FINAL

RESOLUTION NO. 90-35

A RESOLUTION OF ST. JOHNS COUNTY SUPPORTING THE CREATION OF "AQUATIC PRESERVE STATUS" (F.S. CHAPTER 258.35-258.394 AND 258.40-258.46) FOR STATE-OWNED SUBMERGED LANDS ALONG THE EASTERN SHORELINE OF THE ST. JOHNS RIVER, FROM THE NEW SHANDS BRIDGE NORTHWARD, INCLUDING HALLOWES COVE, TO OLD BULL'S BAY, EASTWARD TO INCLUDE THE SOUTH SHORE OF JULINGTON CREEK, TO INCLUDE DURBIN CREEK TO DURBIN SWAMP, TO ALSO INCLUDE THE UNNAMED NATURAL DRAINAGES, AND PETTY BRANCH, KENDALL CREEK, ORANGE GROVE BRANCH, KENTUCKY BRANCH, MILL CREEK, CUNNINGHAM CREEK, FLORA BRANCH, CORKLAN BRANCH, ALL TRIBUTARIES OF THE ST. JOHNS RIVER LYING IN THE NORTHWEST QUADRANT OF ST. JOHNS COUNTY.

WHEREAS, the Florida Aquatic Preserve Act of 1975, Chapter 258.35-258.394 and 258.40-258.46 Florida Statutes, authorizes the setting aside in perpetuity for the benefit of present and future generations state-owned submerged lands which have exceptional biological, aesthetic, and scientific value; and,

WHEREAS, the Durbin Creek system and Hallowes Cove demonstrate very high quality habitat for both finfish and shellfish as documented by the studying and sampling since 1975 by Dr. Carol DeMort, University of North Florida (see attached document #1); and,

WHEREAS, the endangered Florida manatees are a year-round resident of the St. Johns River, and, outside of the winter period, are seen regularly in the Hallowes Cove and Durbin Creek systems feeding, resting, cavorting, and birthing (see attached document #2); and,

WHEREAS, the river and creek associated lands consist of a diverse assemblage of plant communities such as freshwater marsh, cypress swamps, bottomland hardwood swamps, and other mixed hardwood swamps, and hardwood hammocks; and,

WHEREAS, these natural areas provide food and habitat for much wildlife including the river otter, alligator, deer, bear, Florida panther, wild turkey, Indigo snake, ibis, herons, osprey, and the bald eagle (see attached document #3); and,

WHEREAS, rapid growth, five DRI's, two approved and three proposed, and the proposed Southeast Duval Landfill, and the

proposed DOT southern loop beltway, as scheduled threatens the survival of these ecosystems; and,

WHEREAS, these remaining natural areas are excellent representations of Florida's natural heritage and the importance and benefits of protecting these resources and preserving the natural ecosystem of this area will be recognized when declared an aquatic preserve;

NOW, THEREFORE, BE IT RESOLVED, this 13th day of February, 1990, the Board of County Commissioners of St. Johns County, Florida, requests as follows:

Section 1. The Board of Trustees of the Internal Improvement Trust Fund declare the aforementioned river and creek systems (shown on attached document #4) as the Durbin Creek, Hallowes Cove, St. Johns River Aquatic Preserve.

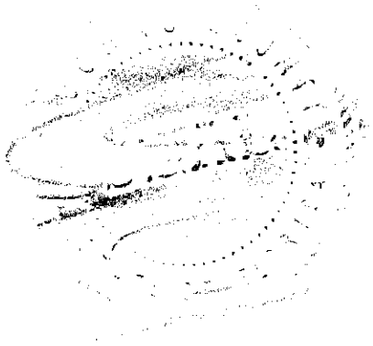
Section 2. St. Johns County requests the Board of Trustees of the Internal Improvement Trust Fund to develop and administer a management plan for the preserve.

BOARD OF COUNTY COMMISSIONERS
OF ST. JOHNS COUNTY, FLORIDA

By: Craig A. Maguire
Its Chairman

ATTEST: CARL "BUD" MARKEL, CLERK

By: Amy B. Mulligan
Deputy Clerk

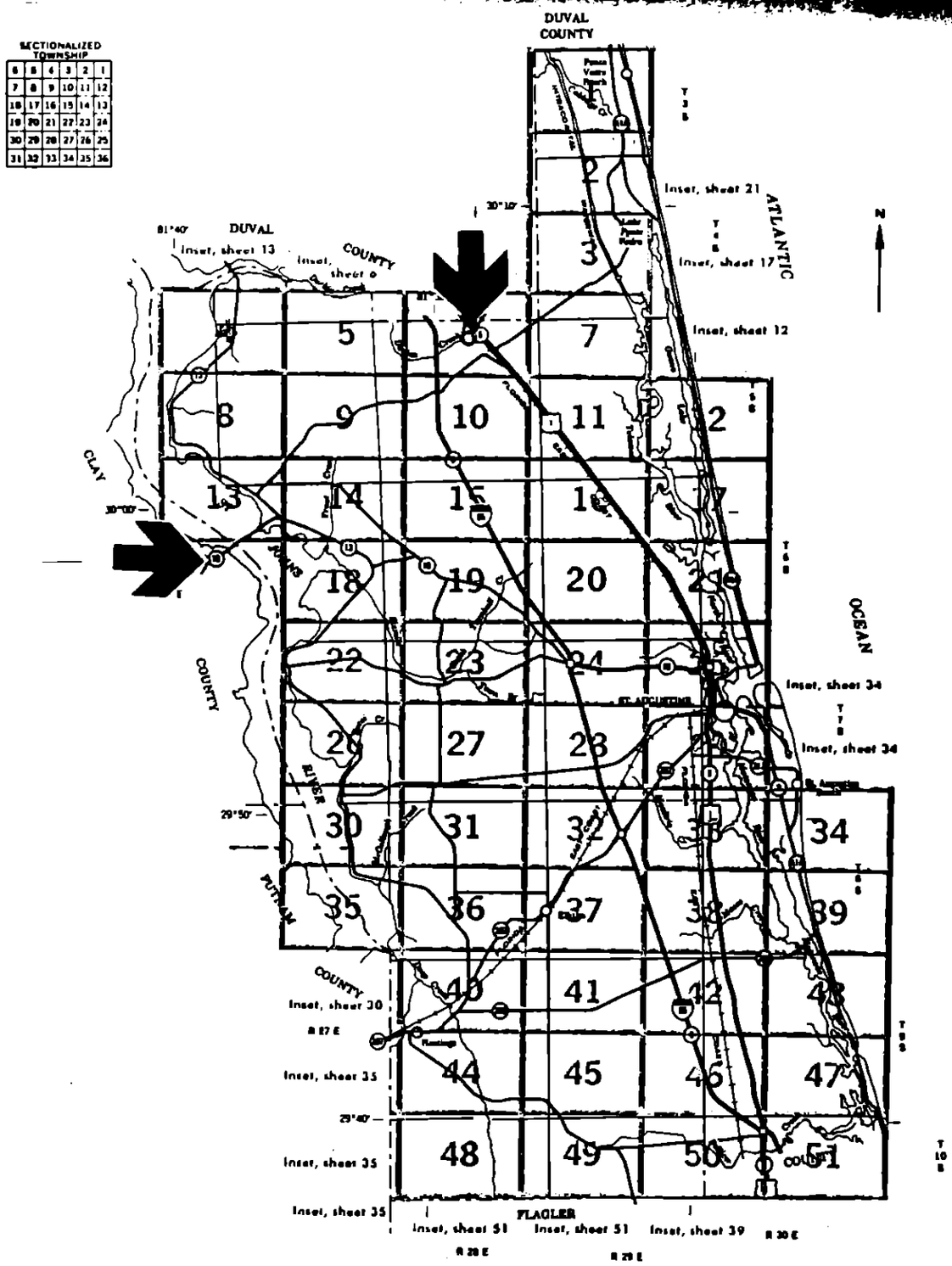


RESOLUTION 90-35

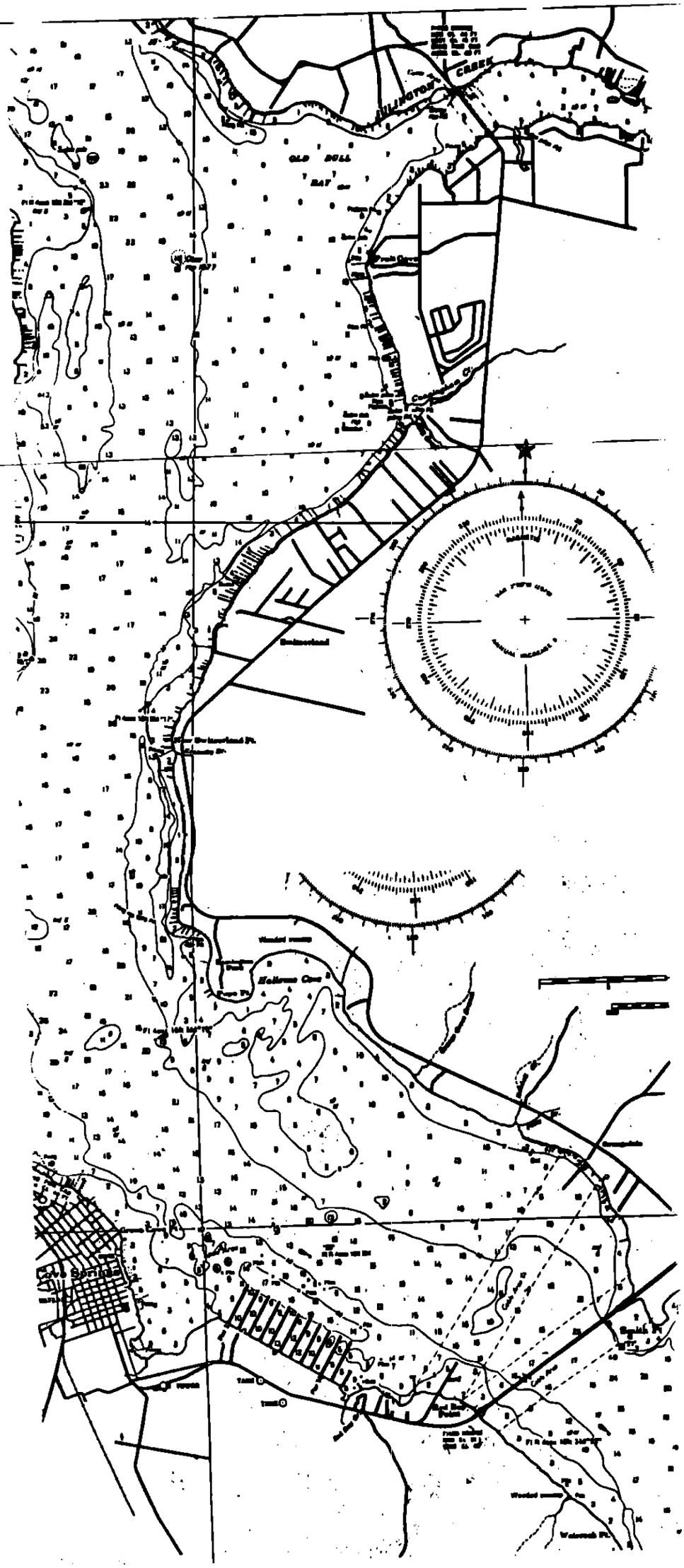
DURBIN CREEK, HALLOWES COVE, ST. JOHNS
RIVER AQUATIC PRESERVE BOUNDARY DESCRIPTION.

This preserve shall include those sovereignty submerged lands within the following described boundaries:

Begin at the eastern side of new Shands Bridge using as eastern landmark the William Bartram Scenic Highway (SR-13), including all sovereignty submerged lands lying within the Ordinary High Water (OHW) line on the east and extending to the west to include all that land within the boundaries of St. Johns County with exception of navigational channels, proceeding northerly including unnamed natural drainages, Orangedale, Petty Branch, Kendall Creek, Orange Cove Branch, Hallowes Cove, Popo Point, Remington Park, Kentucky Branch, New Switzerland Point, Switzerland, Mill Creek, Cunningham Creek, Fruit Cove, Old Bull's Bay, proceeding easterly and following landmark Fruit Cove Road North and Racetrack Road, to Julington Creek, using southern shore OHW and to the north one thousand feet (1000'), proceeding easterly to include Flora Branch, Pine Bluff, Durbin Creek within OHW on each side, Corklan Branch, Bowen Branch, Sampson Creek, continue Durbin Creek, proceeding southerly under Racetrack Road, proceeding easterly under I-95 and northerly to U.S. Highway 1.



INDEX TO MAP SHEETS


CREEK
OLD MILL
Cape Banks

Return to Sarah Bailey

Lestan Woneka
328-8321

40 Box 1429
Palatka Fl

JULINGTON - DURBIN CREEK

REVISED PROJECT DESIGN

November 1, 1989

Prepared for the
Conservation and Recreation Lands Program

By
St. Johns River Water Management District
Division of Land Acquisition

In Cooperation With
Jacksonville Environmental Lands Selection Commitee
Jacksonville Planning Department

Revised Project Design

JULINGTON - DURBIN CREEK

I. Introduction

This project design covers approximately 2,279 acres on and adjacent to the peninsula formed by Julington and Durbin Creeks in southern Duval County. The tract is bounded on the north by Julington Creek and Old St. Augustine Road, on the east by adjacent upland and varying interspersed isolated communities as a buffer to Interstate 95, on the south by Racetrack Road, crossing Durbin Creek and westward to the Jacksonville Electric Authority right-of-way and on the west by the confluence of Julington and Durbin Creeks. The legal description is parts of Sections 24-28 and 35 of Township 4 South, Range 27 East; parts of Sections 30-31 of Township 4 South, Range 28 East; and part of Section 5 and 6 of Township 5 South, Range 28 East, as shown on the attached map. The majority of the tract is located in Duval County while the remaining 187 acres are located in St. Johns County.

The original project design acreage, 3,305 acres, covered the entire peninsula including the primarily upland buffer adjacent to interstate 95. This plan covers approximately 2,279 acres of which roughly two-thirds (1,435.5 acres) are in the wetland vegetative classification. Although there are several parcels indicated in the property appraiser's books, there are only two major owners. The major owners are the Applebaum Trust, managed by Warren A. Weiss, Trustee, and J.E. Williams. The minor owners are Sarah Burroughs with approximately 20 acres,Emma Rudin , 40 acres, and W.W. Cummer,acreage crossing road for parcel on the southside of Racetrack Road, within the project area. The Jacksonville Electric Authority does have a right-of-way with

powerline that traverses the site. The property is currently zoned Open Rural District (OR) with an approximate taxable value of $962,883.

The Julington - Durbin Creek Peninsula was submitted in 1981 by the Rivercoast Chapter of the Florida Wildlife Federation under Sarah Bailey's coordination, with assessment by the Division of Forestry in March of 1982. It was ranked 33 in 1982, and continued in the top ranked projects through 1986 when it was number 16. The Julington Durbin CARL project was among those projects identified with Legislative Condemnation Authority by Fl. law 87-28. The legislature extended the expiration date of such authority to September 1, 1993 for exercising eminent domain. In 1988, this project remained in the pool of projects, ranked 63, with request for redesign of the project boundary.

Acquisition of this project will help protect a natural floodplain that has considerable value as a hydrological resource and related environmental benefits. The City Council of Jacksonville and the St. Johns County Parks and Recreation Department are supportive of efforts to provide additional passive recreation opportunities in this area of the counties. Use of this area as a nature park with associated activities and environmental education for the local citizens of the larger metropolitan area of Jacksonville will compliment the forest management described in the earlier project design. No public facilities of this kind are located in this southern Duval County area. Durbin Creek , to the south is designated as Bartram's Canoe Trail.

Julington - Durbin Creek project area is bordered by Julington and Durbin Creeks for approximately 9 miles and contains 2 major ecosystems, Hardwood Swamp and Sandhills. A number of large, virgin cypress trees and

the rare Bartram's ixia are reported to exist on the tract. Sightings of bald eagles, osprey, wild turkey, black bear and the Florida panther have been reported in this area. One significant archeological site has been recorded (8Du51) with a high probability of others. Historically the Tomoka Trail passes through the tract and Bartram's travels document the area.

II. Ownership Pattern

Applebaum Trust is the major owner on the Julington-Durbin Creek Peninsula. The Jacksonville Electric Authority, J.E. Williams, Emma Rudin, Sarah S. Burroughs, and W.W. Cummer are listed as minor owners. Following are parcels, owners, and taxable values.

Parcel No.	Owner	Acres		Taxable Value
158771-0000 4*	Sarah S. Burroughs	40.	(1/2)	6,800.
158772-0000 0	Warren A. Weiss, Tr.	545.		78,500.
158769-0000 0*	Warren A. Weiss, Tr.	640.	(3/4)	961,000.
158775-0000 8	Warren A. Weiss, Tr.	100.		3,600.
158774-0000 2	Warren A. Weiss, Tr.	320.		33,800.
168130-0000 6	City of Jacksonville			
168131-0000 2*	Warren A. Weiss, Tr.	355.	(1/5)	39,700.
168134-0000 *	Warren A. Weiss, Tr.	485.	(1/3)	195,700.
168135-0000 6*	Warren A. Weiss, Tr.	390.	(1/4)	41.100.
168136-0000 0	J. E. Williams	160.		23,500.
168137-0000 0	J. E. Williams	80.		12,000.
168138-0000 0	J. E. Williams	160.		21,800.
023590-0000	J. E. Williams	59.1		6,390.
023580-0000	Emma Rudin	40.		24,740.
023610-0000*	W. W. Cummer	253.	(1/20)	24,070.

* Indicates portion of the parcel, total taxable value listed.

III. Land Use and Development

The project area is currently zoned Open Rural District with no proposed changes at this time. Access to the site is provided by a dirt road from the north,

off St. Augustine Road, and from the south, off Racetrack Road. There is no vehicle access across Corklan Branch, which separates the area.

The project area lies within the Jacksonville Southeast Planning District , the City's most rapidly growing area of the 1980's. The Avenues, a regional mall currently under construction, is within 3 miles of the site. The junction of Interstate 95, Interstate 295, and US 1 (Phillips Highway) to the north of the project marks the site of this regional shopping center which will serve the tri-county area of Duval, St. Johns, and Clay Counties. Gran Park, a nearby light industrial-commercial park, is in the permitting phase of development and will be built on 934 acres between Interstate 95, US 1 (Phillips Highway) and St. Augustine Road. There is a need to preserve the significant environmental areas within this region to protect and stabilize the limited natural resources and quality of life.

IV. Coordination

The revised Julington-Durbin Creek project area is supported by the City Council of Jacksonville with a resolution (attached). John Crofts, Director of Jacksonville Planning Department, and Dan Miller, Planner, have provided information on ownership, taxable value, and the tax parcel maps and aerials of the area. Commissioner Sarah Bailey of St. Johns County and Leon Shimer, Parks and Recreation Department arranged a site tour and want to assure access from the south of the property for the citizens in St. Johns County. There is a significant need for inland recreational opportunities of this type for both counties.

The St. Johns River Water Management District is currently engaging an outside consultant to compile information needed for a basin acquisition study for the Lower St. Johns and Nassau River Basins. The significant hydrological value of this project area makes the wetland portion of this project a potential acquisition by the District. Julington-Durbin Creek project area can serve a much broader need when viewed as a cooperative project with the CARL program, to enhance the recreational opportunities, to provide on-site location for environmental education, and to manage selectively for natural forest production for this region.

V. Summary

The Julington-Durbin Creek project contains approximately 2,279 acres proposed for purchase under a joint project scenario by the Conservation and Recreation Lands Program and the acquisition program of the St. Johns River Water Management District. The majority of the tract is located in southern Duval County, with additional funding support possibly through the Jacksonville Environmental Lands Selection Committee.

A variety of community types exist on the property, making it a significant multiple-use are for the expanding population centers of Duval and St. Johns Counties. Recreation management, wildlife and timber management should be given equal consideration so that resources will be utilized in the balance that will best serve the people of the State. Cooperative management between state agencies is under consideration. As this revised project boundary has developed to focus on the environmentally sensitive areas of the site, it remains

to complete inter-agency discussion as well as contact the additional minor land owners included.

It is appropriate to define the Julington Durbin Creek project area to reflect the needs of the area and resources available as the development threat continues strong. This tract provides considerable value as a hydrological resource and should be protected for that value, but allows the resource to provide many multi-use opportunities in return to the local citizenry.

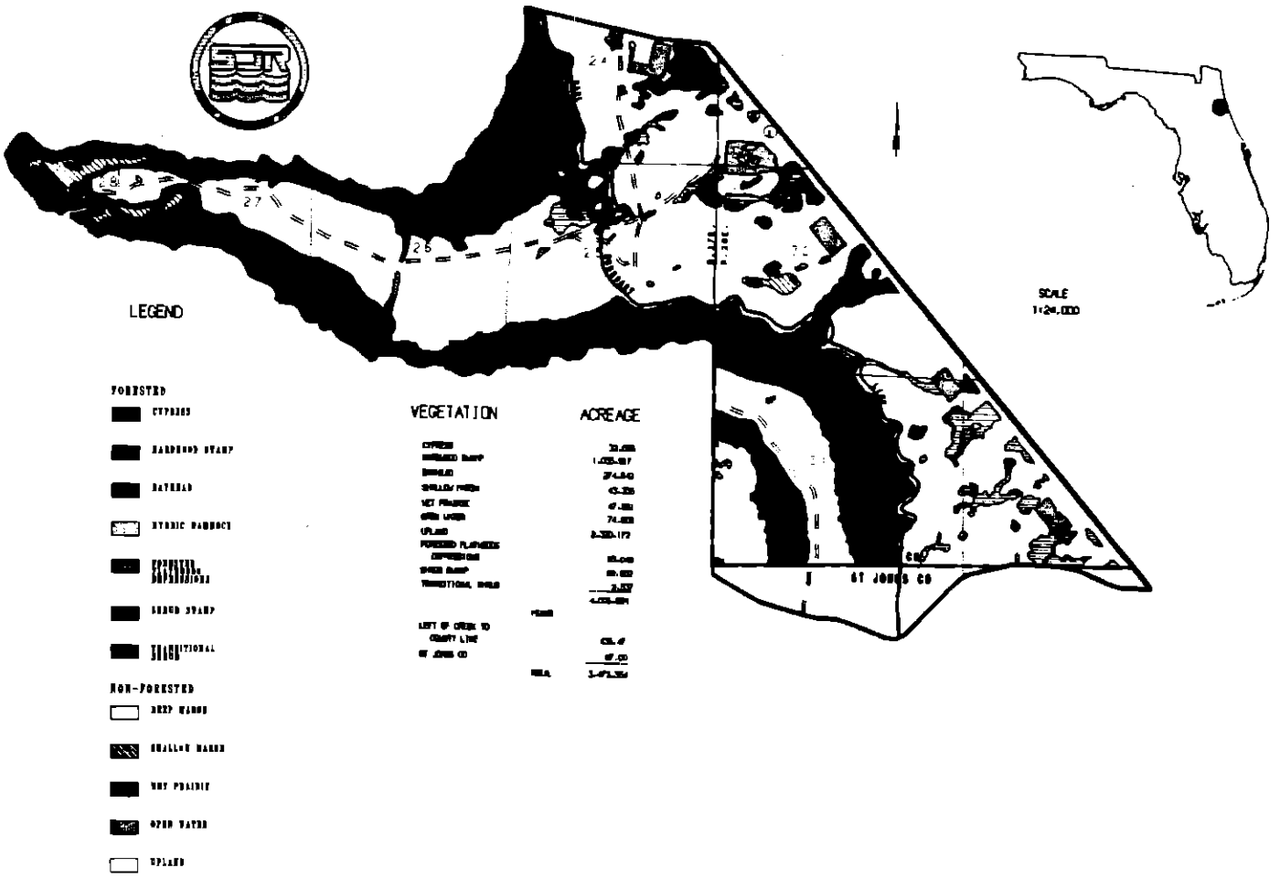
VI. Attachments

Maps

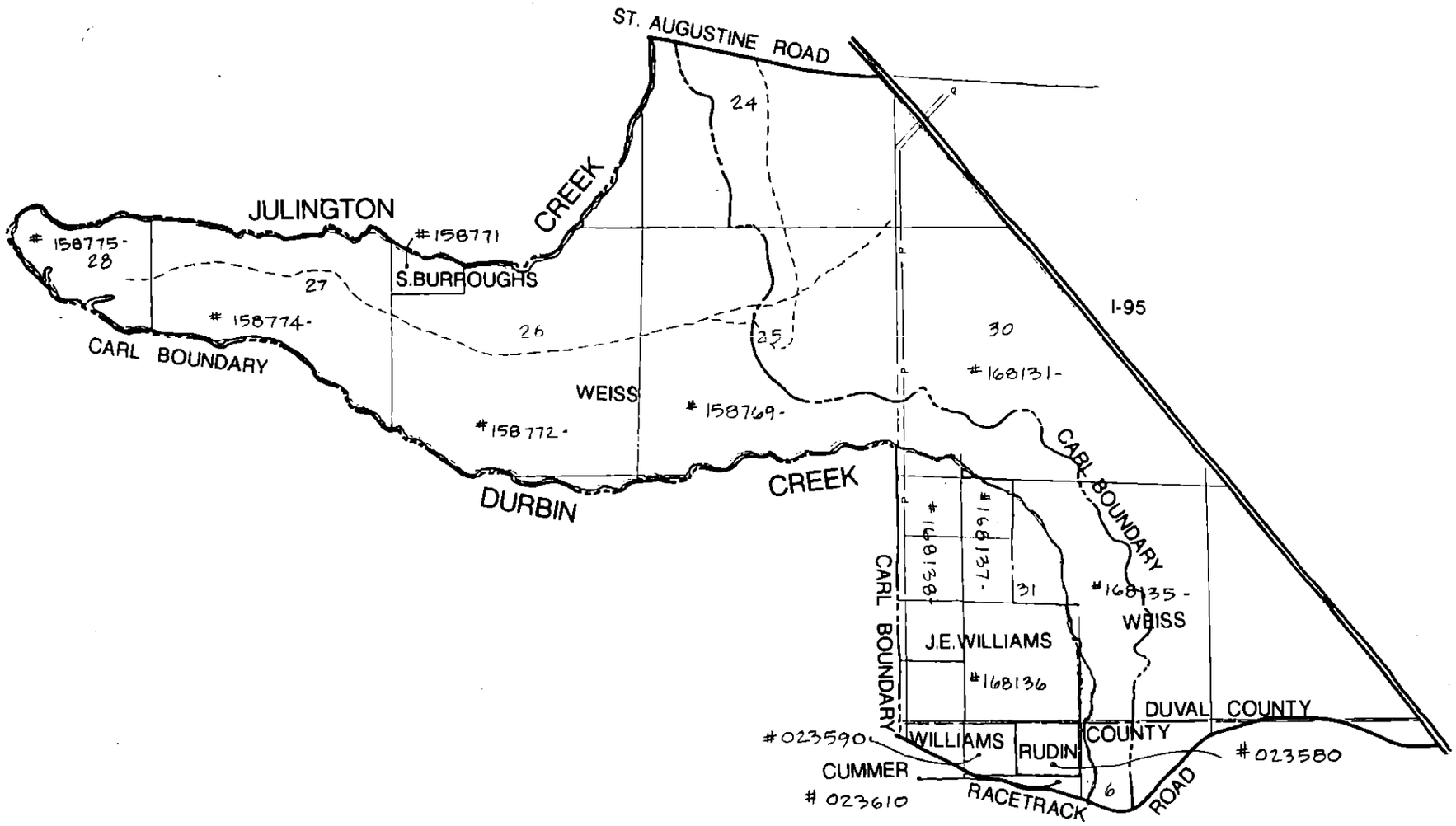
1. Tax Plat Maps and Aerials
2. Project Design

Resolution from Jacksonville City Council

JULINGTON - DURBIN CREEK



JULINGTON - DURBIN CREEK PROJECT AREA

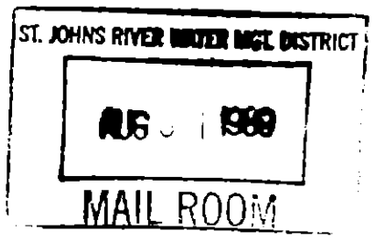


OFFICE OF CITY COUNCIL

JIM WELLS
COUNCILMAN-AT-LARGE
(904) 633-3721

220 E. BAY STREET
JACKSONVILLE, FLORIDA
32202

August 24, 1989



Mr. Henry Dean, Executive Director
St. Johns River Water Management District
Post Office Box 1429
Palatka, Florida 32078-1429

Dear Mr. Dean:

The Jacksonville City Council recently approved the enclosed Resolution 89-624-210. The Council supports the St. Johns River Water Management District's efforts to acquire lands which are of environmental and water management significance. Furthermore, the Council urges and requests the District to designate as its top priority land acquisition in the Lower St. Johns River Basin the Julington/Durbin Creek Peninsula.

We are hopeful that with the combined resources of the CARL program, the St. Johns River Water Management District, the City of Jacksonville, and various other potential public and private sources, we will be able to preserve for the public this valuable natural area.

Sincerely,

Jim Wells

Councilman Jim Wells, Chairman
Jacksonville Environmental Lands
Selection Committee

JW/tc

Enclosure

cc: SJRWMD Governing Board
John L. Minton, Chairman
Saundra H. Gray, Vice Chairman
Ralph E. Simmons, Treasurer
Merritt C. Fore
Val M. Steele
Thomas L. Durrance
Joe E. Hill
Joseph D. Collins
Alice J. Weinberg, Secretary
John Hankinson, Director, Department of Planning and Acquisition
Latane Donelin, SJRWMD

AMENDED 6/27/89

Introduced by the Council Members Wells, Kravitz, Carlucci and Davis:

RESOLUTION 89-624-210

A RESOLUTION SUPPORTING THE LAND ACQUISITION EFFORTS OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT; URGING AND REQUESTING THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT TO DESIGNATE AS ITS TOP PRIORITY LAND ACQUISITION IN THE LOWER ST. JOHNS RIVER BASIN THE JULINGTON/DURBIN CREEK PENINSULA; PROVIDING AN EFFECTIVE DATE.

WHEREAS, the St. Johns River Water Management District, as part of the District Strategic Land Acquisition Plan, is engaged in acquiring property in order to preserve lands that produce high water resource and related environmental benefits, and to facilitate the restoration of altered systems from which such benefits have been lost; and

WHEREAS, the City Council of Jacksonville, Florida, recognizes that the Julington/Durbin Creek Peninsula, now privately owned, is property which is of water management significance for the City of Jacksonville, and is of critical importance in maintaining the water quality of the St. Johns River; now, therefore

BE IT RESOLVED by the Council of the City of Jacksonville:

Section 1. The City Council of Jacksonville hereby fully endorses and supports the efforts of the St. Johns River Water Management District in its efforts to acquire lands which are of environmental and water management significance.

Section 2. The City Council hereby urges and requests the St. Johns River Water Management District to designate as its top priority land acquisition in the Lower St. Johns River Basin the Julington/Durbin Creek Peninsula.

Section 3. This resolution shall become effective upon signature by the Mayor or upon becoming effective without the Mayor's signature.

RESOLUTION 89-624-210

CERTIFICATE OF AUTHENTICATION

DECLARED AN EMERGENCY MEASURE AND
ADOPTED BY THE COUNCIL

June 27, 1989

TERRY R. WOOD
COUNCIL PRESIDENT

ATTEST:

CHERYL D. KIDD
SECRETARY TO THE COUNCIL

APPROVED Jun 30, 1989

THOMAS L. HAZOURI, MAYOR

FLORIDA GAME AND FRESH WATER FISH COMMISSION

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32399-1600
(904) 488-1960

June 28, 1989

Mr. Jeremy Tyler
Department of Environmental Regulation
3426 Bills Road
Jacksonville, FL 32207

RE: DER # 551560982
Southwood Properties,
St. Johns County

Dear Mr. Tyler:

The Office of Environmental Services of the Florida Game and Fresh Water Fish Commission reviewed and commented on the referenced application when it was submitted for a Corps permit approval (see attached letter). Despite recent modifications to the scope of the initial project, our comments of January 10, 1989, remain applicable to the proposed marina facility.

Please contact me if we may provide you with any additional information.

Sincerely,

Douglas B. Bailey

Douglas B. Bailey
Assistant Director, Office
of Environmental Services

DBB/MA
ENV 1-5-2
Attachment

January 10, 1988

Colonel Robert L. Herndon
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Public Notice 88IPR-21044
Southwood Properties, Inc.
St. Johns County

Dear Colonel Herndon:

The Office of Environmental Services of the Florida Game and fresh Water Fish Commission has reviewed the referenced application and offers the following comments.

The applicant proposes to construct two recreational marinas, an 84-slip marina and a 144-slip marina, in the Hallowes Cove area of the St. Johns River near Green Cove Springs. Both marina locations would extend at least 600 feet offshore and waterward of any adjacent submerged grass beds. Fuel service and sewage pumpout facilities would be provided at each location. No dredging is proposed for this project.

At both marina sites, aquatic vegetation dominated by eelgrass (Vallisneria americana) extends outward from the shoreline for approximately 300 feet. Due to the poorer flushing characteristics associated with marina Location #2, Hydrilla (Hydrilla verticulata) abundance is noticeably higher in this area.

The area from Popo Point through, and including, all of Hallowes Cove has been sampled yearly since 1984 by the Commission as part of the State Wide Rivers Monitoring Program. Collected species of exceptional interest (both saltwater and freshwater) are: flier (Centrarchus macropterus), gray snapper (Lutjanus griseus), spotted seatrout (Cynoscion nebulosus), and sand seatrout (Cynoscion arenarius) The flier is of special interest because it is rarely collected in the St. Johns River while the saltwater gamefish listed are of interest due to the fact that juveniles were collected. Most of the freshwater sportfish collected were juveniles also, indicating the value of eelgrass as nursery habitat. (A summary of this data is shown in Tables 1 and 2, and a more in-depth analysis is available if requested).

Based on research information generated to date, the eastern shoreline of the St. Johns River in the vicinity of Halloves Cove is regarded as an extremely productive nursery area for freshwater sportfish and forage fish. Similar work currently being conducted by other investigators is showing that the loss of productive nursery areas as a result of water quality deterioration and physical alteration is contributing to the rapid decline of both sport and commercial fisheries within the river.

We are primarily concerned with the secondary effects on water quality and the loss of productive habitat and concurrent sport and commercial fish production following the construction and operation of the two proposed marinas. Long-term impacts to adjacent submerged aquatic vegetation may be extensive due to the resuspension of sediments from boat propellers, the potential for uncontained spills from the proposed fuel service and sewage pumpout facilities, and the increased concentration of outboard motor oil, fuel, and anti-fouling compounds in the water that can result from the berthing of as many as 144 large boats in a concentrated area.

The operation of boat propellers in close proximity to the bottom resuspends sediments and increases turbidity. Grass beds are covered as sediments settle out, and the increased turbidity reduces the light available that aquatic plants require for photosynthesis, thus reducing productivity. Additionally, a growing literature exists on the lethal and sublethal effects of toxic marina compounds on aquatic organisms. Polycyclic aromatic hydrocarbons are known to occur in higher concentrations in aquatic environmehts that receive accidental releases of petroleum and sewage effluent (Eisler, 1987). These compounds are demonstrably carcinogenic, mutagenic, or teratogenic to a wide variety of organisms, including fish, mollusks, and other aquatic life. Similarly, the release of copper, tributyl tin, and other anti-fouling compounds into the water column is known to result in shell malformation and reduced reproductive capability in bivalves (Thain, 1986).

The long-term effect of increased propeller action and elevated concentrations of toxic compounds along the St. Johns River shoreline is to disrupt the food chain and diminish the shoreline's value as an important fish nursery area. Since this portion of the St. Johns River has been identified by the Florida Legislature as a priority area under current Surface Water Management and Improvement (SWIM) legislation, any activity that would result in the permanent loss of additional productive habitat violates the intent of the 1987 SWIM act.

The availability of existing angler access and facilities similar to those being proposed should be considered in the context of this application. Two other marinas offer commercial services (one selling

fuel) on the Green Cove Springs side of the river in the immediate area of marina Location #2. Another existing marina that offers the sale of fuel is located directly opposite marina Location #1, and two public boat ramps exist on the river in the town of Green Cove Springs. A fishing pier exists on the east bank of the river in Orangedale immediately upstream of marina Location #2. At least six marinas (four that offer fuel sales and four that offer commercial services) are located within four miles of the proposed site (four downstream and two upstream). We believe this raises a serious question over the need for additional marina facilities, particularly when providing such services is accompanied by a very real potential for habitat degradation and subsequent impacts to the river's sport and commercial fisheries.

For the reasons stated above, we are opposed to the issuance of a permit for the project as proposed. However, an acceptable alternative may be the construction of upland storage facilities and boat ramps for the use of residents in this area.

We appreciate the opportunity to comment on this application. Please keep us apprised of your intended actions regarding this application and send us a copy of your final agency action.

Sincerely,

Bradley J. Hartman

Bradley J. Hartman, Director
Office of Environmental Services

BJH/MA
ENV 1-5-2
Attachment

Table 2. Listing of fish species collected from Hallowes Cove, St. Johns River, from 1984 to 1987 during fish population sampling.

FRESHWATER SPECIES

largemouth bass	Micropterus salmoides
chain pickerel	Esox niger
bluegill sunfish	Lepomis macrochirus
redear sunfish	Lepomis microlophus
redbreast sunfish	Lepomis auritus
spotted sunfish	Lepomis punctatus
warmouth	Lepomis gulosus
flier	Centrarchus macropterus
bluespotted sunfish	Enneacanthus gloriosus
golden shiner	Notemigonus chrysoleucas
coastal shiner	Notropis petersoni
Seminole killifish	Fundulus seminolis
rainwater killifish	Lucania parva
brook silverside	Labidesthes sicculus
Tidewater silverside	Menidia beryllina
clown goby	Microgobius gulosus
freshwater goby	Bobionellus shufeldti
mosquito fish	Gambusia affinis
threadfin shad	Dorosoma petenese
gizzard shad	Dorosoma cepedianum
lake chubsucker	Erimyzon sucetta
channel catfish	Ictalurus punctatus
white catfish	Ictalurus catus
brown bullhead	Ictalurus nebulosus
yellow bullhead	Ictalurus natalis
American eel	Anguilla rostrata
Florida gar	Lepisosteus osseus
bowfin	Amia calva
blue tilapia	Tilapia aurea

SALTWATER SPECIES

spotted seatrout	Cynoscion nebulosus
sand seatrout	Cynoscion nothus
gray snapper	Lutjanus griseus
striped mullet	Mugil cephalus
white mullet	Mugil curema
spot	Leistomus xanthurus
spotfin mojarra	Eucinostomus argenteus
yellowfin mojarra	Gerres cinereus
Atlantic menhaden	Brevoortia tyrannus
Pinfish	Lagodon rhomboides
bay anchovy	Anchoa mitchilli
hogchoker	Trinectes maculatus
Atlantic needlefish	Strongylura marina

Table 1. Results of four 30-minute electrofishing samples taken in Hallowes Cove, St. Johns River, yearly from 1984-1987.

	Average number of fish collected	Range	Average Total Wt. (gms) collected	Range
All species	570	445-727	55,671	20,214-67,474
Freshwater species	447	395-626	33,208	20,214-47,145
Sportfish species	232	166-324	18,171	9545-23,769
Commercial species	18	7-44	5,514	704-9,542
Forage species	190	126-254	5,188	4,296-5,899
Saltwater species	123	78-178	22,753	13,465-32,382
striped mullet	60	51-67	20,051	7820-24,345

Total # of Species collected:	Freshwater	Saltwater	Combined
	20	7	27

REFERENCE

Eisler, R. 1987. Polycyclic aromatic hydrocarbon hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish Wildl. Serv. Biol. Rep. 85(1.11). 81 pp.

Thain, J. 1986. Toxicity of TBT to bivalves: Effects on reproduction, Growth and survival. Pages 1306-1313. In Proceedings: Organotin Symposium, Volume 4.

Save the Manatee® Club

PREPARED STATEMENT FOR THE PUBLIC RECORD
Judith Delaney Vallee, Executive Director, Save the Manatee Club

The Save the Manatee Club is a nonprofit, national organization with over 20,000 members nationwide.

According to researchers, there are estimated to be about 150 manatees that use the St. Johns River. About 15 to 20 mortalities per year occur in the St. Johns, with about one third of these the result of boat/barge collisions. Although most of this mortality occurs in Duval County and south of the subject property, manatees use the subject property area on a regular basis and need further protection there.

The area is an important non-winter feeding and resting area for manatees. The area is also used as a travel corridor by manatees, according to a report from the Marine Mammal Commission. Manatees tagged at Blue Spring State Park in 1979 and 1980 were known to use these areas. There have been many manatee sitings in this area. The research data comes from respondent sightings of manatees, aerial surveys, and radio telemetry. Aerial surveys in 1982-1983 and the summer of 1988 over this area document regular use during non-winter periods. According to the Commission report counts of up to 48 animals were recorded during non-winter aerial suveys in 1982-1983 and a count exceeding 90 animals was recorded in 1988. "Almost all animals seen were seen feeding, resting, or cavorting along...both sides of the St. Johns River." Manatees were seen for the most part, close to shore. According to a report by the National Ecology Research Center prepared in 1988 for the Jacksonville Corps of Engineers, "preliminary results from ongoing radio-tracking studies also suggest frequent use of these areas by manatees." Manatees seem to be most abundant from July through September which is also the period of peak boating activity.

The number of boat registrations has increased by 81% during the ten-year period from 1977/78 to 1986/87 in St. Johns County and by 114% in Clay County. The Marine Mammal Commission report states that this area is a major non-winter feeding, resting, and cavorting area for a "substantial portion of the East Coast manatee population." The Commission recommended in their report that a shoreline slow speed zone be established within one-quarter mile of shore. In their Biological Opinion for the Corps, the U.S. Fish & Wildlife Service lists this recommendation as part of their Conservation Recommendations. According to the Biological Opinion, this site is located in manatee critical habitat. The Service then went on to issue a jeopardy opinion on both the Hallowes Cove site and the subject property site stating that these marinas would "jeopardize the continued existence of the manatee."

The importance of this area to manatees cannot be questioned. Loss of habitat is the underlying cause of all manatee mortality and the important seagrass beds in the area need to be protected. We strongly feel that a shoreline slow speed zone that includes the applicant's 5 miles of shoreline be in place prior to the permitting of this project.

There exists a direct correlation between higher numbers of boats and higher manatee mortality. We believe the permitting of this project is likely to cause additional boat-related manatee mortality and possible destruction of manatee critical habitat.

However, if the permit is issued we concur with the Service's Reasonable and Prudent Alternatives listed in their Biological Opinion for the Corps. We also concur with the Services' Conservation Recommendations, and urge the Corps, if it approves the permit application, to make these recommendations part of the permit conditions.

Anticipated/Budget for the minimal on-site management of the Proposed St. Johns River/Hallowes Cove/Durbin Creek Aquatic Preserve: First Year

Salary and Benefits

Environmental Specialist II level	$32,590
Secretary Specialist	$16,620
	$49,210

Start Up Capital Outlay

Boat Motor and Trailer	$12,500
4X4 Utility vehicle (per state contract)	$13,500
Camera, tripod and associated field equipment	$500
Porta-mobile radio	$1,000
Personal computer/word processor	$3,700
	$31,200

Expenses

Office Rental with Telephone	$6,000
Miscellaneous office expenses (i.e., postage, supplies)	$3,000
Gas & Oil, boat, motor, and utility vehicle maintenance and job related travel	$6,235
Office furniture	$5,500
	$20,735

TOTAL $101,145

Paper Submitted at request of Dr. Robt. Livingstone, F.S.U. for publication in "Rivers of Florida" book

CD

THE ST. JOHNS RIVER

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increases toward the mouth of the river. Table 2 gives concentrations for total nitrogen, total phosphorous, and dissolved oxygen for five locations from the Oklawaha River to the Main Street Bridge at Jacksonville.

The UNF Coastal Fisheries Laboratory sampled 23 sites monthly from Lake George to Mayport for a two year period from 1975-1977 and quarterly from 1977-1982. Rice Creek had the highest average nitrate nitrogen concentrations; Cedar River had the highest total phosphate concentrations and the lowest dissolved oxygen concentrations. Main stream sites in the lower river tended to have higher water quality for the parameters of nutrients and dissolved oxygen that impacted tributaries (Table 3).

Within the St. Johns River system as a whole, maximum freshwater discharge occurs typically in October and corresponds with lowest salinities. Specific years and months vary widely for water quality parameters due to rainfall and temperature fluctuations.

Spring fed sections of the river show more constant temperatures of 20-22° C. The large number of spring boils in the St. Johns modify temperatures in the area of the spring. Spring temperatures remain a relatively constant 23-24° C. These areas become important thermal refuges for fish in both winter and summer. The impact on downstream waters depends on distance from the spring, river depth, and velocity.

The area of the St. Johns immediately upstream and downstream of the mouth of the Oklawaha River is considerably

modified by the dilution of mainstream water with the spring-fed Oklawaha. The temperature range is less extreme and the water is less turbid than the receiving river water. It is a diurnal, sliding effect due to tidal reversal. The St. Johns River is, however, basically a blackwater river, receiving most of its freshwater input from swamps and marshes and only a small percentage of total inflow from springs and spring-fed streams.

The St. Johns estuary is a river dominated, moderately stratified system. In the Mayport area there is a horizontal as well as a vertical salinity wedge. This horizontal wedge extends further west on the south bank than on the north bank. This effect disappears in the Dames Point area. The river is regularly brackish during high tide flow as far as the Buckman Bridge, with high tide salinities of $5^0/00$. During low flow years the saltwater mixing zone may extend south as far as Welaka. Low tide salinities in the Mandarin area North of Buckman Bridge are less than $1.0^0/00$.

Biological Factors

Wetlands

Northeast Florida has 37,451 hectares of wetlands. This is about 10% of the total wetlands within the state (Durako et. al. 1987). At present, no accurate estimate of the total wetlands within the St. Johns River drainage system exists.

The wetlands of the upper St. Johns River to Lake Winder primarily consist of freshwater marshes, dominated by Pontedaria cordata (pickerel weed), Nuphar luteum (spatterdock), and various species of Sagittaria. Cladium jamaciense is also abundant in

these marshes.

In the marshes from Lake Winder northward Spartina patens (Cordgrass) covers large areas of intermittently flooded wetlands. In the Puzzle Lakes area, the water is saline. Spartina patens still dominates the marshes. Bacopa monieri (water hyssop), Sesuvium portulacastrum (seaside purselane), and Salicornia bigelovii (glasswort) form extensive mats on wet sands and muds on the upland edges of many of the marshes in this area. The Mullet Lake slough area contains vegetation similar to the Puzzle Lakes region, dominated by halophytes.

From Lake Monroe to Lake George, the marshes are again dominated by freshwater species similar to the vegetation above Lake Winder. The marshes on the east side of Lake George are characterized by Nuphar luteum, Eichornia crassipes (water hyacinth), and Alternanthera pheloxeroides (alligator weed) on the deep water edges and Panicum agrostoides (panic grass) Panicum repens (torpedo grass), Panicum hemitomon (maiden cane), Paspalum repens (water paspalum), Scirpus cyperinus (woodgrass bulrush), and several species of Sparganium (burreed). The author found several large stands of Phragmites communis (common reed) within shallow marshes on the west side from 1972-1981. In 1982, most of these stands had disappeared and contained only a few plants.

Typhus latifolia (cattail) is common in the freshwater marshes throughout the area, occurring as far north along the St. Johns as Goodbys Creek in Jacksonville. The freshwater marshes bordering the river from Lake George north into Jacksonville are

similar in species composition to Lake George.

The wetlands in Duval County are dominated by saltmarshes. Much of the total area of salt marsh communities of the lower St. Johns is a characteristic high tide marsh of Juncus roemerianus (Black Needlerush). High tide marsh occurs extensively throughout the area from the eastward bend of the river to Sisters Creek, along the northern boundary of the watershed (fig. 2).

Low marsh is limited to the narrow edges of tidal creeks along the north bank to Sisters Creek. The greatest percent cover of low marsh dominated by almost pure stands of Spartina alterniflora occurs along the southern boundary of the watershed and eastward from Sisters Creek to the primary dunes along the north bank (Fig. 3). Table 4 is a species list of the typical salt marsh vegetation for Duval County (DeMort, 1986). The landward barrier island marsh is dominated by Spartina alterniflora and does not typically contain Juncus (Fig. 4).

Table 4. Duval County Salt Marsh Plant Species

Dominant Species

Batis maritima (Saltwort)

Borrichia frutescens (Sea daisy)

Distichlis spicata (Saltgrass)

Juncus roemerianus (Black needlerush)

Spartina alterniflora (Smooth cordgrass)

Spartina patens (Marsh hay cordgrass)

Associated species

Salicornia virginica (Glasswort)

Sesuvium portulacastrum (Sea purslane)

Suaeda linearis (Sea blight)

Typha angustifolia (Narrow-leaved cattail)

Transitional species

Andropgon elliottii (Broomsedge)

Baccharis halimifolia (Groundsel bush)

Batis maritima (Saltwort)

Cladium jamaicense (Sawgrass)

Iva fruitescens (Marsh elder)

Limonium carolinianum (Marsh lavender)

Lyonia ferruginea (Staggerbush)

Myrica cerifera (Wax myrtle)

Sabal palmetto (Cabbage palm)

Submerged Macrophytes

Vallisneria americana (eelgrass) is the dominant submerged macrophyte throughout the freshwater sections of the river. Because of the shallow euphotic zone that exists within most of

the system, submerged macrophytes are limited in depths to waters that average less than 1 meter.

Submerged grassbeds are important primary producers and nursery habitats as far north as the Mandarin/Jacksonville Naval Air Station area just north of Buckman Bridge. From this area north to the Acosta Bridge, grassbeds are sparse to non-existent. The bottom from the Acosta Bridge to the mouth is characterized by very soft mud substrate that does not support rooted aquatic vegetation in any shallow area with sufficient light penetration. Scoured areas do exist, but these are generally too deep for submerged vegetation. Shallow scoured areas on sand/shell substrates eastward of downtown Jacksonville are often colonized by Ulva lactuca and several species of Enteromorpha.

Macrophyte populations are being studied in the primarily freshwater portion of the lower river from Lake George to Goodbys Creek. These studies include gradient and line transect analysis, monthly sampling for selected stations, quarterly sampling for all stations, and statistical analyses of the data. Preliminary surveys have been carried out in Lake George, Black Creek, Julington Creek, and Buckman Bridge to Jacksonville Naval Air Station. Table 5 lists the dominant macrophyte species for four of the sample sites, areal coverages and current status of the grassbeds as of 1987 (unpublished data, UNF Coastal Fisheries Laboratory).

Soft-bottom Substrates

Most of the tributaries and main channels of the St. Johns are characterized by soft mud and silt bottoms. These sediments contain large quantities of decaying organic material, including entire leaves and stems, fibers, and pieces of vegetation (Joyce, 1985). Very little research has been done on the soft bottom communities of the of the St. Johns River.

Phytoplankton Ecology of the St. Johns River Estuary

Introduction

The phytoplankton of the St. Johns River are relatively unknown. Previous studies have been limited in their approach and involved primarily freshwater sites and identification to genus only (Pierce, 1947; ~~CRWPC~~ FCGFWFC, Dingell-Johnson Project, 1976-1977). These studies give an incomplete picture of the total phytoplankton species diversity and populations within the system.

The UNF study was designed to give a detailed picture of the annual cycles of phytoplankton species in the St. Johns River estuary system, to identify phytoplankton associations, to cluster stations based on similarity of species, and to attempt to determine environmental factors controlling the occurrence of individual species. (See DeMort and Bowman, 1985, for descriptions of methods of data collection and analysis).

A total of 343 species of phytoplankton have been identified from the St. Johns River and the tributaries sampled during this study (Table 6). Averages of species diversity are given for selected stations (Table 7). Highest averages of species diversities were found at Stations D, E, and F, near the mouth of

the river. Lowest diversity indices occurred at the mouth of Trout River (B3), Cedar River (B7), and Ortega River (B8) (Fig. 53).

The lowest average diversities occurred at Station B (32 Km upstream from the mouth) and Rice Creek (RC).

Taxonomic Distribution

Seven stations from Mayport to Lake George were selected for analysis of taxonomic distribution of species. The major taxa listed in Table 7 were chosen on the basis of largest numbers of species within the river system. Diatom species outnumbered Chlorophyte species by more than 2 to 1, with pennate diatoms having slightly more species represented in the collections than centrics.

Annual Cycles of Major Taxocenes

The annual cycles of four major taxocenes were calculated for four stations using 1975 data. Diatoms were clearly the most numerous taxocene for Stations F and D (Figures 7 and 8), comprising from 70% to 90% of the total species composition. Diatom species composition was lowered to between 45% and 75% at Station A near Orange Park (Figure 9). Diatom species amounted to only 40% to 50% of the total species composition at Lake George, with chlorophyte species more numerous than at the more saline stations closer to the mouth (Figure 10).

Seasonal Succession: Stations D. E. and F.

The Seasonal cycles of phytoplankton populations for Stations D, E, and F are given in Figure 11. The cycles for these three downstream stations were very similar. Phytoplankton populations exhibited maximal numbers in June and July with all three showing secondary peaks in December. Station F, the

species. The April peak was dominated by Anabaena flos-aquae, Dinobryon cylindricum, and Melosira italica. The major species in the July peak were Anabaena flos-aquae, Terpsinoe americanum, Diatoma sp. and Ceratoneis sp. During the January peak, 53% were diatoms, 25% Chlorophyta, and 14% Cyanophyta.

Eighteen species were counted in January, twenty in April, and twenty-four in July. Oklawaha had the lowest population densities of the stations sampled. This correlates with low nutrient concentrations and greater light penetration than the other downstate stations (see discussion of nutrient and light data in water quality section).

The Lake George site was located 178 km upstream from the mouth. Lake George phytoplankton populations exhibited four peaks. The major peak occurred in January dominated by Melosira italica. Forty-six per cent of the species were diatoms, 28% Cyanophyta, and 20% Chlorophyta. A secondary peak occurred in March dominated by Melosira italica with Anabaena flos-aquae, Polycystis aeruginosa and Ceratoneis sp. also abundant. A total of seven species were identified in January, 32 in March, and seven in August.

Cluster Analysis.

Figure 8 shows the cluster map based on ~~forty-seven~~ twenty one most abundant phytoplankton species ~~(See Table 5)~~. If thirteen clusters are chosen, all of the downstate stations cluster, with the exception of Oklawaha; the two arms of Julington Creek cluster separately and the mouth of Julington Creek is distinct from the upstream stations; all of the Cedar River stations cluster; and none of the more saline stations form a distinct

cluster (D, B6, C, E, and F). Stations E and F do show similarity if nine clusters are chosen, but they never cluster with the remaining 21 stations. These two stations exhibit the highest average salinity and frequently mark the inland limit of many of the more salt tolerant species such as the diatoms Ditylum brightwellii and Eucampia zoodiacus and the dinoflagellate Pyrosphacus horologicum.

Zooplankton of the St. Johns River

Mayport to Lake George

The list of zooplankton identified by the UNF Coastal Fisheries Laboratory for monthly collections from 1975-1980 is given in Table 29. The zooplankton collected during the UNF study were analyzed by breaking the 23 sites into four zones based on distance from the St. Johns River mouth or into relatively localized groups based on location in tributary streams. The following four groups will be discussed:

1. The river mouth (downtown Jacksonville to Mayport)
2. The Ortega/Cedar River stations
3. The Julington Creek stations
4. The downstate stations

The species diversities (calculated by the method described for phytoplankton) for thirteen stations are given in Table 19. The lowest recorded diversity occurred in Rice Creek; however, the lowest annual average diversity occurred at Station B4 in the downtown Jacksonville area. The highest average diversities occurred in the first cluster of stations.

The River mouth stations include all samples taken from the following collection sites; stations F, E, D, B3, B4, C and B6. These are arranged in descending order from the river mouth at Mayport and cover a distance of approximately 41 km (refer to Fig. 15). These sites represent the seven most northerly 1976-1980 sampling sites. The "B" heading refers to the station sites shared with the Bio-Environmental Services office in Jacksonville, largely for reasons related to data exchange.

The zooplankton were characteristically marine although a

transition to freshwater species began to appear south of Station D. This transition area was by far the richest area in terms of numbers of species, probably due to the tidal mixing effects and nutrient enrichment from adjacent tidal marshlands. More species were found along this stretch than nearly all of the other stations combined.

Barnacle (Balanus) nauplii and Calanoid copepods (adults and nauplii) comprised the largest numbers of zooplankton in the samples. Balanus appeared to be fairly common throughout the year and was most numerous between the months of March and November. Calanoid copepod counts peaked in March and June at the stations closest to the river mouth and one to two months later farther inland. At times the copepods numbered more than 500 individuals per milliliter of sample.

Tintinnids were also important components of the zooplankton. Tintinnid counts peaked during June and July. Polychaete larvae (early trochophore to segmented individuals) were common during the cooler months. Nereid polychaetes were observed swarming at night during a diurnal oxygen session at Station F in July, 1976. Tunicate "tadpole" larvae were found during March, April and May. Echinoderm plateus larvae were found with regularity in May, especially at station sites D, E and F. Zoeal shrimp (Paloemonetes) were found in the samples during June and July. Figure 16 gives the seasonal cycles of zooplankton for Stations D, E and F in terms of total cell counts.

The Ortega/Cedar River Stations

Six stations comprise this segment of the study; these are

B8 (located in Ortega River) and B7, C1, C2, C3, and C4 (all of which are located within Cedar River). The sampling sites span an area of about 13 km and are located about 10 km south of downtown Jacksonville (B6).

Fewer species were found here than in any of the other areas studied. The dominant zooplankters found in the area were copepods and rotifers. The Copepods belonged to the genera Canthocamptus and Calanus. Copepod populations peaked during the spring months. The Cladoceran Bosmina also appeared in small numbers.

The rotifer populations consisted primarily of the genera Branchionus and Keratella, and Lecane, Platyias, and Asplanchna were also abundant. The highest numbers were encountered in the spring and summer.

The Julington Creek Stations

Julington Creek is located about 21.7 km south of Jacksonville and 71 km from the ocean. It forms part of the boundary line between Duval and St. Johns counties and winds about 1.7 km east from the St. Johns River. The shoreline along its banks is relatively undeveloped except in the immediate vicinity of Mandarin, Florida, which lies along the northwestern bank. Two marinas are located at the SR 13 bridge (J6) and a small fishing camp is located at the foot of Hood Landing Road near station 59 (J5). Since these sites were initially collected (1975) extensive development has occurred along the creek.

Five stations were established in the area, J5 through J9. These range across a span of about 7.5 km to the east of the St.

Johns River from the creek mouth (J5) and include one station in Durbin Creek (J8), and southern prong feeding into Julington.

The zooplankton community was composed primarily of Bosmina and Canthocamptus. Bosmina was found at all stations throughout the year but was least abundant during the fall months. The highest concentrations were found in the summer months between June and August when the numbers exceeded 100 per milliliter. On a annual basis Bosmina averaged approximately 15 individuals per count. Calanoid copepods and Canthocamptus make up the bulk of the zooplankton. Canthocamptus was most common in the fall but Calanoid copepods in general were most common in the summer when they often numbered in the thousands of cells per milliliter of sample.

The Downstate Stations

Five stations comprise the remaining sampling sites. All are located south of Duval County and span about 74 km of the St. Johns River. It is difficult to cluster these stations together since most are separated by at least 8.3 km and most are located in the mouths of feeder tributaries rather than on the St. Johns itself. The stations making up this group are BC (Black Creek at US 17), RC (Rice Creek at US 17), DC (Dunns Creek at US 17), OK (Oklawaha River mouth near Welaka) and LG (Lake George at the Drayton Island ferry). All of the sites are in or near deep water and many are over sand bottom. Due to distinctive differences each of the five stations will be treated on an individual basis. A short description will be given for each station.

Benthic Macroinvertebrates

Infaunal macroinvertebrates of the freshwater areas of the river vary widely in population densities due to water quality changes described previously. The infauna have been studied by Cox et al. (1981). The most common bivalve found in the St. Johns is Rangia cuneata, identified from Lake Washington to Jacksonville. In many areas, Corbicula manilensis, an introduced clam, is as abundant as the native Unionid clam and mactrid clams. Tubificid worms are common annelids throughout the drainage basin. Amphipod populations are dominated by Hyalella azteca. Isopod populations are sparse in most of the system, but Cyanthura polita has been collected from Lake George to Jacksonville by the author and reported by Cox et. al. (1981).

The most widespread epifaunal macroinvertebrate is Rhithropanopeus harrisii (white-fingered mud crab). It has been collected by the UNF Coastal Fisheries Laboratory from Mayport to Lake Poinsett. Its populations appear to peak in the brackish water areas of the river with salinities between 6 and 10 0/00. These areas include downtown Jacksonville and some of the tributaries in this area, and downstate in the Puzzle Lakes area. This distribution, which is part of an artificial habitat project at UNF is in close agreement with larval development studies by Chamberlain (1962).

Economically, the most important epifauna include the blue crab (Callinectes sapidus) and the Penaid shrimp species, Peneus setiferius (white shrimp) and Peneus aztecus (brown shrimp). Peneus setiferius has been collected as far as 210 km upstream at

salinities of 0.26 ppt. Juvenile white shrimp have a higher tolerance for lower salinities than other brown or pink shrimp. Juveniles of Peneus aztecus are more common north of Green Cove Springs and occur abundantly most seasons in Hallowes Cove, Julington and Durbin Creeks, and in the Mandarin area.

Blue crabs are abundant as far upstream as Lake George and may occur in significant numbers further south. Mating occurs in the lower salinities upstream from Duval County. The females migrate downstream to spawn. Most spawning occurs in the lower 32 km of the river, east of Jacksonville (Togatz, 1968). Males tend to remain in the lower salinity waters throughout their lives. Females migrate. Ratios of females to males harvested in crab traps in the St. Johns increase closer to the mouth; males are dominant in the upper St. Johns. Blue crabs occur as far south as Lake Harney, 305 km from the ocean. Both males and females utilize the freshwater portion of the river as feeding grounds.

Large populations of megalops blue crabs have been collected from the underside of spatterdock leaves in Julington and Durbin Creeks, Black Creek and Hallowes Cove. These ~~three~~ Four areas had the highest population of any of the 23 sites sampled from Lake George to Mayport (see Maps, Fig. 5 and 6).

Benthic macroinvertebrate populations are the subject of along term artificial habitat study being conducted by ~~C. L. UNF~~ Coastal Fisheries Laboratory ~~DeMort, J. Mueller, M. Johnson, and R.T. Powers~~. This study utilizes an artificial habitat designed to remain at 1 meter depth and to be suspended off the bottom to prevent heavy silting

that occurs throughout the lower river system (Fig. 8)

The artificial habitat program currently has established 14 sites from Mayport to Black Creek. The most abundant invertebrates found on the habitat is Rhithropanopeus harrisi. Megalops and juveniles of Menippi mercenaria are seasonally abundant in late summer at the Mayport and Sisters Creek sites. The hydroid Tubularia overgrows the habitats from downtown Jacksonville to Mayport during the winter months. Caprilla (skeleton shrimp of the order Amphipoda) are abundant at all Duval sites from spring through early fall. This amphipod is most abundant in the fall when there are 100's of animals /cm^2.

Fishes

Two major studies have described the freshwater and estuarine fishes of the St. Johns River (McClane, 1955; Tagatz, 1968). McClane listed 118 species and Tagatz listed 170 species. A five-year trawl study conducted by the Florida Game and Freshwater Fish Commission listed ten species as dominant; five freshwater game fish and five euryhaline species (Table 6) (Marty Hale, FGFWFC, Personal Communication). The study area included the area from Lake Harney to the Jacksonville Naval Air Station.

Euryhaline species have been observed far upstream from the freshwater - saltwater interface. These species include Archosargus probatocephalus (Sheepshead), Sciaenops ocellata (Red Drum), Pogonias cromis (Black Drum), Micropogon undulatus (Atlantic Croaker), Lutjanus griseus (Gray Snapper), Dasyatis spp. (Tagatz, 1962). Trinectes maculatus (Hogchoker) have been collected in the Puzzle Lakes area.

The following commercial and sports fishes either spawn in the St. Johns River tidal marshes or live as-juveniles within the estuary: Elops saurus (lady fish), Megalops atlantica (tarpon), Opisthonema oglinum (threadfin herring), Brevoortia tyrannus (atlantic menhaden), Alosa pseudoharengus (alewife), Arius felis (sea catfish), Bagre marinus (gafftop catfish), Fundulus heterochlitus (mimmichog), Menidia beryllina (silverside), Mugil cephalus (striped mullet, Mugil curema (white mullet), Chaetidipterus faber (spadefish), Lagodon rhomboides (pinfish), Cynoscion nebulosus (spotted sea trout), Cynoscion regalis (weakfish), Sciaenops ocellatus (red drum), Micropogon undulatus (croaker), Leiostomus xanthurus (spot), Menticirrhus saxatilis (northern kingfish), Caranx hippos (jack crevalle), Selene vomer (lookdown), Trachinotus carolinus (florida pompano), Orthopristis chrysopterus (pigfish grunt), Paralichthys lethostigma (southern fluke), Paralichtys dentalus (summer flounder), Pomatomus saltatrix (blue fish), Poronotus triacanthus (butterfish), Scomberomorus cavalla (king mackerel). ~~See~~ Table 12, ~~for~~ is a complete list of juvenile species collected in a modified roller trawl ~~or~~ and cast nets by the UNF Coastal Fisheries Laboratory from 1980-1987 from Buckman Bridge to the river mouth. Table 13 lists the species composition of fish larvae identified from Sisters Creek for four years.

Several species found in the study area are Species of Special Concern. They are Fundulus grandis (gulf killie), Fundulus similis (longnose killie), and Cyprinodon variegatus (sheephead minnow). Anadromous fish collected in the river

include Alosa sapidissima (american shad), Alosa mediocris (hickory shad), and Alosa aestivalis (bluebaek herring) (McClane, 1955).

The St. Johns is the only river in Florida that supports major commercial fisheries. The principal commercial fishes are Anguilla rostrata (american eel), Ictalurus punctatus (channel catfish), and I. catus (white catfish). There landings from these three fisheries totaled 589,183 kg/yr (1976) with an estimated dollar value of $449,121. There is also a significant blue crab fishery of 491,705 kg/yr (1976) with a dollar value of $199,021 (Bass and Cox, 1985).

Pogonias cromis (black drum), Sciaenops ocellatus (red drum, Menticirrhus americanus (southern kingfish), Mugil cephalus (striped mullet), and Archosargus probatocephalus (sheepshead) are also harvested from the river. Sport fishes that are fished heavily within the St. Johns include Micropterus salmoides (largemouth bass), Lepomis macrochirus (bluegill), and Pomixis nigromaculatus (speckeled perch) in the freshwater areas and Micropogonias undulatus (atlantic croaker), Cynoscion nebulosus (spotted seatrout), and Paralichthys lethostigma (southern flounder) in the estuary. The St. Johns River had a reported yield of 2,268 fish per km of stream in 1975-1976 (Bass and Cox, 1985). This was the highest yield of the nine Florida rivers listed.

inflow. For most marine ecosystems, studies have shown that inorganic nitrogen is the limiting nutrient (Ryther and Dunston, 1971). However, nitrogen does not appear to be limiting in the St. Johns River estuary (DeMort and Bowman, 1985). The total amounts of inorganic nutrients in the river system is determined by upland drainage patterns and volume of sewage discharge. Large amounts of nitrogen are carried into the St. Johns River by swamp drainage, agricultural run-off, and sewage discharge.

Anthropogenous Impacts

The St. Johns River basin has undergone severe physical alterations primarily in the form of wetland drainage, interbasin diversion, dredging, filling wetlands, bulkheading, channelization, and the construction of jetties at the mouth. The St. Johns Water Management District has estimated that as much as 30-50% of the wetlands of the upper basin have been lost due to these alterations. Durako et. al. (1985) have estimated that 36% of the salt marsh habitat has been lost since 1943. Losses certainly occurred prior to 1943, but cannot be measured. Much of metropolitan Jacksonville is built on spoil banks and current residents are ~~not even~~ unaware that marshes and other wetlands once thrived throughout the Greater Jacksonville area. The two worst areas for wetland losses within the St. Johns River basin are the headwaters fresh marshes and the lower basin salt marshes.

The extensive losses at the headwaters drastically altered the hydrologic regimes, causing higher flows during times of maximum discharge and lower flows during low flow conditions and

drought years. Extensive wetlands retained the runoff and released the water more gradually over longer time periods, thus providing a more consistent water supply.

There are at least 13 canals which cross the Atlantic Coastal Ridge, nine of these canals serve to divert water from the St. Johns Basin to the Atlantic (Clapp and Wilkering, 1984). The greatest amount of diversion occurs south of US 192 where extensive areas of marsh have been diked and drained for agriculture use. In 1969, Canal 54 was built to alleviate flooding problems that had occurred primarily because of the loss of flood plain described earlier. Clapp and Wilkering have estimated that returning the diversion flows from the Fellsmere Main Canal and Canal C-1 would add 28.32 CMS to the St. Johns between Fellsmere Grade and US 192. The current average flow at US 192 is 27.61 CMS. Addition of the diverted freshwater inflow would double the flow in that section of river.

The following is a description of the main pollution problems within the river system from Blue Cypress Lake (within the headwater marshes) through Lake Poinsett taken from the St. Johns River - Water Quality Report, September, 1980:

1. Pump water from agricultural drainage canals. In most cases, this is poor quality water from highly organic soils and groundwater.
2. Encroachment on the floodplain for agricultural purposes resulting in the elimination of marshes, ~~are essential for filtering pollutants and water~~ storage.

3. Canalization causing intrusion of groundwater with high chlorides allowing rapid runoff, wasting water and carrying pollutants downstream. The upper river near its origin has been extensively modified by canals and dikes.
4. Hyacinths and the associated problems of hyacinth control, such as introducing a heavy load of organic matter in the form of decaying vegetation into the water.
5. Periodic fish kills associated with large scale agricultural pumping operations.

Within the lower basin, the major land use is foresting mixed with agriculture. This land use changes in Clay and Duval Counties were more than 25% of the land use is urban-industrial. Pollution sources of the lower St. Johns Basin include sewage effluent, urban runoff, pulp mill effluent, and a variety of other industrial discharges (FDER, 1980). The point source inventory of FDER listed 41 industrial sources, and 112 municipal sources, and another 188 permitted sources in 1980.

The most impacted tributaries in the lower St. Johns River are Rice Creek and the Ortega/Cedar River subsystem in Jacksonville. Both of these subsystems experience frequent periods of low dissolved oxygen. The Rice Creek subsystem receives primarily pulp effluent; while the Ortega/Cedar River Subsystem has both industrial effluent and domestic sewage effluent. Toxic substances found in the sediments of Cedar River include PCBs and above average concentrations of mercury. PCB in

fish collected and analyzed by the City of Jacksonville Bioenvironmental Services Division were found to exceed FDA limits for edible tissue in some species collected from the Cedar River (Table 8). Mercury in fish was found not to pose a health threat unless extremely large amounts of fish are eaten.

Resource Management

The St. Johns River Water Management District (SJRWMD) has implemented an extensive program of wetland purchases to obtain privately held wetlands in the headwaters regions of the river. It has also developed a plan to block many of the interbasin and Atlantic ridge diversion and drainage canals discussed earlier. This will increase the freshwater input in the upper St. Johns River (Clapp and Wilkering, 1984). If these two plans are successfully implemented, it will result in significantly increasing flow rates from the upper basin and moderate flood stages and low flow periods.

On November 24, 1969, the State of Florida designated a 57,000 acre area in Northeast Florida as the Nassau River - St. Johns River Marshes Aquatic preserve. This preserve lies between Fernandina Beach on the north and Jacksonville on the south and extends west to State Road 17 (DNR, 1986). The stated objectives of this program are as follows:

1. To ensure the maintenance of an essentially natural condition,
2. to ensure public recreational opportunities, and
3. to assure continued propagation of fish and wildlife resources.

With the opening of the Dames Point Bridge, which is the northern extension of St. Johns Bluff Road into this area, the management objectives are on a collision course with economic growth of the area and anticipated population surges, due to the sudden ease of access from all parts of the city of Jacksonville. The extensive saltmarsh system described earlier with its many small islands and hammocks has been relatively undeveloped because of a lack of easy access from the south and west. The areas rich shellfish beds have already suffered from the impacts of development that has occurred previously. The shellfish beds essentially are closed because of urban and suburban run-off from septic tank drainfields, golf courses, and yards. The number of larval and juvenile finfish produced each year in this area also appear to be decreasing (see Biological and Anthropogenic Impacts Sections). The areas population has been expanding dramatically since the early 1970's. Current regulations and permitting practices do not appear to be effective in maintaining either the surface water quality or the fisheries resources of the river.

In 1987, the Florida Legislature passed the Surface Water Improvement and Management Act. This bill specifically targets the St. Johns River as a deteriorating aquatic system in need of restoration by directing the SJWMD to plan, implement, and coordinate a restoration strategy that will involve both the "surface waters and associated natural systems" (Chapter 87-97, Laws of Florida).

The plan currently is being developed and will be

implemented over the next 5 to 10 years, if legislative funding continues.

Table 3.

Selected Water Quality Parameters for the Lower St. Johns River System, 1975 - 76

STATION		LG	OK	DC	RC
DISSOLVED OXYGEN (ppm)	range	2.1 - 12.6	3.9 - 7.2	2.2 - 7.8	0.1 - 1.9
	avg.	8.0	5.2	6.0	0.8
NITRATE (ppm)	range	1.4 - 3.2	1.2 - 6.0	1.3 - 6.8	1.3 - 8.5
	avg.	2.3	3.1	3.5	5.5
TOTAL PHOSPHATE (ppm)	range	0.2 - 0.8	0.4 - 2.0	0.1 - 1.0	0.1 - 4.1
	avg.	0.6	0.9	0.5	1.9
% LIGHT PENETRATION	range	0.2 - 20	12 - 46	1.0 - 9.3	0.0 - 0.28
	avg.	7.4	25	5.5	0.10
CHLOROPHYLL a (mg/m^3)	range	12 - 34	3.2 - 15	6 - 27	11 - 30
	avg.	20	7.0	17	18
TURBIDITY (JTU'S)	range	32 - 50	7 - 15	22 - 62	128 - 260
	avg.	41	11	36	171
STATION		BC	J5	J6	J7
DISSOLVED OXYGEN (ppm)	range	4.7 - 7.7	6.2 - 7.7	5.9 - 7.8	4.6 - 7.0
	avg.	6.1	6.8	6.9	6.2
NITRATE (ppm)	range	1.5 - 4.0	0.9 - 1.9	1.0 - 1.3	0.8 - 1.0
	avg.	2.6	1.6	1.1	0.9
TOTAL PHOSPHATE (ppm)	range	0.2 - 1.1	0.3 - 1.7	0.1 - 1.7	0.2 - 2.8
	avg.	0.7	1.2	0.8	1.3
% LIGHT PENETRATION	range	1.2 - 5.5	1.8 - 12	3.7 - 15	6.8 - 14
	avg.	3.2	7.6	9.8	11
CHLOROPHYLL a (mg/m^3)	range	4.9 - 9.6	4.4 - 19	5.5 - 19	2.5 - 13
	avg.	7.1	10	12	7.1
TURBIDITY (JTU'S)	range	19 - 43	15 - 22	10 - 28	15 - 30
	avg.	32	19	19	22

STATION		J5	J9	C4	C3
DISSOLVED OXYGEN (ppm)	range	3.1 - 6.7	3.1 - 5.8	0.0 - 0.2	0.0 - 0.6
	avg.	5.2	4.7	0.1	0.2
NITRATE (ppm)	range	0.7 - 1.1	0.8 - 1.2	0.8 - 6.1	1.0 - 3.8
	avg.	0.9	1.0	3.3	1.9
TOTAL PHOSPHATE (ppm)	range	0.10 - 1.9	0.26 - 1.9	1.5 - 5.8	1.1 - 8.0
	avg.	0.9	1.0	3.8	3.8
% LIGHT PENETRATION	range	6.5 - 13	7.5 - 15	2 - 15	0.9 - 11
	avg.	11	10	7.1	6.1
CHLOROPHYLL a (mg/m^3)	range	4.2 - 13	1.2 - 12	4.6 - 12.7	5.6 - 33
	avg.	8.2	6.9	9.1	19
TURBIDITY (JTU'S)	range	14 - 26	5 - 45	18 - 26	4 - 30
	avg.	17	27	22	19
STATION		C2	C1	B8	B7
DISSOLVED OXYGEN (ppm)	range	0.1 - 0.7	1.6 - 4.0	4.2 - 8.0	3.6 - 8.4
	avg.	0.4	2.5	6.3	6.2
NITRATE (ppm)	range	1.4 - 3.8	0.8 - 4.8	0.5 - 3.2	0.2 - 4.0
	avg.	2.2	2.8	2.2	2.4
TOTAL PHOSPHATE (ppm)	range	0.8 - 11.0	0.6 - 5.5	0.46 - 2.8	0.58 - 4.7
	avg.	5.0	3.1	1.5	2.7
% LIGHT PENETRATION	range	1.2 - 15	2.8 - 8.8	0.5 - 12	1 - 20
	avg.	8.9	5.2	5.4	10
CHLOROPHYLL a (mg/m^3)	range	9.7 - 38	13 - 52	20 - 47	33 - 63
	avg.	24	30	32	44
TURBIDITY (JTU'S)	range	10 - 35	12 - 20	5 - 45	20 - 38
	avg.	22	17	25	30

Rivers Sequence

STATION		B6	C	B4	B3
DISSOLVED OXYGEN (ppm)	range avg.	5.2 - 9.0 7.0	4.4 - 7.2 6.5	4.2 - 7.0 6.0	4.2 - 7.0 6.2
NITRATE (ppm)	range avg.	0.1 - 6.5 2.5	1.2 - 3.0 2.0	0.3 - 4.0 1.7	0.7 - 4.0 1.9
TOTAL PHOSPHATE (ppm)	range avg.	0.2 - 2.3 1.1	0.2 - 2.8 1.2	0.2 - 1.9 1.1	0.30 - 1.5 1.1
% LIGHT PENETRATION	range avg.	3 - 14 9	4 - 11 8	3 - 18 11	6 - 53 20
CHLOROPHYLL a (mg/m^3)	range avg.	3.3 - 8.8 6.9	3.1 - 10.3 6.7	2.8 - 10.0 5.6	3.3 - 7.2 5.0
TURBIDITY (JTU'S)	range avg.	15 - 48 32	11 - 51 29	5 - 36 24	2 - 33 20
STATION		D	E	F	
DISSOLVED OXYGEN (ppm)	range avg.	4.9 - 8.2 6.8	4.8 - 7.7 6.6	3.7 - 7.3 6.0	
NITRATE (ppm)	range avg.	1.0 - 3.5 2.1	0.8 - 3.5 1.8	0.9 - 3.0 2.0	
TOTAL PHOSPHATE (ppm)	range avg.	0.18 - 1.8 1.1	0.44 - 1.2 0.9	0.18 - 7.8 2.6	
% LIGHT PENETRATION	range avg.	11 - 26 15	13 - 33 23	25 - 67 42	
CHLOROPHYLL a (mg/m^3)	range avg.	2.6 - 5.7 4.1	2.8 - 4.3 3.7	3.9 - 6.0 4.7	
TURBIDITY (JTU'S)	range avg.	5 - 23 16	7 - 14 10	7 - 15 11	

Table 5. Principal Submerged Macrophyte Associations for Four Selected Sites in Lower St. Johns River.

Site	Dominant Species	Areal Coverage %*	Current Status of Grassbeds (1982-1987)
Lake George	1. Vallisneria americana	91	Areal Coverage
	2. Ceratophyllum demersum	7	and Species
	3. Nais guadalupensis	5	Composition
	4. Potamogeton illinoensis	5	Stable
	5. Hydrilla verticiliata	3	
Hallowes Cove	1. Vallisneria americana	98	Areal Coverage
	2. Ceratophyllum demersum	45	and Species
	3. Egeria densa	10	Composition
	4. Sagittaria subulata	10	Stable
	5. Ruppia maritima	10	
Black Creek	1. Vallisneria americana	41	Areal Coverage
	2. Ceratophyllum demersum	6	fluctuated
	3. Nais quadalupensis	4	10-20% over
	4. Potamogeton illinoensis	4	3 year period/
	5. Sagittaria kurziana	3	Species
			Composition
			Stable
Buckman Bridge	1. Vallisneria americana	1-2	Areal Coverage
(Mandarin Area)	2. Ruppia maritima	31	increasing
	3. Potamogeton pectinatus	10	(30% since
	4. Ceratophyllum demersum	8	1982)/ Species
	5. Enteromorpha intestinalis	5	composition
	6. Ulva lactuca	5	fluctuates
			(especially

relative

- abundance of

#1 and 2)

*Area coverage sometimes greater than 100% because of plants overlapping in coverage.

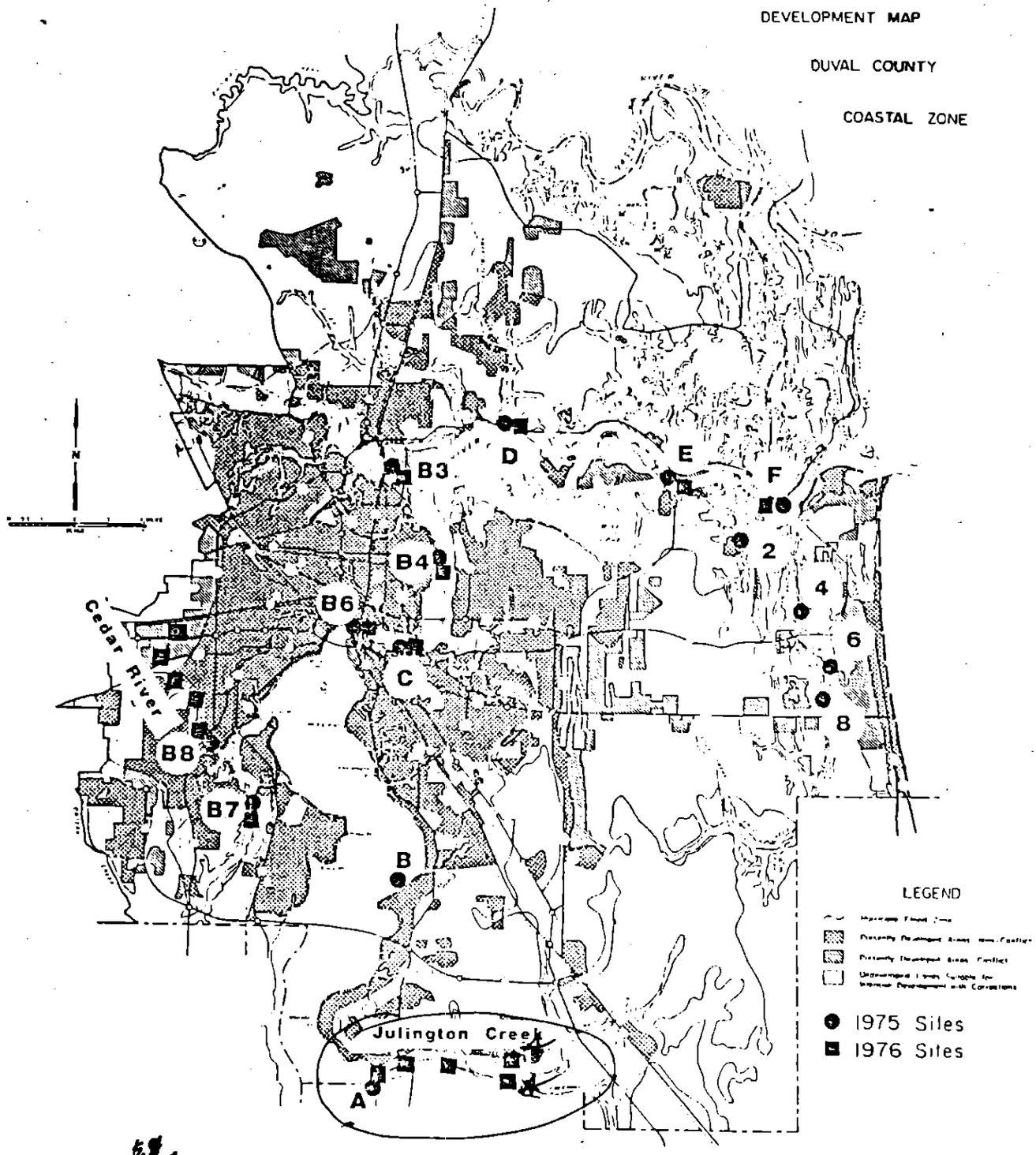

Fig. 25. Map of the St. Johns River near Jacksonville showing all collection sites for 1975 and 18 of the 23 collection sites for 1976. For the remainder of the 1976 sites, see Fig. 2.

* These have been continually sampled since 1976 on a quarterly basis & are location sites for artificial substrates. V.

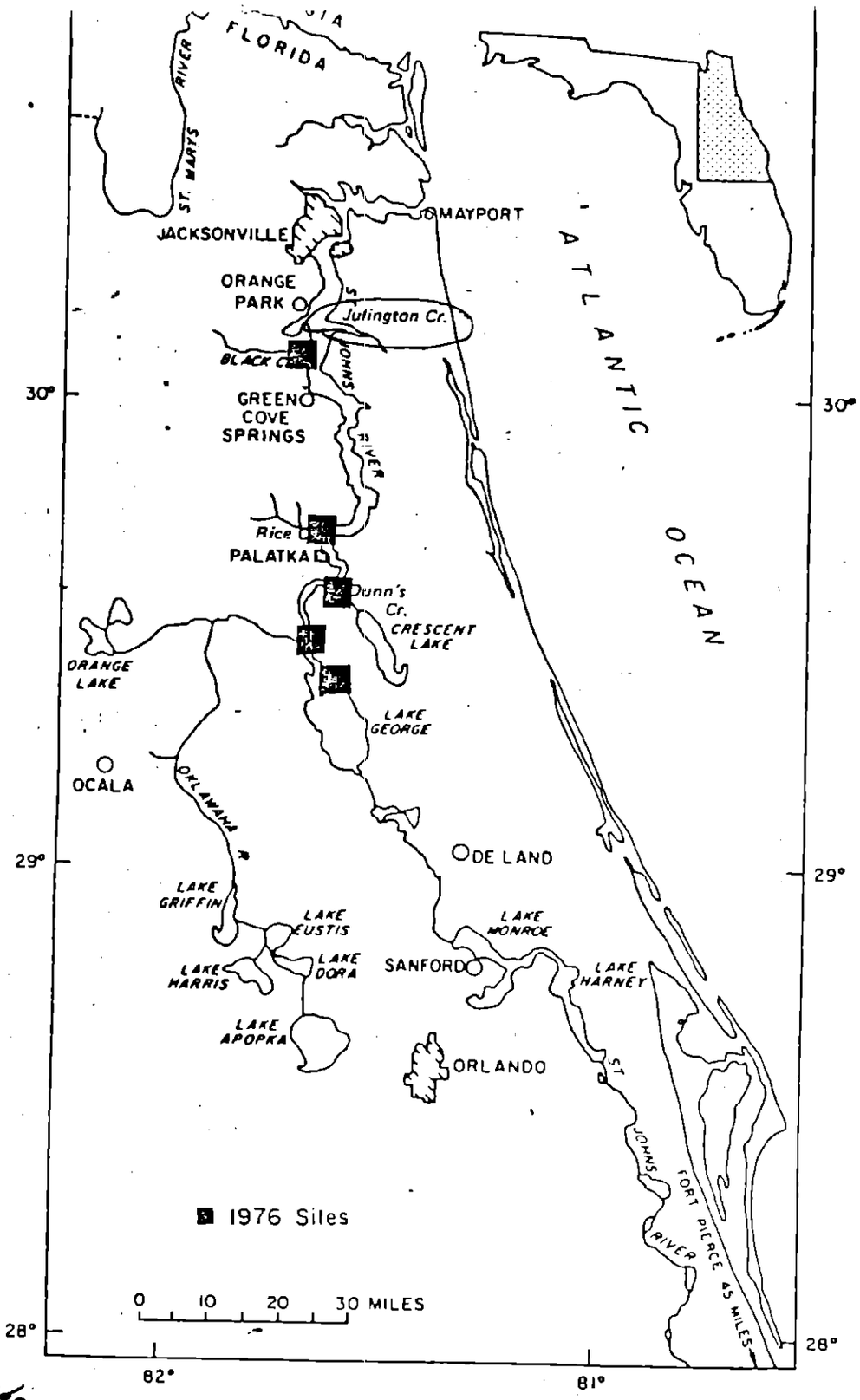

Fig. 1. Map of northeastern Florida showing major elements of the St. Johns River system. Five collection sites for 1976 are marked. For the remainder of the 1976 sites, see Fig. 1.

Table 8 Taxonomic Grouping of Species for Selected Stations -

	Cyanophyta	Chlorophyta	Chlorococcales	Desmidiaceae
L.G.	10	24	4	6
R.C.	9	15	3	4
J.C.	10	20	5	6
C.R.	13	19	4	7
A.	8	19	6	3
C.	11	14	3	3
F.	4	8	1	2
TOTAL	65	119	26	31

	Bacillariophyta	Centrales	Pennales
L.G.	23	3	20
R.C.	23	10	13
J.C.	36	13	23
C.R.	39	21	18
A.	37	14	23
C.	51	30	21
F.	74	49	25
TOTAL	283	140	143

Report Made by Dr Carol DeMort November, 1987
Chief Biologist For Coastal Fisheries 62
Marine University of North Florida
of Switzerland - Hallows Cove Area

I'm coming at the request, actually, of Sarah Bailey and a few other people here. This site, I probably have had more experience with this area than, I assume, probably any other biologist in the state of Florida.

This is one of our sites that we chose in 1975 as part of a long-term finfish-shellfish study.

We have been studying and sampling it yearly since 1975, and quarterly since 1980. We have been trolling in this area.

It's one of our troll sites, one of our selected troll sites. We have a lot of data. We chose this area specifically because of the high-quality habitat for both finfish and shellfish, and both adult and juvenile.

We have found in this area thirty-two species of finfish. Among the more important sportfish that are common in this particular area are croker, red drum, spotted seatrout, wheat fish, jack crevalle, flounder, hog choker, large-mouth bass, black crockie and

red-ear sunfish, and that's not all of them, but that's a portion of them that are relatively common and very important.

Also important, this area is a major nursery area for white shrimp and also a major nursery area usually for brown shrimp, and also for blue crabs.

So we're talking about an area that, at present, is a very high-quality habitat area. The opposition that we at Coastal Fisheries Laboratory is really twofold, and I'd like to split it that way.

One is immediate impact of loss of habitat. And much of my input will be very similar to Lawson's. I'm one of those that Dr. White cited as one of the studies that we have done, because we have published in this area.

We have also gotten in the paper and in the press at present on the lower St. Johns River. So we have -- and part of this area is also included in that report.

The immediate impact, part of the

loss of habitat, as I indicated before, the habitat is excellent for both finfish and shellfish.

The water quality is among the highest, I would say, in the lower St. Johns River. It's an area that I have repeatedly requested that the St. Johns Water Management District designate as part of the SWIM program as critical nursery habitat.

And, among those we're talking about in terms of critical nursery habitat would be the spotted seatrout, jack crevalle, and also the red drum, which, as I think everyone knows, is a species of very important significance to the National Marine Fisheries Service we've been working on.

We have large numbers of red drum and trout in this area, juvenile red drum. The problem that we see in this area, the data from our studies, and not only our studies but similar studies from -- that have been reported in the transactions of the American Fishery

Society and the Fisheries Journals, the fisheries management journals.

What I want to address, first of all, I think it's without question that this is eelgrass habitat in the shallow-water areas, and I agree with Dr. White, because that was part of my study, was that, basically, the eelgrass was limited to about a meter or slightly over a meter, meter and a half, but there is something else that I think is missing here, and that is the fact that there was a similar study, and our studies, that have indicated that what actually happens, basically, is that there is the deeper water adjacent to grass beds.

In other words, prime grass beds that we are talking about, that I think everyone in this room, including those people who are ready to develop the marina, would indicate that, if there are prime grass beds, there are grass beds there utilized by the manatees, there are grass beds there that are utilized for finfish and shellfish.

But deeper-water areas, minus twelve, minus eighteen, that they're talking about building in, are utilized heavily by larger juvenile and yet of the year in both finfish, portfish and commercial fish, both large-mouth bass and crawfish.

The adults move out there and so do the young. You know, this is something that both flounder, hog choker, as well as the ones we've stated, it's been well established, it's not just my study that I'm talking.

I can give you references, if that's required, later on. But, basically, the reports indicate that, as the small fries, they get older and larger -- I'm not talking about adults now, I'm just talking about large -- or juveniles, they move into deeper waters, in the deeper waters, adjacent to the grass beds, and then they move in and out with the tide, because this is a tidal-influenced area, and so they move out into those areas.

The areas that we're talking about,

these are submerged habitats. These are areas that are utilized. It's not just grass-bed habitat that we're talking about in the lower St. Johns.

We are dealing with a black-water river. There are a lot of sediments and materials and detrital materials that are fed upon by the shrimp, by the crab, and they in turn feed into the food web.

So what we're looking at is a high-quality submerged habitat, not just grass bed habitat, but adjacent deep-water habitat.

In fact, when we troll the area, we get the large fish in the deeper areas, not in the grass-bed areas, except seasonally.

The lower St. Johns River has already experienced the loss of from thirty to sixty percent of the suitable juvenile finfish and shellfish habitat.

And, as Lawson Snyder pointed out, the lower St. Johns has been designated as an area for surface water improvement and manage-

ment, and, at the same time, we're talking about a net loss.

No matter how you consider it, there is going to be a net loss of suitable prime juvenile nursery habitat and adult habitat.

And, secondly, there are long-term effects, and they're, just very briefly -- and, again, some of this was -- I'll address from a little different angle, but basically I agree with Mr. Snyder in that the increased boat traffic will increase turbidity, and I cannot believe that there will only be sailboats that are utilizing this.

Just generally, I have never seen any marina in this whole area where there are only sailboats in there.

And, even if there are sailboats, they are also usually assisted by a motor-assist when they come in and out very frequently.

So there will be an increased turbidity in the area. This will cause increased

facilitation and lower for artivity of the grass beds.

It will also lower productivity and prevent the communities of the river bottom, not just the grass beds, and that particular area has a very high concentration of Grans utiano (phonetic), which is one of the mussles that's fed upon. There are a lot of other types in the river basin in that area.

A similar type of problem has occurred, and we're seeing this occur in Julington Creek, where, with the increased boat traffic and the increased problems, this is one of our other study areas that, again, Sarah Bailey was alluding to, as Julington Creek is already showing some of these problems due to increased boat traffic.

Secondly, the toxic effects that are associated with, again, use of byproducts and also the anti-fouling compounds, will cause a deterioration in the overall actual waterfall and the habitat suitability of this area.

But, in general, we're going to see, basically, there's no way around it, there's going to be a decreased yield of both juvenile finfish and shellfish if this project is allowed to continue. (Applause.)

LT. COL. BROWN: Thank you, Dr. DeMort. Mark Jackson.

MARK JACKSON: Mark Jackson, president of the Switzerland Community Club, 2654 Fox Hunt Trail, Switzerland, Florida.

We have heard testimony today, we have heard that our county commissioners have asked that y'all deny the request.

We have heard that the Florida Game and Fresh Water Fish Commission, who is another -- an agency that is paid by the taxpayers to look after the natural resources of our waterways.

We have heard from Dr. DeMort, which I don't think that it can be disputed that Dr. DeMort is the authority, quote, on this area of the St. Johns River.

"Distribution and Mortality of the W. Indian Manatee (Trichechus manatus) in the S.E. United States: A Compilation and Review of Recent Information," Vol. I: The Atlantic Coast, I.E. Beeler and T. J. O'Shea, Natl. Ecology Research Ctr. Rep. No. 88-09, 1988.

ST. JOHNS COUNTY

A. Mortality

St. Johns River

Three dead manatees were recovered from the St. Johns River and its tributaries in St. Johns County (Table I.8, Fig. 19). Carcasses were recovered in 1977, 1983, and 1985 during the months of February and March. These deaths included a boat-killed manatee recovered from Deep Creek, a manatee dead from an undetermined cause found at Green Cove Springs, and a third manatee found dead from natural causes in Julington Creek.

Intracoastal Waterway and Atlantic Ocean

Nine manatees died in the ICW and its tributaries in St. Johns County and one manatee died in the Atlantic Ocean (Table I.8, Figs. 20, 21). Two were killed by boats in the Palm Valley and Crescent Beach areas. Five died from undetermined causes: two in the ICW from Ponte Vedra Beach to St. Augustine, one in the San Sebastian River, and one near Matanzas Inlet. A manatee dead from undetermined causes was recovered on the ocean side of Ponte Vedra in January 1982. A calf was recovered alive in the ICW at Ponte Vedra in August 1976 but later died in captivity at Marineland in St. Augustine. Two cases were classified as dead from natural causes, both subadult-size individuals recovered during winter months in unusually cold years. One was recovered in the ICW at Palm Valley in January 1981 and the second in Moultrie Creek in February 1984.

B. Distribution

St. Johns River

Kinnaird (1983a) observed 17 manatees in St. Johns County on aerial surveys during the months of May, August, September, and November (Fig. 22). Groups of 1-7 were observed along the east bank of the St. Johns River from Julington Creek to the Shands Bridge, particularly in the area of Hallowes Cove (Fig. 25). The river south of the bridge was not surveyed by Kinnaird.

Fifty-eight manatees were observed during 26 aerial surveys conducted by CH2MHill (1986) over the St. Johns River in St. Johns County (Fig. 22). The study was conducted to evaluate the potential hazard to manatees by the proposed St. Johns Harbour Marina project in the vicinity of Sixmile Creek. The majority of sightings were north of the Shands Bridge (Fig. 25). Locations with relatively high numbers of sightings included Hallowes Cove and Little Florence Cove. Other locations included Orange Grove Branch, Kendall Creek, Florence Cove, Trout Creek, Sixmile Creek, Pacetti Point, Colee Cove, and Tocoi Creek. Manatee use of the St. Johns River dropped upriver of Pacetti Point. Manatee counts were highest in spring and summer, dropping to zero in winter (CH2MHill 1986).

Respondent sightings of manatees in the St. Johns River were made primarily in the spring and summer. Sightings occurred along the east bank of the river from Fruit Cove to Tocoi Point, including Hallowes Cove, Orangedale, the Shands Bridge, and Picolata. Manatees were also observed in Julington Creek and at the mouth of Cunningham Creek.

Fig. 22. Combined aerial survey routes of Kinnaird (1983a) and CH2MHill (1986) over the St. Johns River in St. Johns County.

FIG. 22

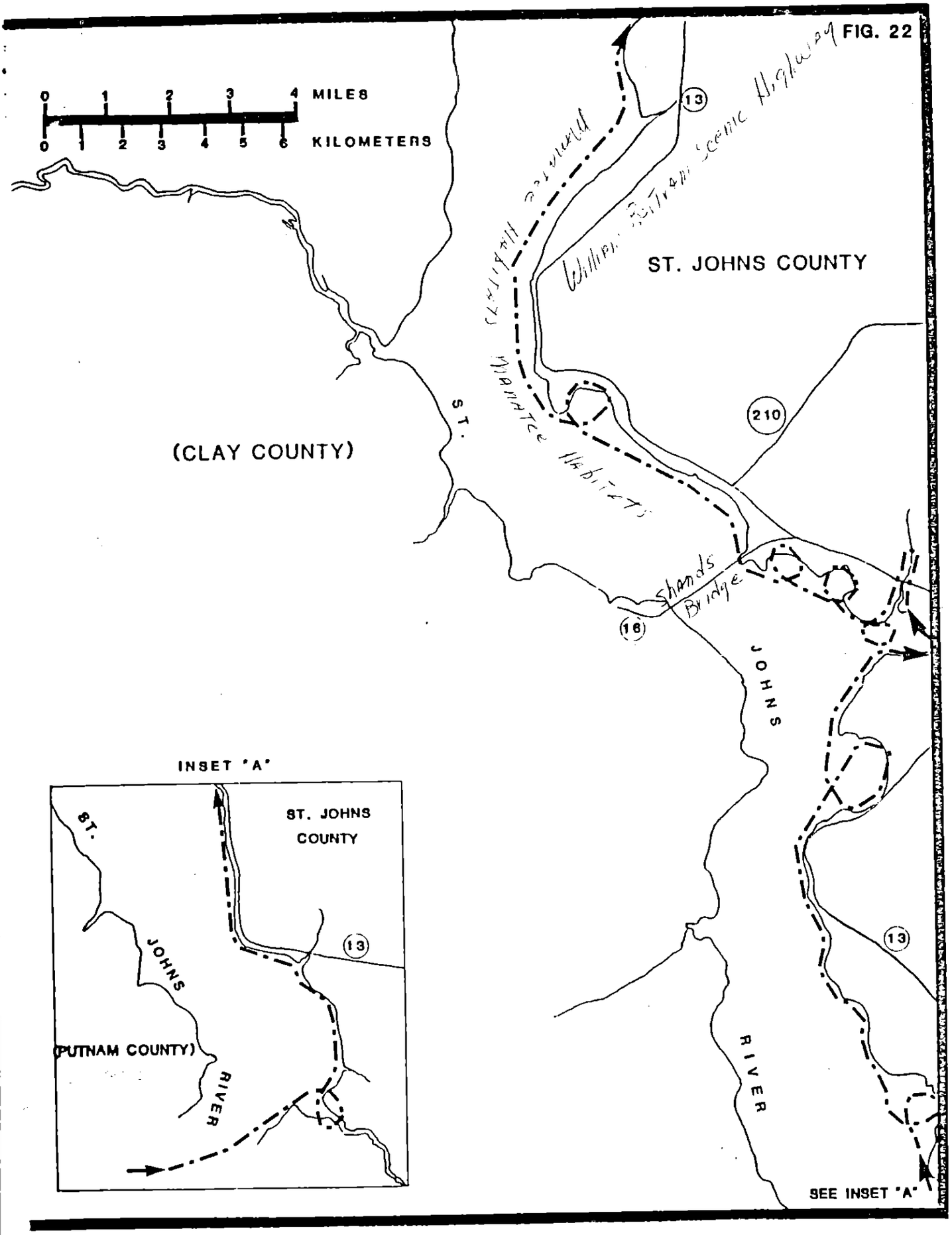
0 1 2 3 4 MILES
0 1 2 3 4 5 6 KILOMETERS
ST. JOHNS COUNTY
(CLAY COUNTY)
ST.
JOHNS
RIVER
13
210
16
Shands Bridge
INSET "A"
ST. JOHNS COUNTY
(PUTNAM COUNTY)
SEE INSET "A"

Fig. 25. Locations of manatee sightings reported by Kinnaird (1983a) and CH2MHILL (1986) in the St. Johns River in St. Johns County.

FIG. 25

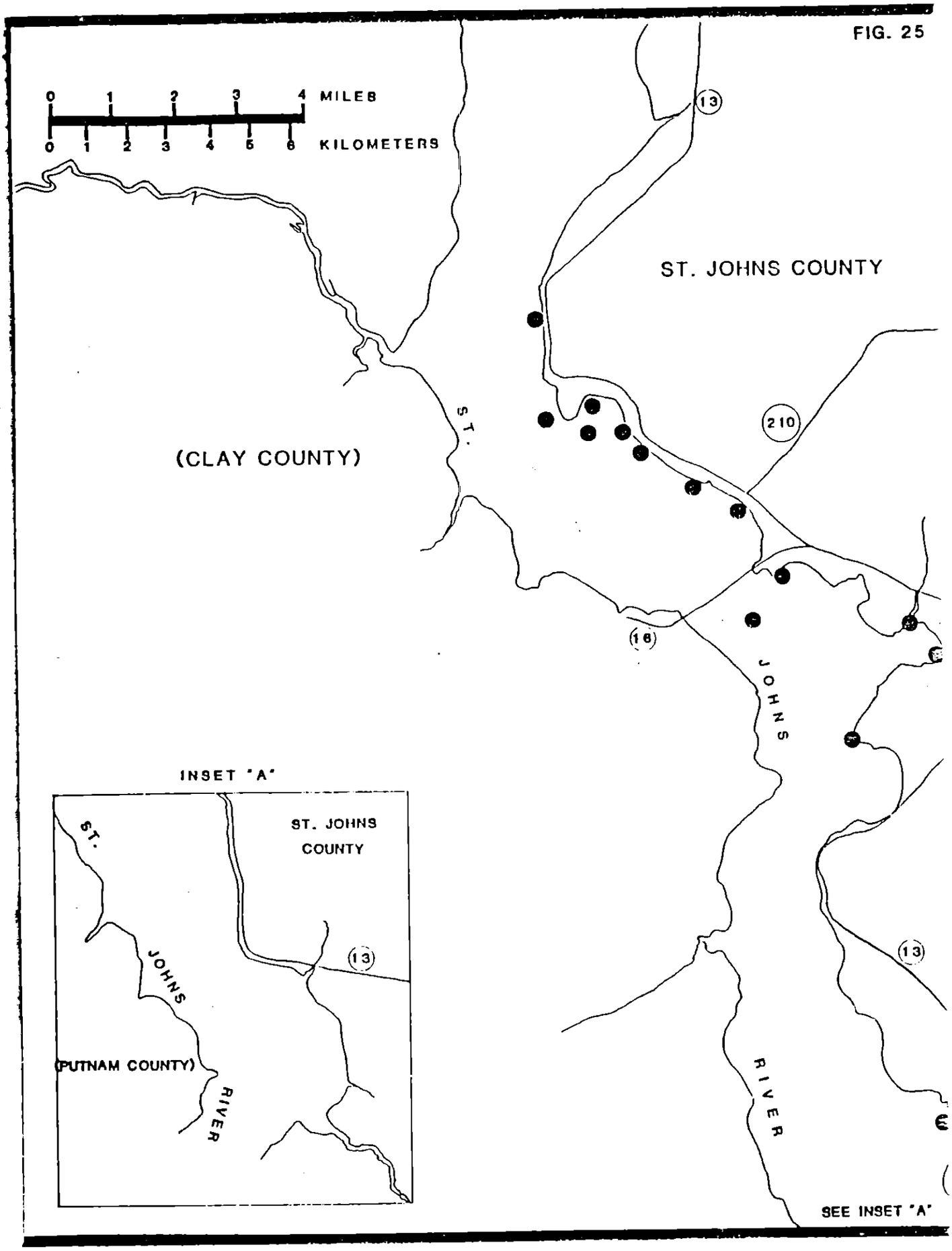
0 1 2 3 4 MILES
0 1 2 3 4 5 6 KILOMETERS
ST. JOHNS COUNTY
(CLAY COUNTY)
ST.
JOHNS
RIVER
13
210
16
INSET "A"
ST. JOHNS COUNTY
(PUTNAM COUNTY)
SEE INSET "A"

Table 1.8. Summary of manatee mortality records for St. Johns County from April 1974 through December 1985.

ID NO	DATE	SEX	LENGTH (cm)	RECOVERY LOCATION LATITUDE / LONGITUDE	LOCALITY
				BOAT/BARGE COLLISION	
M 249	27JUL81	M	298	29 45 N 81 15 W	CRESCENT BEACH, WEST SHORE MATANZAS RIVER, 1 KM S OF HWY 206 BRIDGE
M 299	29MAY82	M	318	30 11 N 81 24 W	PALM VALLEY, INTRACOASTAL WATERWAY, 0.8 KM NORTH OF PALM VALLEY LANDING
M 430	25FEB85	M	310	29 44 N 81 30 W	ONE AND A HALF MILES UPSTREAM FROM MOUTH OF DEEP CREEK, OFF THE ST. JOHNS RIVER
				DEPENDENT CALF	
M 35	13AUG76	M	119	30 12 N 81 25 W	DIED AT MARINELAND OF FLORIDA. PICKED UP ALIVE AT 11 PALM LN, PONTE VEDRA, ST. JOHNS CO.
				UNDETERMINED	
M 70	28FEB77	M	274	29 58 N 81 20 W	INTRACOASTAL WATERWAY, 5 MILES N OF ST. AUGUSTINE
M 73	07MAR77	M	258	29 58 N 81 37 W	GREEN COVE SPRINGS, ST. JOHNS RIVER, OLD SHANDS BRIDGE
M 77	21MAR77	M	212	29 42 N 81 1' W	MATANZAS RIVER, E SIDE OF RATTLESNAKE ISLAND, 1 KM S OF FORT MATANZAS
M 114	16MAR78	?	174	29 54 N 81 19 W	ST. AUGUSTINE, .5 KM SOUTH OF HWY 16, EAST BANK OF SAN SEBASTIAN RIVER
M 260	02JAN82	F	317	30 12 N 81 22 W	PONTE VEDRA BEACH, ATLANTIC OCEAN SIDE, AT HIGH TIDE LEVEL ON SAND BEACH, 1 KM S OF SR 210
M 264	31JAN82	F	225	29 53 N 81 18 W	ST. AUGUSTINE, E SHORE MATANZAS RIVER, ANASTASIA ISLAND, IN MARSH NEAR MOUTH OF QUARRY CREEK
				NATURAL	
M 217	17JAN81	M	252	30 13 N 81 25 W	INTRACOASTAL WATERWAY, NORTH OF PALM VALLEY
M 323	18FEB83	F	199	30 07 N 81 37 W	SOUTH SHORE JULINGTON CREEK, NEAR HWY 13 BRIDGE, AT 1403 WENTWORTH AVENUE
M 370	04FEB84	F	237	29 49 N 81 19 W	SOUTH SHORE MOULTRIE CREEK, JUST WEST OF US HWY 1