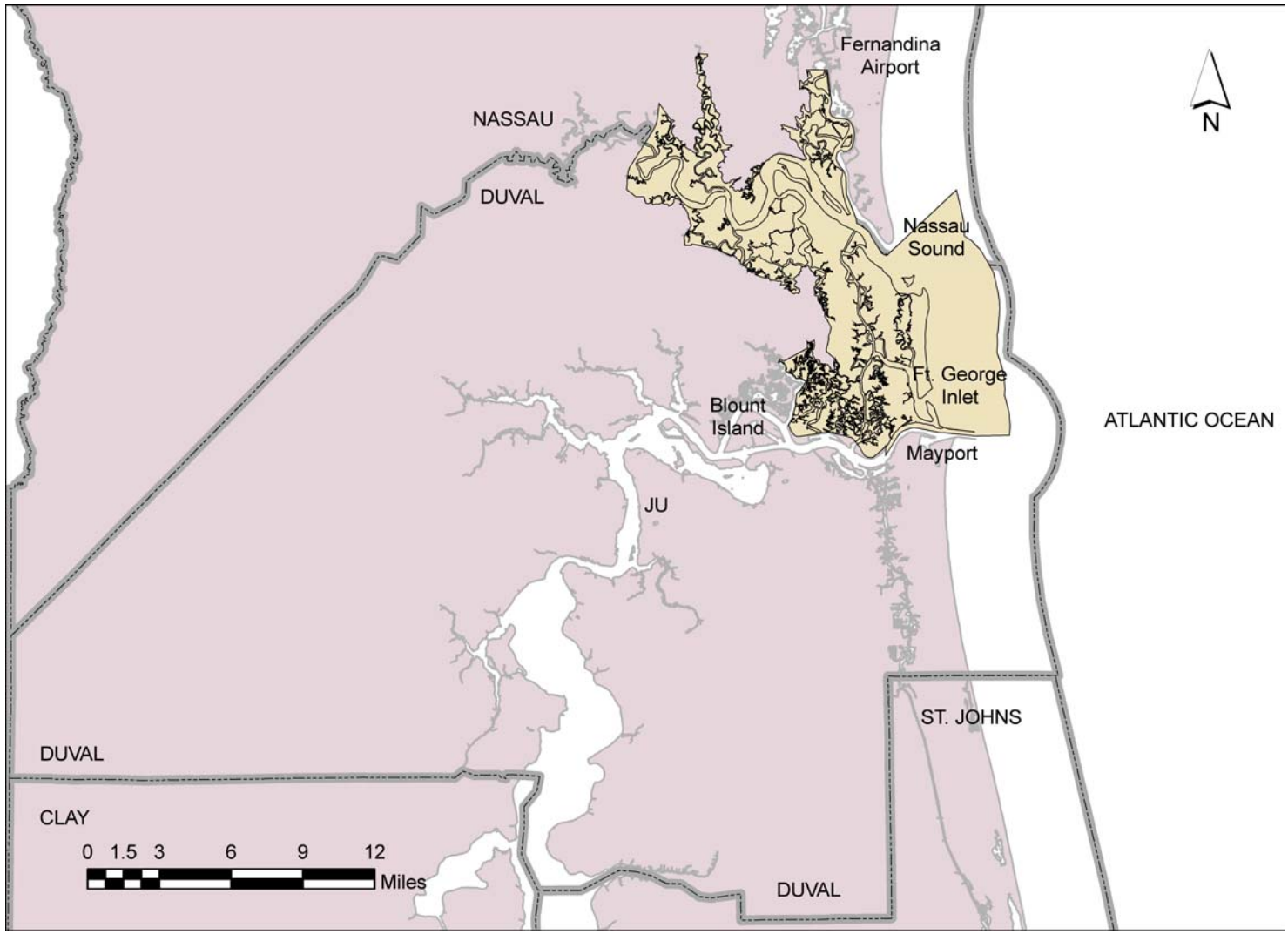
2. City Ordinance Chapters 360 and 362. Monitoring is specified in the Water Quality Attainment Plan Resolution 87-401-345.

3. The City of Jacksonville has entered into General and Specific Operating Agreements (GOA, SOA) with the Department of Environmental Protection. Under these agreements, the Water Quality Division of the Regulatory and Environmental Services Department monitors surface water quality in Dual County.

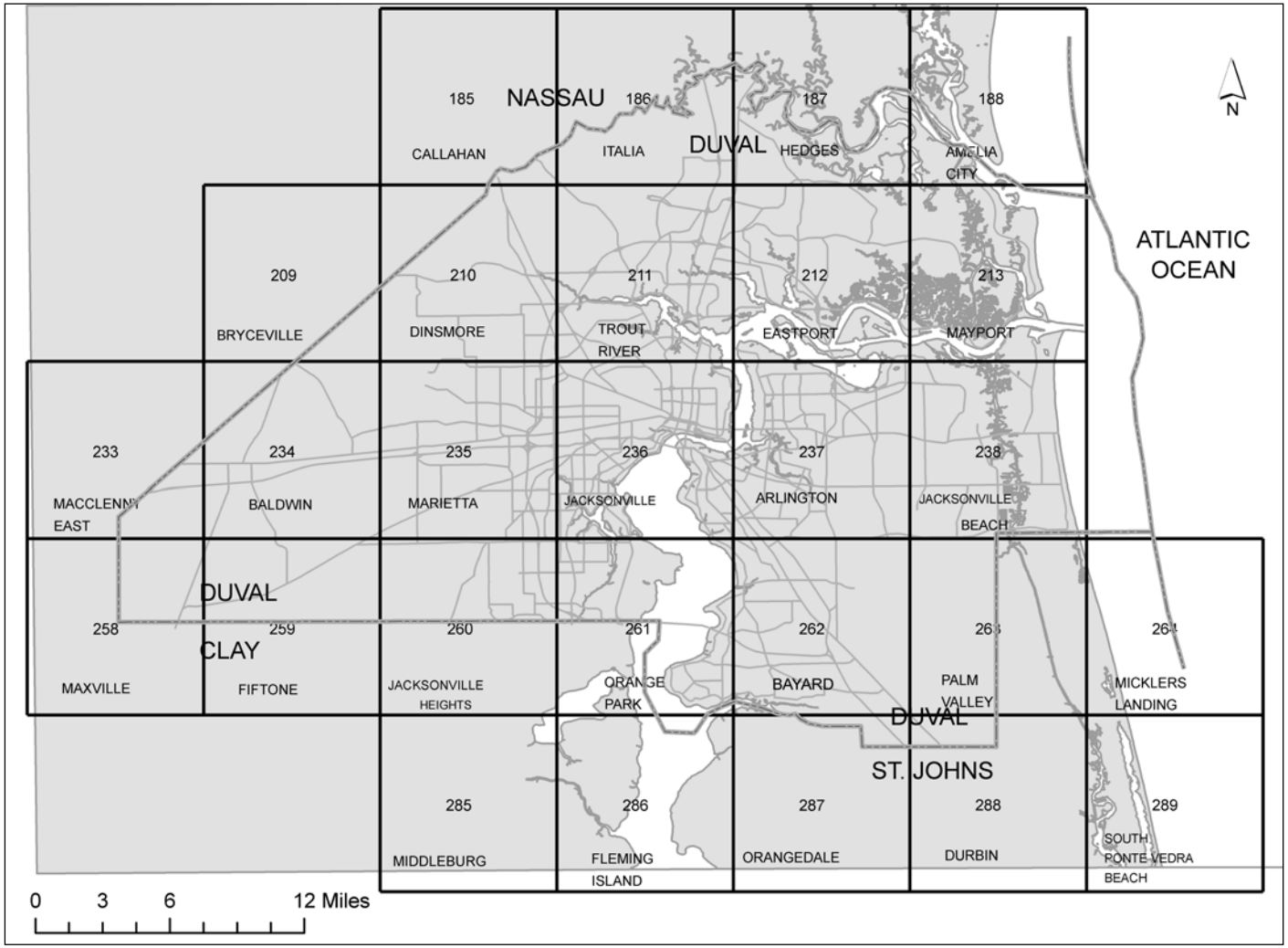
The St. Johns River Water Management District (SJRWMD) developed a plan called the *"Lower St. Johns River Basin Water Quality Monitoring Program."* The plan was developed *"for the purpose of prioritizing water quality objectives and defining patterns of degradation."* Copies of monitoring atlases are available through St. Johns River Water Management District with maps and specific water quality parameters outlined. Map 8, SJRWMD Quads, shows the index numbers corresponding to specific area quadrangles used by SJRWMD.



MAP 6. Location of Water Class Boundary Areas, Duval Co., FL.
(Specifically, Class II Waters are shaded black).



MAP 7. Nassau River–St. Johns River Aquatic Preserve (Aquatic Preserve A-2/3, Nassau & Duval Co., FL).



MAP 8. SJRWMD Quads (Index numbers corresponding to area quadrangles).

Land Development

Marinas: A summary of marinas (Table 13) includes marina names, addresses, numbers of wet slips available, amount of dry storage available, percentage of occupancy, fuel facilities, sanitary sewage capacities, public access and State of Florida Clean Marina Status. These data were collected by Jacksonville University and serve as a comparison for data for the years 1999 to 2006. Marina locations are identified in Map 9. Map 10, illustrates marina capacity as total wet plus dry slips. There was an increase of 1,154 total slips in the County since 1999 (wet +687; dry +467). Fuel capacity in the County increased by 28,250 gallons since 1999. Also, the number of sanitary pump-outs at marinas doubled from 7 in 1999 to 14 in 2006. In 2000 we had two marinas designated with State of Florida Clean Marina Status. The number has risen to 8 in 2006. Marina numbers 47 thru 52 (Table 13) represent marinas associated with new water front condominium developments.

Boat ramps: A summary of boat ramps (Table 14) includes boat ramp names, public or private and the number of trailer parking spaces for a measure of capacity. Map 11, identifies the location of each boat ramp and Map 12, illustrates boat ramp capacities indicated by the total number of trailer parking spaces. There were a total of 1,004 trailer parking spaces in the County. Boat ramp numbers 56 thru 64 represent new canoe/kayak launches and boat tie-ups. Boat ramp number 65 (Charles Reese) is a new proposed boat ramp on the Ribault River.

TABLE 13. Inventory of Duval County Marinas 2006 (Part 1 of 2).

No.	Zone	Marina Name	2006					1999					99-06	2006		1999	2006	1999	Clean	Address
			Wet Slips	(%) Full	Dry Slips	(%) Full	Total Slips	Wet Slips	(%) Full	Dry Slips	(%) Full	Total 1999	Change	Gas	Diesel	Fuel both	Pump outs	Pump outs	Marina Status	
1	17	Julington Creek Marina	50	100	190	98	240	50	90	180	40	230	10	10,000	0	10,000	0	0	Nov-04	12807 San Jose Blvd. 32223
2	16	Mandarin Holiday Marina	150	98	0	0	150	150	80	0	0	150	0	7,000	2,000	4,000	0	0	No	12796 San Jose Blvd. 32223
3	16	Julington Creek Pier 3	84	100	10	70	94	76	100	0	0	76	18	0	0	0	0	0	No	12752 San Jose Blvd. 32223
4	16	Bull Bay Pier	Gone away																	
5	15	FL Tackle & Gun Club	28	100	0	0	28	16	50	0	0	16	12	0	0	0	0	0	No	3700 Rubin Road 32217
6	15	Goodby's Creek Yacht Sales	4	75	175	95	179	4	100	168	90	172	7	6,000	0	3,000	0	0	No	8940 San Jose Blvd. 32257
7	15	Goodby's Lake Marina	Gone away																	
8	15	Epping Forest Yacht Club	64	100	7	100	71	69	80	2	0	71	0	0	0	0	1	1	No	1830 Epping Forest Dr. 32217
9	14	JAX Rudder Club	35	100	100	60	135	35	100	50	80	85	50	0	0	0	0	0	No	8533 Malaga Rd. OP. 32032
10	14	NAS/JAX Marina	61	100	203	85	264	59	100	105	100	164	100	2,000	0	2,000	1	0	Dec-03	1072 Ranger St. 32212 NAS
11	14	FL Yacht Club	45	98	72	95	117	47	65	100	100	147	-30	0	0	0	0	0	No	5210 Yacht Club Rd. 32210
12	13N	Chuck's Boat Yard	30	3	0	0	30	30	5	0	0	30	0	0	0	0	0	0	No	6214 Park St. 32205
13	13N	Cedar River Marina	50	100	200	90	250	35	90	8	100	43	207	0	0	0	0	0	No	5700 San Juan Ave. 32210
14	13N	Lighthouse Moorings	Gone away																	
15	13N	Weeks Marina	3	100	0	0	3	3	75	0	0	3	0	0	0	0	0	0	No	2652 Blanding Blvd. 32210
16	13N	Lamb's Yacht Center	210	90	0	0	210	250	100	200	90	450	-240	8,000	4,000	24,000	2	1	Feb-02	3376 Lakeshore Blvd. 32210
17	13N	Huckin's Yacht Dock	13	100	0	0	13	13	80	0	0	13	0	0	0	0	0	0	Sep-05	3482 Lakeshore Blvd. 32210
18	13N	Sadler Point Marina	65	100	45	60	110	66	100	50	75	116	-6	0	0	0	1	0	Jun-06	4669 Roosevelt Blvd. 32210
19	13N	Ortega Yacht Club Marina	99	97	0	0	99	110	90	0	0	110	-11	4,000	4,000	4,000	1	0	No	4585 Lakeside Dr. 32210
20	13N	Ortega River Boat Yard	227	80	0	0	227	246	70	30	90	276	-49	3,000	3,000	3,000	1	1	Sep-02	4451 Herschel St. 32210
21	9	River City Marina	62	60	0	0	62	60	75	0	0	60	2	10,000	10,000	10,000	0	0	No	835 Museum Circle 32207
22	9	Metropolitan Park Marina	30	60	0	0	30	50	0	0	0	50	-20	0	0	0	1	0	No	1410 East Adams St. 32202
23	8E	Arlington Marina	32	94	158	85	190	0	0	150	100	150	40	8,000	4,000	8,000	0	0	May-04	5137 Arlington Rd. 32211
24	8E	Geis Marine	Gone away				0	21	100	0	0	21	-21	0	0	0	0	0		
25	7	Jackies Restaurant	35	50	0	0	35	20	70	0	0	20	15	0	0	0	0	1	No	8132 Trout River Dr. 32208
26	8W	Pier 68	30	0	104	18	134	36	90	64	50	100	34	3,000	1,500	5,000	1	1	No	8137 North Main St. 32208

Source Jacksonville University 2006.

Continued on following page

TABLE 13. Inventory of Duval County Marinas 2006. (Part 2 of 2).

No.	Zone	Marina Name	2006 Wet Slips	2006 (%) Full	2006 Dry Slips	2006 (%) Full	2006 Total Slips	1999 Wet Slips	1999 (%) Full	1999 Dry Slips	1999 (%) Full	1999 Total	99-06 Change	2006 Gas	2006 Diesel	1999 Fuel both	2006 Pump outs	1999 Pump outs	Clean Marina Status	Address
27	8W	Arnold's Marina	16	15	0	0	16	16	90	0	0	16	0	0	0	0	0	0	No	451-B Trout River Dr. 32208
28	8W	Seafarer's Marina	51	75	0	0	51	61	95	0	0	61	-10	0	0	0	1	1	No	455 Trout River Dr. 32208
29	4	Reddie on the St. Johns	Gone away																	
30	5	Harbor Cay	25	20	0	0	25	25	20	0	0	25	0	0	0	0	0	0	No	4639 Harbor North Ct. 32225
31	4	Mariner Point Yacht Club	44	70	0	0	44	44	70	0	0	44	0	0	0	0	0	0	No	5105 Mariner Point Rd. 32225
32	2	Clapboard Creek Marina	30	99	0	0	30	30	40	0	0	30	0	0	0	0	0	0	No	6220 Hecksher Dr. 32226
33	2	Sister's Creek Marina	Gone away				0	45	25	80	0	125	-125	0	0	0	0	0		
34	1	Sandollar Restaurant	14	66	0	0	14	18	50	0	0	18	-4	0	0	0	0	0	No	9716 Hecksher Dr. 32226
35	2	Alamacani	Gone away																	
36	1	Mayport Marina	10	100	200	75	210	0	0	203	90	203	7	10,000	10,000	20,000	1	0	No	4852 North Ocean St. 32226
37	1	Monty's Marina	6	50	0	0	6	0	0	0	0	0	6	2,000	2,000	2,000	0	0	No	4378 North Ocean St. 32226
38	1	USCG/ Mayport Base	8	100	1	100	9	8	100	0	0	8	1	0	0	1,250	0	0	No	4200 North Ocean St. 32226
39	3	Queens Harbor Club	60	100	0	0	60	72	30	0	0	72	-12	0	0	0	1	0	No	13361 Atlantic Blvd. 32250
40	3	Pablo Creek Devel.	0	0	0	0	0	100	90	205	80	305	-305	0	0	4,000	0	0		
41	3	The Moorings	80	100	32	100	112	80	100	35	100	115	-3	0	0	4,000	0	0	No	14750 Beach Blvd. 23350
42	3	Harbor Lights Marina	Gone away				0	16	90	0	0	16	-16	0	0	0	0	0		
43	3	Palm Cove Marina	223	90	460	98	683	72	60	210	60	282	401	10,000	10,000	1,000	1	0	May-01	14603 Beach Blvd. 32250
44	3	Beach Marine	325	100	350	100	675	350	100	0	0	350	325	10,000	10,000	20,000	1	1	No	2315 Beach Blvd. 32250
45	3	Bayshore Marina	Gone away				0	0	0	0	0	0	0	0	0	0	0	0		
46	3	The Cove Marina	Gone away				0	0	0	0	0	0	0	0	0	0	0	0		
47	9	Berkman Plaza	54				54						54							D B HOLDINGS, LLC
48	8W	JAX Ship Yards	300				300						300							TRI LEGACY GRP, LLC
49	9	The Strands at St. Johns	75				75						75							Amer. Land Housing Grp, Inc
50	15	The Cove(Goodby's Ck.)	none anticipated				0						0							
51	3	Pablo Ck.	150	20	0	0	150	Proposed 165 wet slips				0	150	0	0	0				13846 Atlantic Blvd. 32225
52	13N	The Marina @ Ortega Ldg.	192				192						192							MLG Luxuary Condo Community
Total			3,070		2,307		5,377	2,383		1,840		4,223	1,154	93,000	60,500	125,250	14	7		

Source Jacksonville University 2006.

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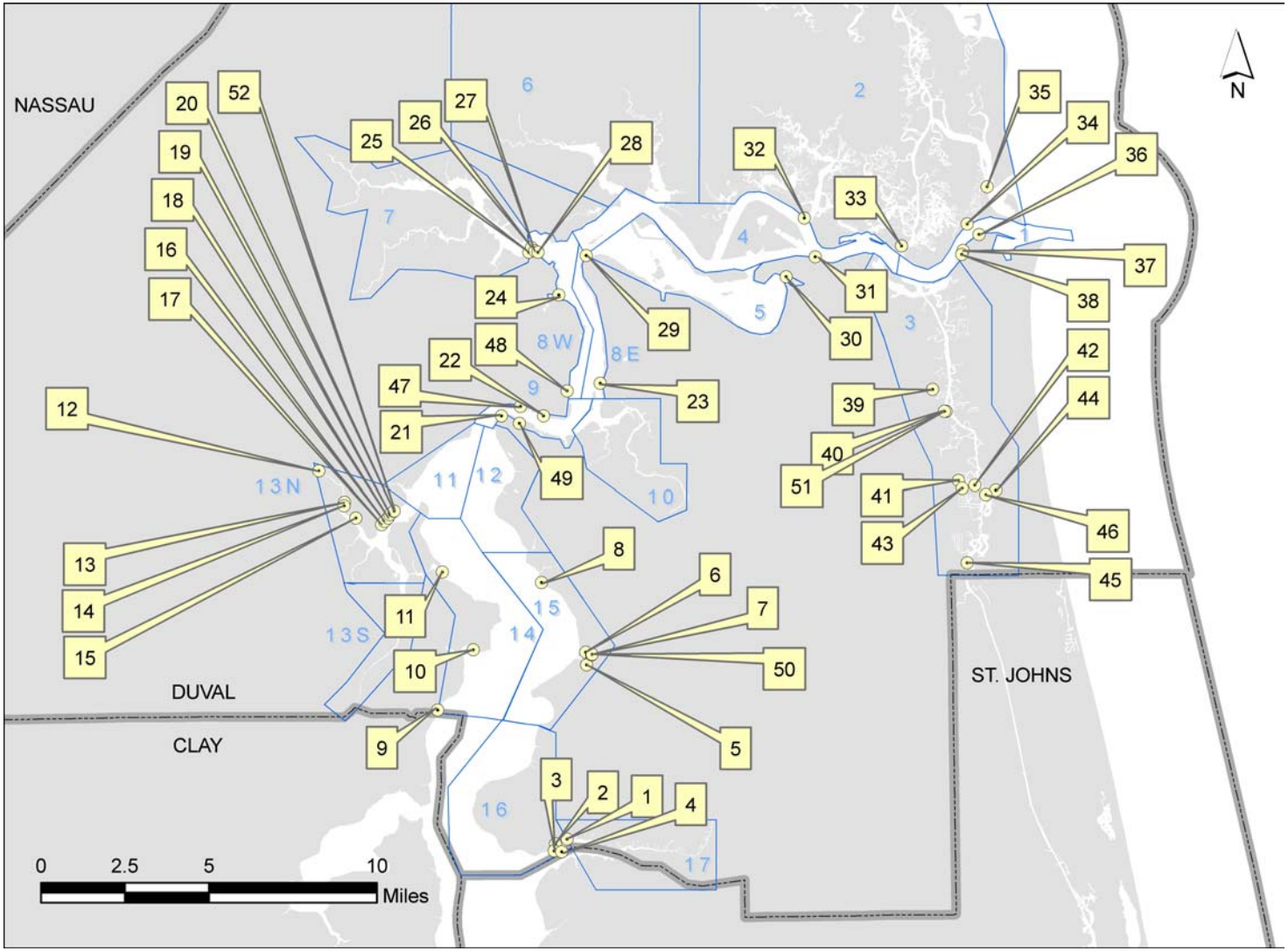
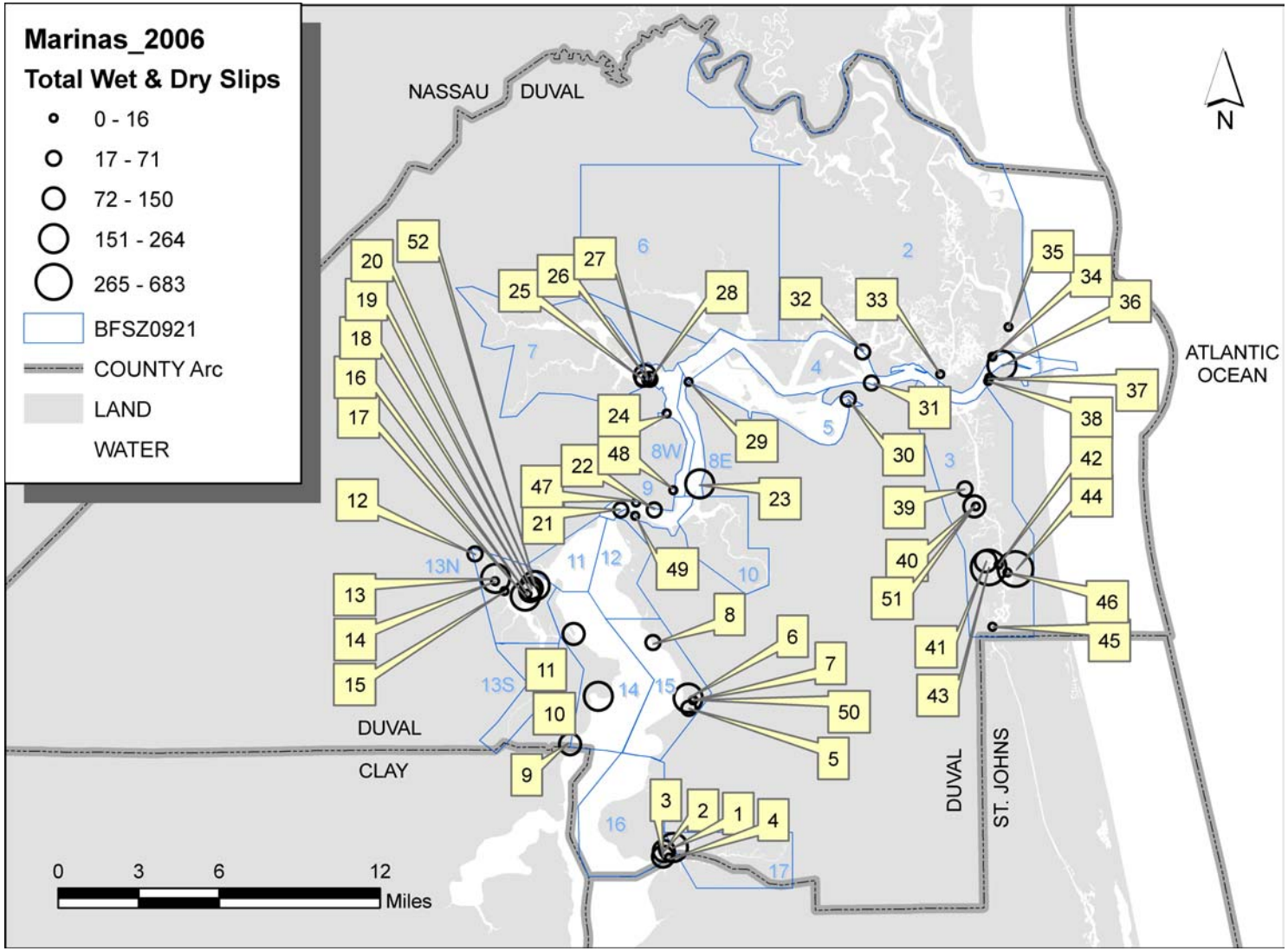


MAP 9. Marina locations in Duval Co., FL (2006).
Note: Numbers indicate a specific marina. For more details about a specific marina see Table 13.



MAP 10. Marina capacity indicated by total number of wet plus dry slips, Duval Co., FL (2006).
Note: Numbers indicate a specific marina. For more details about a specific marina see Table 13.

TABLE 14. Inventory of Duval County Boat Ramps 2006 (Part 1 of 2).

Zone	Ramp No.	Ramp Name	Trailer Parking Spaces	Public	Fee	Status	Notes
17	1	Hood Landing	10	Y	N	Open	All
16	2	Mandarin Holiday	1	N	Y	Closed	All
16	3	Mandarin Park	20	Y	N	Open	All
16	4	County Dock Road	10	Y	N	Open	All
14	5	Jacksonville Rudder Club	15	N	Y	Open	All
14	6	NAS/JAX	10	N	Y	Open	All
15	7	Florida Gun & Tackle Club	20	N	Y	Open	All
15	8	Goodby's Lake Marina				Gone	Burned down
15	9	Goodby's Lake Boat Ramp	42	Y	N	Open	All except sail
14	10	Florida Yacht Club	25	N	Y	Open	All
13N	11	Wayne B. Stevens	45	Y	N	Open	All
13N	12	Cedar Cove Apartments	10	N	Y	Open	All
13N	13	Messiah Marine	8	Y	Y	Open	All
13N	14	Lighthouse Marine	15	Y	N	Open	All
13N	15	Jones	1	N	N	Closed	All
13N	16	Chuck's Boat Yard	1	N	N	Closed	Inaccessible
9	17	RiverWalkPk/St.Johns Marina	15	Y	N	Open	All
10	18	Pottsburg Creek	12	Y	N	Open	All
8	19	Arlington	11	Y	N	Open	All
8	20	Arlington Lion's Club	50	Y	N	Open	All
8W	21	Geis Marine	8	N	N	Open	All
8W	22	Pier 68 Marina	30	N	Y	Open	All
7	23	Bert Maxwell Park	40	Y	N	Open	All
7	24	T. K. Stokes Park	25	Y	N	Open	All
7	25	Harbor View	40	Y	N	Open	All
7	26	Dinsmore Boat Landing	20	Y	N	Open	All
0	27	Thomas Creek Fish Camp	10	Y	N	Open	All
6	28	Drummon Point	5	Y	N	Open	All
6	29	Dunn Creek	5	Y	Y	Open	All
5	30	Lonnie Wurn	9	Y	N	Open	All

Source Jacksonville University 2006.

Continued on next page

TABLE 14. Inventory of Duval County Boat Ramps 2006 (Part 2 of 2).

Zone	Ramp No.	Ramp Name	Trailer Parking Spaces	Public	Fee	Status	Notes
5	31	Harbor North Marina	35	N	Y	Open	All
4	32	St. Johns Landing	24	N	Y	Open	All
4	33	Fulton Cut Landing	5	Y	N	Open	All
2	34	Clapboard Creek	20	Y	Y	Open	All
2	35	Palms Fish Camp	10	Y	Y	Open	All
4	36	Pirate's Cove	10	Y	Y	Open	All
4	37	Joe Carlucci Park	45	Y	N	Open	All
2	38	Sister's Creek Marina	50	Y	N	Open	All
1	39	Mayport Jetties	10	Y	N	Open	All
3	40	Sherman Creek	30	Y	N	Open	All
3	41	Oak Harbor	25	Y	N	Open	All
3	42	Pablo Creek Marina Develop.				No ramp	Removed
3	43	Beach Blvd. Boat Landing	33	Y	N	Open	All
3	44	Moorings Apartments	3	N	Y	Open	All
1	45	Mayport Boat Ramp	75	Y	N	Open	All
1	46	Oyster Shell Fish Camp	6	Y	Y	Open	All
2	47	Alamacani/Huguenot Mem.Pk.	25	Y	Y	Open	All
2	48	Fort George Island/Kingsley	1	Y	N	Open	All
2	49	Simpson Creek	8	Y	N	Open	All
2	50	Nat. Pk. Serv. Cedar Pt. Rd.	18	Y	Y	Open	All
8E	51	Jacksonville University	5	N	N	Open	All
5	52	Edenfield Road	1	N	N	Closed	All
4	53	New Berlin Road	2	Y	N	Open	All
2	54	Sister's Creek Bait & Bar	0	N	N	Closed	All
2	55	Talbot Island	50	Y	N	Open	All
3	56	Castaway Island Preserve		Y	N	Open	Canoe/Kayak
3	57	Dutton Island Preserve		Y	N	Open	Canoe/Kayak
2	58	Ribault		Y	N	Open	Canoe/Kayak
2	59	Kingsley Plantation		Y		Open	Boat tie-up
4	60	Ft. Caroline		Y		Open	Boat tie-up
4	61	Fulton Road		Y	N	Open	Canoe/Kayak
2	62	Palms Fish Camp		Y	N	Open	Canoe/Kayak
4	63	New Berlin		Y	N	Open	Canoe/Kayak
2	64	Pumpkin Hill		Y	N	Open	Canoe/Kayak
7	65	Charles Reese (proposed)		Y	N	No	Proposed
Total			1,004				

Source Jacksonville University 2006.

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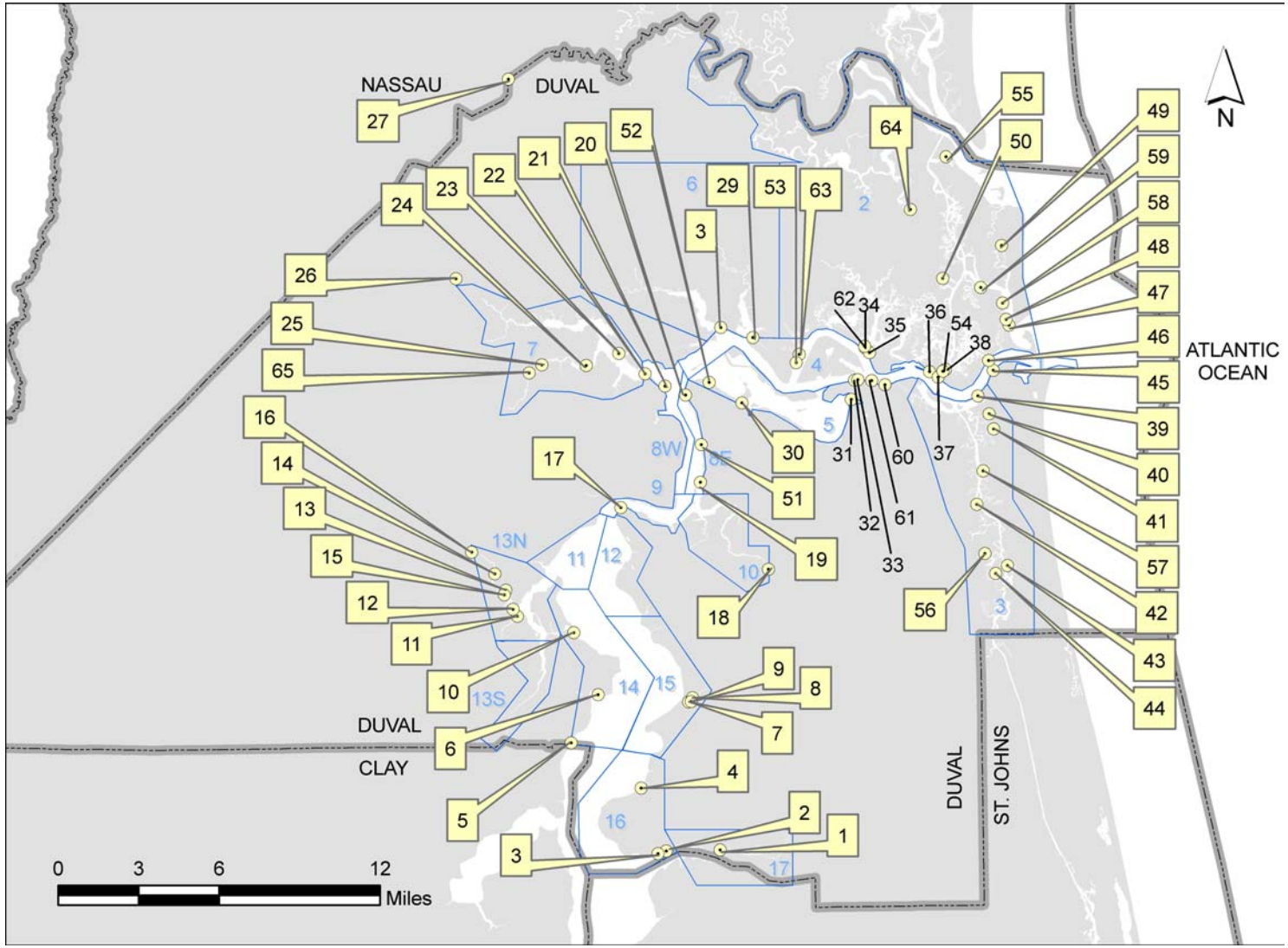
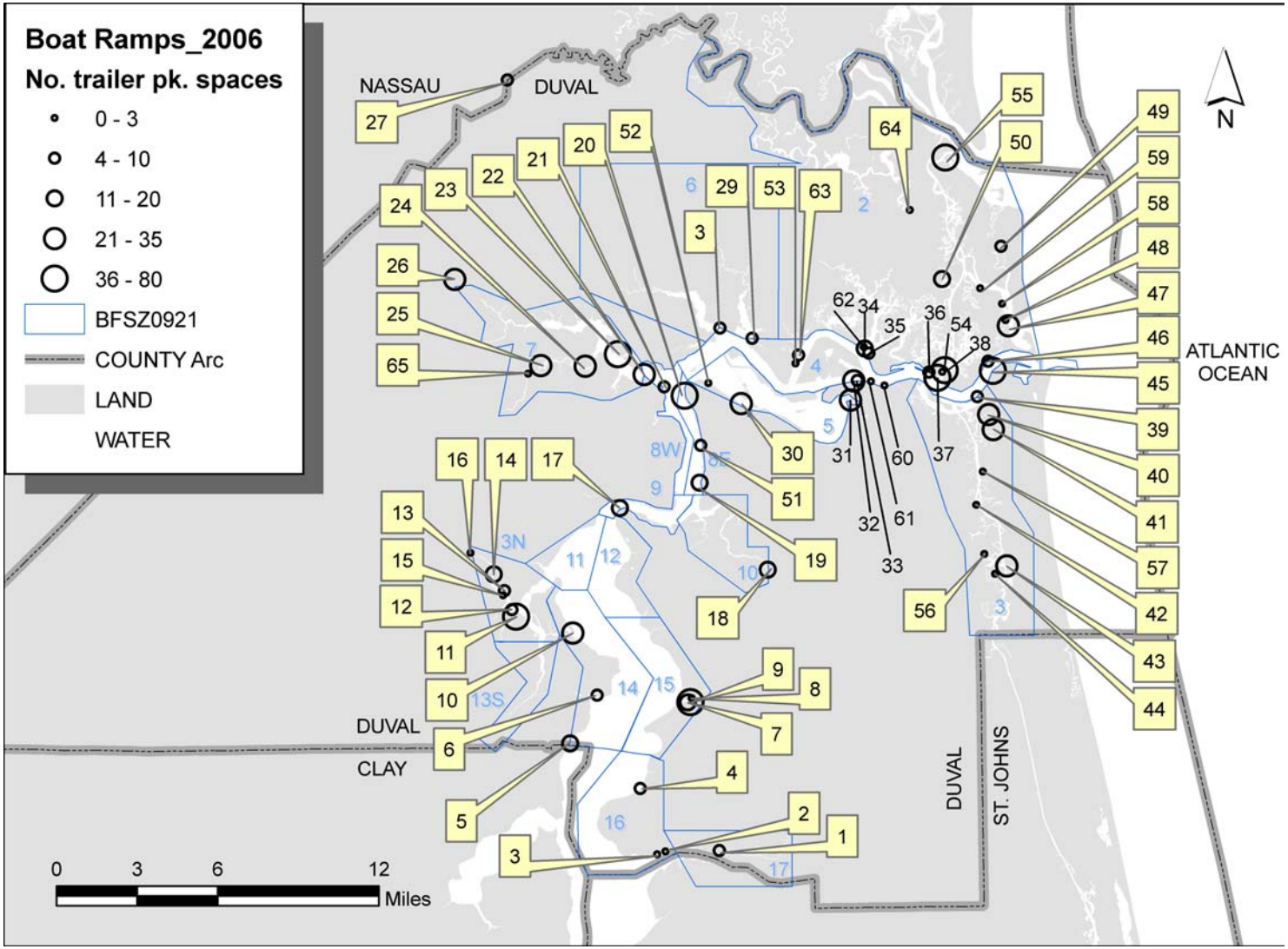


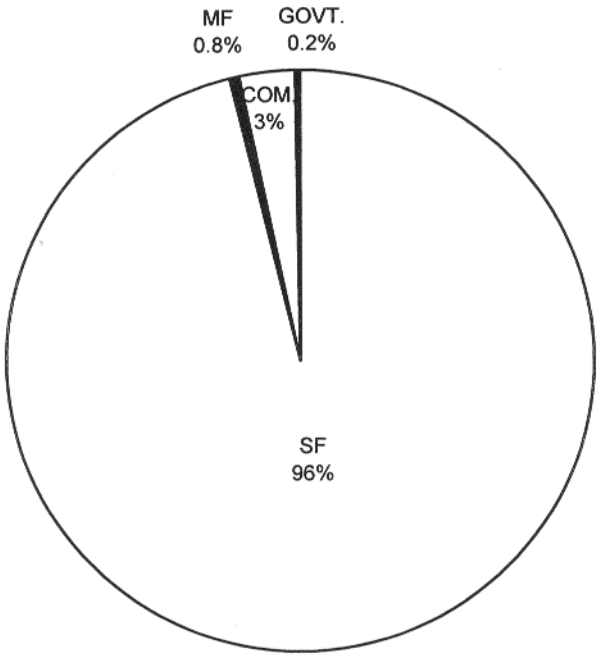
MAP 11. Boat ramp locations, Duval Co., FL (2006).
Note: Numbers indicate a specific boat ramp. For more details about a specific ramp see Table 14.



MAP 12. Boat ramp capacity indicated by total number of trailer parking spaces, Duval Co., FL (2006). Note: Numbers indicate a specific boat ramp. For more details about a specific ramp see Table 14.

Docks: Duval County, with its numerous miles of waterfront property, contains many residential, multi-family and commercial docks. A preliminary dock survey was conducted by Jacksonville University in October 1994 (Figure 28). Map 13, Commercial and Map 14, Residential docks locations, delineates locations for all residential, multi-family and commercial/military docking facilities. Information for this survey was obtained by using spot satellite imagery (provided by the City of Jacksonville, GIS Department) and aerial surveys (JU). Arc-Info software was used to project the images onto a computer screen; high resolution allowed researchers to identify the exact location of all docks within the county boundaries. Quality control measures undertaken to ensure the proper location of each dock entailed the comparison of final results with the City of Jacksonville Tax Appraiser's aerial photographs available through City Hall. A comprehensive inventory of commercial docks in Duval County is included as Table 15. Data collected from federal, state, municipal, or private facility included: goods imported/exported, dock structural specifications, and average monthly traffic.

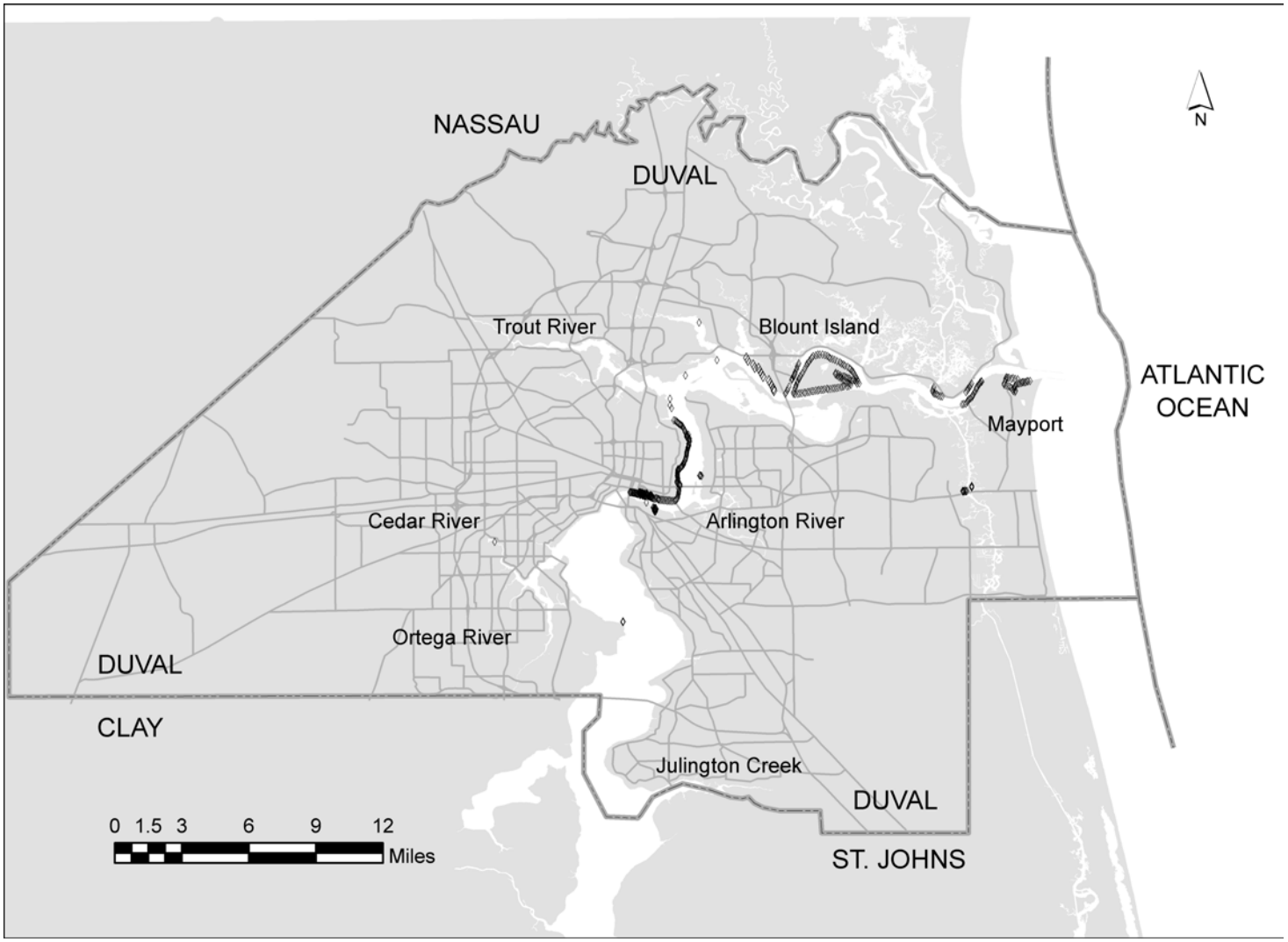
Future Land Use designations/limitations: The 2010 Comprehensive Plan designates the functional land use categories throughout the City that provide the guidelines for activities and densities. Zoning classifications are determined by the land use categories. *Appendix A* indicates the relational listing of land use categories with primary and secondary zoning districts. Table 16 identifies the zoning districts which relate to uses and structures within and adjacent to waterways.



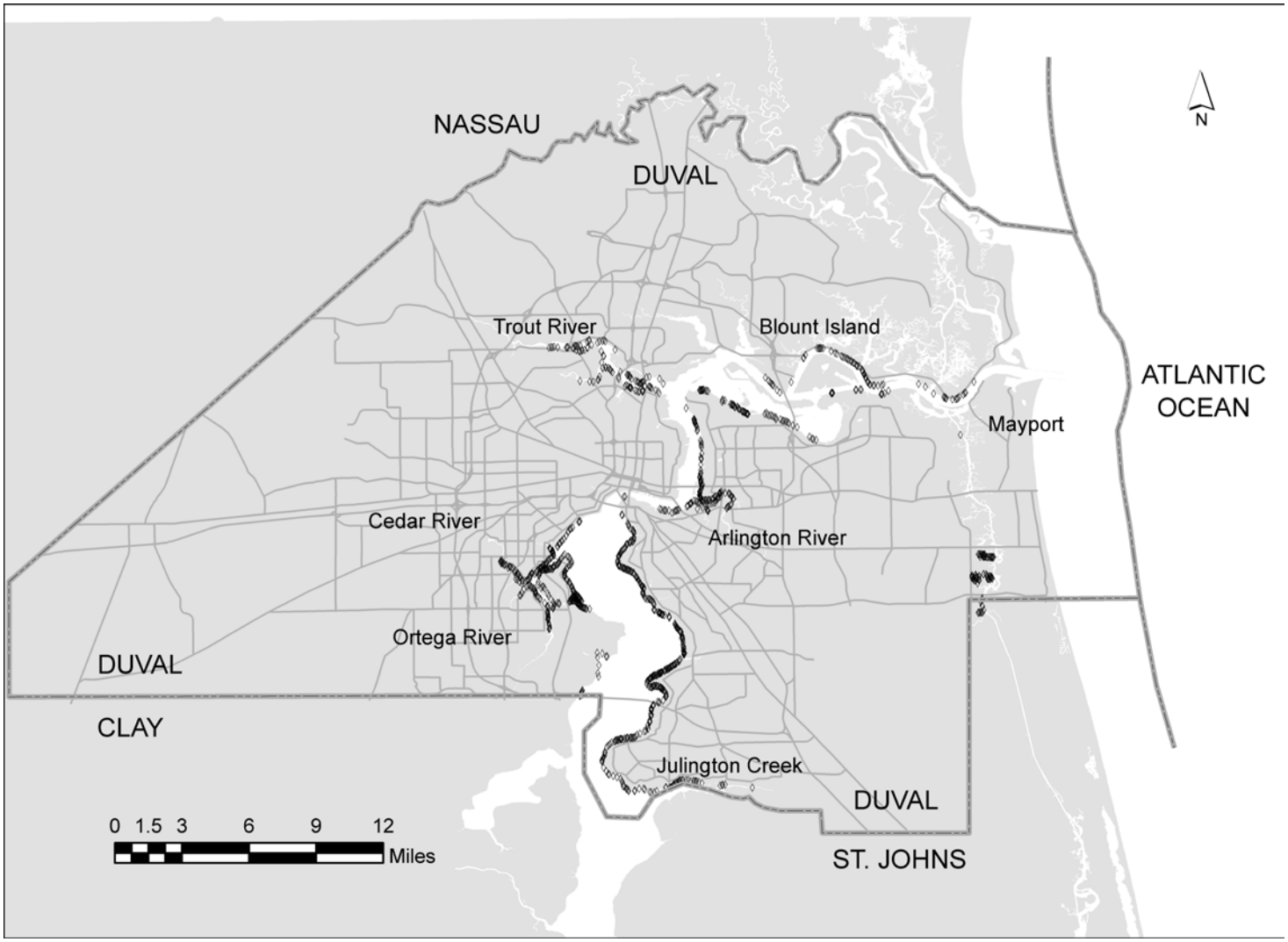
Key	Vessel type	Total Number
SF	Single-family	3,388
MF	Multi-family	30
COM.	Commercial	112
GOVT.	Government	7
TOTAL		3,537

Source Jacksonville University- October '94.

FIGURE 28. Total number and type of docks in Duval Co., FL. Pie chart values represent percent of the total number of docks counted (N=3,507).



MAP 13. Commercial dock locations, Duval Co., FL.



MAP 14. Residential dock locations, Duval Co., FL.

TABLE 15. Commercial Dock Survey, Duval Co., FL.

Company	Address	Cargo	Structural Specs.	Dockings (monthly)
Atlantic Marine and Drydock Corp.	8500 Heckscher Drive Jacksonville 32226	raw materials, petroleum	Yokohama bumpers, 4' between pillars	50
British Petroleum Oil Company	2101 Heckscher Drive Jacksonville 32226	crude oil	dock 4' above mean high water	20
The Celotex Corporation	Post Office Box 28830 Jacksonville 32226	raw materials	dock 4' above mean high water	15
Chevron USA, Incorporated	Post Office Box 1706 Atlanta GA 30301	petroleum, crude oil	dock 4' above mean high water	20
Coastal Fuels Marketing, Inc.	Post Office Box 025500 Miami 33102	petroleum	dock 4' above mean high water (mhw)	25
Commodores Point Properties, Ltd.	1010 East Adams St. Jacksonville 32201	raw materials	4' between pillars, dock 4' above mhw	35
Crowley American Transport, Inc.	1163 Talleyrand Ave Jacksonville 32203	not available	spaghetti bumpers, dock 4' above mhw	30
Gate Concrete Products	402 Heckscher Drive Jacksonville 32226	raw materials	dock 6' above mhw, 4' between pillars	20
Gate Maritime Properties	5880 Channelview Blvd Jacksonville 32225	raw materials, petroleum	spaghetti bumpers, dock 4' above mhw	25
Hess Oil Corporation	2617 Heckscher Drive Jacksonville 32226	crude oil, petroleum	dock 4' above mhw	15
ITAPCO - Jacksonville, Inc.	3721 Talleyrand Ave Jacksonville 32206	raw materials, products	spaghetti bumpers, dock 4' above mhw	20
Jacksonville Electric Authority	21 West Church Street Jacksonville 32202	propane, natural gas	dock 6' above mhw	10
Jacksonville Port Authority	2831 Talleyrand Ave Jacksonville 32206	not available	spaghetti bumpers, dock 4' above mhw	n/a
Jacksonville Shipyards, Inc.	750 East Bay Street Jacksonville 32202	not active	spaghetti bumpers	n/a
Jefferson Smurfitt Containerboard	1915 Wigmore Street Jacksonville 32206	not active	dock 6' above mhw	n/a
Mat Roland Seafood Company	4212 Ocean Street Jacksonville 32299	seafood, raw materials	n/a	30
Miss Becky Seafood, Inc.	4432 Ocean Street Jacksonville 32299	seafood, raw materials	n/a	20
Naval Air Station/Jacksonville	NAS Jacksonville 32212-0102	not active	dock 4' above mhw	n/a
Naval Air Station/Mayport	NAS Mayport Jacksonville 32226	Navy ships	dock 4' above mhw	n/a
Owens Corning Fiberglass Corp.	1035 Talleyrand Ave Jacksonville 32206	raw materials	spaghetti bumpers, dock 4' above mhw	20
Seaboard Coastline Railroad Co.	500 Water Street Jacksonville 32202	not active	dock 4' above mhw	n/a
Southern Belle Frozen Foods	PO Box 3823 Jacksonville 32206	seafood, raw materials	n/a	30
Standard Oil Company	3529 Talleyrand Ave Jacksonville 32206	petroleum, crude oil	spaghetti bumpers, dock 4' above mhw	15
Steuart Petroleum Company	3529 Talleyrand Ave	petroleum, crude oil	dock 4' above mhw	30
St. Johns Bar Pilots, Inc.	4910 Ocean Street Mayport 32226	pilot boat traffic	dock 4' above mhw	50+
Trailer Marine Transport Corp.	1163 Talleyrand Ave Jacksonville 32206	commercial vessels	dock 4' above mhw	30
US Army Corps of Engineers	400 West Bay Street Jacksonville 32202	army corps vessels	dock 4' above mhw	15
United States Gypsum Company	6865 Evergreen Ave Jacksonville 32206	raw materials, gypsum	dock 4' above mhw	15
WITCO Chemical Corporation	3101 Talleyrand Ave Jacksonville 32206	raw materials, petroleum	spagfhetti bumpers, dock 4' above mhw	20

Source: Jacksonville University 1999.

Public Education/Awareness Programs

Save the Manatee Club: The Save the Manatee Club is a non-profit organization that increases public awareness and education relating to manatees. The Club's activities encompass: producing and distributing awareness signs, publishing various educational materials, decals, and promoting an "Adopt A Manatee" program. In addition, the Club is involved on both a "grass roots" level and a professional level through lobbying for protection of manatees and their habitat and securing funds for research. Educational materials are available through the web site, http://www.savethemanatee.org/, and include the following:

Manatees – An Educator's Guide (5th Edition)
Florida's Gentle Giants: A Coloring and Activity Book
Adopt-a Manatee Program
Manatee Messages: What You Can Do (video)
The Best of Manatees (video)
The Manatee (book)
Manatees and Dugongs (book)
Sam the Sea Cow (book for young readers)
J. Rooker Manatee (book for youths age 2-12)
Mary Manatee: A Tale of Sea Cows

SMC also offers community and organization presentations and display booths for community events.

City of Jacksonville: The City of Jacksonville's Regulatory and Environmental Services Department was awarded funds from the Florida Coastal Management Program to implement the **Duval County Manatee Awareness Program**. The program was implemented in the fall of 1994 with $62,176 in funding. This includes $31,088 (or a 50% match) in funds from the City of Jacksonville.

The primary focus of the Manatee Awareness Program is to educate boaters through the utilization of educational kiosks located at 14 of Jacksonville's highest-use boat ramps (Map 15, Kiosks). All of these Kiosks present 3 themes: 1) basic and interesting facts about manatees in the St. Johns River and the Intracoastal Waterway, 2) actions boaters can take to help protect manatees, and 3) actions which residents can take to help improve water quality in St. Johns River.

The program also makes use of portable information displays. Indoor displays may be used in a variety of settings such as: Learning Resources Centers (LRC's), Boating safety classes, boat shows, and The Home and Patio Show. Portable displays are designed for use outdoors, with engagements likely to include the Jacksonville Jazz Festival, the Jacksonville Seafood Festival, the Greater Jacksonville Kingfish Tournament, and other events that take place at the Jacksonville Landing and Metropolitan Park.

Portable displays will be made available to environmental education centers such as the Marine Resource Center and Tree Hill Nature Center, in an effort to reach students in Duval County. Displays will also be available for use at annual in-service training centers for teachers in Duval County.

Jacksonville's Electric Authority: Includes manatee education as an integral part of programs offered at Dale Joiner Ecological Preserve on Pelotes Island to students and other interested parties.

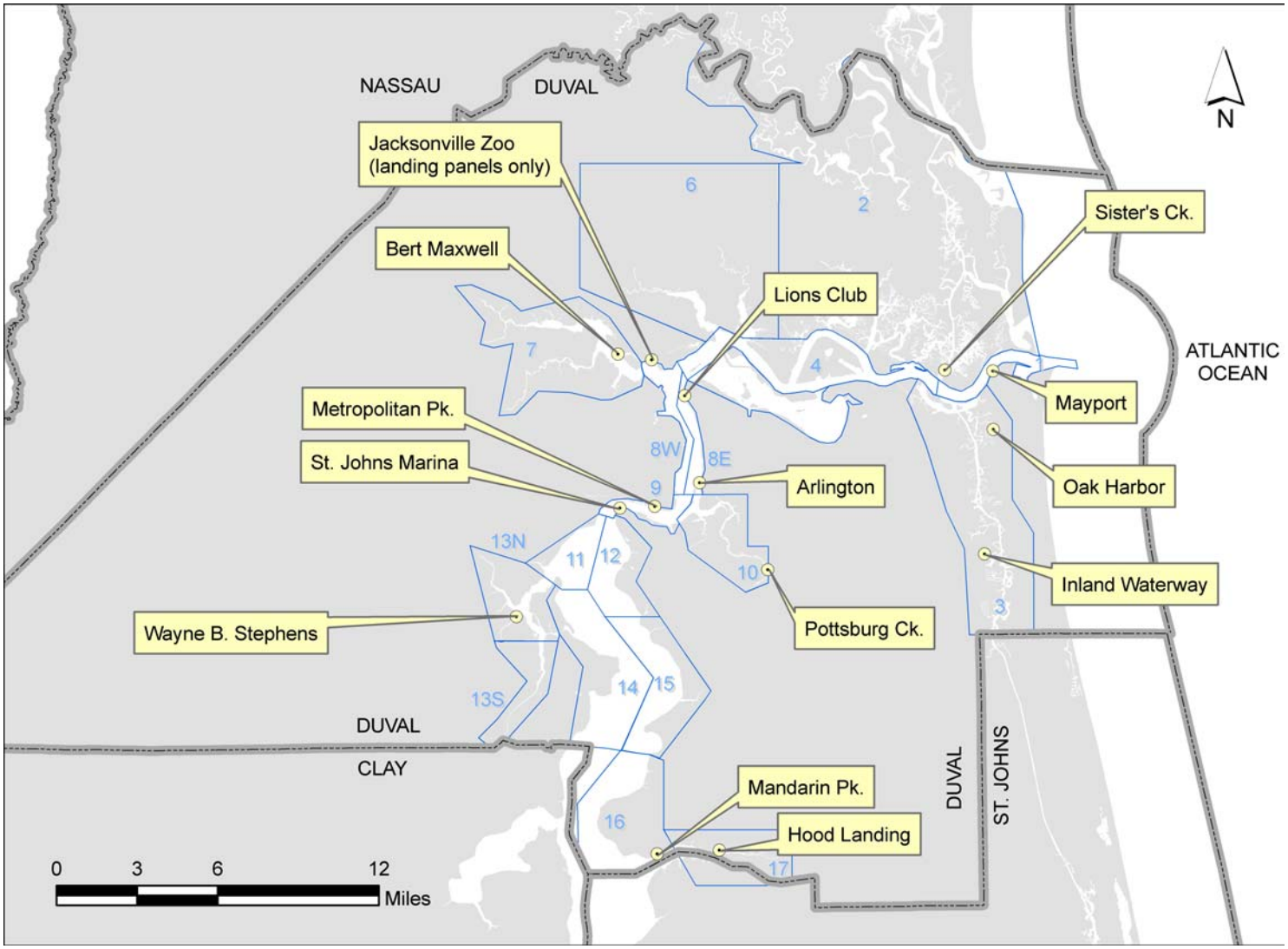
Jacksonville University (JU): A 24-hour "Manatee Hotline," established to collect information on manatee sightings, is staffed during business hours (904-256-7575). At other times, callers are able to leave recorded messages. If calls are received during business hours, an attempt is made to verify the sighting. This information is subsequently transferred to a GIS database to facilitate data handling and analysis *(Map Series A)*. Thus far, sightings reported on the telephone are consistent with the location of aerial survey sightings. Feedback from the general public, as a result of the hotline, prompted the subsequent creation of a public service announcement. The latter explained the hotline, provide information about manatees, and answered questions from the public about manatees. The public service announcement is shown on all local cable and broadcast television stations.

A children's book entitled *The Manatee Who Wanted to be a Mermaid,* by William Leyden, Ph.D. (Jacksonville University, Professor of English), was distributed to all public schools in Duval County. The book was provided through the Manatee Awareness Program at JU and funded by the City of Jacksonville. In addition, a speaker's bureau of Jacksonville University researchers was established to present programs at local schools and civic clubs about the Manatee Protection Plan for Duval County.

St. Johns River Keeper Organization: with offices at Jacksonville University, 2800 University Blvd. N., Jacksonville FL 32211. Telephone (904) 256-7591

Boating Safety Courses: For registration and these may also be taken on-line at the following web address (http://boat-ed.com/fl/).

Pamphlets: Pamphlets are periodically mailed to all waterfront property owners and registered boaters. Pamphlets include basic information about manatees, a Manatee Protection Plan Speed Zone Map, the hotline number for reporting manatee sightings and/or injuries, and other pertinent information. The FWC's hotline telephone number is 1-888-404-FWCC (or *FWC for mobile phone users). This number should be used to report a manatee that is dead, abandoned calf, injured or being harassed.



MAP 15. Locations of manatee awareness kiosks, Duval Co., FL.

School curriculum: Jacksonville University provides a slide presentation that is available to elementary, middle, and secondary school students, among other civic organizations. This could be made available to County staff for educational purposes. Also, the FWC provides teacher resource kits for loan to schools. These kits have proved to be useful educational tools.

State-sponsored information:

The Northeast Florida Regional Planning Council: Prepared coloring books for elementary age students in 1989. Coloring books are still available and may be requested from NEFRPC.

Florida Department of Environmental Protection (FDEP): The FDEP is one of two state agencies primarily responsible for dissemination of environmental information. Within FDEP, the State Park System provides a variety of materials describing the State's flora and fauna.

Florida Fish and Wildlife Conservation Commission (FWC): The primary sections of the FWC involved with manatees are the Florida Wildlife Research Institute (FWRI) and the Imperiled Species Management Section (ISM) of the Division of Habitat and Species Conservation within FWC. Although scientific information (e.g. mortality statistics) is compiled by FWRI, the majority of FWC's educational materials are made available through ISM. These include a variety of posters, brochures, booklets and videos (Table 16). The Fish and Wildlife Conservation Commission also funds a full-time manatee educator's position.

The United States Power Squadrons: Conduct classes in boating safety. A portion of the program includes a segment concerning manatees that is presented by Wildlife Officers from Florida Fish and Wildlife Conservation Commission. Classes are available to the general public.

Other Regional, State and Federal Organizations:

These entities have a variety of information concerning manatees that may include interactive and static exhibits and /or educational programs that could be incorporated into school curricula.

United States Fish and Wildlife Service (USFWS): The USFWS is the primary federal agency involved in the conservation of the nation's wildlife. The Service operates the National Wildlife Refuge System. Additionally, the USFWS is responsible for enforcing the Endangered Species Act and the Marine Mammal Protection Act. USFWS issues concerning manatee protection, such as the Recovery Plan, are administered at the USFWS North Florida Ecological Services Office in Jacksonville, Florida, as well as the review and issuance of permits for federal dredge/fill and boat facility projects. The current contact is John Milio. Telephone: (904) 232-2580.

Federally-sponsored information: The United States Fish and Wildlife Service (USFWS) works in cooperation with the Save the Manatee Club to provide educational materials for the general public. The Sirenia Project of USGS, Gainesville, FL has catalogued over 2,000 scar patterns on manatees from photographs. Jacksonville University is also involved in the project and provides local photographs of manatees. Photographs assist in identification of individual manatees. In addition, Jacksonville University assists the project by doing research and collecting data to help determine travel patterns for individuals.

Funding sources: Current funding sources for the State program include manatee license plates, boat registration fees and voluntary contributions associated with vehicle registrations. Duval County funding for manatee protection has originated from contributions by the City of Jacksonville, the Department of Parks, Recreation and Entertainment, Jacksonville Electric Authority, Jacksonville Port Authority, Jacksonville Regulatory and Environmental Services Department, and the Downtown Development Authority. Funding for signage of the Manatee Protection Plan comes from Florida Inland Navigation District.

U.S. Geological Survey (USGS): The USGS Sirenia Project is based in Gainesville, Florida and conducts field research on manatees. Telephone: (352) 372-2571.

U.S. Army Corps of Engineers (ACOE): The ACOE is the federal agency responsible for reviewing and issuing permits for projects in the nation' s rivers, lakes, harbors, navigation channels and wetlands. Although their primary responsibility is permitting, information about manatees is available through the ACOE's Public Affairs Office, P.O. Box 4970, Jacksonville, Florida 32232. Telephone: (904) 232-1650.

Saint Johns River Water Management District (SJRWMD): SJRWMD is one of five water management districts in Florida. Together with the FDEP, the water management districts share in the responsibility for reviewing and issuing state permits for projects in waters and wetlands of the state. They are also responsible for implementing the state's Surface Water Improvement and Management (SWIM) Program and for mapping submerged aquatic vegetation in some areas of the state. The SJRWMD publishes and distributes a variety of brochures and environmental education information from their District headquarters located at 3301 Gun Club Road, West Palm Beach. Telephone: (561) 686-8800. Or contact the Palatka Office (386) 329-4500.

Florida Inland Navigation District (FlND): FIND is responsible for maintaining the Intracoastal Waterway (ICW) for navigation. This agency also installs and maintains the signs, which identify the boundaries of manatee-related vessel speed zones, in many parts of the state but not in Clay County waters. FIND, which is based in Jupiter, Florida, also prints and distributes the pamphlets that identify speed zones in many counties on the east coast of

Florida. These brochures are available by contacting FIND at 1314 Marcinski Rd., Jupiter, FL 33477. Telephone: (561) 627-3386.

Homosassa Springs State Wildlife Park: This FDEP facility located north of Tampa near Florida's west coast now houses several long-term captive manatees and a research facility. The public may view manatees from an underwater viewing area and obtain a variety of information about manatees. Further information can be obtained from Homosassa Springs State Wildlife Park, 9925 W. Fishbowl Dr., Homosassa Springs, Florida 33408. Telephone: (352) 628-5343.

Sea World of Florida: Sea World of Florida is one of several state-approved facilities that provides care and rehabilitation of sick and injured manatees in Florida. They maintain a large exhibit, where manatees can be observed. The exhibit includes informational videos and signs. Manatee education information is available from Sea World of Florida, 7007 Sea World Drive, Orlando, Florida 32809. Telephone: (407) 351-3600 or (407) 363-2613.

Audubon of Florida: Audubon of Florida is a state-wide alliance of over 40 local Audubon chapters and the National Audubon Society. Audubon is a recognized leader in natural resource protection and provides information on a variety of conservation issues. Additional information is available from Audubon of Florida, 1331 Palmetto Ave., Winter Park, Florida 32789. Telephone: (407) 539- 5700.

Miami Seaquarium: The Miami Seaquarium is another state-approved manatee care and rehabilitation facility and has a variety of on-going manatee education and research programs. Captive manatees can be viewed by visitors, and educational materials and presentations are given about manatees. Miami Seaquarium, 4400 Rickenbacker Causeway, Miami, Florida 33149. Telephone: (305) 361- 5705.

Lowry Park: Located in Tampa in Hillsborough County, Lowry Park in is another state-approved manatee rehabilitation facility offering year-round care and public viewing of manatees. Additional information can be obtained from Lowry Park Zoo, 7530 N. Blvd., Tampa, Florida 33604. Telephone: (813) 935-8552 and Education: (813) 932-0245.

TABLE 16. Information available from FWC's Imperiled Species Management Section.

Video	A Closer Look at Manatees
	The State of Manatees
	Manatee Messages: What can you do?
	Roll on Manatees
	Silent Sirens
	The Best of Manatees
	What in the World is a Manatee?
	Endangered Mermaids—The Manatees of Florida
	Audubon's Animal Adventures – Manatee Adventures
	Protecting Florida's Springs
	Manatees—Florida's Gentle Giants
Posters	The Florida Manatee—A Florida Treasure
	Manatee Behavior
	Mini-poster: The Florida manatee
Brochures/Fact Sheets/Booklets	The Florida Manatee—A Florida Treasure
	Where are the manatees?
	Manatee Decal Collection
	Manatee Facts
	Sea Stats - Manatees
	Florida's Seagrass Meadows
	Monofilament Recycling Program
	Commonly Asked Questions
	The West Indian Manatee in Florida
	Propeller Guard Issues
Educational materials	The Manatee—Florida's Endangered Marine Mammal (Middle/High School)
	Manatees—Florida's Gentle Giants (Elementary)
	What do I want to be when I grow up?
	Way of the Manatee Treasure Box Report
	Book list
	Sunshine State Standards relating to educational materials—manatees
Web sites	www.MyFWC.com -- Imperiled Species Section
	www.efieldtrips.org/manatees (Internet field trip)
	http://research.myfwc.com (Manatees)
Video footage	18 minutes of B:roll footage, no sound, BetaCam SP or VHS—manatee behavior (on loan for productions)
Artwork	Black and white graphics—manatees
Photographs	Photo gallery located on web site

Updated: 01/05—Florida Fish and Wildlife Conservation Commission, Imperiled Species Management Section, Education and Information Program.

Moore's Creek Manatee Observation and Education Center: Located in Fort Pierce, wild manatees can be viewed at the non-profit center year-round. Observers can stand along a covered observation walkway or climb a second story observation tower to see the animals in Moore's Creek. The Manatee Observation and Education Center's primary purpose is to promote understanding and responsible actions for the fragile ecosystems of the Treasure Coast and their inhabitants. Educational curriculum for grades kindergarten through fifth are taught as a part of the educational program on subjects such as manatees, butterflies, insects, endangered species, and sea turtles. Interested teachers who would like to schedule a class should call (772) 466-1600, ext. 3337. Educational special events such as Naturefest, Spring Break camp, Summer Camps, Brown Bag Lunch Lecture Series, and exciting guest speakers are also provided.

For more information, call (772) 466-1600, ext. 3333. Moore's Creek Manatee Observation and Education Center, 480 North Indian River Drive, Fort Pierce, FL 34950 or http://www.manateecenter.com/about.html.

National Estuary Program (NEP):
The Environmental Education Resource Directory.
The Summer Institute Programs – summer workshop series for teachers (1991)
The Boaters Guide to the Indian River Lagoon
The Indian River Lagoon Owner's Guide
Pamphlets/brochures
Posters
Program's slide show
Lagoon Partner Fund grant program for environmental education projects ($2,500-$5,000).

Governmental Programs and/or Regulations

Federal Programs

Endangered Species Act, 1973: This Act protects endangered and threatened species and their habitat at the national level and is administered by United States Fish and Wildlife Service and National Marine Fisheries Service in cooperation with State agencies. Recovery plans are required under this Act and must include site-specific management activities, measurable criteria, and time estimates for implementing these plans. Prior to approval of recovery plans, the public is provided with an opportunity to review and comment. The following describes the specific charge of the USFWS, under the Endangered Species Act of 1973, in relation to manatee protection and conservation:

> *The Endangered Species Act of 1973 as amended establishes policies and procedures for identifying and protecting species of wildlife endangered or threatened with extinction. The West Indian Manatee is listed as endangered throughout its range. The Secretary of the Interior is responsible for administering the Act's provisions as they apply to this species. Day-to-day research and management authority for endangered and threatened species under the Department's jurisdiction has been delegated to USFWS. The Service developed an initial recovery plan for manatees in 1980, which has since been expanded and revised (USFWS 1996).*
>
> *Specific charges of the U.S. Fish and Wildlife Service include: Examination with other agencies of possible modification of flood gates and navigation locks to diminish these types of manatee mortalities; Review of applications for State and Federal permits for construction projects or water sport events in manatee habitat areas; Acquisition of lands containing important manatee habitat for inclusion in the National Wildlife Refuge System; Detailed research programs on manatee ecology and life history including a salvage and necropsy program to monitor manatee mortality, radio tagging and tracking studies using VHF and satellite-linked*
>
> *Telemetry to define manatee movements , a scar pattern catalog to photographically identify individual animals, age determination studies, and aerial surveys to determine distribution and relative abundance; Manatee rescue, rehabilitation, and release in consort with other agencies; Public education, awareness, and support; And a geographic information system to store, integrate, and retrieve site-specific information (USFWS 1996).*

Marine Mammal Protection Act, 1972: This Act protects manatees from harassment, injury, molestation, capture, collection, and/or killing - akin to the *Endangered Species Act, 1973*. The Marine Mammal Commission administers this Act and has the authority to establish refuges and sanctuaries.

State Programs

Water Quality: The Fish and Wildlife Conservation Commission delegated the majority of surface water quality monitoring in Duval County to local government. FWCC samples six stations in Duval County (1 in the Ortega River and 5 in the Intracoastal Waterway). Stations are monitored on a quarterly basis for physical chemistry, nutrients and microbiological aspects.

Florida Manatee Sanctuary Act, 1978: This Act established Florida as a refuge and sanctuary for manatees. It protects manatees from injury, disturbance, harassment or harm in the waters of Florida and allows for enforcement of boat speeds and operations in areas where manatees are concentrated. The Fish and Wildlife Conservation Commission is responsible for enforcement.

Growth Management Act, Chapter 163: Specifically, Rule 9J-5 requires comprehensive plans from each municipality and is administered by the Department of Community Affairs. These plans address protection of endangered species and their habitat. In addition, all plans must address water quality, marina siting and port activities (among other issues), and plan components must outline goals, objectives and policies.

Fish and Wildlife Conservation Commission: is the state regulatory agency charged with managing and protecting Florida manatees, marine turtles, and right whales. Protection of endangered and/or threatened wildlife species (including manatees, turtles, and right whales) falls under the jurisdiction of the Florida Fish and Wildlife Conservation Commission.

Regional Programs

Strategic Regional Policy Plan: The Northeast Florida Regional Planning Council is involved in regional issues dealing with planning and managing growth in the region. Seven counties comprise the northeast Florida region. The Strategic Regional Policy Plan (SRPP) establishes goals for regional growth. The SRPP must further the State comprehensive plan goals as well as assist the State in determining local government comprehensive plan consistency with both the State and SRPP plans. Specific purposes of the SRPP are identified in Chapter 186, Florida Statutes. Contained within the SRPP is Regional Issue 10.2: Protection of Endangered Species, including policies relating to manatees and their

habitat, boat facility siting and education. Relevant excerpts from Regional Issue 10.2 are included in *Appendix B*.

Water Quality: The St. Johns River Water Management District maintains water quality monitoring sites in a 19-county district. Programs are aimed at determining ambient conditions at point and non-point sources. About 70 stations between Lake George and the St. Johns River mouth are sampled at varying frequencies for dissolved oxygen (range 15 min. - monthly). Constituents measured are used to determine nutrient status, oxygen levels, water clarity, toxic trace metals, and major ion profiles.

City of Jacksonville Programs

2010 Comprehensive Plan: Chapter 163 - Florida Statutes - requires each local municipality to submit comprehensive plans to the Department of Community Affairs. These plans are reviewed for compliance with the State comprehensive plan and the Comprehensive Regional Policy Plan (CRPP). Requirements include policies which protect listed species and their habitat as well as policies which address water quality, port facilities, marina siting, and other issues.

Appendix C is a compilation of the goals, objectives, and policies of the 2010 Comprehensive Plan Conservation/Coastal Management Element that are specific to manatees, their habitat, marina siting, and water quality.

Interim Manatee Protection Plan (Appendix D): Created in 1989 to meet the mandate set forth by the Governor and Cabinet, the City Council incorporated the interim plan into the final plan for manatee protection. A site-specific approach was recommended for boat speed zones, distribution of educational materials and posting of signs in order to protect manatees while preserving portions of the St. Johns River and its tributaries for recreational boating and water sports.

Existing Boating Safety Zones: Existing boating safety zones are not incorporated in the review for proposed speed zones for manatee protection. The existing boating safety zones are left in place without any changes, and are incorporated within Goal 10 of the Conservation/Coastal Management Element of the 2010 Comprehensive Plan. These are shown as a part of the Interim Manatee Management Plan Information Booklet *(Appendix D)*. A mechanism for granting exemptions from boating safety zones is included.

Water Quality: Present water quality monitoring efforts in Duval County involve two City departments. The Regulatory and Environmental Services Department's (RESD) Air and Water Quality Division (AWQD) is the primary and lead agency. The Department of Public Utilities (DPU) assists by joining the AWQD in maintaining a 29-station monitoring

program along the main stem of the St. Johns River. Water samples collected by both agencies are analyzed at State-certified laboratories run independently by JEA and RESD. The current sampling program covers 29 stations monthly with emphasis on nutrients. Heavy metals analysis is conducted at least twice annually.

The AWQD maintains an extensive tributary monitoring program of approximately 120 stations that are sampled quarterly. Analysis at these stations is limited to dissolved oxygen, pH and coliform bacterial counts. Special water quality studies of a more short-term nature are conducted routinely by AWQD. Past projects included individual basin studies (i.e., Cedar River, Julington Creek) and studies of impacts by marinas on water quality.

Land Acquisition: Acquisition of environmentally sensitive lands is the responsibility of the Preservation Project Jacksonville (PPJ), made up of 11 mayoral appointees who are responsible for making recommendations for purchasing environmental and resource conservation lands for acquisition. The PPJ was established under an executive order for acquiring land for growth management, protection of environmentally sensitive lands and water quality improvement. The project calls for total involvement and cooperation with federal, state, and regional agencies' land acquisition programs through its Technical Advisory Committee consisting of members representing: the National Park Service, the SJRWMD, FFWCC, FDF, CARL, FDEP, JEA, and the Pumpkin Hill Creek State Buffer Preserve. The PPJ divides the county into five conceptual land acquisition corridors: the Southeastern Greenbelt, the Intracoastal Waterway, the Timucuan Preserve, the Western Greenbelt and the St. Johns River and Urban Core.

The PPJ is staffed by a Steering Committee consisting of representatives from various City agencies: the Planning and Development Department, the Parks, Recreation, and Entertainment Department, the Public Works Department, the Regulatory and Environmental Services Department, and the General Council's Office. The Mayor's Office coordinates the activities of the Mayor's Commission, The Technical Advisory Committee, and the Steering Committee.

At this time, there are two primary programs to assist local governments in purchasing environmentally sensitive lands. The programs are administered by the State of Florida:

1) **Florida Communities Trust (FCT),** requires a 50% match; the main purpose of the FCT is to assist local governments in implementing land acquisition portions of the comprehensive plans. There is a limitation of 10% of available money to FCT that can be distributed to ach local government. The FCT receives approximately 10% of the Preservation 2000 money to administer their program.

2) **Conservation and Recreational Lands (CARL),** does not require a 50% match; however those projects with a match receive a higher ranking from the CARL

committee. This project assists in purchasing larger tracts of land with no price limitations on grants.

FCT AND CARL PROJECTS (1999).

1. Blue Cypress: A recreation-oriented site located in the Arlington area of Jacksonville, it consists of 120 Acres of land.

2. Cedar Point: Located in northeast Jacksonville, it is bound on three sides by saltwater marshes. The total project area is about 285 Acres.

3. County Dock Historical Park: (a.k.a. Walter Jones Historical Park), containing 10 acres, is located in the Mandarin area along the St. Johns River.

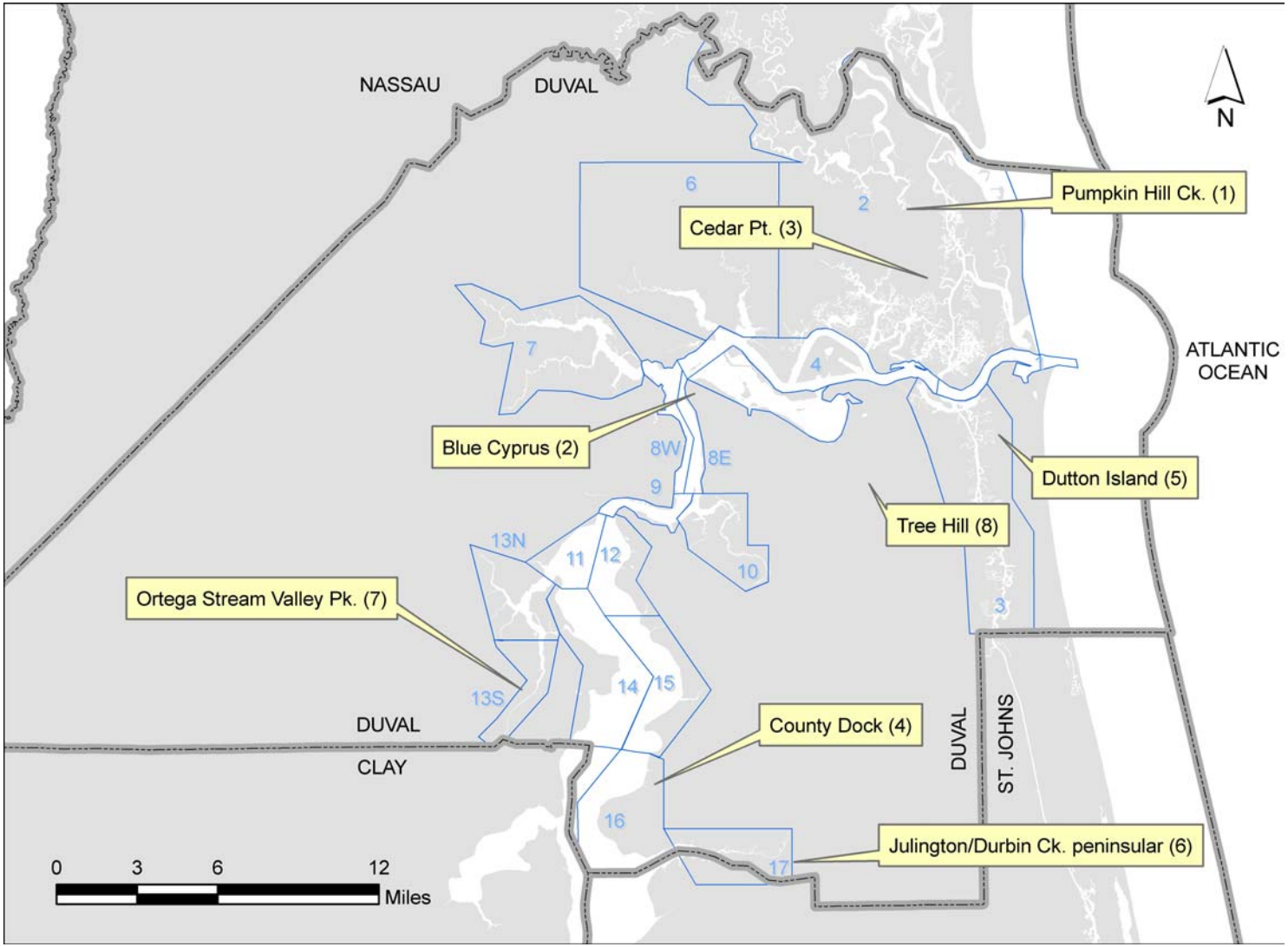
4. Dutton Island Intracoastal Waterway Park: A joint effort between the City of Jacksonville and the City of Atlantic Beach, this 45-acre coastal hammock, salt marsh, and slash pine island is located off the eastern shore of the Intracoastal Waterway in Duval County, just west of Atlantic Beach.

5. Julington Creek Headwaters Park and Preserve, Phase I and II: 610 acres, this site is located in southeastern Jacksonville. Approximately 50 percent of the site consists of wetlands.

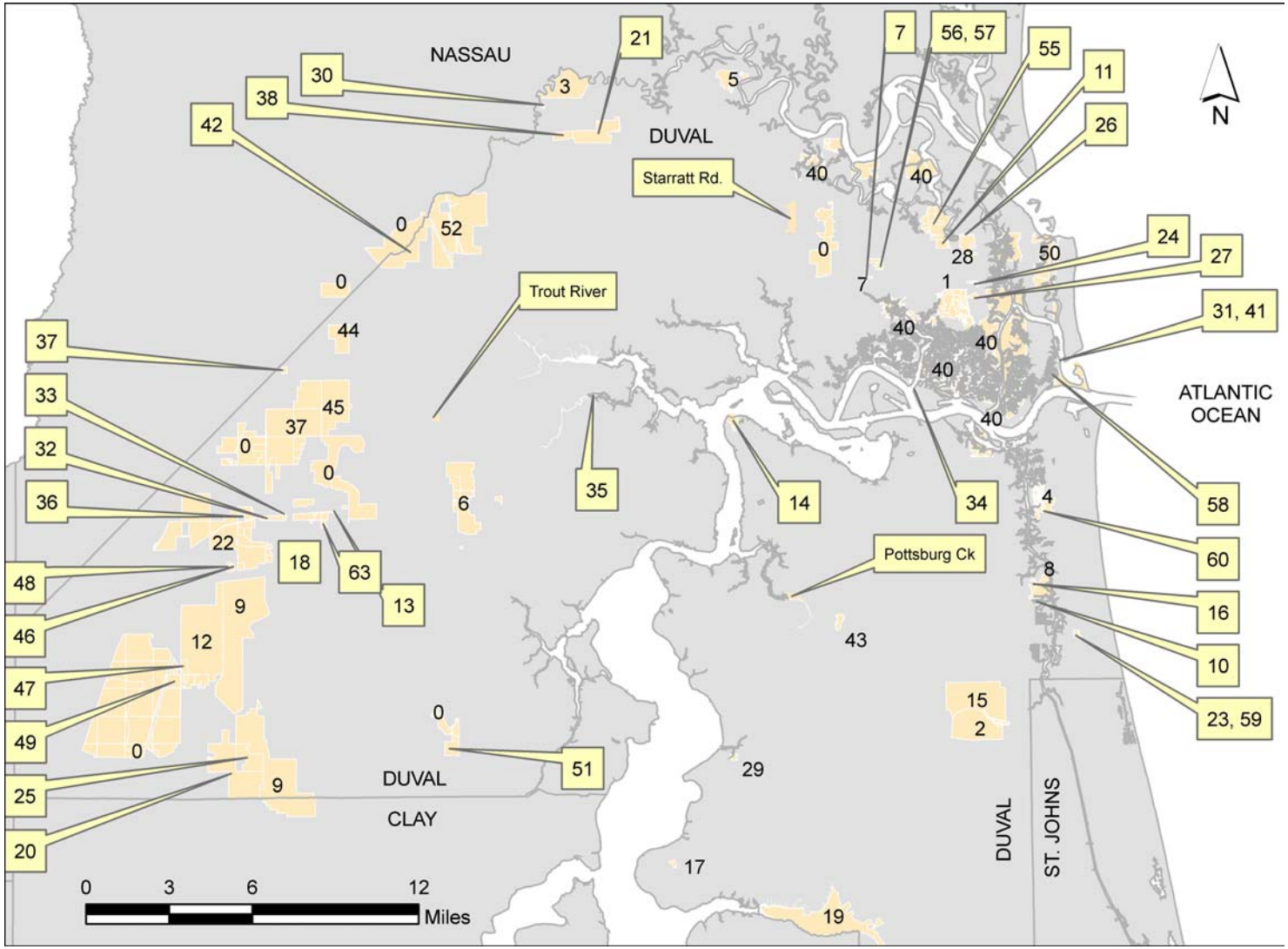
6. Ortega Stream Valley Park: Located in southwestern Jacksonville, this 582-acre park is located along the eastern boundary of the Ortega River.

7. Tree Hill Nature Center: This site of 10 acres in the Arlington area was acquired to protect and expand the environmental and educational needs of the existing preserve.

Purchase of the above projects benefits Jacksonville waterways and manatee by maintaining and/or improving water quality and providing areas that will remain in a more natural state. These parcels are preserved in perpetuity. Each year, other parcels will be evaluated and proposed for acquisition by Preservation Project Jacksonville. In addition, most acquisition projects include an environmental education portion that can incorporate manatee education for those parcels located along the waterways. Map 16, indicates the location of acquisition projects during 1999. Map 17, illustrates the latest available information in 2006 (Table 17).



MAP 16. Land acquisition projects, City of Jacksonville, Duval Co., FL (1999).



MAP 17. Land acquisition projects, City of Jacksonville, Duval Co., FL (2006) (Table 17).

TABLE 17. Preservation Project Jacksonville 2006. (Part 1 of 6)

No.	Name	Closing	Acres	Use	Status	Program/Ownership/Funds
1	Cedar Point	5/2/1996	196	Park	Acquired	FCT
1	Cedar Point	5/2/1996	9	Park	Acquired	FCT
1	Cedar Point	5/2/1996	38	Park	Acquired	FCT
1	Cedar Point	5/2/1996	18	Park	Acquired	FCT
1	Cedar Point	5/2/1996	140	Park	Acquired	FCT
2	Pablo Creek Preserve	3/1/1999	1,104		Acquired	COJ has no title interest
3	Thomas Creek Preserve	11/1/1999	749	Park	Acquired	SJRWMD
4	Dutton Island Preserve	11/1/1999	98	Preserve	Acquired	FCT
5	Half Moon Island Preserve		218	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		0	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		0	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		3	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		25	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		0	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		9	Preserve	Acquired	Cedar Mitigation Funds
5	Half Moon Island Preserve		10	Preserve	Acquired	Cedar Mitigation Funds
6	Bulls Bay Preserve	12/21/1999	26	Preserve	Acquired	Cons.easement/mitigation
6	Bulls Bay Preserve	12/21/1999	565	Preserve	Acquired	Cons.easement/mitigation
6	Bulls Bay Preserve	12/21/1999	100	Preserve	Acquired	Cons.easement/mitigation
6	Bulls Bay Preserve	12/21/1999	57	Preserve	Acquired	Cons.easement/mitigation
6	Bulls Bay Preserve	12/21/1999	4	Preserve	Acquired	Cons.easement/mitigation
6	Bulls Bay Preserve	12/21/1999	13	Preserve	Acquired	Cons.easement/mitigation
6	Bulls Bay Preserve	12/21/1999	456	Preserve	Acquired	Cons.easement/mitigation
7	Jim Wingate Park	12/18/1999	26	Park	Acquired	Donation
8	Castaway Island Preserve	7/28/2000	233	Park	Acquired	FCT
9	Cecil Field Conserv. Corridor	8/1/2000	5,310	Preserve	Acquired	Cons.easement/mitigation
10	Castaway Island Preserve	9/11/2000	26	Park	Acquired	FCT
11	Birchfield	10/13/2000	92	Preserve	Acquired	FL PS
12	Peterson Tract Property	10/6/2000	2,746	Preserve	Acquired	JEA
13	Camp Milton Historic Preserve	10/20/2000	8	Park	Acquired	FCT
13	Camp Milton Historic Preserve	10/20/2000	3	Park	Acquired	FCT
13	Camp Milton Historic Preserve	10/20/2000	13	Park	Acquired	FCT
13	Camp Milton Historic Preserve	10/20/2000	0	Park	Acquired	
14	Reddie Point Preserve	11/21/2000	106	Park	Acquired	FCT

TABLE 17. Preservation Project Jacksonville 2006. (Part 2 of 6)

No.	Name	Closing	Acres	Use	Status	Program/Ownership/Funds
15	Pablo Creek Preserve	11/30/2000	1,524		Acquired	COJ has no title interest
16	Castaway Island Preserve	12/8/2000	47	Park	Acquired	FCT
17	Ferngully Preserve	4/1/2001	26	Preserve	Acquired	BJP Bond funds
18	Camp Milton Historic Preserve	4/1/2001	43	Park	Acquired	FCT
18	Camp Milton Historic Preserve	4/1/2001	42	Park	Acquired	FCT
19	Julington-Durbin Creek Preserve	4/4/2001	1,990	Park	Acquired	COJ has no title interest
20	Longleaf Timber Property	5/24/2001	1,471	Preserve	Acquired	SJRWMD
21	Thomas Creek Preserve	6/26/2001	588	Preserve	Acquired	SJRWMD & COJ
21	Thomas Creek Preserve	6/26/2001	3	Preserve	Acquired	SJRWMD & COJ
22	Miller Property	7/16/2001	1,941	Preserve	Acquired	JEA
23	Cradle Creek Preserve	8/9/2001	29	Preserve	Acquired	FCT
24	Holton	9/4/2001	10	Preserve	Acquired	NPS
24	Holton	9/4/2001	17	Preserve	Acquired	NPS
25	Sal Taylor Creek Preserve	11/16/2001	410	Preserve	Acquired	FCT
26	Oberg	12/31/2001	16	Preserve	Acquired	NPS
27	Owens	12/31/2001	38	Preserve	Acquired	NPS
28	Sohn	12/31/2001	211	Preserve	Acquired	NPS
29	Goodbys Creek Preserve	12/31/2001	34	Park	Acquired	Cons.easement/mitigation
30	Thomas Creek Preserve	1/18/2002	9	Park	Acquired	Lease agreement (SJRWMD)
31	Alimacani Park	2/1/2002	1	Park	Acquired	BJP Bond funds
32	Otis Road Trailhead	2/21/2002	85	Preserve	Acquired	FCT
33	Campbell	2/4/2002	19	Preserve	Acquired	FCT
34	Palms Creek Fish Camp	2/19/2002	2	Park	Acquired	BJP Bond funds
35	Ribault River	3/20/2002	35	Preserve	Acquired	BJP Bond funds
36	Otis Road Trailhead	6/14/2002	398	Preserve	Acquired	FCT
37	Monticello Drug	7/1/2002	29		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	573		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	642		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	43		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	48		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	18		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	131		Acquired	Timber cutting agreements
37	Monticello Drug	7/1/2002	3		Acquired	
37	Monticello Drug	7/1/2002	646		Acquired	Timber cutting agreements

TABLE 17. Preservation Project Jacksonville 2006. (Part 3 of 6).

No.	Name	Closing	Acres	Use	Status	Program/Ownership/Funds
37	Monticello Drug	7/1/2002	13		Acquired	
37	Monticello Drug	7/1/2002	595		Acquired	Timber cutting agreements
38	Thomas Creek Preserve	7/2/2002	122	Preserve	Acquired	BJP Bond funds
40	Northshore	8/8/2002	7,290	Preserve	Acquired	Nature Conservancy
41	Alimacani Park	8/26/2002	1	Park	Acquired	BJP Bond funds
42	Kings Road Historic Park	9/1/2002	577	Preserve	Under Contract	SJRWMD Owned
43	Beach & Peach Urban Park	9/5/2002	71	Park	Acquired	FCT
44	Monticello A	10/11/2002	406	Preserve	Acquired	Timber cutting agreements
45	Monticello B	10/11/2002	656	Preserve	Acquired	Timber cutting agreements
45	Monticello B	10/11/2002	444	Preserve	Acquired	Timber cutting agreements
46	Hawkins		28	Preserve	Acquired	Lease agreement (State)
47	Peterson Farm	10/24/2002	99	Park	Acquired	FCT
48	Nemours Foundation	10/31/2002	66	Preserve	Acquired	Lease agreement (State)
49	Corwith Davis Family	10/31/2002	21	Park	Acquired	FCT
49	Corwith Davis Family	10/31/2002	149	Park	Acquired	FCT
49	Corwith Davis Family	10/31/2002	9	Park	Acquired	FCT
50	Kennedy Trust	10/31/2002	5	Preserve	Acquired	Nature Conservancy
50	Kennedy Trust	10/31/2002	25	Preserve	Acquired	Nature Conservancy
50	Kennedy Trust	10/31/2002	710	Preserve	Acquired	Nature Conservancy
51	McGirts Creek Park Expansion	10/31/2002	166	Park	Acquired	FCT
52	Kings Road Historic Park	12/16/2002	2,463	Preserve	Acquired	BJP Bond funds
55	Betz Tiger Point Park	1/6/2003	4	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	4	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	37	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	46	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	94	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	40	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	48	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	20	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	20	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	182	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	24	Park	Acquired	FCT
55	Betz Tiger Point Park	1/6/2003	25	Park	Acquired	FCT
56	Caldwell	4/23/2003	18		Acquired	CARL_BJP Bond funds

TABLE 17. Preservation Project Jacksonville 2006. (Part 4 of 6)

No.	Name	Closing	Acres	Use	Status	Program/Ownership/Funds
56	Caldwell	4/23/2003	22		Acquired	CARL_BJP Bond funds
57	Wood Trust	4/24/2003	35	Private	Acquired	CARL_BJP Bond funds
58	Meric	1/1/1900	29	Preserve	Acquired	Nature Conservancy
59	Cradle Creek Preserve	1/1/1900	6	Preserve	Acquired	FCT
60	Dutton Island Preserve	1/1/1900	8	Preserve	Acquired	FCT
63	Camp Milton Historic Preserve	1/1/1900	30	Preserve	Acquired	Lease agreement (State)
0	Huguenot Memorial Park		316	Park	Acquired	Lease agreement (State)
0	Cecil Field Conserv. Corridor		647	Preserve	Acquired	Cons.easement/mitigation
0	Forbess		73	Preserve	Acquired	FCT
0	Walker		23	Preserve	Acquired	FCT
0	Dutton Island Preserve		31	Preserve	Acquired	FCT
0	McGirts Creek Park Expansion		10	Park	Acquired	FCT
0	Kings Road Historic Park		321	Preserve	Under Contract	SJRWMD Owned
0	Kings Road Historic Park		883	Preserve	Under Contract	SJRWMD Owned
0	Sheffield Dairy		385	Private	Acquired	BJP Bond funds
0	Ellis Property		108	Private	Acquired	BJP Bond funds
0	Livestock Farms		113		Acquired	FCT
0	Monticello - Drug II		74		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		71		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		503		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		11		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		222		Cons. Easement	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		177		Acquired	Cons.easement/mitigation
0	Monticello - Drug II		74		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		7		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		1		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		55		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		45		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		9		Cons. Easement	Cons.easement/mitigation
0	Monticello - Drug II		0		Cons. Easement	Cons.easement/mitigation
0	Monticello Wildlands		40	Private	Acquired	BJP Bond funds
0	Monticello Wildlands		139	Private	Acquired	BJP Bond funds
0	Monticello Wildlands		648	Private	Acquired	BJP Bond funds
0	Loblolly Mitigation Preserve		1		Acquired	Cons.easement/mitigation

TABLE 17. Preservation Project Jacksonville 2006. (Part 5 of 6)

No.	Name	Closing	Acres	Use	Status	Program/Ownership/Funds
0	Loblolly Mitigation Preserve		3		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		56		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		3		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		306		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		4		Acquired	
0	Loblolly Mitigation Preserve		32		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		604		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		5		Acquired	Cons.easement/mitigation
0	Loblolly Park		454		Mitigation	
0	Loblolly Mitigation Preserve		6		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		126		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		18		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		593		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		179		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		196		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		641		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		605		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		1		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		4		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		5		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		20		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		313		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		111		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		1		Acquired	Cons.easement/mitigation
0	Verdie Forest		118	Private	Acquired	CARL_BJP Bond funds
0	Bird Island		9	Preserve	Acquired	Cedar mitigation funds
0	Bird Island		9	Private	Acquired	Cedar mitigation funds
0	Sample Swamp		1	Private	Under Negotiation	
0	Sample Swamp		1	Private	Under Negotiation	
0	Dutton Island Expansion II		176	Private	Acquired	BJP Bond funds
0	Loblolly Mitigation Preserve		248		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		153		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		534		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		96		Acquired	Cons.easement/mitigation

TABLE 17. Preservation Project Jacksonville 2006. (Part 6 of 6)

No.	Name	Closing	Acres	Use	Status	Program/Ownership/Funds
0	Loblolly Mitigation Preserve		480		Acquired	Cons.easement/mitigation
0	Treehill		129	Private	Acquired	Donation
0	Treehill		6	Private	Acquired	Donation
0	Treehill		35	Private	Acquired	Donation
0	Reaves		19	Private	Acquired	FCT
0	Point South Ventures		75	Private	Acquired	FCT
0	Point South Ventures		2	Private	Acquired	FCT
0	Point South Ventures		1	Private	Acquired	FCT
0	Point South Ventures		1	Private	Acquired	FCT
0	Livestock Farms		7		Acquired	FCT
0	Walker		38		Acquired	FCT
0	Walker		63		Acquired	FCT
0	Monticello - Drug II		21		Cons. Easement	Cons.easement/mitigation
0	Camp Shaw/Finnegan		7		Under Contract	
0	Beasley		93		Acquired	BJP Bond funds
0	Beasley		23		Acquired	BJP Bond funds
0	Beasley		15		Acquired	BJP Bond funds
0	Beasley		7		Acquired	BJP Bond funds
0	Beasley		1		Acquired	BJP Bond funds
0	Beasley		3		Acquired	BJP Bond funds
0	Beasley		0		Acquired	BJP Bond funds
0	Gefen		1		Acquired	
0	Gefen		0		Acquired	
0	Castaway Island Preserve		5		Acquired	FCT
0	Loblolly Mitigation Preserve		150		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		508		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		71		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		1		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		86		Acquired	Cons.easement/mitigation
0	Norfolk Southern		1,606	Private	Under Negotiation	
0	Loblolly Mitigation Preserve		141		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		20		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		183		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		3		Acquired	Cons.easement/mitigation
0	Loblolly Mitigation Preserve		23		Acquired	Cons.easement/mitigation
0	Sample Swamp		290	Private	Under Negotiation	

Source: COJ 2006

POLICY/PLAN RECOMMENDATIONS

Natural Resource/Habitat Protection

The following classifications are used to define and identify areas for natural resource or habitat protection.

Class II waters: Prohibit construction of new facilities in Class II water as stated under Policy 10.1.2 of the Conservation/Coastal Management Element of the 2010 Comprehensive Plan.

Warm-Water Discharges: Warm-water discharges can attract manatees during cooler times of the year. It is recommended that JEA not perform any optional operational testing of equipment involving warm water discharge between November 15 and January 31.

Manatee Protection Zones: Regulatory zones will be designated by signs along waterways (*Map Series D, Speed Zones).* Signs provide information regarding the boundary of a zone, its regulated speed, and the area of regulation. Regulatory zones are to be enforced by the appropriate law enforcement agencies. Proposed new speed zones include:

1) ***Caution Zone -*** A zone frequently inhabited by manatees, requiring caution on the part of the vessel operators to avoid disturbing or injuring the manatees.

2) ***Idle Speed Zone -*** A zone in which vessels create no wake and are not permitted to proceed at a speed greater than that necessary to maintain steerage of the vessel. While operating within an idle speed zones, all vessel operators shall exercise a high degree of care for manatee presence.

3) ***Shoreline Buffer Zone -*** A zone which designates a 100, 300, 400, 600, 900 or 1000 ft. buffer along the natural shoreline of a water body. In this zone, vessels must operate at slow speed as defined below in the *Slow Speed Zone.*

4) ***Slow Speed Zone -*** A zone in which vessels are completely off plane and proceeding with minimum wake. Slow speed also means no speed greater than that which is reasonably and prudent to avoid either intentionally or negligently, molesting, harassing, disturbing, colliding with, injuring, or harming manatees.

5) ***Slow Speed Zone Channel Exempt -*** A zone that allows a designated navigation channel to be exempt from the slow speed zone along the course of the waterway. Any vessel leaving the designated channel would be required to travel at slow speed.

6) ***Slow Speed Channel Included -*** A zone that is designated as slow speed with no exception for the navigable channel. All vessels within this waterway would be required to maintain slow speed throughout this zone.

Boat Facilities Siting Criteria

Boat facilities are defined as marinas with wet or dry storage, boat ramps or other launching facilities, or multi-family residential docks. An existing boat facility is defined as one permitted or in use on July 1, 1994. An existing boat facility may be reconstructed with at least the maximum number of slips in use on July 1, 1994. All existing boat facilities will be allowed to continue to operate, and may renovate, according to permitting guidelines, as long as there is no increase in number of wet or dry slips. Any expansion must meet the Boat Facilities Siting Criteria as established in the Manatee Management Plan. Boat facilities siting shall be considered using the following criteria:

I. The proposed facility will have no or minimal adverse impact on manatee movements or on known areas of high manatee use or high manatee mortality.

II. The proposed facility shall have no or minimal dredging and thereby reduce or eliminate impact to benthic communities and native submerged vegetation.

III. The proposed facility is compatible with local land use and zoning.

In considering the construction, expansion or renovation which changes structures or adds boat slips to a boat facility, the landowner or developer must submit the proposal to the Jacksonville Planning and Development Department for initial review to determine consistency with the 2010 Comprehensive Plan and the Duval County Manatee Protection Plan, as well as identify land use and zoning of the proposed site. The purpose of this is to determine if development presents unfavorable impacts in relation to such issues as the improvement, development and protection of the St. Johns River and its tributaries. Moreover, the Jacksonville Planning Commission will oversee and verify the findings of the Planning and Development Department.

Characteristics of Boat Facility Siting Zones (BFSZ) are presented for the years 1999 (Table 18) and 2006 (Table 19). Manatee death data by zone is presented for the years 1994, 1999 and September 2005 (Table 20). Basic criteria were applied to zones in Duval County to determine suitable sites for marinas, boat ramps and port usage (Map 18 and Table 21). Zones 1 and 4 were designated as preferred zones for new construction of boat facilities; remaining zones were designated as acceptable or unacceptable for new development. It is the intent of the Boat Facility Siting Zone (BFSZ) Plan to include all navigable waters, as defined by the U.S. Army Corps of Engineers (USACE) (33 CFR Part 329). Navigable waters that extend out of the BFSZ are included within the requirements of that zone. Zone descriptions are as follows:

Boat Facility Siting Zones

(Zones 1-17 see Map 18)

Zone 1 - From the Atlantic Ocean to the Intracoastal Waterway following the St. Johns River.

Zone 2 - The Nassau River/St. Johns River Marshes Aquatic Preserve, **Clapboard Creek and its tributaries, and Browns Creek and its tributaries.** ~~north of the St. Johns River and west of the Atlantic Ocean.~~ Note that this description includes all waters north of the St. Johns River to the Nassau/Duval County boundary (i.e. all places where boat facility development or expansion is possible). This preserve is described in Official Records Volume 3183, pages 547-552, current public records of Duval County, Florida and in Official Records Book 108, pages 232-237, current public records of Nassau County, Chapter 18-20.002(7)(a)(2) F.A.C., and other Aquatic Preserves, as designated by the State.

Zone 3 - Atlantic Intracoastal Waterway south of the St. Johns river including Chicopit Bay.

Zone 4 - West of the Intracoastal Waterway following the St. Johns River to Reddie-Point excluding Mill Cove, Broward Creek and Dunn Creek.

Zone 5 - All of Mill Cove south of Quarantine Island west to Reddie-Point.

Zone 6 - Broward River, Dunn Creek and its tributaries north of Heckscher Drive.

Zone 7 - Trout river to the Trout River Main Street Bridge.

Zone 8E - Westerly from Reddie-Point to the eastern boundary of the channel, and encompassing the shoreline and all waters east of the channel, southerly to the Matthews Bridge.

Zone 8W- Easterly from the Trout River Main Street Bridge to the eastern boundary of the channel, and encompassing the shoreline and all waters west of and including the channel, southerly to the Matthews Bridge.

Zone 9 - South of the Matthews Bridge, west of Exchange Island, excluding Arlington River and its tributaries, to the Fuller Warren Bridge.

Note: In cases of discrepancy between text descriptions above and the graphical representations of Boat Facility Siting Zones on Map 18, the text descriptions shall be held to be more accurate. **Each description includes all navigable waters that extend out of the Z.**

Zone 10 - East of Exchange Island, south of the Matthews Bridge, including all of Arlington River.

Zone 11 - Following the west half of the St. Johns River south of the Fuller Warren Bridge to the Ortega Blvd. Bridge.

Zone 12 - The east half of the St. Johns River south of the Fuller Warren Bridge to New Rose Creek.

Zone 13N - Ortega River from the Grand Avenue Bridge (Ortega Blvd.) west including all its tributaries and south to the Timuquana Bridge.

Zone 13S - Ortega River from the Timuquana Bridge south to it's head waters.

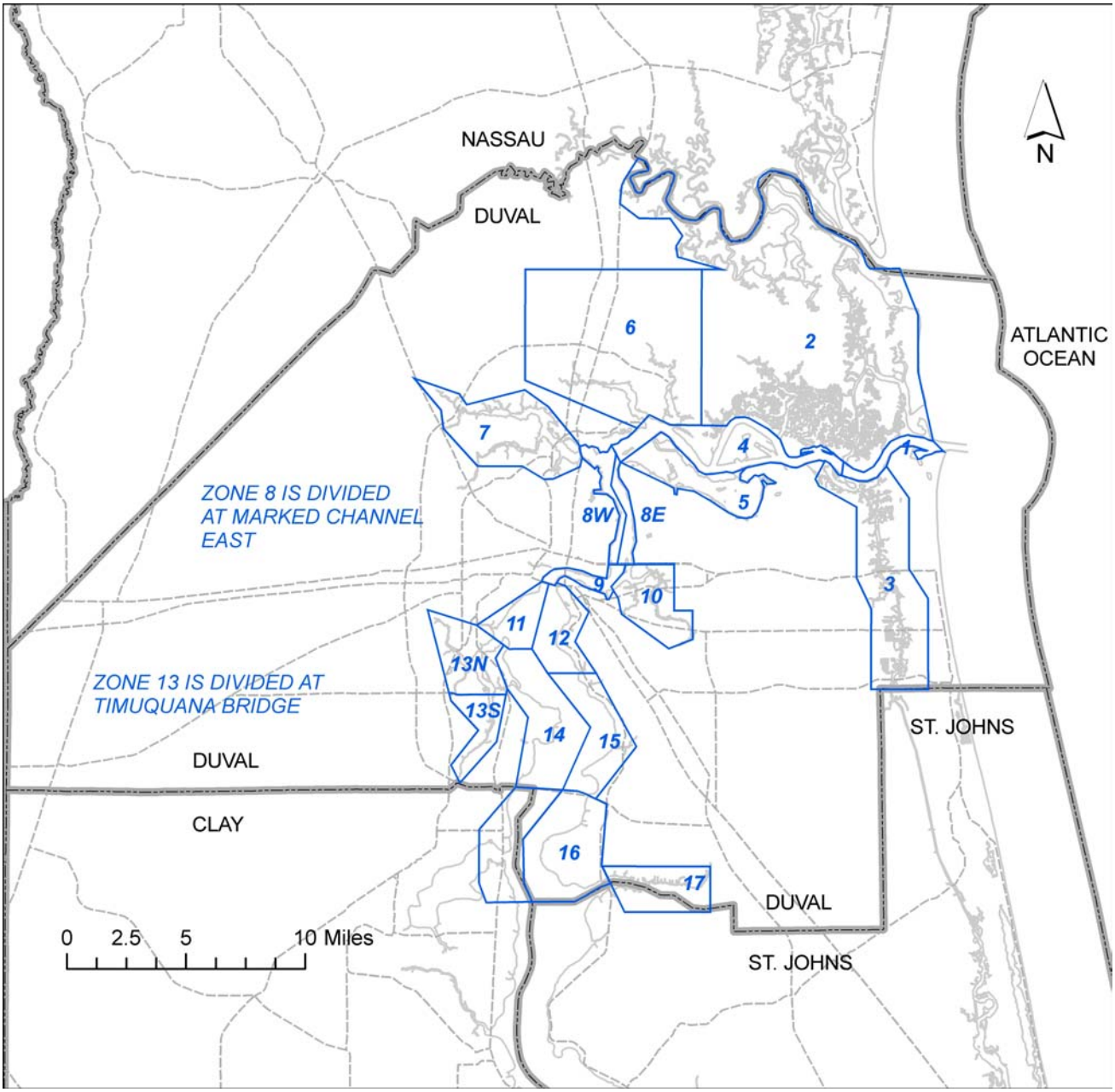
Zone 14 - The west half of the St. Johns River south of Zone 11 and west of Zone 15 to the Buckman Bridge.

Zone 15 - The east half of the St. Johns River south of Zone 12 and east of Zone 14 to the Buckman Bridge.

Zone 16 - South of the Buckman Bridge on the west bank of the St. Johns River, following the Duval County boundary line, to one-quarter mile east of the State Road 13 Bridge in Julington Creek.

Zone 17 - Julington Creek and Durbin Creek from one-quarter mile east of the State Road 13 Bridge to the headwaters.

Note: In cases of discrepancy between text descriptions above and the graphical representations of Boat Facility Siting Zones on Map 18, the text descriptions shall be held to be more accurate. **Each description includes all navigable waters that extend out of the BFSZ.**



MAP 18. Boat Facility Siting Zones, Duval Co., FL.

TABLE 18. Characteristics of Boat Facility Siting Zones (1999).

Boat Facility Zone #	Manatee Deaths				Distance To 8 ft. Of water	Warm Water Effluents	Emergent Grasses Present	Submerged Grasses Present	Number Of Boat Ramps	Number Of Marinas	Total Parking Spaces	Fuel Capacity (gallons)	Sanitary Pumpout Stations	Shoreline Covered By Dock
	Watercraft	Undetermined	Perinatal	Natural										
1	9	5	2	4	<100 ft.	N	N	N	3	4	67	23,250	-	50
2	2	4	-	5	<1/4 mile	N	Y	N	9	3	126	40,000	-	25
3	4	5	1	3	<1/4 mile	N	Y	N	5	8	95	13,000	1	25
4	11	14	1	4	<300 ft.	Y	Y	N	4	1	44	-	-	50
5	1	2	-	2	<1 mile	Y	Y	N	3	1	66	-	-	25
6	3	1	-	2	<1 mile	Y	Y	N	2	-	10	-	-	25
7	7	4	4	3	<1 mile	Y	Y	N	5	1	196	-	1	75
8E	8	4	1	4	<300 ft.	Y	Y	N	3	1	52	8,000	-	50
8W	16	9	-	3	<100 ft.	Y	N	N	2	4	30	5,000	2	75
9	11	6	-	8	<100 ft.	Y	N	N	1	2	115	20,000	2	50
10	3	1	2	1	<1/4 mile	N	Y	N	1	-	16	-	-	50
11	-	-	-	-	<900 ft.	N	N	Y	-	-	-	-	-	25
12	-	1	2	-	<900 ft.	N	N	Y	-	-	-	-	-	25
13	3	3	8	4	<1/2 mile	N	Y	Y	5	8	140	30,000	1	75
14	6	5	-	3	<900 ft.	N	Y	Y	3	3	50	2,000	-	25
15	6	9	2	6	<900 ft.	N	Y	Y	1	3	30	3,000	1	75
16	2	5	1	4	<900 ft.	N	Y	Y	2	3	11	4,000	-	75
17	-	3	-	1	<300 ft.	N	Y	Y	1	-	8	10,000	-	50

TABLE 19. Characteristics of Boat Facility Siting Zones (Sept. 2005).

BFSZ	Manatee Death Codes (Sept-2005)										Distance to 8 ft. depth	Warm water source	EAV	SAV	No.		No. boat ramps	No. trailer parking	No.		Fuel capacity (gal.)	No. sanitary pumpout	Shoreline covered by docks
	1	2	3	4	5	6	7	8	9	Sum					C/K	Tie-up			marinas	slips			
1	11			2		2	1	1	3	20	<100 ft.	N	N	N	0	0	3	91	4	239	25,250	1	50
2	2				3	2	2	4	5	18	<1/4 mile	N	Y	N	3	1	8	182	3	30	0	0	25
3	7			3	3	2		4	1	20	<1/4 mile	N	Y	N	2	0	4	91	9	1820	40,000	3	25
4	19			1	2	2	1	16	6	47	<300 ft.	N	Y	N	2	1	5	86	2	44	0	0	50
5	2			2	1	1	1	2		9	<1 mile	N	Y	N	0	0	3	45	1	25	0	0	25
6	4							1	1	6	<1 mile	N	Y	N	0	0	2	10	0	0	0	0	25
7	3			3		2		1	1	10	<1 mile	N	Y	N	0	0	4	125	1	35	0	0	75
8E	9		1	1	2	2			6	21	<300 ft.	N	Y	N	0	0	3	66	2	190	12,000	0	50
8W	19		2	2	2	2		3	3	33	<100 ft.	N	N	N	0	0	2	38	4	501	4,500	2	75
9	10		3		6	2		11	1	33	<100 ft.	N	N	N	0	0	1	15	2	92	20,000	1	50
10	4		2	1	2		2	1		12	<1/4 mile	N	Y	N	0	0	1	12	0	0	0	0	50
11					1				1	2	<900 ft.	N	N	Y	0	0	0	0	0	0	0	0	25
12				4				2	1	7	<900 ft.	N	N	Y	0	0	0	0	0	0	0	0	25
13N	1			8	1	3		6	1	20	<1/2 mile	N	Y	Y	0	0	5	79	10	1144	26000	5	75
13S	1			3				1		5	<1/2 mile	N	Y	Y	0	0	0	0	0	0	0	0	<25
14	4			1	3	1		2	2	13	<900 ft.	N	Y	Y	0	0	3	50	3	516	2,000	1	25
15	4			2	1	4		4	5	20	<900 ft.	N	Y	Y	0	0	2	62	5	278	9,000	1	75
16	4				2		1	2	4	13	<900 ft.	N	Y	Y	0	0	3	??	3	244	9,000	0	75
17	1			3				1	1	6	<300 ft.	N	Y	Y	0	0	1	10	1	240	10,000	0	50
Total	105	0	8	36	29	25	8	62	42	315		None			7	2	50	962	50	5398	157,750	14	

EAV=Emergent Aquatic Vegitation

SAV=Submerged Aquatic Vegitation

Source data: FWRI, 2006

Key to death codes

1. = Watercraft (propeller, impact, both).
2. = Flood gate/canal lock.
3. = Human, other.
4. = Perinatal (natural or undetermined).
5. = Cold stress.
6. = Natural, other (includes red tide).
7. = Verified; not recovered
8. = Undetermined; too decomposed
9. = Undetermined; other

TABLE 20. Comparison of Boat Facility Siting Zones (1994, 1999 and Sept-2005).

Year	94	99	05	94	99	05	94	99	05	94	99	05	94	99	05	94	99	05	94	99	05	94	99	05
Death code		1			3			4			5			6			7			8			9	
1	8	9	11				2	2	2				1	1	2	1	1	1		1	1	3	3	3
2	2	2	2					1		2	2	3	2	2	2			2	2	3	4	5	5	5
3	1	4	7				1	1	3	1	1	3	2	2	2				1	3	4	1	1	1
4	13	14	19				1	1	1	1	1	2	1	2	2	1	1	1	7	10	16	6	6	6
5	1	1	2						2			1	1	1	1	1	1	1		1	2			
6	1	3	4					1													1	1	1	1
7	3	3	3				1	1	3				1	2	2				1	1	1	1	1	1
8E	5	7	9	1	1	1			1	1	2	2	2	2	2							6	6	6
8W	12	14	19	2	2	2	1	2	2	2	2	2	2	2	2				3	3	3	3	3	3
9	5	9	10	3	3	3				5	6	6	2	2	2				4	6	11	1	1	1
10	3	3	4	2	2	2		1	1			2				2	2	2			1			
11											1	1										1	1	1
12							3	3	4											2	2	1	1	1
13N	1	1	1				3	5	8	1	1	1	1	2	3					4	6		1	1
13S			1				2	2	3												1			
14	4	4	4						1	2	2	3		1	1					1	2	2	2	2
15	3	3	4					1	2			1	3	4	4				2	4	4	5	5	5
16	3	3	4							2	2	2						1		1	2	4	4	4
17			1						3												1	1	1	1
Total	65	80	105	8	8	8	14	21	36	17	20	29	18	23	25	5	5	8	20	40	62	41	42	42
Mean	4	5	6	2	2	2	2	2	3	2	2	2	2	2	2	1	1	1	3	3	4	3	3	3

Source data: FWRI, 2006

Key to death codes

1. = Watercraft (propeller, impact, both).
2. = Flood gate/canal lock.
3. = Human, other.
4. = Perinatal (natural or undetermined).
5. = Cold stress.
6. = Natural, other (includes red tide).
7. = Verified; not recovered
8. = Undetermined; too decomposed
9. = Undetermined; other

TABLE 21. Recommendations for siting of boat facilities in Duval Co., FL.

Zone	New Marina	Boat Ramp	Port
1	P	P	P
2	U	U	U
3	A	A	U
4	P	P	P
5	A	A	A
6	U	U	U
7	U	A	U
8E	A	A	U
8W	A	A	P
9	A	A	A
10	U	U	U
11	U	U	U
12	U	U	U
13N	A	A	U
13S	U	U	U
14	A	A	U
15	A	A	U
16	A	A	U
17	U	U	U

P=Prefered

A=Acceptable with conditions

U=Unacceptable for new development

Zone 8 is divided at channel boundary east.

Zone 13 is divided at the Timuquana Bridge.

Boat facility siting is north of the Timuquana Bridge in Zone 13 and unacceptable south of the Bidge to the headwaters of the Ortega River.

New Marina – As referenced in Table 21, is a boat facility proposed for development or expansion.

Development in Preferred zones is unrestricted from a manatee management/boat facility siting plan perspective. All development must meet applicable permit requirements in place at the time of application. Exceptions to recommendations for site selection of boat facilities may be considered in the case of waterborne transportation systems which are necessary and appropriate for the public experience (Table 21). This exception provides an opportunity for the public to experience the waterways and tends to reduce numbers of boats entering a particular area by providing alternative waterborne transportation which may include embarking, disembarking, and docking facilities.

Development in Unacceptable zones may occur only if the development is proposed at a level consistent with the statewide average for single-family density (one slip for every 100 feet of shoreline owned) and it is not prohibited as described below.

Prohibit new boat facilities in the following areas:

- Areas approved or conditionally approved by the Florida Department of Environmental Protection for shellfish harvesting.
- Areas designated in the Conservation/Coastal Management Element as potential areas to be opened for shellfish harvesting.
- Class II waters.
- Areas described by the Inter-State Shellfish Sanitation Conference (ISSSC) buffer zone calculation for individually proposed marinas.
- The Nassau River/St. Johns River Marshes Aquatic Preserve north of the St. Johns River and West of the Atlantic Ocean. This preserve is described in Official Records Volume 3183, pages 547-552, current public records of Duval County, Florida and in Official Records Book108, pages 232-237, current public records of Nassau County, Chapter18-20.002 (7) (a) (2) F.A.C., and other Aquatic Preserves, as designated by the State.
- Outstanding Florida Waters north of the St. Johns River and West of the Atlantic Ocean.
- Other new boat facility prohibition areas specified in Special Management Area management plans.

Development in Acceptable zones may occur if the Boat Facilities Siting Criteria I, II and III (Page 111) are met. This determination, and conditions that allow a project to meet the determination (such as dock densities or other siting restrictions, if appropriate) shall be addressed on a case-by-case basis during the permit review process. The following information will be considered during this case-by-case review:

I. Avoid Correlation of Boat Facility Siting With Areas of High Manatee Usage

A. Direct boat facility construction away from the following areas:

- Areas of high manatee use.
- Areas where wetlands supporting manatee habitat will be disturbed.
- Areas of highly productive habitat.
- Areas of high manatee mortality.
- Sensitive, undisturbed natural areas frequented by manatees.

II. Avoid Negative Impacts to Benthic Communities and Sea Grasses as a Result of Boat Facility Siting

A. Prohibit new boat facilities in the following areas:

- Areas approved or conditionally approved by the Florida Department of Environmental Protection for shellfish harvesting.
- Areas designated in the Conservation/Coastal Management Element as potential areas to be opened for shellfish harvesting.
- Class II waters.
- Areas described by the Inter-State Shellfish Sanitation Conference (ISSSC) buffer zone calculation for individually proposed marinas.
- The Nassau River/St. Johns River Marshes Aquatic Preserve north of the St. Johns River and West of the Atlantic Ocean. This preserve is described in Official Records Volume 3183, pages 547-552, current public records of Duval County, Florida and in Official Records Book 108, pages 232-237, current public records of Nassau County, Chapter 18-20.002 (7) (a) (2) F.A.C., and other Aquatic Preserves, as designated by the State.
- Outstanding Florida Waters north of the St. Johns River and West of the Atlantic Ocean.
- Other new boat facility prohibition areas specified in Special Management Area management plans.

B. Direct construction of boat facilities toward the following areas:

- All structures and other activities shall be within the riparian rights area of the applicant and shall be designed in a manner that will not restrict or otherwise infringe upon the riparian rights of adjacent upland riparian owners.
- Locations in or near well flushed, deep water areas where the least maintenance or dredging is required.
- Areas where the water quality benefits of existing water circulation are maximized.
- Locations as close as possible to public demand.
- Areas of minimal manatee use and mortality (except where otherwise

provided within specified boat facility siting zones).
- Areas with no or minimal amounts of native submerged aquatic vegetation.

C. Prevent indirect impacts to local resources
- Demonstrate the capability to promptly contain and dispose of any petroleum spills or hazardous materials within their boundaries.
- Evaluation of cumulative impacts.
- Capability to control and treat storm water runoff.
- Adequate on-site sewerage handling in accordance with applicable standards.
- Demonstrate ability to comply with State water quality standards.

D. Ensure adherence to the following design and operation
- Minimize or eliminate adverse impacts on habitat.
- Preserve or establish shoreline stabilization of appropriate native wetland vegetation.
- Utilize rip rap materials, previous interlocking brick systems and other similar stabilization methods in lieu of vertical sea walls where feasible.
- Piling construction and other non-dredge/fill techniques where possible.
- Open wet slips preferred to covered wet slips to reduce shading of water bodies which results in lower biological productivity.

III. Maintain Compatibility of Boat Facility with Land Use and Zoning

In the City of Jacksonville, under current land use of zoning regulations, marinas are permitted in Agricultural, Recreational and Open Space zoning districts. In addition, marinas are permitted by exception in the Industrial Water zoning district (Table 22). The Agriculture zoning district (AGR) is primarily a zoning district representative of land used for Agriculture. As a secondary zoning district, AGR represents land use designations for Rural Residential (RR), Low Density Residential (LDR), Medium Density Residential (MDR), Residential-Professional-Institutional (RPI), Neighborhood Commercial (NC), Community/General Commercial (CGC), Business Park (BP), Light Industrial (LI), High Industrial (HI), Water Dependent/Water Related (WD/WR), Conservation, Public Buildings and Facilities (PBF) and Recreation and Open Space (ROS). Primary zoning districts are considered consistent for the corresponding land use category. Secondary districts may be permitted in a corresponding land use category under certain conditions. For example, AGR is allowed as a secondary district if the minimum lot area is five acres and the site is located outside the Urban area as defined in the Comprehensive Plan.

TABLE 22. Zoning designations and corresponding land use activities in Duval Co., FL.

Zoning designation	AGR	CCG-2	IH	IL	IW	ROS
Land use activity						
Bait/Tackle Shops	PE					P
Boat Yards		P				
Bulk Material Shipping					P	
Construction of Vessels					P	
Docks					P	
Dredge Disposal					P	
Fish Camps	PE				PE	P
Freight Terminal			P	P	P	
Maintenance of Vessels					P	
Marinas	P				PE	P
Military Installations					P	
Passenger Terminal				P	P	
Piers					P	
Repair of Vessels					P	
Ship Supply Facilities					P	
Utility Plants					PE	
Water-related Recreation					PE	
Wharves					P	

Land use activity key
P = Permitted uses and structures
PE = Permitted uses by exception

Zone Designations Key
AGR- Agriculture
CCG-2- Commercial Community General - 2
IH- Industrial Heavy
IL- Industrial Light
IW- Industrial Water
ROS- Recreation and Open Space

In addition to the information included above, consideration for boat facilities siting shall also include the following:

- Preservation of archaeological or historical sites and incorporate into site design or mitigate impacts in accordance with the guidelines of the State's Division of Historic Resources.
- Parking facilities available.
- Traffic access consistent with the Traffic Circulation Element of the 2010 Comprehensive Plan.
- Non-water dependent uses located on uplands, except in cases clearly in the public interest or where sensitive upland areas may be affected.
- Protect life and property against hurricanes complying with all applicable construction codes.

- Delineate ingress and egress points by channel markers indicating speed limits and applicable regulations.

Potential Conditions

Reviewing agencies for proposed developments and boat facilities may include, but are not limited to, recommending any of the following conditions:

a) Standard manatee construction conditions for all in-water construction;
b) Manatee Educational displays and/or educational programs that provide information on the characteristics of manatees and the potential thereat to this endangered species from boat operation;
c) Dedicated and approved by FWC manatee observers and/or watch plans for construction and/or demolition;
d) Construction time windows;
e) Restrictions on types of equipment for dredging;
f) Grates for culverts or pipes to prevent entrapment;
g) Fenders or stand-off space between wharfs and vessels;
h) Avoid and minimize impacts to SAV.

For any proposal located in the "Acceptable with conditions" zones, the reviewing agencies may also include, but are not limited to, recommending any of the following conditions based on a case-by-case review of proposed development:

a) Restrictions on vessel drafts;
b) Restrictions on facility vessel composition (powerboat: sailboat ratio);
c) Potential modification to the size, type, or design of the proposed facility;
d) Execution of a conservation easement, designed to prohibit future construction or expansion of docking facilities or other water access along the shoreline;
e) The facility is adjacent to state or federally authorized Slow or Idle speed zones; or implementation of additional vessel speed restrictions in the vicinity of the proposed facility deemed adequate to offset potential impacts;
f) The facility requires minimal or no dredging to provide a water depth at mean low water that is 3 feet greater than the expected draft of vessels using the facility;
g) The facility adheres to all conditions contained in the Conservation/Coastal Management Element of the current Comprehensive Plan.

The Jacksonville Port Authority

The Jacksonville Port Authority (JPA) is an independent agency of the City of Jacksonville. The Maritime Division of the JPA is responsible for promoting and developing waterborne traffic and commerce through the Port of Jacksonville. The Port of Jacksonville includes both JPA and privately-owned facilities. Future Port expansion, public or private, must follow the Comprehensive Plan 2010 for Duval County. The Comprehensive Plan 2010 addresses future Port expansion in Objective 3.7 *(Appendix C*, this report).

Public Works/GIS

The City of Jacksonville Department of Public Works, Geographical Information Systems Section uses state of the art technological with mapping capabilities to illustrate and pinpoint various natural resources. The GIS section, in cooperation with Jacksonville University, has established a significantly large database. Data exist on manatee observations and mortalities; bathymetry of the St. Johns River; locations of single family, multi-family and commercial docks; marinas and boat ramps; submerged aquatic vegetation; major outfalls and proposed speed zones for watercraft for the County. The database is regularly updated in order to keep track of the latest information on manatee abundance, distribution and habitat in Duval County.

Education/Awareness

Educating the public is a critical component of manatee protection. Several programs are currently in place, and other means for educating the public are proposed.

Pamphlets: Pamphlets are periodically mailed to all waterfront property owners and registered boaters. Pamphlets include basic information about manatees, a Manatee Protection Plan Speed Zone Map, the hotline number for reporting manatees sightings and/or injuries, and other pertinent information.

Kiosks: Kiosks are located at 14 major boating facilities in Duval Co. (Map 15) City of Jacksonville's Parks and Recreation Department makes use of traveling education displays at fishing tournaments, conferences and other special events. While not in use, these displays may be used in libraries where they can provide a more long term and beneficial exhibit.

School curriculum: Jacksonville University provides a slide presentation that is available to elementary, middle, and secondary school students, among other civic organizations.

Public service announcements: Weather broadcasting stations can provide information to boaters about manatees as part of an on-going education that can be specific to changing conditions.

Public displays at boat facilities: In addition to updating the Duval County Boating Safety and Manatee Protection Zones brochure, sets of maps at a larger scale can be generated and displayed at boating-related businesses.

Regulations

Jacksonville Waterways Commission: The Commission will review the manatee protection plan on an annual basis to determine if the plan is protecting manatees. In addition, the Commission will update information and determine any needed changes to the plan to ensure the plan's implementation.

2010 Comprehensive Plan: The Comprehensive Plan will be amended to include reference to the Manatee Protection Plan.

Future Needs

1) There is a need to continue aerial surveys and incorporate these into the annual review by the Waterways Commission.

2) There is a need to regularly update information from Jacksonville waterways, including tributaries and the Intracoastal Waterway.

3) Commercial and Recreational boat activity need to be regularly updated with information for Jacksonville waterways, including tributaries and the Intracoastal Waterway.

4) There is a need for continual winter monitoring of industrial warm water outfalls so that we may accurately depict the condition of Duval County manatee populations.

Exemptions

1. For the purpose of considering conditional exemptions from speed restrictions within certain sections of the St. Johns River for the purpose of powerboat racing, ski shows and similar events, the following conditions, limitations, and procedures for application shall apply:

a. Exemption application shall be submitted, at least 90 days prior to the event requested, to the Florida Fish and Wildlife Conservation Commission, Division of Marine Resources, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399, and to the Jacksonville Waterways Commission, 10th floor, City Hall, 220 East Bay Street Jacksonville, Florida 32202. The letters of application must clearly state:

1. The nature and scope of the boat race, ski show or other event including estimated numbers and nature/configuration of vessels involved and maximum speeds anticipated;

2. The specific area within which the race is requested, described within the letter of application and depicted on a National Ocean Survey nautical chart;

3. The intended month and day (if known) of the requested event;

4. Justification for holding the event within waters regulated for manatee protection, clearly demonstrating why an alternative site is unsuitable for the racing event.

b. Exemption consideration shall be limited as follows:

1. Exemptions will be considered only along the St. Johns River between the Hart Bridge and the Acosta Bridge;

2. The season of exemption consideration shall be from April 1 through October 31;

3. Exemptions shall be approved only for events to be conducted during daylight hours.

c. Upon receipt of letters of exemption from FWCC and the Jacksonville Waterways Commission, an exemption must comply with all the applicable provisions of this ordinance and with all conditions and limitations within the non-transferable letter of exemption as well as with any specific notice requirements as may be requested by the Florida Marine Patrol and the Jacksonville Sheriff's Office. Failure to comply with exemption conditions, and any finding of fraudulent use and/or application for said exemption, shall be cause for its immediate revocation, including a suspension of exemption privileges prior to or during the exempted event.

d. The recipient shall also comply with all other conditions (and/or determinations issued concurrent with or subsequent to said letter of exemption) as may be specified in association with U.S. Coast Guard and other appropriate State or Federal permits as they may relate to manatee protection.