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September 1996

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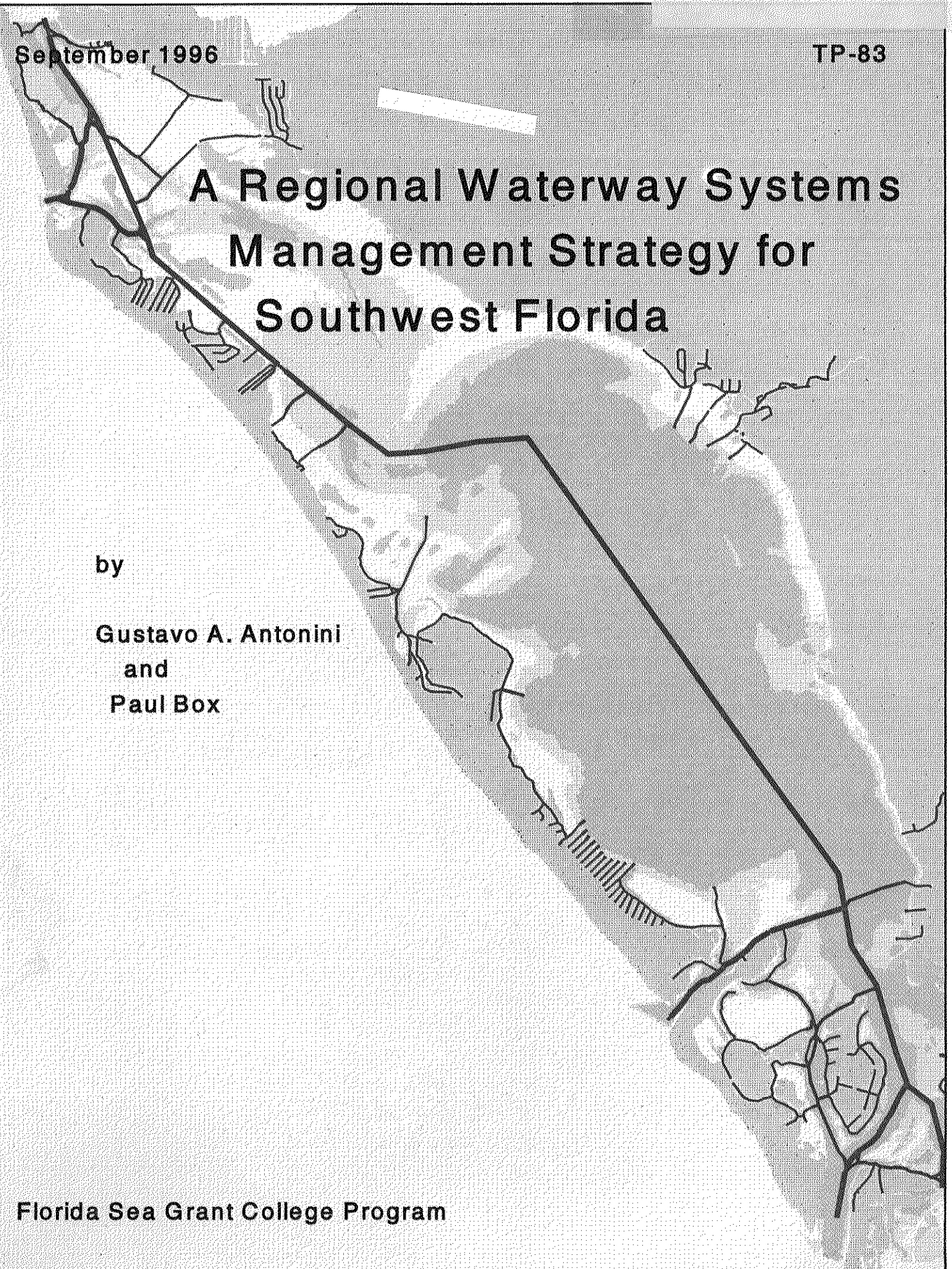
A Regional Waterway Systems Management Strategy for Southwest Florida



by

Gustavo A. Antonini
and
Paul Box

Florida Sea Grant College Program

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A REGIONAL WATERWAY SYSTEMS MANAGEMENT STRATEGY FOR SOUTHWEST FLORIDA

by

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Sea Grant Project Number R/C-P-18

Grant Number NA36RG-0070

Technical Paper - 83

September 1996

$15.00

Florida Sea Grant College Program
University of Florida
P.O. Box 110409
Gainesville, FL 32611-0409

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ACRONYMS

ACD	access channel depth
ARC/INFO	vector GIS software by Environmental Systems Research Institute
COE	U. S. Army Corps of Engineers
FCES	Florida Cooperative Extension Service
FDEP	Florida Department of Environmental Protection
FSG	Florida Sea Grant
GIS	geographic information system
GPS	global positioning system
LULC	land use/land cover
NOAA	National Oceanographic and Atmospheric Administration
NOS	National Ocean Service
NWSC	National Waterway Safety Congress
UF	University of Florida
VD	vessel draft
WCIND	West Coast Inland Navigation District
WMD	Southwest Florida Water Management District

ABSTRACT

This report presents a geographic information system (GIS)-based method for planning and managing coastal waterways for sustainable recreational use. A pilot application of the methodology, carried out in Sarasota Bay, provides an example of how boat traffic can be managed in ways that reduce stress on surrounding natural habitats and waterfront communities. The methodology is consistent with prevailing state and federal coastal policy initiatives and offers an integrated, place-based approach to boat traffic management which may be applicable in other coastal areas.

The GIS analysis is undertaken at large-scale, small-area and high-resolution in order to provide detailed results for regional analysis and local applications. Section aerials are used as the compilation base. Aerial photo interpretation is used to update habitat and shoreline information from public GIS archives. Bathymetry includes public record digital files and boat channel centerline field surveys. Boat, facility and signage information is from on-the-water census. Field record-gathering includes GPS methods.

The geographic analysis evaluates the relationship between boat draft and channel depth for each vessel in order to measure boat accessibility and channel restriction. Results provide a strategy for evaluating the functionality of a regional waterway system and prioritizing maintenance and remediation of system channel components. Alternate scenario methods are used to assess a range of decision options influencing waterway management. One method uses an accessibility index to evaluate the ratio of boat draft to channel depth. Another method determines the effects of normal versus below normal tidal conditions on boat accessibility. Boats are grouped into trafficsheds which are source areas of boats having a common channel to gain access to open water. Trafficsheds are used as segmentation units and the trafficshed is the common denominator for waterway management. There are 51 trafficsheds in the pilot study area. Segmentation into trafficshed-delimited areas permits data generalization and reduction for geographic (GIS) analysis.

Mapped results are presented in four ways: regional characterization, 1:24,000 scale, showing color-shaded bathymetry as 15 zones at 1 ft. resolution, seagrass, mangrove, boats, facilities, and signage; detailed inventory, 1:4,800 scale, showing color-shaded bathymetry at 1 ft. resolution, supplemental 3 ft.

contours, centerline channel controlling depth, boats, facilities, signage, seagrass, and mangrove; neighborhood boat accessibility, 1:4,800 scale, showing levels of boat accessibility to open bay at 1 ft. draft levels; and neighborhood channel restrictions, 1:4,800 scale, showing the location and extent of channel depth restrictions at 1 ft. intervals.

A community trafficshed application illustrates how results can be transformed into action projects at the local level, to address habitat restoration, channel maintenance, boat traffic management and public education.

The report concludes with the outline of a regional waterway management system to preserve the ecological and recreational values of southwest Florida waterways, based on: fitting channel maintenance to boat draft requirements; minimizing impacts on surrounding bay habitats; prioritizing and evaluating management alternatives on a regional basis; developing map and other information products for boaters and shore residents to encourage environmental awareness and stewardship by users of the neighborhood waters and boat access channels; and empowering waterway communities and boating organizations to take an active role in managing their waterways. These proposed actions are pursued through a combination of management tools, with a focus on: acquiring the necessary information on waterway and user characteristics in order to map and evaluate boat access needs; providing waterway communities with technical support to develop local management implementation strategies; and disseminating map and guide products to waterway residents which foster stewardship and environmentally responsible boating practices.

PREFACE

The authors wish to acknowledge the contributions of colleagues, elected and appointed officials, local staff, shore residents and boaters, who provided valuable assistance throughout the research and extension phases of this project. Leonard Zobler, Professor Emeritus, Columbia University, participated in the early stages of the study and the conceptualization of the trafficshed methodology. Florida Sea Grant (FSG) extension agents John Stevely and Will Sheftall provided advice throughout the project, and John Stevely was a key outreach team member with local neighborhood associations and boating groups.

Sue Dudley, Chair of the Governor's Citizens Advisory Committee on Coastal Management, offered encouragement to search for innovative ways of addressing waterway management needs. Jeremy Craft, Division Director of State Submerged Lands, provided stimulus for pursuing the strategy concept early in the study, and his staff at the Florida Department of Environmental Protection, Bob Stetler, Rose Poynter, Allen Burdett, gave of their time and counsel to evaluate local applications of the project findings by assisting with demonstration initiatives. The Sarasota County Natural Resources Department staff, Gary Comp, Belinda Perry, and John McCarthy, and, the Town of Longboat Key staff, Griff Roberts, Dan Gaffney and Len Smally, offered moral support and logistical help.

Paul Boetcher with the U.S. Geological Survey provided tidal station data to correct centerline channel surveys to the navigational datum. Courtney Westlake at the Florida Marine Research Institute provided the sea grass coverage.

A number of waterfront residents and boaters played an active role in promoting the project by helping to conceptualize and implement local applications. They include: Sam Britton, Roy Lunn and Tony Pirelli, from Bay Isles; and Peg Schneider, and Mike and Deborah Imparato, from Sleepy Lagoon.

A special note of thanks to Chuck Listowski, Executive Director, and to the Board of Directors of the West Coast Inland Navigation District, Joe McClash (Manatee), Adam Cummings (Charlotte), Jack O'Neil (Sarasota), and Ray Judah (Lee), for their advice and support. Project funding was provided by the Florida Sea Grant College Program, the West Coast Inland Navigation District, and the University of Florida.

I. FLORIDA WATERWAYS: A SYSTEM REQUIRING MANAGEMENT

1. Issues

Inland coastal waterways of the United States, since 1960, have been transformed along much of their length by recreational boating and fishing, and by accompanying tourist and residential uses (U.S.H.R.,1989; Williams et al, 1990). Many working waterfronts have been gentrified, often replaced by residential-recreational developments. This transformation has been driven by technologic changes combined with rising income, increasing leisure time, and population growth and migration. Coastal areas that had not experienced prior intensive use are now severely stressed by the rapid pace of settlement. In these locations, a near-pristine environment is ecologically threatened by the continuing wave of development.

Pressures from a coastal population explosion and unprecedented waterway boating intensities are stressing many of our nation's water bodies (Nordheimer, 1993). Fifty-four percent of the U.S. population (135.1 million in 1991) lives in the coastal zone (U.S. Bureau of Census, 1994). While population growth along our coasts, since 1960, has increased slightly above the overall U.S. growth rate, regions such as the Gulf Coast have experienced double the national rate of change, and Florida's coastal population has increased 169 percent, from 4.8 to 12.8 million, four times the national rate. Seventy-nine percent of Florida's population lives within this coastal zone (Culliton et al, 1990).

Recreational boats in the U.S. doubled between 1973 and 1989; today there are 20 million (American Red Cross, 1991). During the same period, the number of boats in Florida grew by 176 percent; today (1995) there are an estimated 750,000 registered vessels in the state (FDEP, various years), and tourists pilot or trailer another 300,000 into the state each year (Shaw, 1995). In southwest Florida, the number of boats has increased by three times the national rate.

Thousands of miles of channels and basins have been dredged in Florida as by-products of coastal development. Dredging provided a source of borrow material to make land. The historic dredged depth was dependent upon the amount of needed fill. Waterfront access in residential developments was

maximized by creating finger canals and basins which are used by recreational vessels. These "improved" waterways provide a significant portion of the boating infrastructure in the state, and there are over 400 miles alone in Charlotte County and the City of Cape Coral (Lee County).

Boating and fishing make a significant annual contribution to Florida's economy. The estimated 1995 economic contribution of boating, adjusted for inflation, was $2.04 billion (Adams and Milon, 1985). Recreational fishing contributed $2.6 billion to Florida's economy in 1993 (FSG, 1993). Boating and fishing are high growth industries, indispensable to local and regional economies. The continued viability of these industries is possible only if future boating activities are pursued in an environmentally acceptable manner. Herein lies the dilemma: maintaining a quality waterway environment and infrastructure in the face of mounting shoreside and boating pressures.

2. Regional Setting

Sarasota Bay, a microcosm of the Florida coastal growth phenomenon, served as a pilot area to test a waterway management strategy. The economic vitality of the Sarasota pilot area is dependent upon maintaining a quality bay environment. The Bay is estimated to provide more than $115 million annually to the local economy through property taxes, tourist uses, water-dependent activities, and the like (Roat and Alderson, 1990). Tourism is the largest industry; marine-related activities and commercial and recreational fisheries rank next. But the 35 sq. mi. area is well on the way toward becoming an 'urban sea', attached to a land shoreline of residential use, retail service establishments and limited fish processing plants, and a hinterland of urban-suburban housing. Over 5,000 boats access the area from 2,300 shoreside dock facilities.

The bay's waterway system includes 83 miles of arterials, collectors and residential canals and basins (Figure 1). There has been a 30 percent increase in shoreline length since 1860. Most of this change has occured as a result of dredge-and-fill (Figure 2). While the earliest dredging one hundred years ago was associated with initial attempts by the federal government, at Longboat Cut and Longbar Cut (U.S.H.R., 1889, U.S.H.R., 1914), to establish an arterial inland waterway connecting Tampa and Sarasota, most waterway development has occurred since WWII, particularly during the 1960s (Figure 3). Two-thirds of all

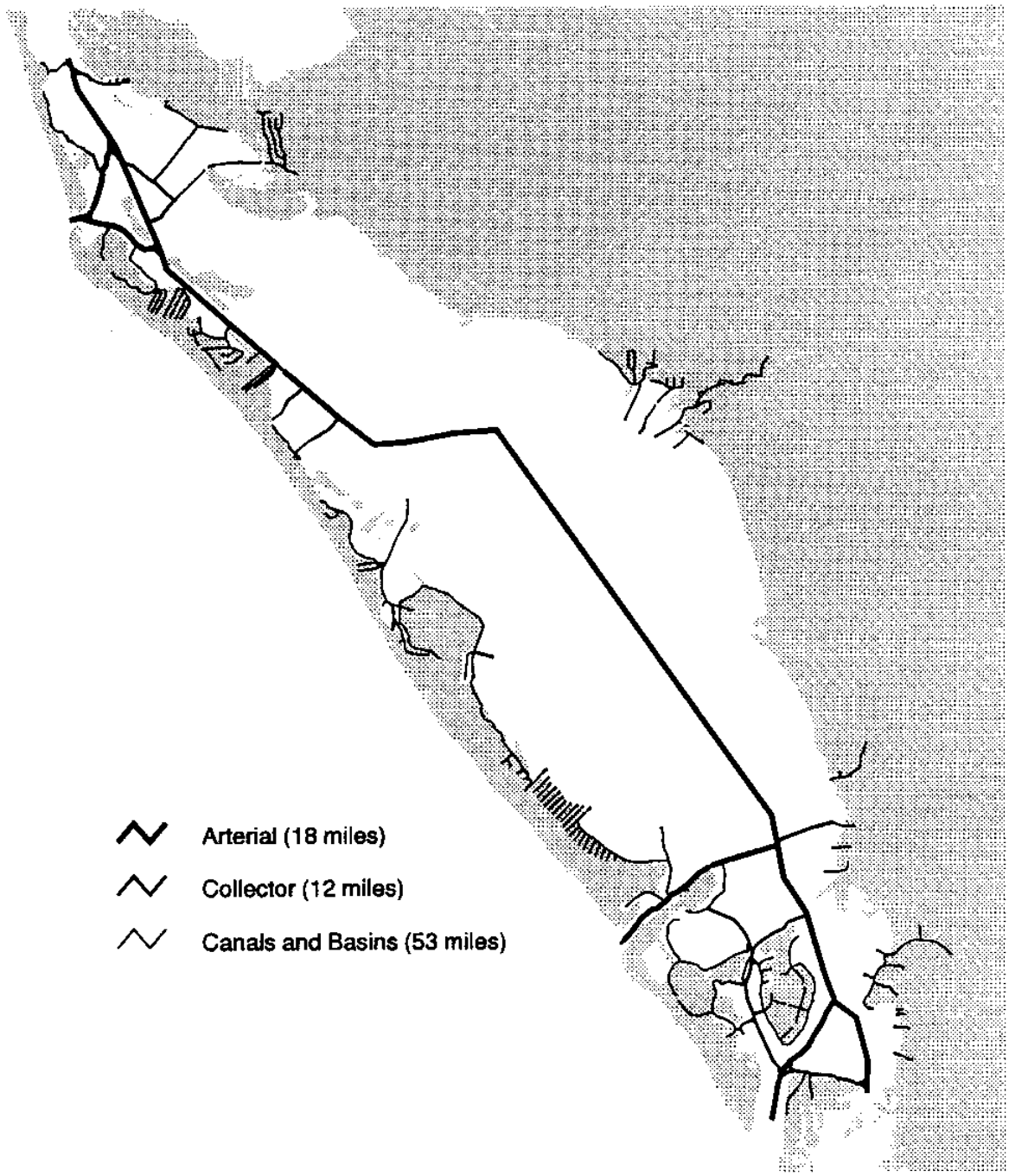

Figure 1: Study region with waterway system of arterials, collectors, canals, and basins

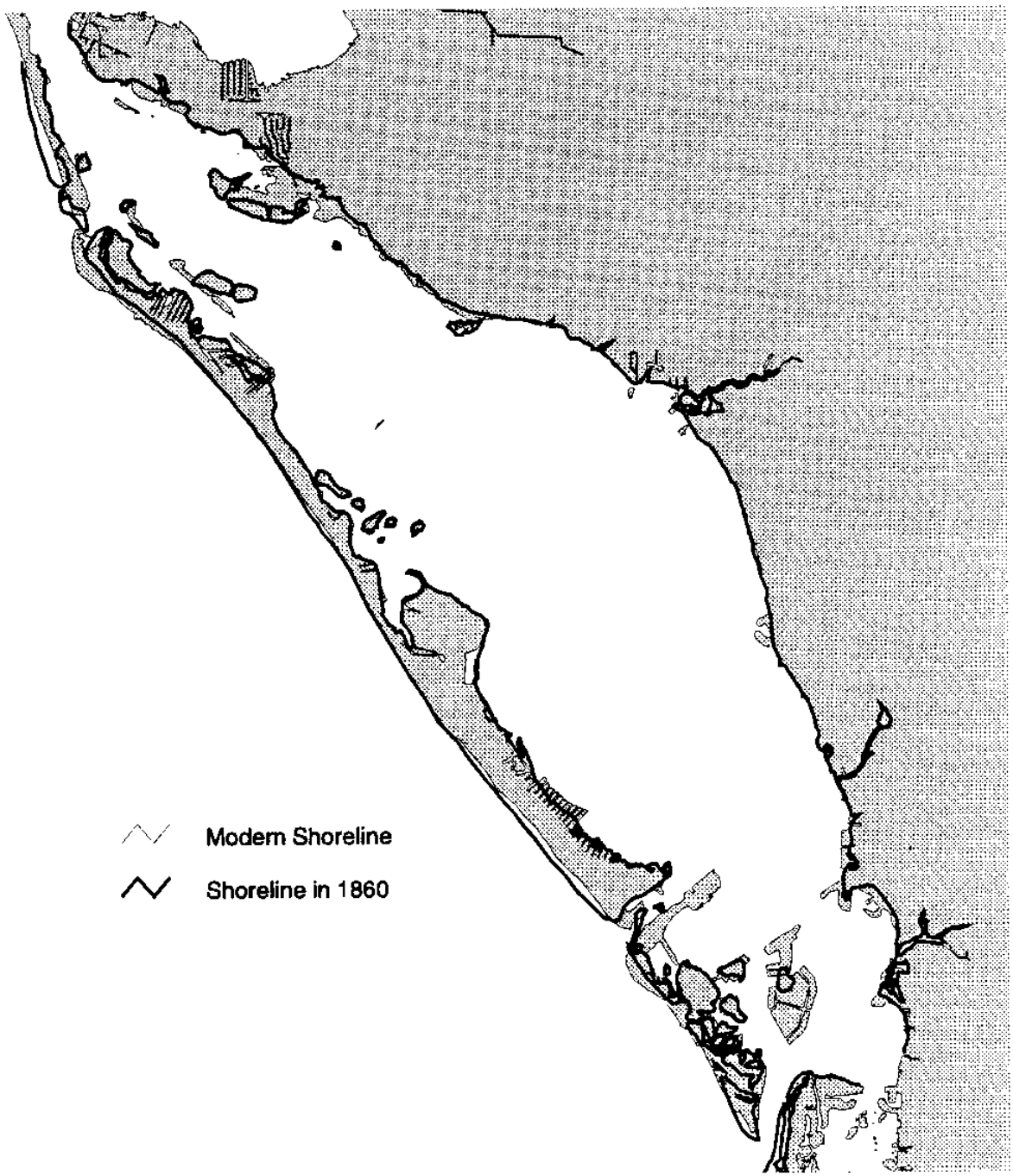

Figure 2: Shoreline change: 1860 - 1996.

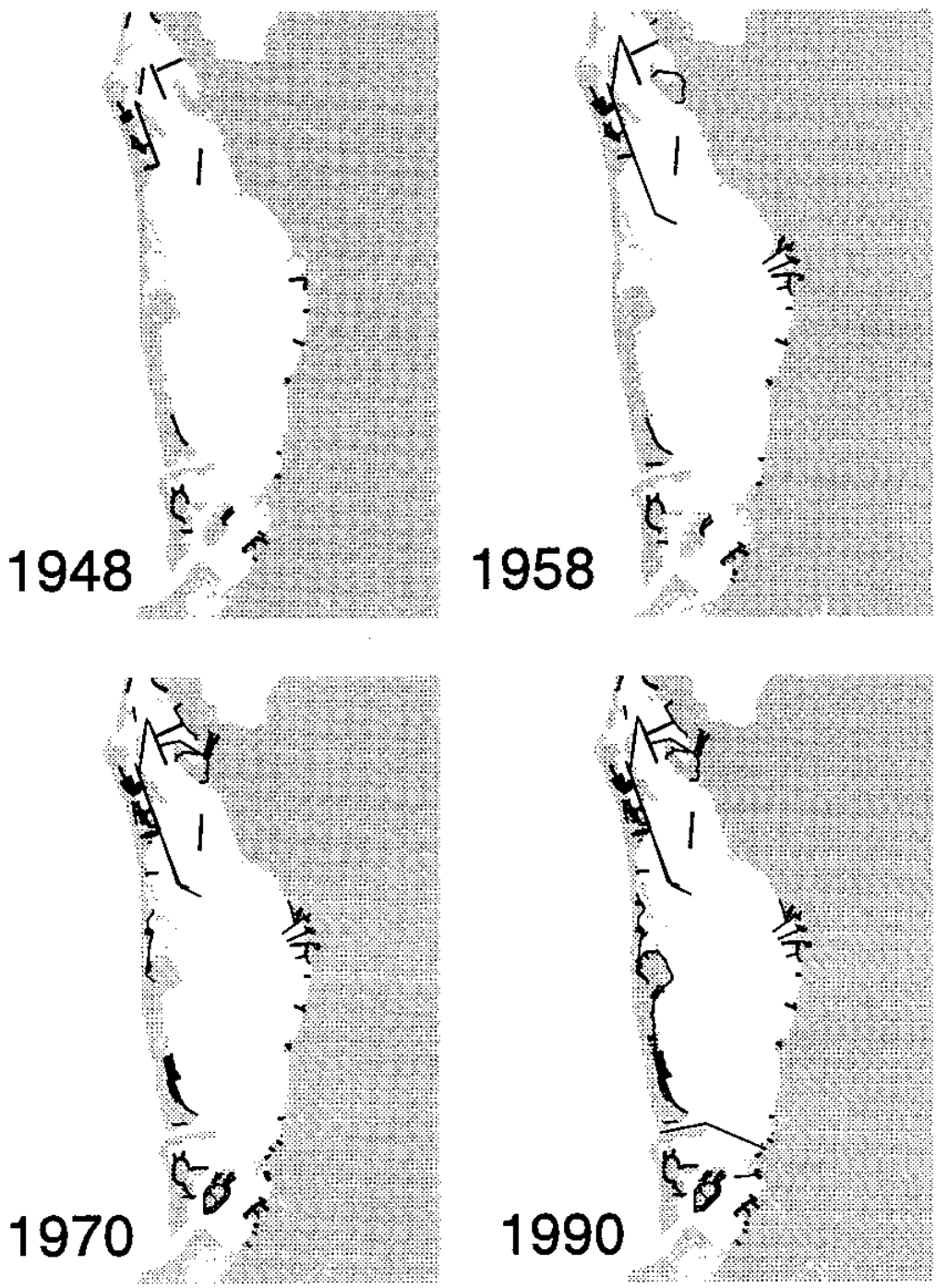

Figure 3: Dredging history of Sarasota Bay: 1948, 1958, 1970, 1990. Dark lines indicate dredged channels.

waterways are residential canals and basins (Figure 1). Issues of special concern include channel siltation, boating safety, wildlife protection, and habitat restoration.

Southwest Florida waterways are a product of spontaneous development. A system-wide management strategy would help to deal with issues of waterway maintenance, signage placement, and traffic management, which need to be addressed to accommodate water-dependent uses and minimize environmental impacts. This report presents a methodology which can be used to plan and manage the waterway system. A pilot application of the methodology, carried out in Sarasota Bay, provides a useful example of how boat traffic can be managed in ways that reduce stress on surrounding natural habitats and waterfront communities. The methodology is consistent with prevailing state and federal coastal policy initiatives (FDEP, 1992, FDEP, 1995, NOS, 1995, NWSC, 1996), and offers an integrated, place-based approach to boat traffic management which may be applicable in other coastal areas.

3. Project Background

This effort began in 1991 as a NOAA - Florida Sea Grant (FSG) research project to develop a waterway boat traffic monitoring geographic information system (GIS) for estuarial planning, with the West Coast Inland Navigation District (WCIND) and Sarasota County as local sponsors.[1] In the course of the research, it was necessary to inventory the stock of boats, shore facilities, signs, and to field survey the centerline channel depth of all access channels, feeder canals and basins. Information was collected at large-scale (1:1,200), high-resolution (parcel), and provided the basis to compile maps of boating infrastructure, such as signs and facilities, as well as waterway system conditions, such as boat accessibility and channel restrictions.

The methodology and field data derived from the FSG research project offered the necessary tools and information to create a regional waterway system management strategy for Sarasota Bay. The WCIND provided supplemental funds to develop the system evaluation procedures for channel management,

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[1]The research project objectives were: (1) characterize the nature and extent of boat traffic conditions in Sarasota Bay, the pilot area; (2) determine the type of information needed and the best methods suitable for (a) routing simulations to forecast trip preferences, frequencies, durations, and times, and (b) predict channel bottlenecks and safety hazards. A report on the traffic simulation methodology and results will be found in Box, in preparation.

based on user needs, existing conditions, and state of the surrounding bay habitat. This included a pilot local community application. Meetings and workshops were held with public officials, staff at local, regional, state, and federal levels, and boaters and shorefront residents, on the waterway system management strategy. This report presents the methodology, regional results, local applications, and implementation strategies for local, county and regional use.

4. Goals and Objectives

The underlying goal of the project is to achieve waterway resource sustainability in the face of increasing recreational boating and shorefront community pressures, through a management strategy that uses science, public education and community outreach, to maintain the infrastructure of arterial, collector and local waterways in a manner that promotes environmentally responsible boating. This is achieved by developing a waterway management system that:

a. Fits channel maintenance to boat draft requirements,
b. Minimizes impacts on surrounding bay habitats,
c. Prioritizes and evaluates management alternatives on a regional basis,
d. Develops and disseminates map products for boaters to encourage stewardship, and
e. Empowers shore communities to actively manage their waterways.

5. A Non-Regulatory Initiative

Waterway management offers a pro-active, problem prevention approach to sustainable use of baywater resources. A central tenet of this project is that a non-regulatory approach provides a viable alternative management option to preserve quality waterways that are navigable, safe, and enjoyable for water and shore-based users. Public education provides the means to achieve this purpose. A non-regulatory approach is bottom-up, both in design and implementation, and is more consistent with current policies of place-based managment than with top-down rule-making.

A non-regulatory approach to waterway management implies that boaters, shorefront residents, resource managers and elected officials, can make wise choices on waterway issues, with minimum negative impact on the bay habitat and

shore communities. Choice is a decision process based on selection of alternative options. A wise choice can be made, only if (1) information on waterway resources and facilities is available, and (2) the user is aware of the negative impacts a poor use choice has on the quality of the recreational experience. Providing the public with the right kind of information and sensitizing these users to wise choice options can make the "non-regulatory" approach a realistic management option. The project offers products that satisfy the multiple needs of boating and shore resident users, managers and decision-makers. Examples of these products are given in this report.

6. Report Outline

The operating components of the waterway system management strategy are presented in Section II1, and data requirements are described in Section II2. The methodology for analyzing boat accessibility and channel restriction, including alternate scenario procedures, is treated in Section II3, and map products are illustrated in Section II4. Results in Section III evaluate and rank boat access problems and channel restrictions for the pilot region and for administrative areas pertaining to the Town of Longboat Key, and to those areas in Manatee and Sarasota counties.

Two local applications of the project methodology are given in Section IV: the Bay Isles case is an example of management planning for a residential waterfront canal community and includes habitat restoration, traffic management by signage placement, channel maintenance, and boater education; the nature-tourism publication of Sarasota's historic barrier island waterways is an example of a boater education product that can be used to promote stewardship through a better understanding of the environmental history and boating geography of the locale. Implementation strategies are presented in Sections V. An executive summary is found in Section VI.

II. PROPOSED MANAGEMENT SYSTEM

1. Trafficshed Model

Waterways are transportation systems. In barrier island coastal locations, such as the Gulf Coast and the Eastern Seaboard, the functionality of waterways which govern boat traffic is dependent upon the relation of boat draft to water depth. Waterway functionality affects accessibility which may stimulate or limit boat traffic from trip origin to destination. Bays and estuaries are shallow water habitats where ecologically sensitive grasses and hard-bottoms flourish. Boats behave as mobile objects, and their movement along waterways adjoining these habitats may create management problems (Barker and Garrett, 1992; Folit and Morris, 1992; Sargent et al, 1995).

Boating access may be by ramp (trailer), private dock (single, multi-family), marina (wet slip, dry stack) or permanent mooring[2]. Unrestricted access from trip origin to open water is uncommon. Waterways -- in most cases improved channels -- link source areas of boats to bays, which in turn are connected by improved inlets (passes) to offshore waters. In Florida, roughly two-thirds of boat access to water in 1993 was by ramp; in Charlotte County, which is situated in southwest Florida, 57 percent of the boaters gained access by private dock (F. Bell, 1994).[3] Ninety-seven percent of the boats in Sarasota Bay must use channels to travel from their place of origin to the open bay.

Locations of boat concentrations are called trafficsheds; by definition, a trafficshed is a source area of boats which has a common channel to gain access to open water. In this study, trafficsheds are used as segmentation units and the trafficshed is the common denominator for waterway management. There are 51 trafficsheds in the Sarasota Bay pilot region (Figure 4, Table 1). Segmentation into trafficsheds permits data generalization and reduction for GIS analysis.

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[2]Though permanent moorings are commonplace in the Mid-Atlantic States and New England, they are a rare occurrence in Florida.

[3]There are no comparable statistics for other counties in the region. However, the senior author estimates, based on knowledge of field conditions, that probably Lee County exceeds Charlotte in boaters' reliance on private docks for water access, while Sarasota County and Manatee County boaters are closer to the state average in their use of ramp and marina facilities.

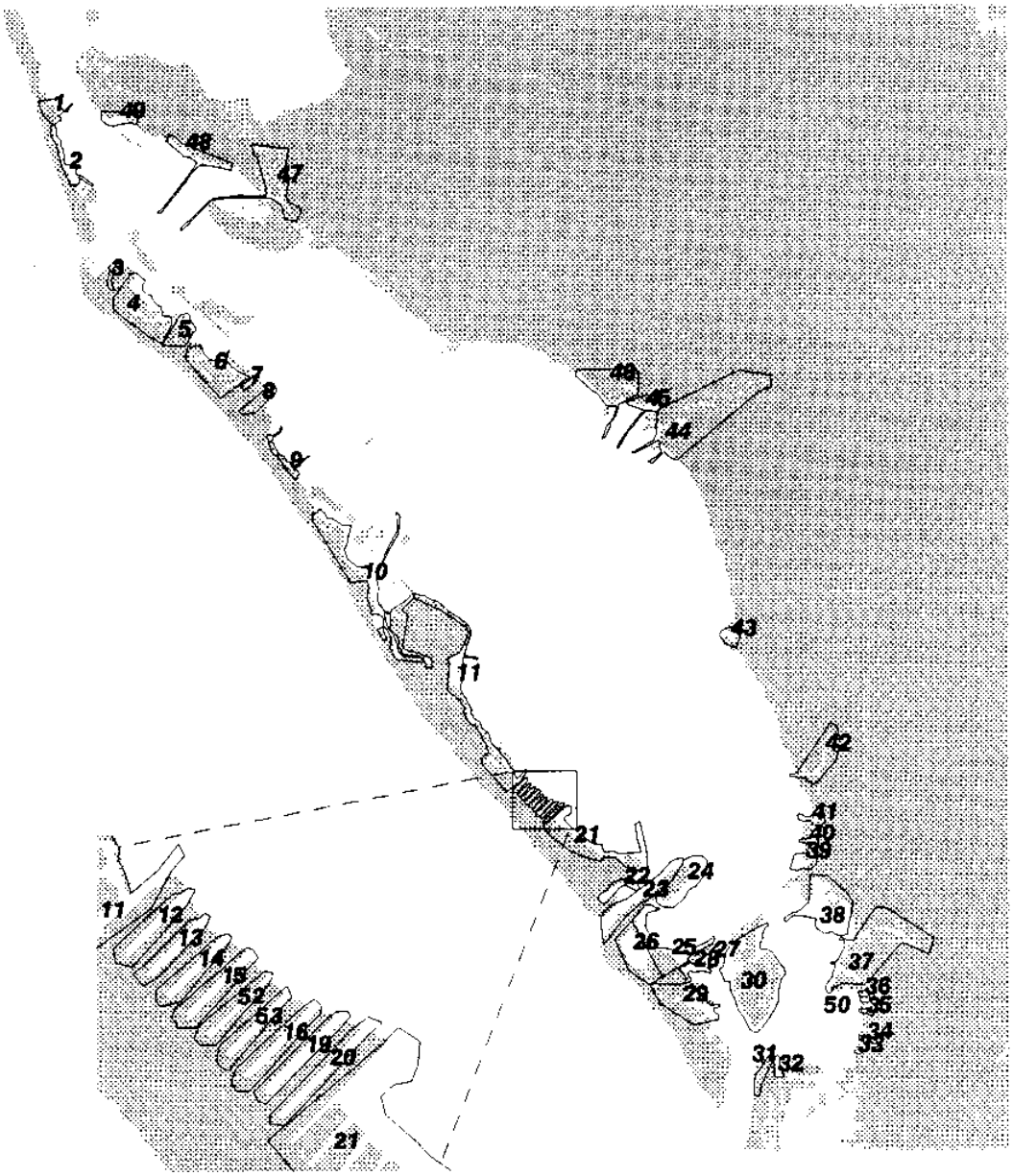

Figure 4: Trafficsheds. See table 1 for location names.

Trafficshed #	Name (Location)	Jurisdiction
0	Open Bay	All
1	Bradenton Beach North	Manatee
2	Bradenton Beach South	Manatee
3	Whitney Beach North	Longboat Key
4	Whitney Beach South	Longboat Key
5	General Harris	Longboat Key
6	Emerald Harbour	Longboat Key
7	Gulf Bay Basin	Longboat Key
8	Tarawitt	Longboat Key
9	No Name	Longboat Key
10	Buttonwood Harbor	Longboat Key
11	Bay Isles/Longboat Key Moorings	Longboat Key
12	Golf Links	Longboat Key
13	Chipping	Longboat Key
14	Wedge	Longboat Key
15	Birdie	Longboat Key
16	Bowsprit	Longboat Key
19	Ranger	Longboat Key
20	Halyard	Longboat Key
21	Boat Name Lanes	Longboat Key
22	New Pass Lagoon	Longboat Key
23	City Island New Pass Channel	Sarasota City
24	City Island Southeast	Sarasota City
25	St. Armands/Coon Key North	Sarasota City
26	North Lido Lagoon	Sarasota City
28	Coon Key South	Sarasota City
29	Otter Key	Sarasota City
30	Bird Key	Sarasota City
31	Louise Bayou	Sarasota City
32	Hanson Bayou	Sarasota City
34	Cherokee Park	Sarasota City
35	Blue Heron (McClellan Park)	Sarasota City
36	Hyde Park (McClellan Park)	Sarasota City
37	Hudson Bayou/Harbor Acres	Sarasota City
39	Quay	Sarasota City
40	Library Channel	Sarasota City
41	Centennial Park	Sarasota City
42	Whitaker Bayou	Sarasota City
43	Stephens Point	Sarasota City
44	Bowlees Creek	Manatee County
45	Trailer Estates East	Manatee County
46	Trailer Estates West	Manatee County
47	Mt. Vernon/Coral Shores	Manatee County
48	Paradise Bay	Manatee County
49	Cortez	Manatee County
50	Mallard Lane (McClellan Park)	Sarasota City
51	No-Name North	Sarasota City
52	Putting Green	Longboat Key
53	Yardarm	Longboat Key
88	Trafficshed Totals	All
99	Study Area Totals	All

Table 1: Trafficsheds in Sarasota Bay

2. Data Requirements

The following information is used to operationalize a waterway system management strategy: shoreline, bathymetry, habitat, boats, facilities, and signage. These are discussed below.

Waterway analysis is undertaken at large-scale and high-resolution in order to provide sufficiently detailed results for local community applications. Section aerials at 1:1,200 scale are used to locate boats, facilities, signs and channel centerline depth. Boat draft and water depth information are collected to the nearest foot resolution.[4] Summary statistics are reported in Appendix 1.

a. Shoreline

The shoreline was obtained as a GIS digital coverage from the Southwest Florida Water Management District (WMD). It corresponds to the U.S. Geological Survey 7.5' Map Series. The coverage was updated by photo interpretation methods.

b. Bathymetry

Three sources of information on water depth were used: (i) National Ocean Service (NOS) digital file of the 1952-53 field survey undertaken at 1:10,000 scale[5]; (ii) U.S. Army Corps of Engineers (COE) paper copy of centerline field surveys of Gulf Intracoastal Waterway (1987, 1:24,000 scale), Longboat Pass (1993, 1:1,200 scale) and New Pass (1993, 1:2,400 scale)[6]; and (iii) centerline boat channel field survey (May 1992, 1:1,200 scale) undertaken by the authors. Datum is mean lower low water (mllw). The shoreline corresponds to 0 ft. (mllw). Figure 5 shows the distribution of data from the three sources. Arterial and collector waterway channels are based on data from COE 1987 and 1993

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[4]Thirty-nine trafficsheds in Sarasota Bay (76 percent of area) are artificially created waterways where 1 ft. resolution water depth provides adequate detail for planning. In areas of predominantly natural estuaries, a higher resolution (0.5 ft.) may be required to obtain sufficient information to characterize channel depth.

[5]These data are available on CD-ROM, as NOS Hydrographic Survey Data, from the NOAA - National Geophysical Data Center, Boulder, CO.

[6]A folio atlas containing the Gulf Intracoastal Waterway centerline controlling depth is published periodically by the COE, Jacksonville, Fl. and is available from their Construction/Operations Division. COE also field surveys federally maintained inlets, as Longboat Pass and New Pass, and can provide channel cross-section bathymetric data for these locations.

surveys. Trafficshed waterway channel depths are from the 1992 survey by the authors. NOS data from 1952-53 surveys provide general information to characterize open bay conditions (Figure 6).

The project maps portray depth in two ways: as arcs showing centerline controlling depths at 1 ft. increments representing waterway boat channels; and as polygons corresponding to bay-wide depth areas. The boat accessibility and channel restrictions analyses rely on the arc coverage compiled from the 1992 survey. Bathymetric data precision is ± 1 ft.

The polygon topology, used to create the bathymetric map of Sarasota Bay, was compiled by two methods: a bay method, which processed the 1:10,000 scale digital NOS depth information from open bay locations where most water depths exceed boat draft requirements, and where channel depth constraints to navigation are minimal; and a trafficshed method, which processed the 1:1,200 scale UF depth information for residential canals, basins and access channels, and where minor variations in bathymetry translate into serious navigation problems.[7]

(i) Open Bay Method

A triangular irregular network (TIN) model was used to create a three-dimensional representation of bay depth.[8] The TIN representation of the bottom then was converted to a lattice using the ARC/INFO command TINLATTICE, and

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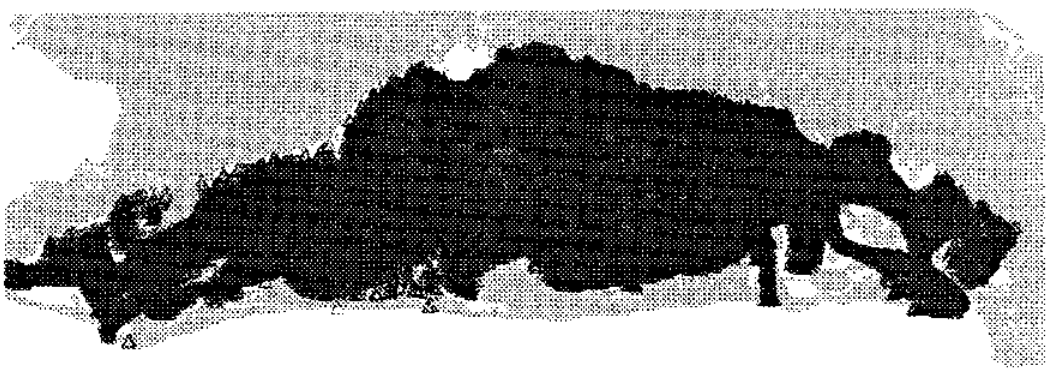
[7]Limitations in available computing resources also influenced the design of the methodology: large areas could be processed quickly at a low resolution, or small areas could be processed slowly at high resolution. Since trafficsheds typically have long, complex shapes consistent with polygons of a higher fractal dimension, they required processing at a high resolution to accurately interpolate water depth. Conversely, open bay bathymetry, outside trafficsheds, is less complex by an order of magnitude (lower fractal dimension), and was processed at an order of magnitude smaller in scale.

[8]TIN interpolates using straight lines between points, and depth is treated as an exact measurement regardless of the precision at which the data are gathered. If depth measurements are taken every 30 ft., and 3 ft. depth is recorded at Point A, one can assume that Point B, a few inches away from Point A, would also be 3 ft. TIN modelling, however, represents Point B as less than 3 ft., and, by the computer's default rounding standards, Point B would be labeled as 2 ft. In this example of a 3 ft. data value, given the system's ±1 ft. level of resolution, the actual value would be between 2.5 and 3.5 ft. Arbitrarily adding or subtracting 0.5 ft. to depth values allows contours to be drawn around the points at integer depths. In the name of caution, 0.5 ft. was added to each depth point.



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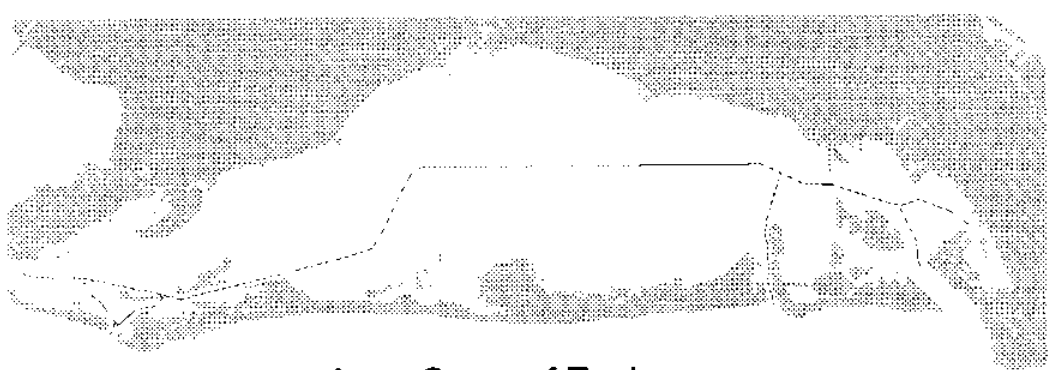
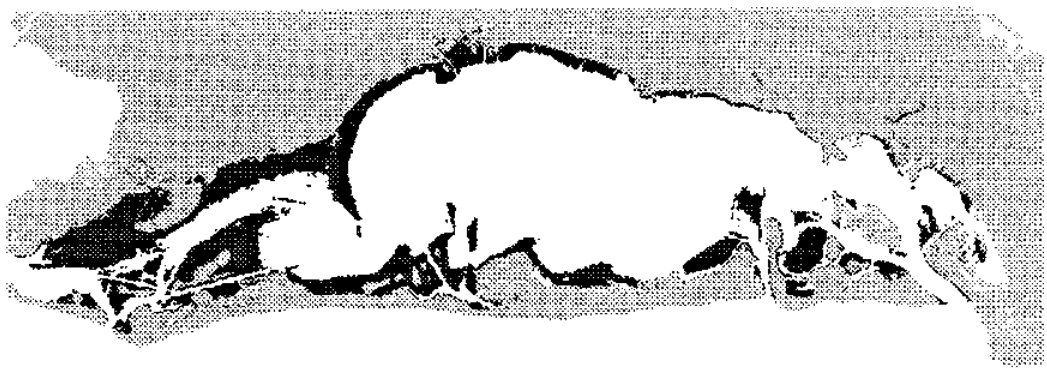
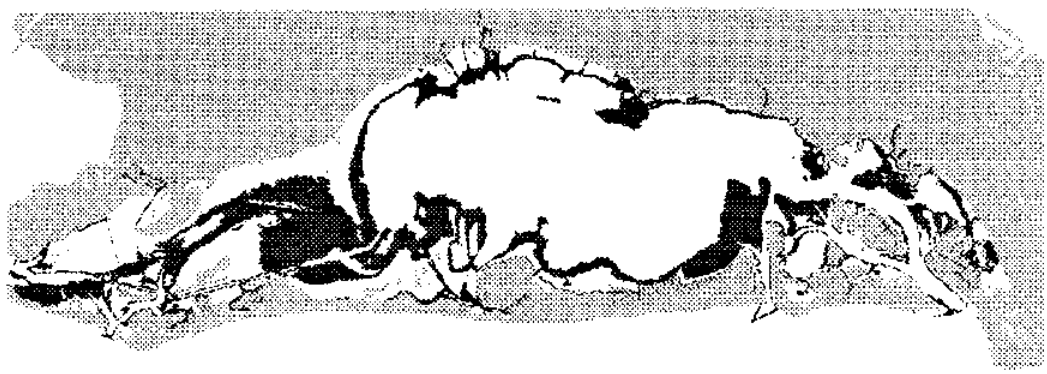


Army Corps of Engineers

Figure 5: Sources of bathymetric data



Water Depth < 3 ft.



Water Depth >= 3 and < 6 ft

Water Depth >= 6 ft.

Figure 6: Bathymetry

the lattice was converted to a polygon coverage using the LATTICEPOLY command. As each of the these steps require significant computer storage space and processing power, it was necessary to segment the area into tiles, and to process each tile separately. Figure 7 shows the tile-processing structure.

(ii) Trafficsheds

Water depths within trafficsheds were from three sources: (1) a centerline depth survey in 1992, collected as a series of points, (2) selected bathymetric contours compiled at 1:2,400 scale by photo interpretation and field inspection, and (3) the shoreline which was assumed the 0 ft. (mllw) datum. Centerline soundings were converted to arcs, and the arcs converted to a series of continuous points using the DENSIFY command. A TIN representation of trafficshed depth was constructed using items (1) and (2), and this compilation layer was converted into a polygon coverage using the open bay method described above. Note, however, that this processing was done at an order of magnitude larger in scale than in the case of the open bay.

All 91 tiles (43 open bay, 48 trafficshed) were reassembled into a single coverage using the MAPJOIN command. This procedure was used to compile the bathymetric map element. It is presented as a 1:24,000 regional characterization on one map sheet, and as part of the 1:4,800 scale maps in the Detailed Inventory Atlas. Figure 8a is an example from the Detailed Inventory Atlas; Figure 8b gives the explanation of symbols. Bathymetry is shown by 1 ft. graduations of blue-color shading at regional and detailed analysis scales.

c. Habitat

Two types of habitat information -- seagrass and mangrove -- are incorporated into the GIS analysis. The WMD provided seagrass data for Manatee County as a Land Use/Land Cover (LULC) GIS coverage. Sarasota County seagrass was interpreted from l991 false-color, 1:24,000-scale, aerial photography. The WMD provided mangrove data for the entire study region as a LULC GIS coverage. Figures 9 and 10 show the distribution of seagrass and mangrove.

d. Boats

Information on boats is from an on-the-water census conducted between December 1991 and April 1992. Boat locations were plotted on 1:1,200 enlarged section aerials and the characteristics of each boat were recorded on data sheets (Appendix 2). This information was digitized and compiled into a boat GIS

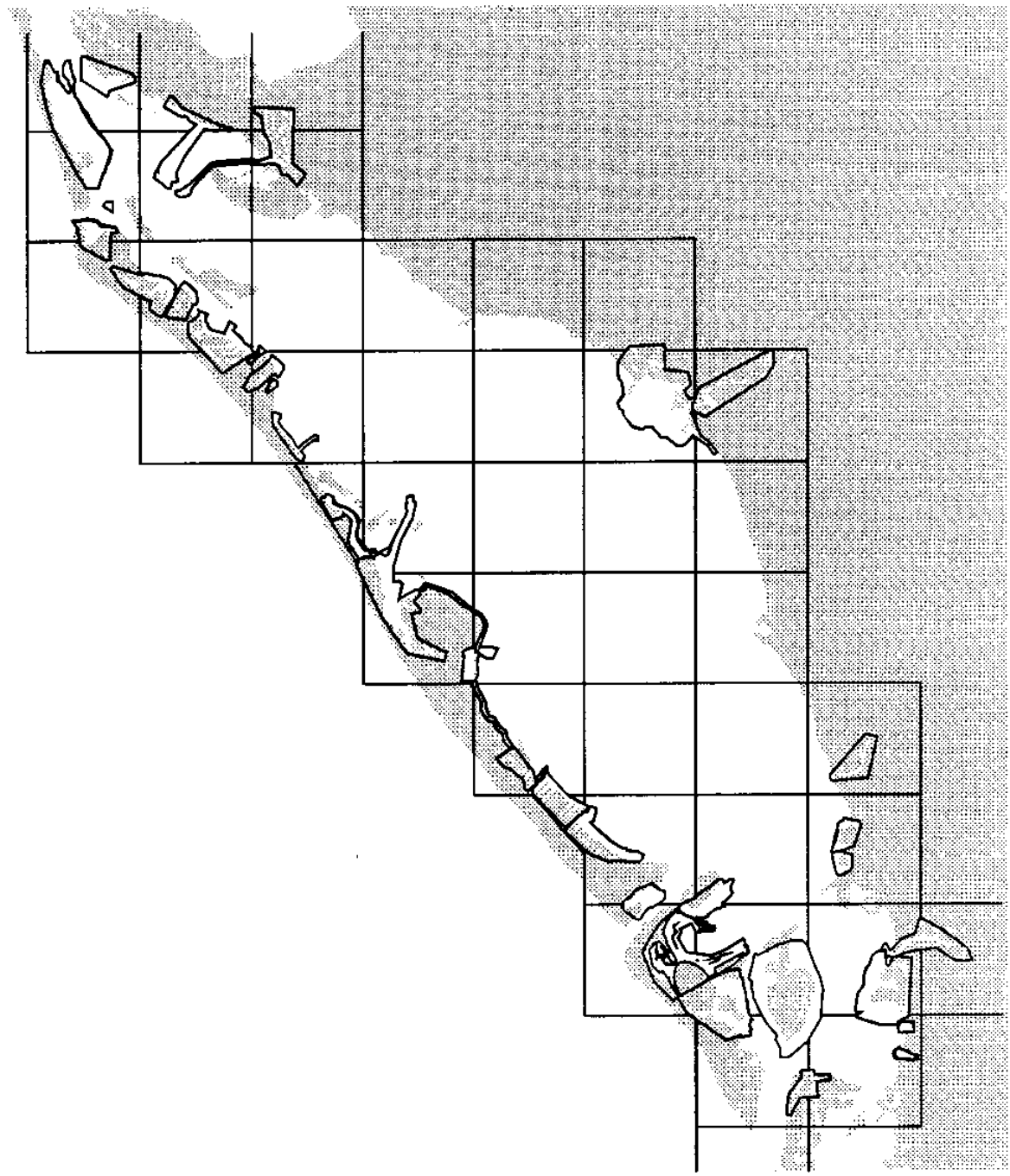


Figure 7: Tile structure for assembling the bathymetric coverage.

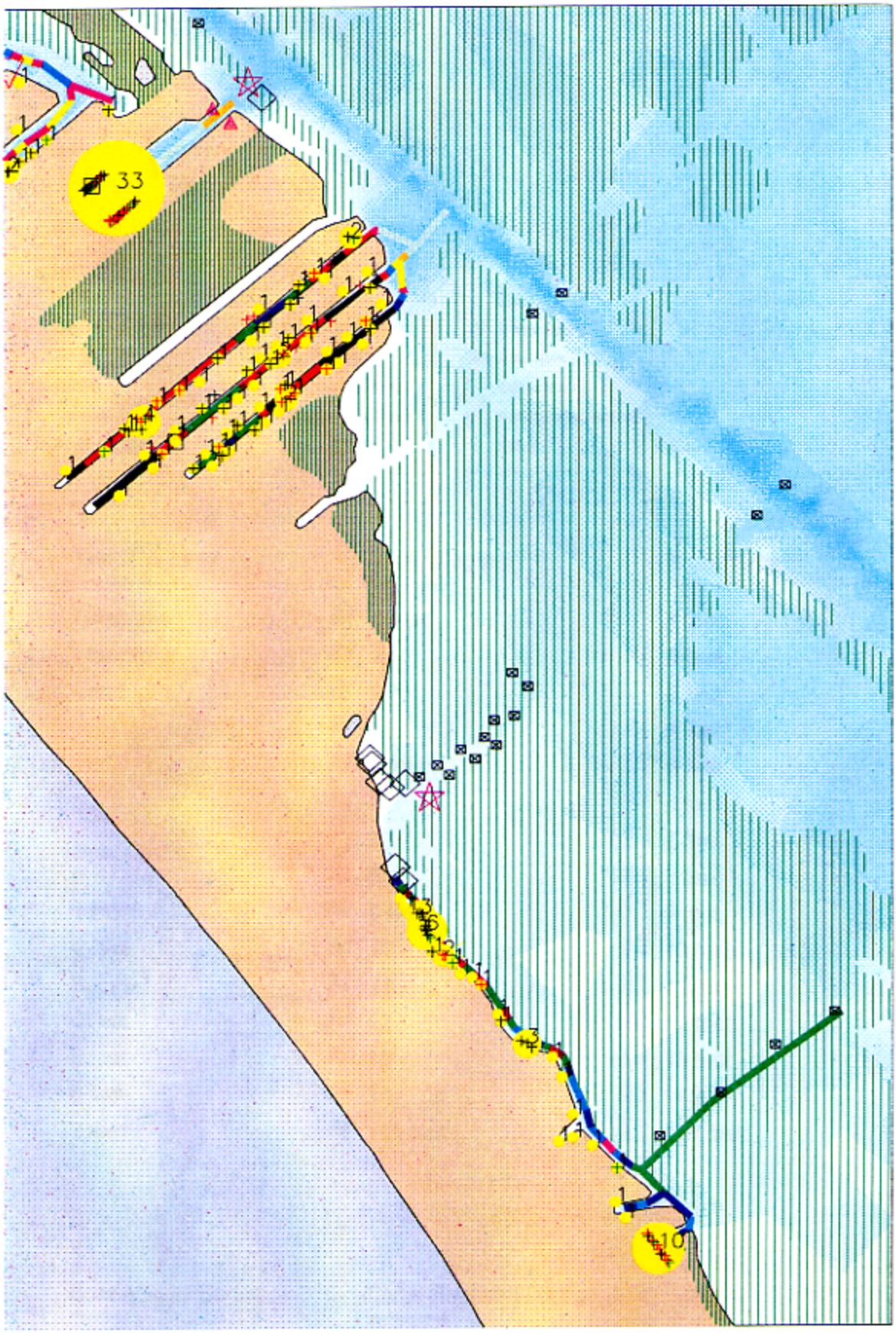


Figure 8a. Example from the Detailed Inventory Atlas.

Figure 8b. Explanation of symbols found on atlas maps.

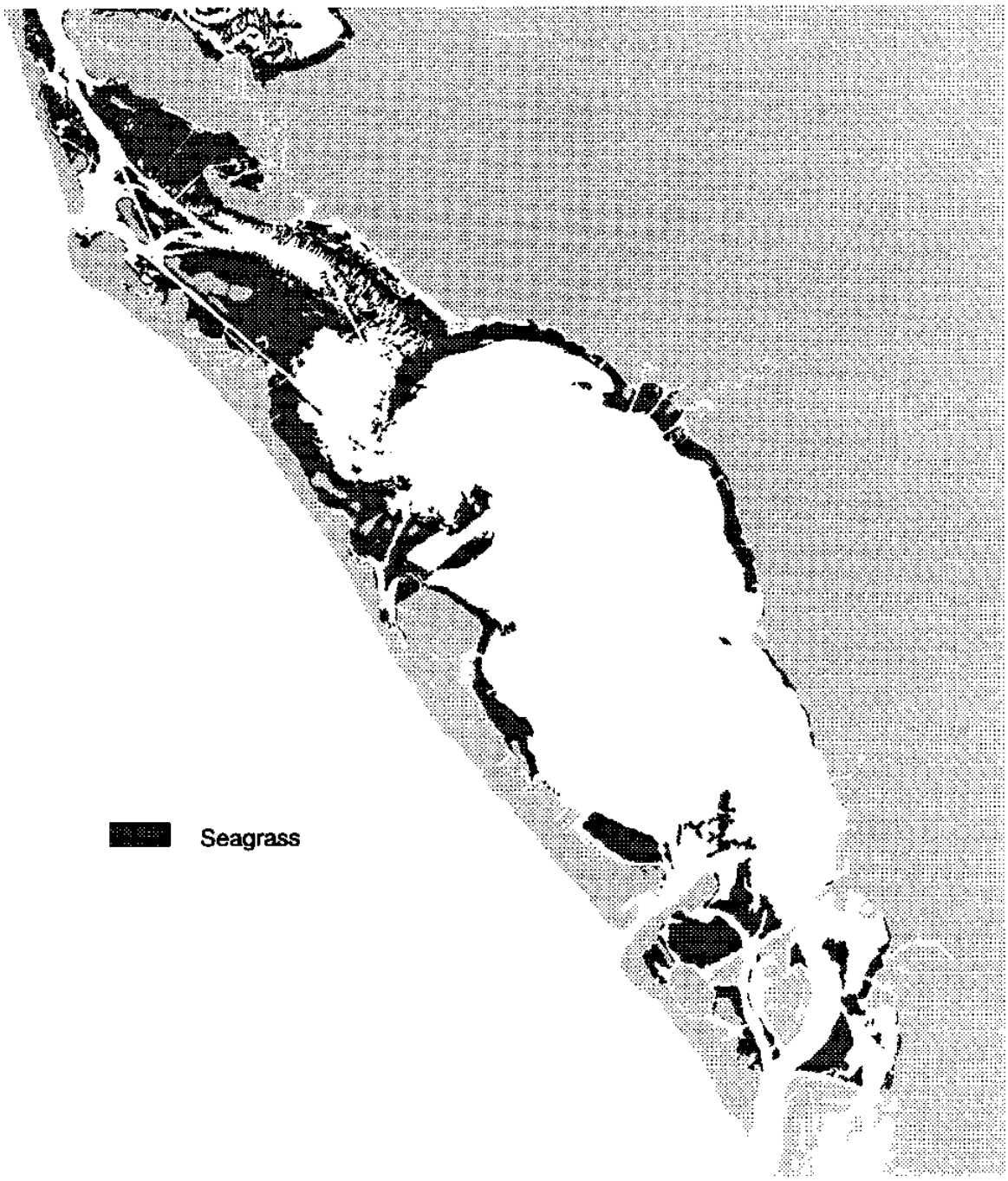


Figure 9: Seagrass

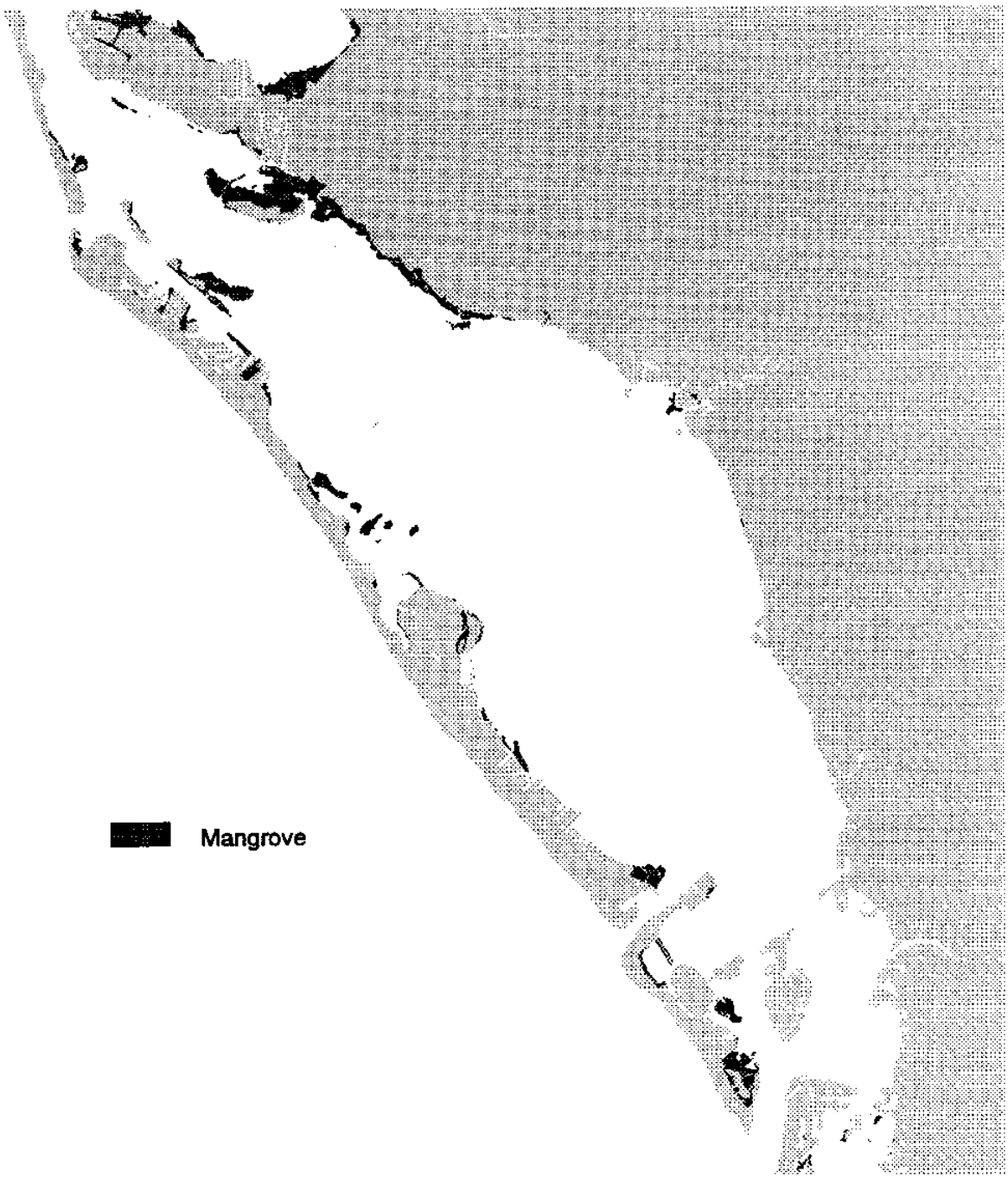


Figure 10: Mangrove

coverage. Information for each boat includes type, length, age and draft. Boat types are reported as: row, sail, speed (including personal watercraft), power, recreational fish, commercial fish, other (ferry, dredge, tug, barge, cargo, salvage, safety/law enforcement, survey, floating home or office, pilot, excursion, research). Boat draft was determined either by direct observation, or by relating make, model, length and age characteristics, observed in the field, with published listings (BUC, 1991). Figure 11 shows the boat distribution in the study region.

e. Facilities

Facility information was obtained concurrently with the boat data during the on-the-water field census, recorded on aerials and data sheets (Appendix 2), and compiled into a facility GIS coverage. Information for each facility includes accessibility, type, berthing, and services. Facilities are reported as residential (single, multi-family), marina/yard/club, motel (hotel), restaurant (shop), anchorage, ramp, other (industrial, government, charter, brokerage, commercial). Berthing (mooring) includes wet slip, hoist, dry-stack, beached, blocked, and trailer. The distribution of wet and dry slips per facilities is mapped in Figure 12.

f. Signage

A survey of all boating-related signs, in the water and along the shoreline, was undertaken in May 1993. Features were located using a global positioning system (GPS). Signs were classified as navigation aids (channel, bridge, cable, danger), artificial reef, seagrass, manatee (speed, habitat, information), boat wake, water sports, business, restricted access (crime, private), pollution prevention, anchorage, and pilings. The general distribution of signs is shown in Figure 13. Fifteen types of signs are plotted on regional (1:24,000) and detailed inventory (1:4,800) maps (Figure 8a).

3. Analysis

The objective of the analysis was to evaluate the relationship between boat draft and channel depth for each vessel in order to measure boat accessibility and channel restrictions for all trafficsheds in the study region. An examination of the results of this trafficshed analysis provided a strategy for evaluating the functionality of the regional waterway system in Sarasota Bay and for prioritizing maintenance and remediation of system channel components. The underlying objective of the analysis was to develop an analytical tool that could fit channel depth to draft requirements and minimize impacts on surrounding bay habitats.

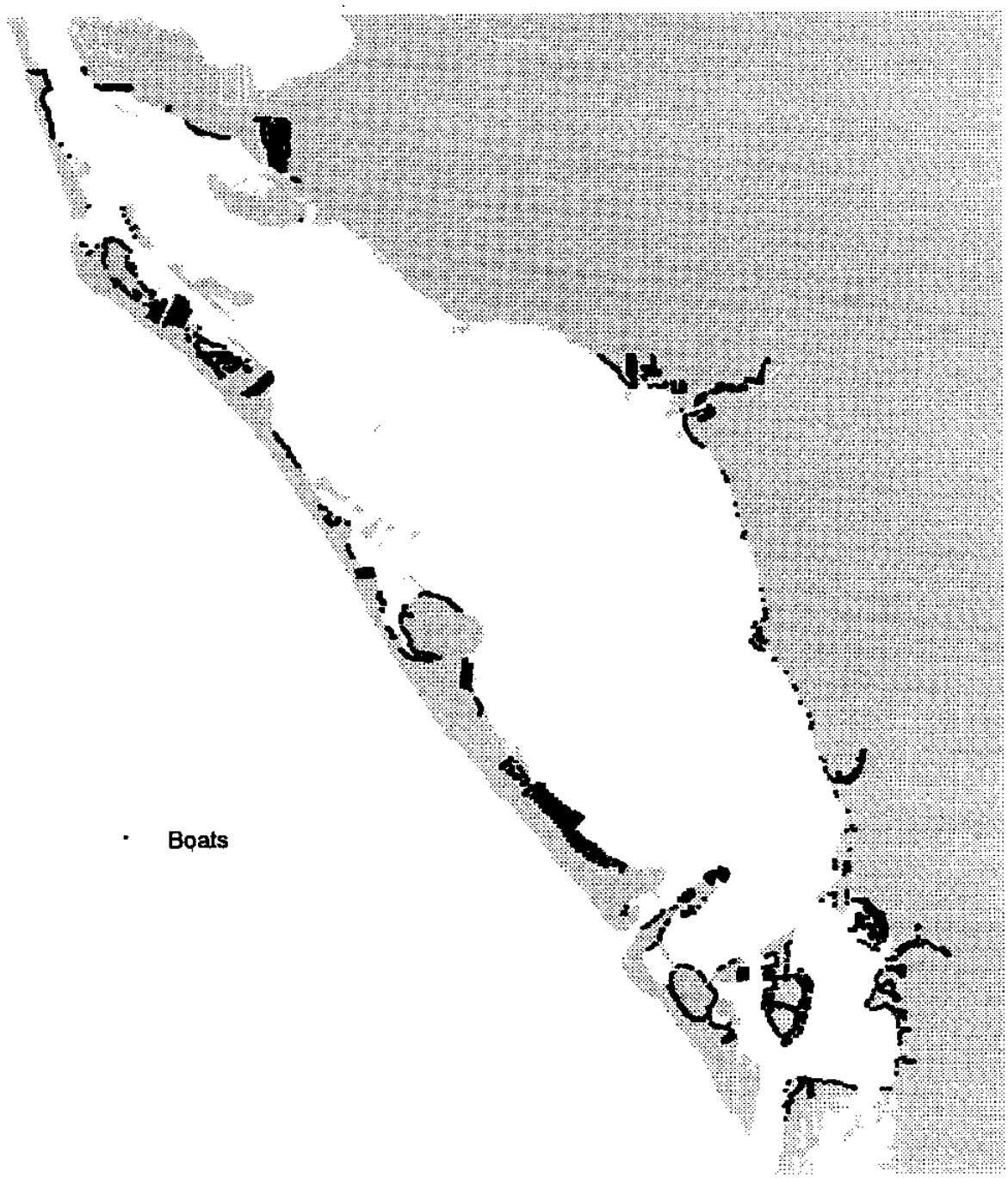


Figure 11: Boats

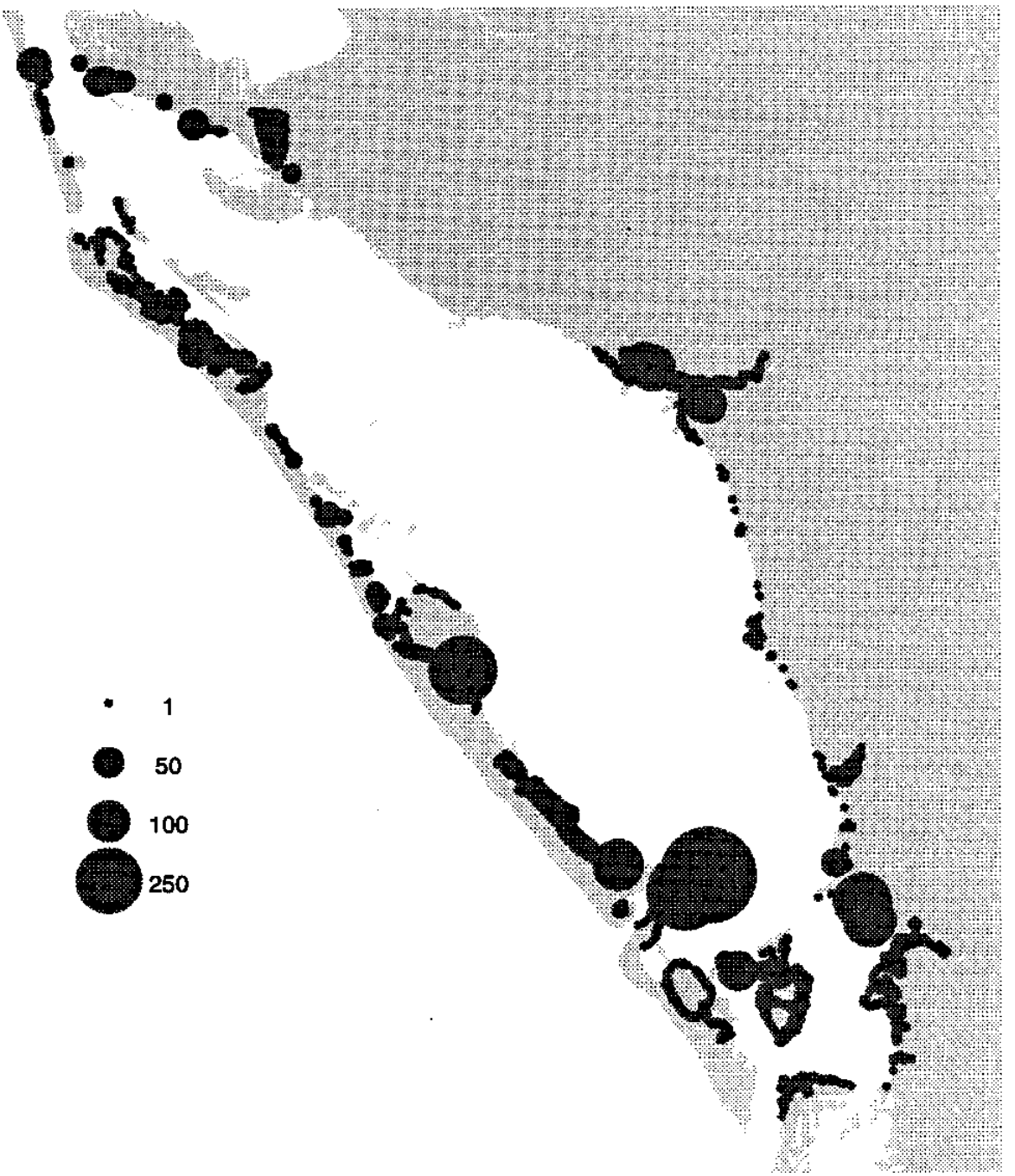


Figure 12: Facilities.

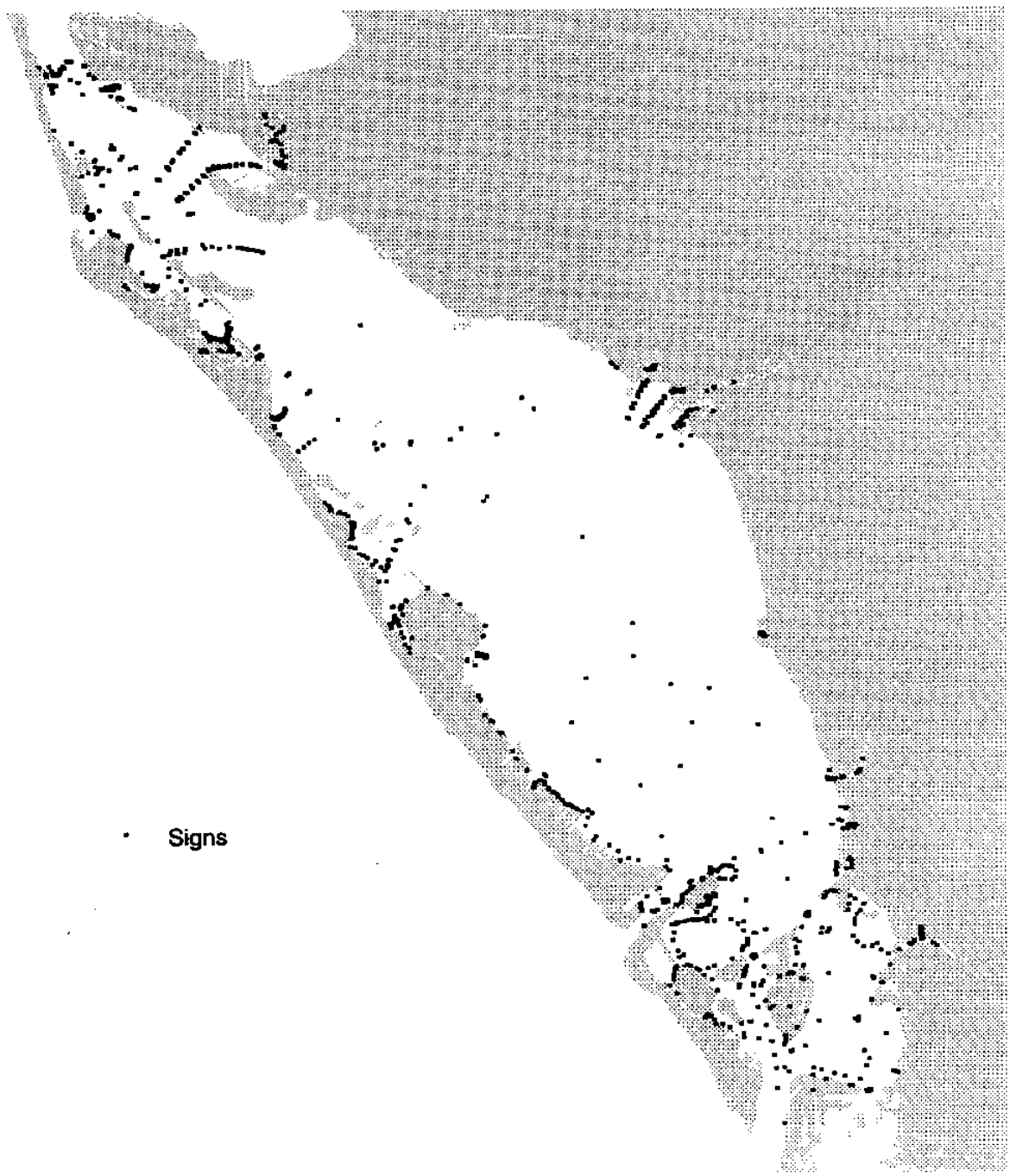


Figure 13: Signage

The methodology offers managers criteria for selecting alternative policies to satisfy all or partial user needs.

a. Boat Accessibility

A five step evaluation was undertaken: (1) a network of boat traffic paths was created in all the trafficsheds; (2) the water depth of each path segment in the network was entered into the channel data base as an attribute of that segment; (3) a boat path was traced representing the most likely route each boat would travel from its point of origin to the open bay; (4) the water depth of each segment was noted, and the shallowest depth that each boat would traverse was recorded, and became an attribute of each individual boat in the data base; (5) the shallowest depth was compared to the draft of the boat. As a result of this boat accessibility evaluation, if the boat draft was less than the shallowest depth, then, the boat was considered not restricted. However, if the shallowest depth was equal to or less than the boat draft, then, the boat was considered restricted according to the systems' design criteria (see II3c). The accessibility rating for each boat is plotted on maps in the Neighborhood Boat Accessibility Atlas. Color-coding is used to designate each of the classes (Figures 14 and 8b).

b. Channel Restrictions

It was possible to determine which channel segments were causing the restriction, once the restricted boats had been identified. A three step analysis was carried out: (1) all boats were linked with each segment in every pathway leading from each boat trip's origin to the open bay exit of the trafficshed; (2) the drafts of all those boats were noted, and the maximum draft of that group was recorded for each channel segment; and (3) the maximum boat draft was compared to the depth of the corresponding channel segment.

The difference between the deepest draft boat and the depth of the segment -- referred to as channel restriction -- identified the depth of dredging required for that segment to accommodate the deepest draft boat that would traverse it. As a result of this channel restrictions analysis, if the draft of the deepest draft boat was less than the depth of the channel segment, then, that segment was classified as not restricting any boats. However, if the draft of the boat was greater than the segment's depth, then, that segment was deemed as restricting that boat. For example, a 4 ft. draft boat traveling along a canal segment 3 ft. deep would be restricted by a 1 ft. shoal, and 1 ft. depth of material would have to be removed along that segment to accommodate unrestricted access by the boat.

Figure 14. Example from the Neighborhood Boat Accessibility Atlas.

Restrictions, in 1 ft. increments, are plotted for channel segments on the 1:4,800 maps in the Neighborhood Channel Restrictions Atlas. A sample map is shown in Figure 15; see Figure 8b for explanation of symbols.

c. Alternate Scenarios

Two methods were devised to assess a range of decision options influencing waterway management.

(i) Accessibility Index

The first method is based on a sliding scale which evaluates the ratio of boat draft to channel depth. Each boat's accessibility is classified relative to the shallowest segment of its access channel leading to the open bay. A boat may be: (1) somewhat restricted, if its access channel depth (ACD) = vessel draft (VD); (2) restricted, if its ACD $\geq$ 1ft. shallower than VD; (3) severely restricted, if its ACD $\geq$ 2 ft. shallower than VD; or (4) blocked, if its ACD $\geq$ 3 ft. shallower than VD. Evaluation of a trafficshed's boat population by accessibility classes uncovers boat-channel relationships that affect the magnitude and geographical extent of channel improvement needs.

Table 2 shows the variability in boat accessibility by trafficsheds for the pilot region. Buttonwood Harbor (Trafficshed 10) has 31 boats with access problems; 27 of these (87 percent) face moderate channel restrictions ($\geq$ 1 ft.). Four boats (13 percent) are severely restricted or blocked ($\geq$2 ft.). It may be reasonable to provide unlimited access for the majority of boats in the moderate restriction categories, but it may be questionable to provide such access for the 4 deeper draft boats. Bradenton Beach North is a different situation. There are 18 boats with access problems, but 11 (61 percent) have severely restricted and blocked channel conditions. The access needs of the majority of boats, in this case, may justify maintenance dredging to accommodate the extreme cases. These data offer valuable insights for regional comparisons.

The accessibility index also can be used for local applications. Table 3 provides information for Whitaker Bayou, a trafficshed containing 115 boats, 97 classed as unrestricted, 12 as somewhat restricted and 6 as restricted; restricted boats includes one with a 2 ft draft and 5 with a 5 ft. draft. The trafficshed consists of a 2,121 ft. channel with 19 depth-unique length segments (Figure 16). Each segment is evaluated for each boat that must pass through it. Table 4 shows characteristics for all channel segments, and additional depths required for

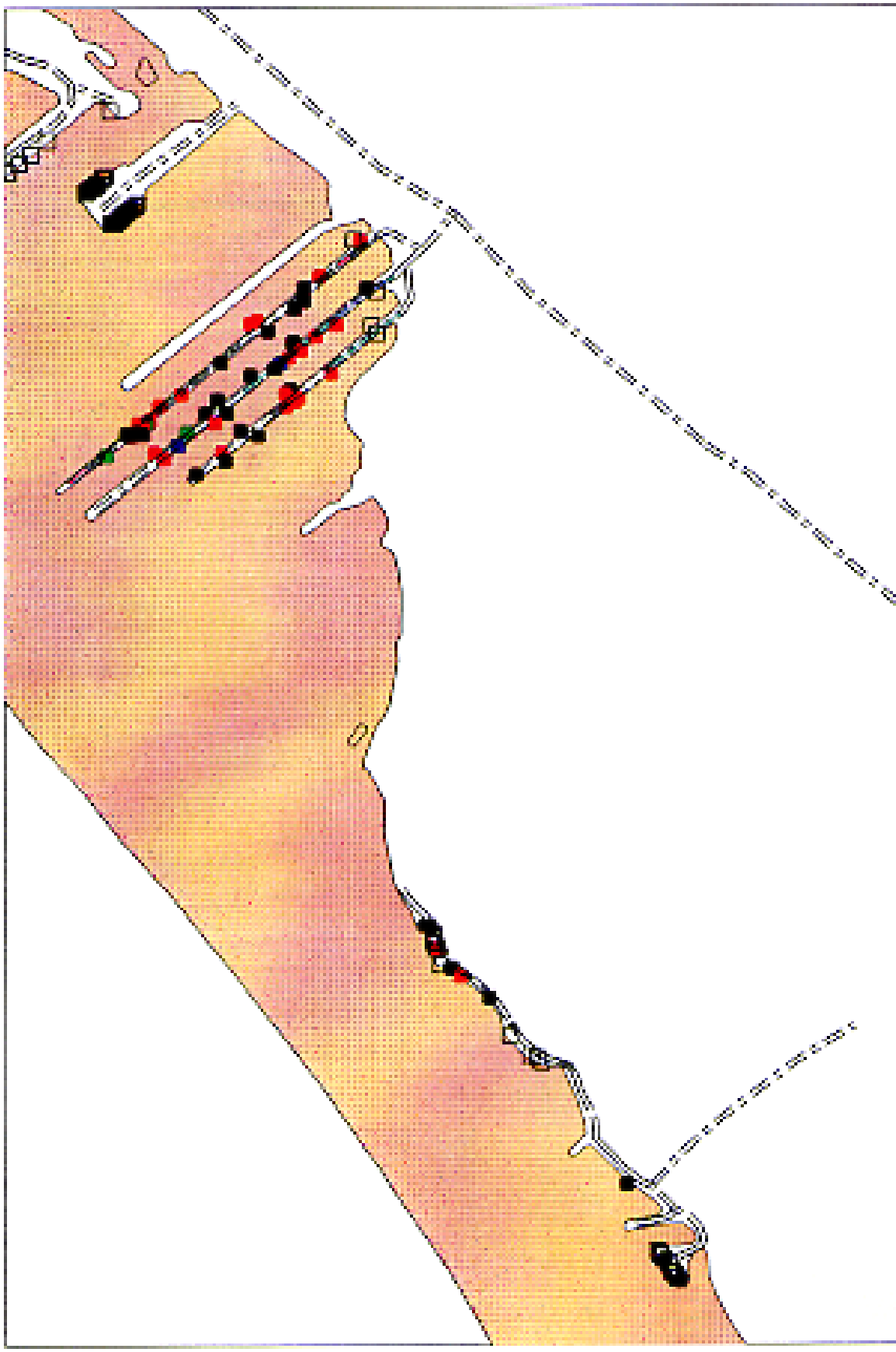


Figure 15. Example from the Neighborhood Channel Restrictions Atlas.

Trafficshed	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
1 Bradenton Beach North	3	4	5	6	18
2 Bradenton Beach South	4	1			5
3 Whitney Beach North	8		1		9
4 Whitney Beach South	17	2			19
5 General Harris	8				8
6 Emerald Harbour	15		1	1	17
7 Gulf Bay Basin					0
8 Tarawitt	19	21	3	2	45
9 No Name	9	2			11
10 Buttonwood Harbor	15	12	3	1	31
11 Bay Isles/Longboat Key Moorings	45	22	1		68
12 Golf Links		1			1
13 Chipping		1			1
14 Wedge	1	1			2
15 Birdie	1				1
16 Bowsprit	2				2
19 Ranger	1				1
20 Halyard	1	1			2
21 Boat Name Lanes	7				7
22 New Pass Lagoon					0
23 City Island New Pass Channel					0
24 City Island Southeast					0
25 St. Armands/Coon Key North					0
26 North Lido Lagoon		4			4
27 Sarasota Yacht Club					0
28 Coon Key South					0
29 Otter Key					0
30 Bird Key	2	2			4
31 Louise Bayou	1				1
32 Hanson Bayou					0
33 Spring Creek (Cherokee Park)			1		1
34 Cherokee Park	4	5			9
35 Blue Heron (McClellan Park)	2				2
36 Hyde Park (McClellan Park)					0
37 Hudson Bayou/Harbor Acres	22	3	1		26
38 Marina Jacks/Island Park					0
39 Quay					0
40 Library Channel					0
41 Centennial Park					0
42 Whitaker Bayou	14	6			20
43 Stephens Point					0
44 Bowlees Creek	44	15	5		64
45 Trailer Estates East	14	7	1		22
46 Trailer Estates West	46	17	5	1	69
47 Mt. Vernon/Coral Shores	27	6	2		35
48 Paradise Bay	7	1			8
49 Cortez	6	4			10
50 Mallard Lane (McClellan Park)	3				3
51 No-Name North					0
52 Putting Green	2	1			3
53 Yardarm		2	1		3
Trafficshed Total	350	141	30	11	532

Table 2: Boat accessibility classes by trafficshed

Boat Draft (ft)	Unrestricted	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
1	17					17
2	36	1	1			36
3	44	2				46
4		9				9
5			5			5
Total	97	12	6			115

Explanation of channel accessibility (channel depth [0=mllw] / vessel draft)

Unrestricted	≥ 1 ft. deeper than vessel draft	**Severely restricted**	≥ 2 ft. shallower than vessel draft
Somewhat restricted	= vessel draft	**Blocked**	≥ 3 ft. shallower than vessel draft
Restricted	≥ 1 ft. shallower than vessel draft		

Table 3: Channel accessibility in Whitaker Bayou

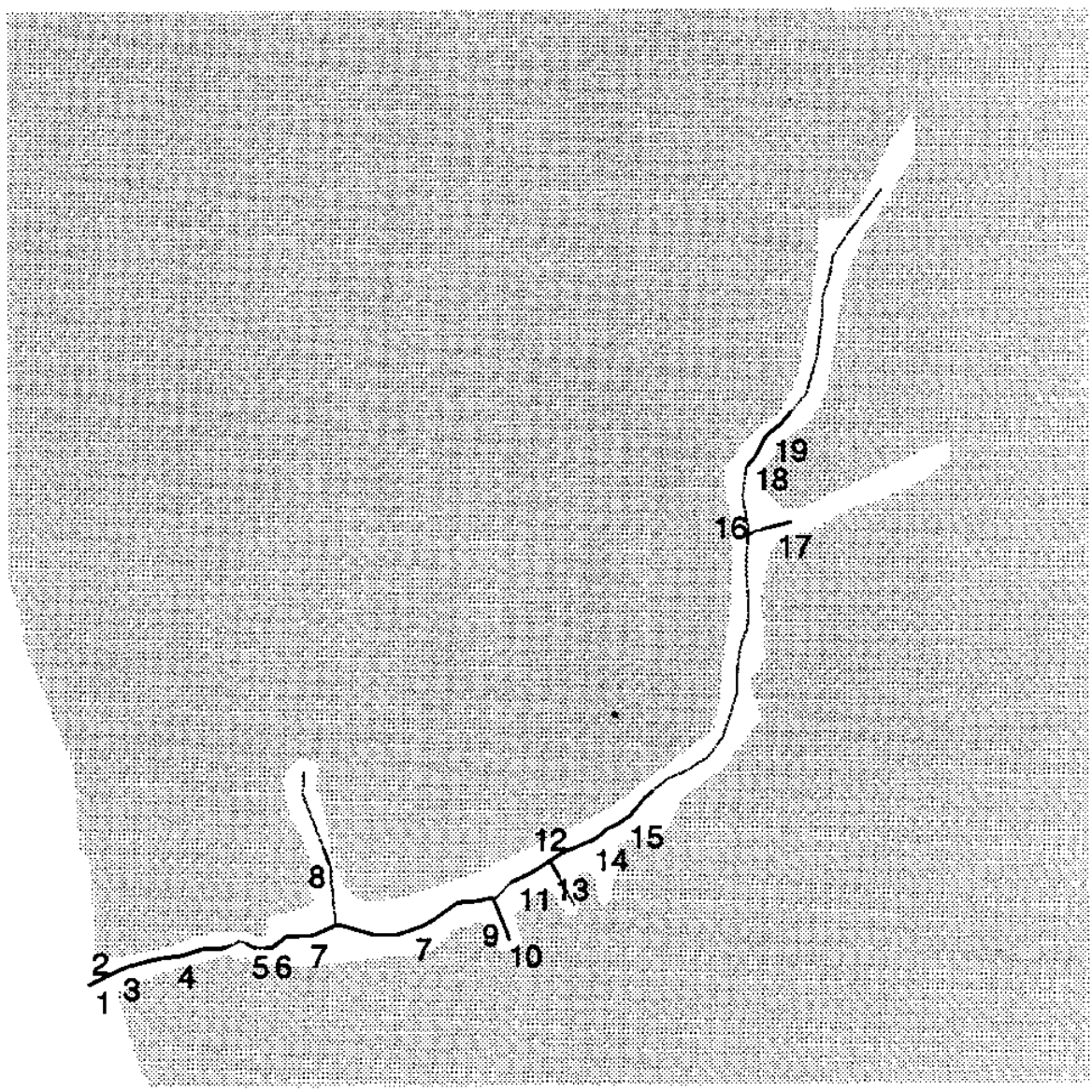


Figure 16: Whitaker Bayou channel segmentation.

Channel Segment Characteristics						Improvement Scheme Additional Depth Required		
			Boats Affected			Unrestricted	Somewhat Restricted	5 ft access to Great
Segment ID#	Depth (ft)	Length (ft)	#	draft	total	Access	or better access	American Boatworks
1	4	40	5	5	14	2	1	1
			9	4				
2	5	49	5	5	5	1		
3	4	33	5	5	14	2	1	1
			9	4				
4	5	276	5	5	5	1		
5	5	31	5	5	5	1		
6	5	82	5	5	5	1		
7	4	604	5	5	14	2	1	1
			9	4				
8	3	19	1	3	1	1		
9	5	114	1	5	1	1		
10	4	27	1	5	3	2		1
			2	4				
11	5	49	4	5	4	1		
12	4	191	4	5	7	2	1	1
			3	4				
13	5	52	1	5	1	1		
14	5	45	2	5	2	1	1	
15	4	192	2	4	2	1		
16	3	41	1	3	1	1		
17	1	85	1	2	1	2	1	
18	3	50	1	3	1	1		
19	2	141	1	2	1	1		
Total	NA	2,121	NA	NA	NA	NA	NA	NA

Table 4: Channel segment characteristics and hypothetical improvement scheme for Whitaker Bayou

specific segments under three improvement schemes: unrestricted; somewhat restricted or better access; and, 5 ft. access to Great American Boatworks.

(ii) Planning for Normal or Below Normal Tidal Conditions

We decided to ask, "what would it take to accommodate all boats if the water was 1 ft. BELOW mean lower low water?" (The analysis to this point used 0 ft. mllw datum or NORMAL tidal conditions.) A second analysis arbitrarily added an additional foot of clearance for all boats to take into account "below normal" tidal conditions. This is presented as Option B in all tables in Section III. ("Normal" is based on 0 elevation (mllw) datum, and is referred to as Option A). Below normal water depth is associated with the passage of atmospheric cold fronts and strong northerly winds. It must be noted, however, that tidal data from Mote Marine, for the calendar year (October 1994 - September 1995), only report 16 daily occurrences where tidal conditions were ≤ 0.5 ft mllw (Table 5).

1994			1995				Total
Oct	Nov	Dec	Jan	Feb	Mar	Apr	
0	1	1	5	9	2	0	16

Option B conditions occuring during winter season (8% of time)

Table 5: Number of daily occurrences at Mote Marine where tidal conditions were ≤ .5 ft mllw

4. Map Products

Eighty maps were produced as an integral component of this waterway management application. They were compiled into four atlases and include:
Regional Characterization: 5 maps, 1:24,000 scale, showing color-shaded bathymetry (as 15 zones, 1 ft. resolution), seagrass, mangrove, boats, facilities, and signage.
Detailed Inventory: 25 maps, 1:4,800 scale, including color-shaded bathymetry (1 ft. resolution), supplemental 3 ft. contours, centerline controlling depth, boats, facilities, signage, seagrass, and mangrove.
Neighborhood Boat Accessibility: 25 maps, 1:4,800 scale, showing levels of boat accessibility to open bay.
Neighborhood Channel Restrictions: 25 maps, 1:4,800 scale, showing location and extent of channel depth restrictions at 1 ft. intervals.

III. REGIONAL RESULTS

1. Trafficshed Geography

Sarasota Bay's present shoreline differs from natural conditions which prevailed before the advent of dredge-and-fill coastal development (Figures 2 and 3). The geography of this altered shoreline, and its associated finger canals, perimeter canals, basins, and access channels, directly influences recreational boat traffic. Facilities are situated along the altered shoreline and boats are moored along waterways which comprise the trafficshed geography of the region.

The key elements of the trafficshed system are finger canals, shoreline canals, natural streams (bayous) and tidal creeks; there are simple and complex forms. The system includes the following trafficshed classes: (1) finger canal or basin with one access channel; (2) multiple finger canals and/or basins with one or more access channel(s); (3) shoreline channel with one or more access channel(s); (4) shoreline channel linked to multiple finger canals, basins, streams and/or creeks, with one or more access channel(s); and (5) natural stream or tidal creek with one access channel. These forms are illustrated in Figure 17, and their distribution is shown in Figure 18. Appendix 3 includes a listing of the trafficsheds by classes, location and land use.

Simple forms (single canal, shoreline channel) are products of early coastal developments, e.g., City Island, Lido Key, Bradenton Beach, and Cortez. These systems have bulkheaded shorelines and contain limited areas of natural habitat. Complex finger canal systems are found on north Longboat, on the mainland at Mt. Vernon, and at Bird Key. Other complex forms, which include both shoreline channels and finger canals or tidal creeks, are found at Buttonwood Harbor and Bowlees Creek. Some complex forms include long, dredged, access channels bordered by shoal water and seagrass. There are few streams which retain their natural morphology, e.g., Whitaker Bayou, Louise Bayou and the tidal creek north of Broadway at Whitney Beach; these may or may not have hardened shorelines.

2. Boating Resources

Boating conditions on the bay and the distribution of shore facilities determine the nature and extent of recreational use. Water depth is a critical

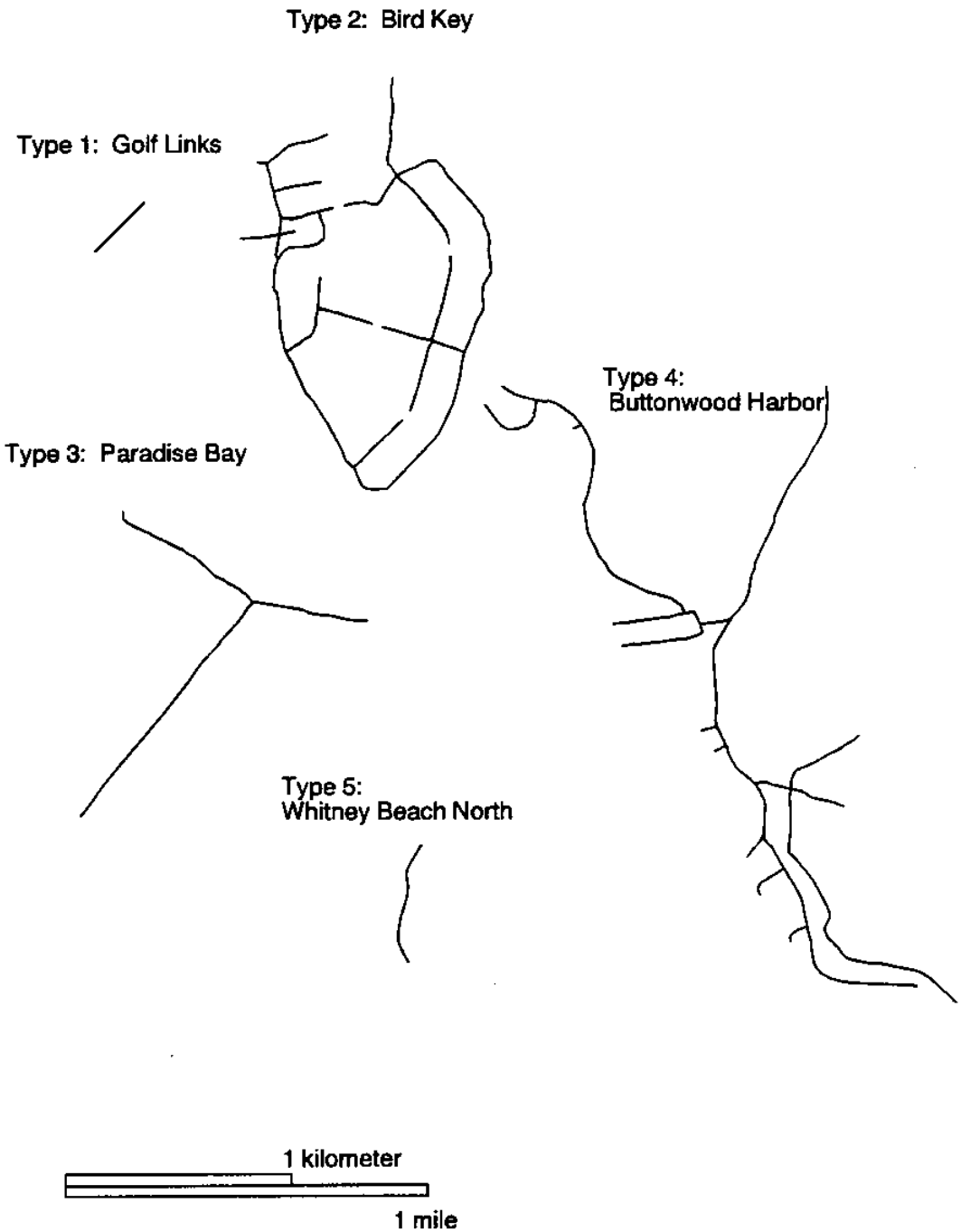


Figure 17: Trafficshed channel networks.

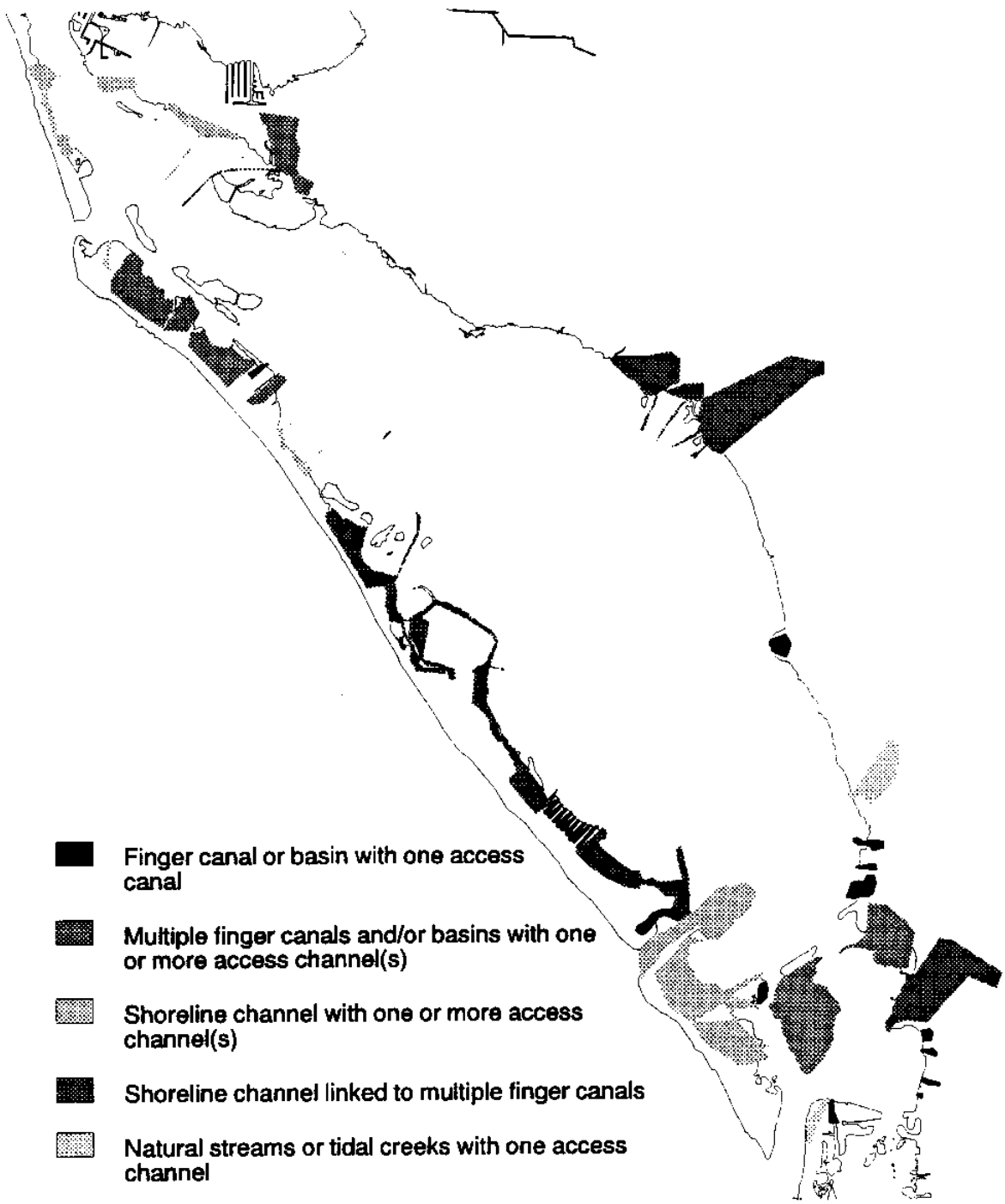


Figure 18: Trafficshed classes.

factor governing baywater use on emergent barrier island coasts, such as in southwest Florida. Natural habitats, as seagrass and mangrove, are important resources for recreational fishing, cruising and nature touring. Boats, facilities, moorings and signs, are distributed in a manner that reflects the boating geography of the region. These are discussed below.

a. Environmental

Sarasota Bay -- bounded by Cortez bridge on the north and Siesta Key bridge on the south -- is a 35.3 sq. mi. area consisting of 32.5 sq. mi. of open bay and 2.8 sq. mi. of trafficsheds (Table 6). Twenty-three percent of the open bay is < 3 ft. deep; much of this shallow water area is in the northern third of the bay (from Longbar to Cortez), and along the eastern shores of the barrier islands (Table 7). Another 20 percent is 3 to 6 ft. deep. Shallow to moderate depths (<6 ft.) are found along the western mainland shoreline. Fifty-seven percent of the open bay -- the middle bay region -- is relatively deep water (≥ 6 ft.), which is adequate for all boating activities. There are over 8 sq. mi. of seagrass meadows and about 3 sq. mi. of mangroves (Table 6). Shallow water, in the northern third and along the barrier islands western shore, contains the most extensive areas of these sensitive bay habitats (Figures 9 and 10).

Resource Areas	Trafficsheds	Open Bay	Study Region
Baywater	2.8	32.5	35.3
Seagrass	0.4	8.4	8.8
Mangrove	0.8	2.1	2.9

Table 6: General resource areas (sq. mi.)

Water Depth (ft)	Area (percent)
< 3	23.00
≥3 < 6	19.64
≥6	57.35
Total	99.99

Table 7: Open bay bathymetry

Trafficsheds represent only 8 percent (2.8 sq. mi.) of the bay, but their shoreline locations and close proximity to mangrove and seagrass make these areas of special environmental concern. Over the years, sea grass has been reduced by channel dredging, and mangroves have been removed by canal construction and shoreline hardening. Former channels, such as Longbar Cut, which are no longer used for navigation, remain as meadow scars (Figure 9). Much of the boating activity which takes place on the bay comes into contact with these sensitive habitats, due to trafficshed geography and the origin-destination pathways of the boats. Five percent of the seagrass (0.4 sq. mi.) and 28 percent of the mangroves (0.8 sq. mi.) are located in trafficshed areas (Table 6).

The relative distribution of seagrass and mangrove by trafficshed classes is shown in Table 8. Simple shoreline canals have the largest proportion of sensitive habitat, followed by complex shoreline canal systems and multiple finger canals. Natural creeks and single finger canals contain negligible natural habitat areas. Trafficshed channels have relatively deep water: 12 percent are ≤3 ft., 37 percent are 4 - 5 ft., and 51 percent are ≥6 ft. (Table 9). Boat accessibility problems are found in limited segments of channels with restricted depths.

Trafficshed Class	Seagrass	Mangrove
Single finger canal	0.50	0.00
Multiple finger canals	28.76	22.54
Simple shoreline canal	48.94	36.50
Complex shoreline canal	20.07	40.96
Natural creek	1.73	0.00
All trafficsheds	100.00	100.00

Table 8: Seagrass and mangrove distribution by trafficshed classes (percent)

Water Depth (ft.)	Total (percent)
≤ 3	5
3	7
4	19
5	18
≥6	51

Table 9: Average trafficshed channel depths

b. Boats

There were 4,552 boats (excluding dinghies) using Sarasota Bay in 1992 (Table 10). Boats, in this analysis, were grouped as follows: sail, recreational fishing, power, speed, and others. Sailboats were the most prevalent (27.2 percent), followed by recreational fishing (25.6 percent), power (20.8 percent), and speed (15.8 percent). The average draft of sail and power were relatively similar, 2.93 versus 2.89, but sailboats had a larger range of drafts (1.48 std. dev.). This distinction is of importance in evaluating the accessibility of trafficsheds which berth large numbers of sailboats. Ninety-seven percent of all boats are moored in trafficsheds. The map in Figure 11 shows the general distribution of boats in Sarasota Bay.

			Draft (ft.)			
Boats	Number	Percent	Average	Maximum	Minimum	Std. Dev.
Row	179	3.9	1.01	2	1	0.09
Sail	1,248	27.4	2.93	7	1	1.48
Speed	720	15.8	2.15	3	1	0.67
Power	947	20.8	2.89	6	1	0.88
Recreational Fish	1,165	25.6	1.70	5	1	0.78
Commercial Fish	211	4.6	2.06	9	1	1.80
Other	82	1.8	2.24	6	1	0.93
Total	4,552	100.0	NA	NA	NA	NA

Table 10: Boats (excluding dinghies)

c. Infrastructure

There are a large number (2,167) of private moorings -- wet slip, hoist, and seawall -- at residential single and multi-family shorefront sites (Tables 11 and 12).

Type	Number	Percent
Residential	2,167	94.34
Marina/Yard/Club	22	0.96
Motel/Restaurant/Shop	12	0.52
Anchorage	7	0.30
Other	48	2.09
Unclassified	41	1.78
Total	2,297	99.99

Table 11: Facilities

Type	Number	Percent
Wet Slip	4,523	64.08
Hoist/Dry Stack	1,515	21.47
Seawall	202	2.86
Beached/Blocked	405	5.74
Trailer	331	4.69
Ramp	73	1.03
Total	7,049	99.87

Table12: Moorings

The map in Figure 12 shows a saturated pattern of slips, for example, at the north and south ends of Longboat Key, mid-bay at Bird Key, on the mainland in the northeast at Mt. Vernon and in the southeast at Hudson Bayou and Harbor Acres. These are predominantly private dock facilities. Large commercial marinas are situated at Sarasota Island Park, Bowlees Creek, City Island, and in central and south Longboat Key.

There are 968 boating signs located in Sarasota Bay. These are almost evenly divided between trafficsheds and open bay locations. Figure 13 shows their distribution and Table 13 lists the relative numbers of signs in each mapped category. Almost two-thirds are navigation aids; another 10 percent, each, are abandoned pilings and manatee signs; the remainder are recreational, commercial, etc. Most commercial and manatee signs are situated in trafficsheds. All seagrass signs are in the open bay.

Type	Trafficshed		Open Bay		Study Region	
	Number	Row Percent	Number	Row Percent	Total	Column Percent
Commercial	46	73.02	17	26.98	63	6.51
Manatee	62	70.45	26	29.55	88	9.09
Navigation	321	53.41	280	46.59	601	62.09
Piling	55	59.78	37	40.22	92	9.50
Recreational	37	52.11	34	47.89	71	7.33
Seagrass	0	0.00	24	100.00	24	2.48
Other	18	62.07	11	37.93	29	3.00
Total	539	55.68	429	44.32	968	100.00

Table 13: Signage

3. Restricted Boats

Step 1 of the waterway system analysis related boat draft to channel depth, and was performed to identify the numbers of boats restricted in traveling from trip origin to open bay. The accessibility indexing and alternative tidal datum analyses methods, presented in Section II3, were used. Results (Table 14) show the scaled boat accessibility categories as rows and the tidal datum options (A = normal, B = below normal) as columns. Most boats have unrestricted access

Restriction Levels		Option A (mllw = 0)		Option B (mllw = -1)	
		Boats	Subtotal %	Boats	Subtotal %
(all trafficshed boats excluding dinghies)		4416	100.00	4416	100.00
Unrestricted		3884	87.95	3202	72.51
Restricted		532	12.05	1214	27.49
Somewhat Restricted	(= vessel draft)	350	7.93	685	15.51
Restricted	(< 1ft. shallower than draft)	141	3.19	352	7.97
Severely restricted	(≤ 2 ft. shallower than draft)	30	0.68	136	3.08
Blocked	(≤ 3 ft. shallower than draft)	11	0.25	41	0.99

Table 14: Boat access to Sarasota Bay

(87 percent, Option A; 73 percent, Option B). There are 532 restricted boats under A, and roughly double the number, 1,214, under B. This doubling of the restricted boats, from A to B, is reflected by the two lower index levels (≤1 ft. difference between draft and depth), but there are four times the number of restricted boats under B at the higher index levels. Figure 19 illustrates these relations. The 25 maps in the Neighborhood Boat Accessibility Atlas show the level of accessibility for each boat under Option A.

Restricted boats are clustered spatially: three trafficsheds account for 38 percent; eight others represent 40 percent; and 23 to 26 additional locations include 22 percent, under both Options A and B. The general distribution of restricted boats, expressed as a percent of trafficshed boats, in low (1- <3), medium (3- <10), and high (≥10) concentration categories, is mapped in Figure 20. Four trafficsheds -- Trailer Estates West, Bay Isles/Longboat Key Moorings, Bowlees Creek, and Mt. Vernon and Coral Shores -- have the highest concentrations of restricted boats (44 percent, A; 49 percent, B). The seven trafficsheds which have medium concentrations (34 percent, A; 28 percent, B) are: Tarawitt, Buttonwood Harbor, Hudson Bayou/Harbor Acres, Whitaker Bayou, Trailer Estates East, Whitney Beach South, and Emerald Harbor.

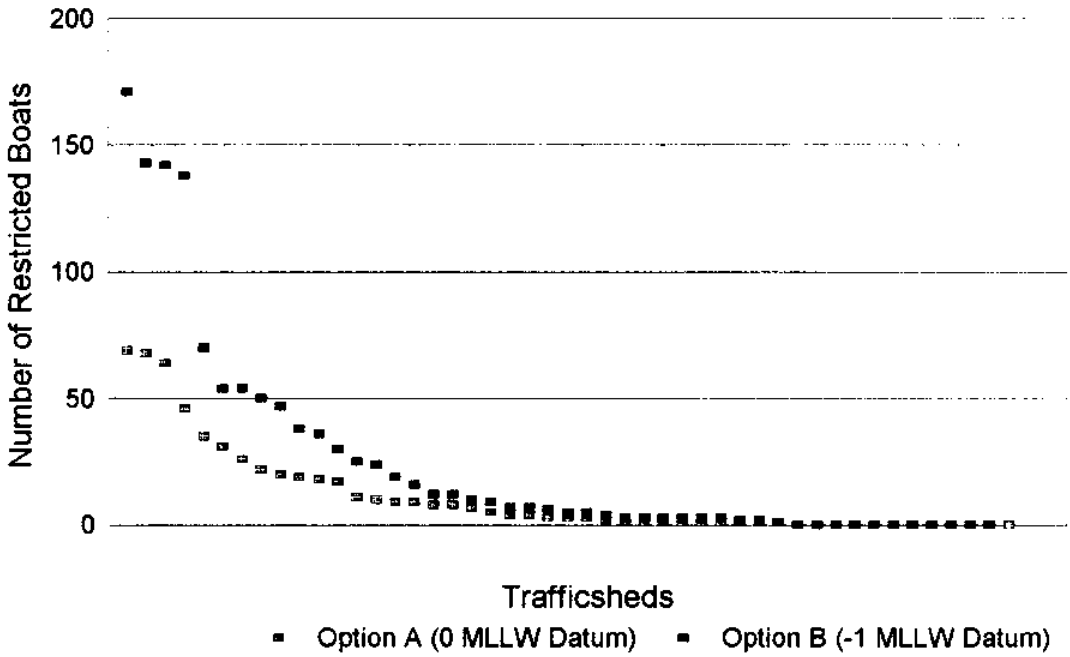


Figure 19: Distribution of restricted boats by trafficshed

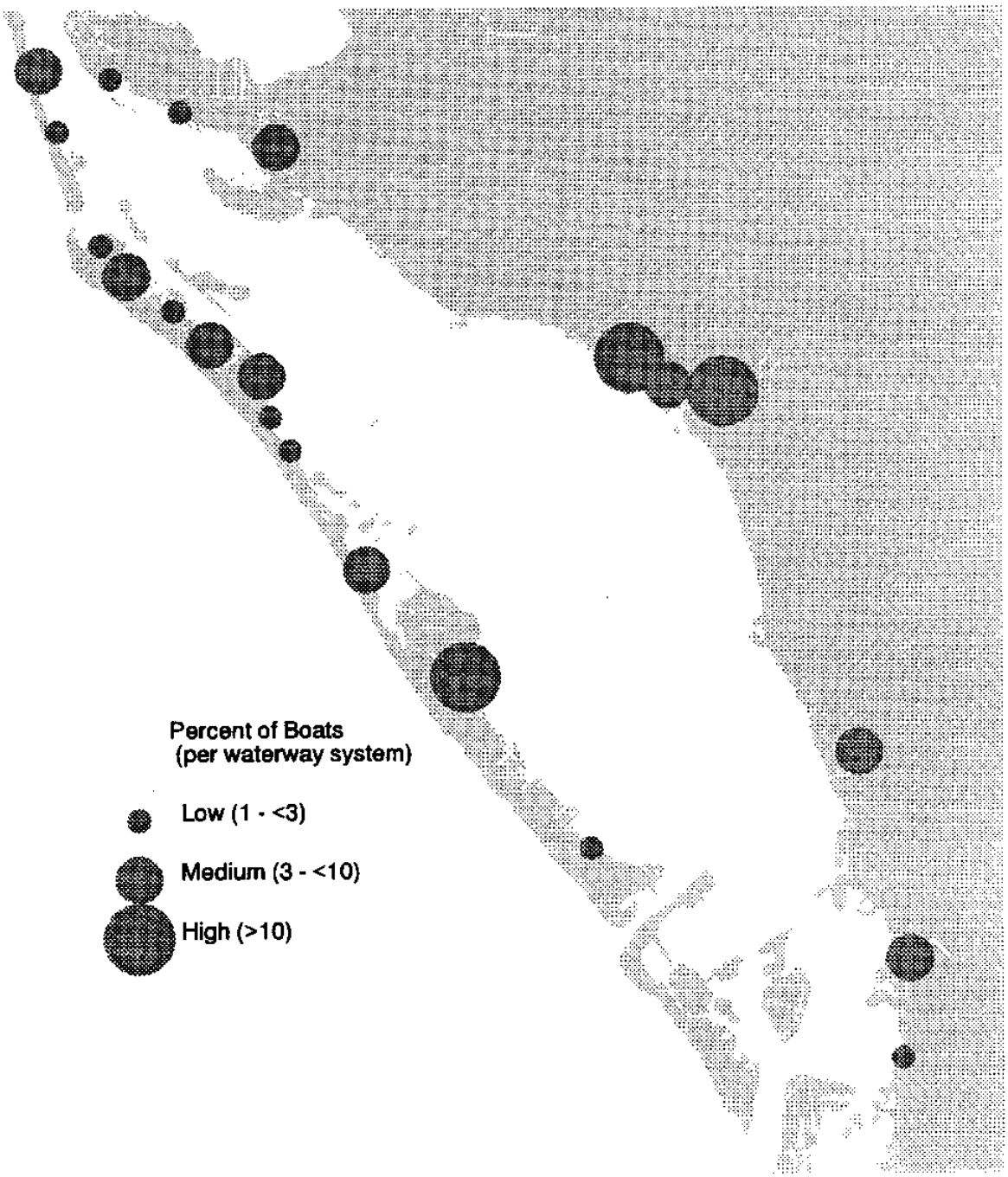


Figure 20: General distribution of restricted boats.

4. Restricted Channels

Step 2 of the analysis located and identified the lengths of restricted channel segments in the trafficsheds (Table 15). Ten percent (28,680 ft.) of the waterway system restricts boat traffic under Option A: the length of restricted channels is four times the amount (117,829 ft.) under Option B (Table 16). All levels ≥ 1 ft. were lumped for analysis purposes into a general restriction class. The somewhat restricted class (<1 ft.) was excluded since <1 ft. was within the ± 1 ft. resolution of the data, and minimum depths which equal vessel draft at mllw would be considered operationally navigable under prudent pilotage.

Characteristics	Option A (0 MLLW Datum)		Option B (-1 MLLW Datum)	
	Length (ft)	Total (%)	Length (ft)	Total (%)
Unrestricted	251,242	89.75	162,093	57.91
Restricted	28,680	10.25	117,829	42.09
Total	279,922	100.00	279,922	100.00

Table 16: Channel access to Sarasota Bay

There are significant differences in results between Options A and B (Figure 21). Twenty percent of all trafficsheds under A have no restricted segments; that declines to 5 percent under B. The number of trafficsheds with low and medium (≤9.9) percentages of restricted channels doubles from A to B; conversely, locations with a high (≥10) percentages of restricted channels decline to half from B to A. Relatively few trafficsheds require channel improvements under Option A, while many more locations do so under B. The general distribution of restricted waterways for Options A and B is shown in Figure 22. The 25 maps in the Neighborhood Channel Restrictions Atlas show levels of restrictions for channel segments in all the trafficsheds under Option A.

Table 17 examines maintenance dredging impacts under Options A and B as reflected by the required depth and relative amounts of dredged material that must be removed to provide unrestricted access. Under Option A, a 1 ft. cut will satisfy 70 percent of the dredging requirement; 2, 3 and 4 ft. dredging depths satisfy 14, 11 and 4 percent of the needs, respectively. Conversely, a 1 ft. cut satisfies only 23 percent of the Option B; deeper dredging is required to satisfy most boat access needs.

Trafficshed Number	Location	Channel Restricted Lengths (Depth, ft.)				Total Length (ft.)
		1 ft.	2 ft.	3 ft.	4 ft.	
3	Whitney Beach North	176	66	--	--	242
4	Whitney Beach South	390	--	--	--	390
6	Emerald Harbour	1424	99	--	--	1523
8	Tarawitt	1519	203	1149	374	3245
9	No Name	313	--	--	--	313
10	Buttonwood Harbor	385	34	28	--	447
11	Bay Isles/Longboat Key Moorings	632	131	--	--	763
12	Golf Links	178	--	--	--	178
13	Chipping	148	--	--	--	148
14	Wedge	191	--	--	--	191
20	Halyard	70	--	--	--	70
30	Bird Key	37	125	--	--	162
31	Louise Bayou	118	--	--	--	118
34	Cherokee Park	123	--	--	--	123
35	Blue Heron (McClellan Park)	33	--	--	--	33
37	Hudson Bayou/Harbor Acres	1444	301	--	--	1745
42	Whitaker Bayou	982	--	--	--	982
44	Bowlees Creek	4475	270	--	--	4745
45	Trailer Estates East	1163	118	--	--	1281
46	Trailer Estates West	3382	112	112	--	3606
47	Mt. Vernon/Coral Shores	6238	972	--	--	7210
48	Paradise Bay	836	--	--	--	836
49	Cortez	93	--	--	--	93
52	Putting Green	55	--	--	--	55
53	Yardarm	146	35	--	--	181
--	All trafficsheds	24551	2466	1289	374	28680

Table 15: Channel depth restricted segments by trafficshed under Option A

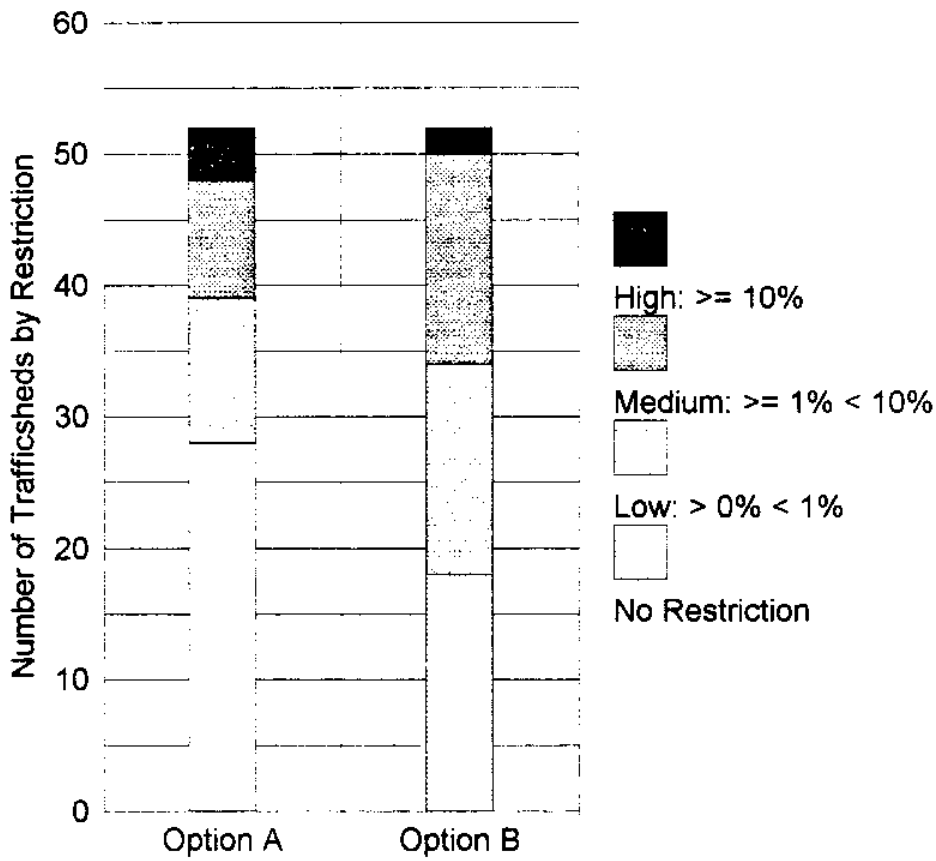


Figure 21: Trafficsheds with restricted channels under options A and B

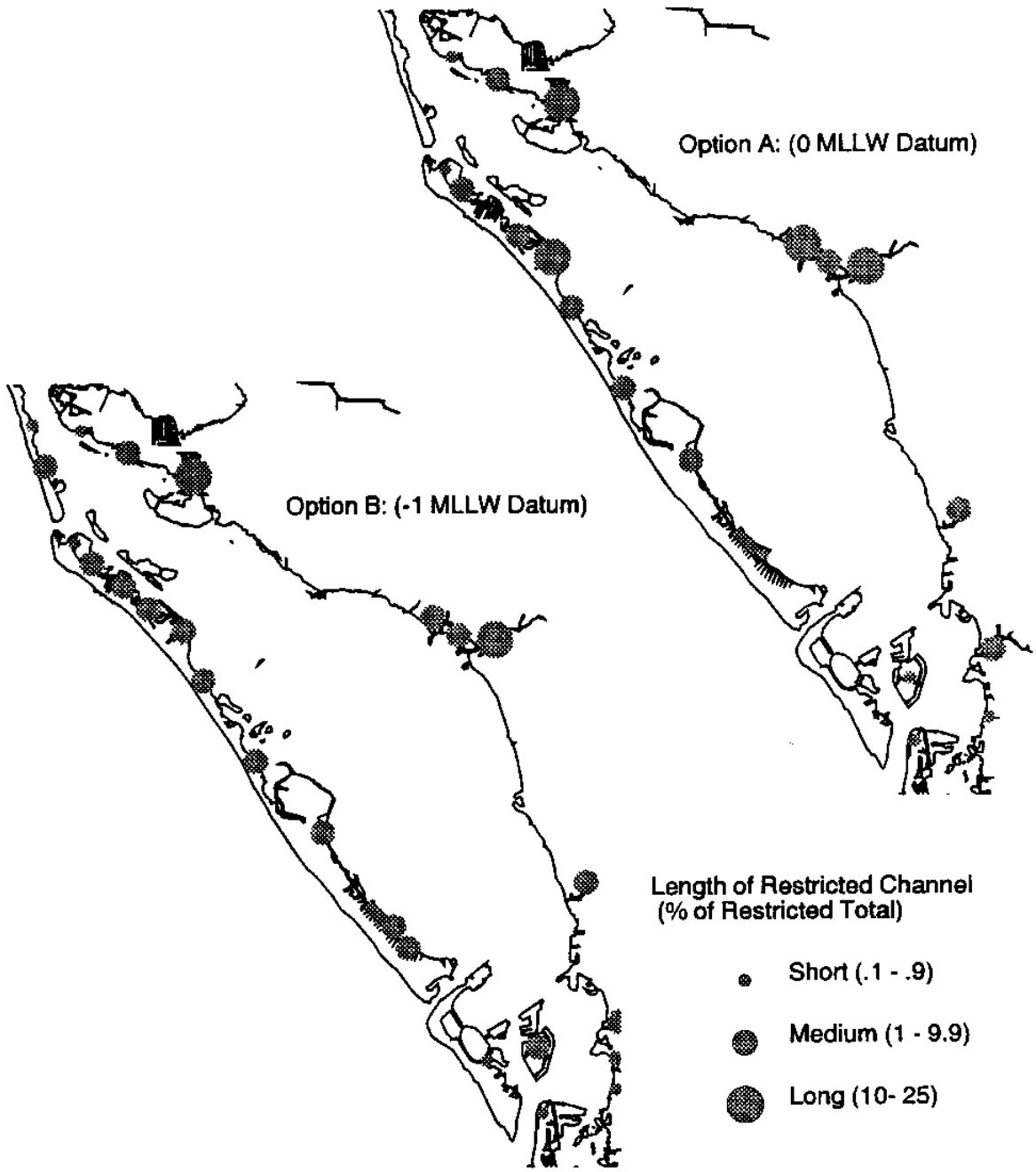


Figure 22: Distribution of restricted waterways.

Required Dredge (ft.)	Relative Amount (%)	
	Option A (mllw = 0)	Option B (mllw = -1)
1	70.45	23.35
2	14.16	35.23
3	11.10	33.83
4	4.29	7.59

Table 17: Maintenance dredging options

There are orders of magnitude of difference in the estimated amounts of dredged material that would be removed under Options A and B (Table 18). The relative impacts, based on numbers of restricted boats, restricted channels and required dredging, in the two counties and Town of Longboat Key, are shown in Table 19. Manatee County has a far greater problem than Sarasota: twice as many restricted boats; three to five times the restricted channels; and five times the required dredging. Sarasota County has a concentration of deeper draft boats. Therefore, restricted channels double from Option A or B. The Town of Longboat Key is situated on a barrier island and there are little relative differences between Options A and B. One infers, therefore, that the mainland trafficsheds are the source of substantial additional dredging required under Option B. The foregoing analysis identifies the relative benefits for Sarasota's boating population of managing the waterway within a regional systems framework.

Location	Amount (yd^3)	
	Option A (mllw = 0)	Option B (mllw = -1)
Sarasota County	4,351	43,755
Manatee County	21,454	117,475
Town of Longboat Key	8,937	54,520
Sarasota Bay Region	25,805	161,230

Table 18: Estimated amount of maintenance dredging by jurisdiction (20 ft. channel width is assumed)

Location	Relative Amount (%)	
	Option A (mllw = 0)	Option B (mllw = -1)
Sarasota County		
Restricted Boats	34.60	33.96
Restricted Channels	15.35	31.62
Required Dredging	16.86	27.13
Manatee County		
Restricted Boats	63.16	66.04
Restricted Channels	83.12	68.37
Required Dredging	83.13	72.84
Town of Longboat Key		
Restricted Boats	42.87	37.03
Restricted Channels	33.83	35.61
Required Dredging	34.64	33.80

Table 19: Summary of restricted boats, channel locations, and dredging, under Options A and B, by jurisdiction

IV LOCAL APPLICATIONS

1. Community Waterway Management

A successful regional program must be able to translate results into meaningful benefits at the community level. Commonly, results are transformed into implementation by action projects *after* the initial work is completed and findings are disseminated. This section describes a community application that is already taking place due to local interest in the project's preliminary findings and map products. There are many residential waterfront communities that comprise the shore side of the fifty-one trafficsheds in Sarasota Bay. This pilot application in Bay Isles illustrates the waterway conditions and management problems facing shorefront communities throughout the region.

The 680 acre Bay Isles community is situated midway on Longboat Key. It includes 1,267 dwelling units in single-family homes, condominiums, townhouses and villas, a 27 hole golf course, and a resort marina regarded as one of the largest in Florida. A 3.6 mi. boat channel parallels the perimeter of the community and is connected to the marina. There are three access channels that connect the waterway with the open bay. Around the perimeter channel and in the marina are 437 boat slips and hoists. In 1992 there were 252 boats: 50 percent were power cruisers and another 25 percent were sailboats. There is transient boat traffic throughout this waterway. In part, this is due to traffic drawn to the resort marina and restaurant. It also results from the natural attractiveness of the perimeter canal as a nature preserve and prime fishing locale.

The perimeter canal was created in 1973 by cutting a 50 ft. wide dredged channel through the mangrove and parallel to the shoreline. The developer's intent was to leave a mangrove buffer on the outer edge that would provide protection to the channel and homes constructed along the canal length. The outer mangrove buffer has been depleted over time as a result of storm action from the bayside and boat wake from the canal side. Presently, there are large gaps in the buffer which has led to shoaling of the waterway and shoreline erosion. The community is concerned about re-establishing the mangrove buffer as a "first-line of defense" to protect property. Channel siltation and depletion of the mangrove buffer are two critically important problems facing this waterway community.

Pressures from landside development along with increased boat traffic have created additional problems that are reflected in water quality and habitat conditions in the Bay Isles trafficshed. Boat wake is washing away soil and sand which support the roots of mangroves. Contaminants from boats -- discharging of bilges, exhaust from 2-cycle marine engines, head pumping -- accumulate because of the low tidal exchange within the canal system. The management needs which Bay Isles faces are multi-faceted, and a plan to address them must include: (1) habitat restoration; (2) channel maintenance; (3) traffic management (signage); and (4) public education.

a. Habitat Restoration

Florida Sea Grant is providing the community with project data and technical support. This includes holding workshops and inspecting the field sites in order to develop solution strategies and network the community with permitting agencies and contractors. Habitat restoration is the major focus since it is the most pervasive issue. The project maps provide a basis for evaluating present conditions. The mangrove buffer was examined further and changes were mapped using time sequential aerial photography. Three problem areas have been defined: (1) a shoreline virtually devoid of mangrove, where wave scour has deepened the nearshore profile, which requires special sand accretion or mangrove planting methods to re-establish the buffer; (2) a mangrove area, devoid of new growth, where plants are progressively dying off due to wash-over by storm generated waves, unlawful pruning, and contamination; and (3) a mangrove area, where erosion on the canal shore results from boat wake. The community is preparing a demonstration project to deal with this issue.

b. Channel Maintenance

The project maps identify areas where maintenance dredging is needed to accommodate the resident boats' access to Sarasota Bay. The channel restrictions analysis provides data on the extent and location of required dredging. Restoration of the mangrove buffer will make feasible maintaining the perimeter canal portion of the Bay Isles trafficshed.

c. Traffic Management

Sarasota County has designated and posted the waterway as an "idle speed, no wake zone.[9] There are a plethora of signs and pilings, all of which are inventoried on the project maps. The community intends to remove abandoned pilings. It has received a permit from the U.S. Coast Guard to mark the perimeter channel with private daybeacons for navigation.

d. Public Education

Community leaders acknowledge that education benefits could be achieved by publishing and distributing a map of the Bay Isles waterway based on project information, which would advise boaters of channel depths, seagrass areas, signs, and shore facilities. An "Environmental Guide for Boaters" has been prepared by Florida Sea Grant (Appendix 4) which provides thoughtful tips on fuel management, boat care, engine maintenance, sewage, marine debris, and recycling, and will be available for distribution. The community plans to encourage the resort marina to adopt a program to dispose of hazardous and recyclable materials. These educational activities and outreach products will promote better boating behavior and improve the quality of the waterway.

2. Nature Tourism and Stewardship

Boaters recognize their accountability for actions beyond piloting and seamanship, such as destruction of seagrass, pollution, and trespassing, since they are being required to make wise decisions on where or whether to boat for environmental reasons (Jones, 1993, Flannery, 1996). Research indicates that boaters care about the environment and will adopt responsible behavior practices when provided with the right kind of information (Antonini et al, 1990; Antonini et al, 1994). However, the information that boaters rely on – the NOAA small-craft chart – oftentimes, has too little detailed information, is too small a scale, or is out-of-date (Sisson, 1996). Faced with limited resources to modernize its products,, NOAA has decided to drop 199 charts from production, including those most frequently used by recreational boaters in southwest Florida (Queeney, 1995; NOAA, 1996; NRC, 1994). This lack of information in the hands of the boaters frustrates efforts to promote stewardship, respect for shore community concerns, and adequate protection of marine resources.

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[9]Idle Speed, No Wake is that speed which is necessary to maintain steerage. Boat docking speed is idle speed, no wake. Generally this is a speed of 1 to 3 miles per hour.

The maps in the Detailed Inventory Atlas (Figure 8a) provide large-scale, high-resolution, up-to-date information on bathymetry, channel controlling depth, boat and facility locations, signs, seagrass, and mangrove. While this report highlights planning and decision-making applications, the maps also have inherent public education value. The Atlas maps can be transformed into aerial photomaps which would provide boaters with easily interpretable information. The maps, also, can be used to interpret the region's unique water-based natural, historical and tourism opportunities. For the thousands who boat in the area, such map publications would convey an understanding of the boating geography and appreciation of bay resources, and would help to develop a boating stewardship ethic. Appendix 5 describes the content of such a nature-tourism publication, which would focus on "Sarasota's Historic Barrier Island Waterways and Anchorage."

V. IMPLEMENTATION STRATEGIES

1. Management Guidelines

Maintaining a waterway system requires balancing user needs for adequate channel depth, with minimizing environmental impacts, while holding maintenance dredging and habitat restoration costs to acceptable levels. These factors are interrelated. Cost is determined by volume of spoil, excavation depth, and the number and location of dredging or restoration sites. Oftentimes, the cost of maintaining a waterway system may be shared by public and private sources, or, in the case of private waterways, must be borne exclusively by the canal community. Expenditures, in either case, must be justified in relating the cost to be incurred by the canal resident or local taxpayer with the relative benefits that accrue to the waterfront community in order to dredge to a navigation depth that satisfies all boats. The potential impact on sensitive bay habitats, also, must be minimized since recreational boating relies on a healthy, high quality environment for fishing, cruising, day sailing, skiing, and nature touring. Where habitat is severely degraded, it must be restored in order to retain quality baywater conditions required by waterfront residents and recreational boaters.

Waterways make up the recreational and commercial boating transportation system of a region. In the pilot study region, two-thirds of these arteries are canals and basins, many of which were designed to make salt-water-accessible residential land. The original dredged depth, oftentimes, depended on the amount of borrow material required, and not on the provision of adequate channel depth for navigation. In many cases, finger canals in residential developments were dredged deep, but entrance channels were minimally improved or even left in a natural state. Longboat Key Moorings is such an example: the average basin depth is 20 ft. while the entrance channel controlling depth is 5 ft. Over time, these canals, basins and entrance channels have either silted in by stormwater runoff or shoaled from boat wake and storm fetch. Maintenance dredging has been piecemeal and projects have targeted segments of the waterway system. Criteria for improving water depth have been based either on the "historic dredged depth" or an arbitrary depth, i.e., -5 ft. mllw. Neither approach has produced satisfactory results.

The waterway management strategy described in this report provides a method for fitting channel maintenance to boat draft requirements. This approach

offers boaters reasonable access while minimizing impacts on surrounding bay habitats. The strategy's regional framework offers resource planners a method of prioritizing waterway maintenance by geographic area, such as Sarasota Bay, or by municipality, county or administrative district. Alternative management strategies can target trafficsheds with the severest channel restrictions, those areas with the greatest number of problem-access boats, or both. Evaluations can identify the locations of the deepest draft boats, and determine the relative costs and benefits of providing the additional navigation depth for this boat draft class. And for agencies charged with determining whether permit applications meet the public good test, this waterway management approach offers a method for revising the present permit review process, based on single project application, by allowing for the joint and concurrent evaluation of multiple requests for channel maintenance and habitat restoration in a given region.

2. Management System

This project evolved, from an effort solely focused on research, to include scientific, planning, management, and community outreach functions. As project activities developed, participants came to realize that not only is a management system needed, but that the institutional resources and the science and technology to build such a system are available and committed to its implementation. There is a growing consensus that increasing and competitive user pressures must be moderated with a holistic, place-based, regional management systems approach that allows for protection and use of coastal waters while still maintaining the economic vitality of shore communities. There is concurrence that waterway management should focus on solutions to problems associated with channel maintenance, habitat restoration, traffic and signage, and boat maintenance. Such an approach will ensure safe, environmentally sustainable waterways for the boating public.

A regional waterway management system has been proposed by the WCIND (Appendix 6). The long-term goal is to preserve the ecological and recreational values of southwest Florida waterways in a manner that maintains the widest possible degree of freedom for users. In order to attain this goal, the following supporting objectives are being proposed: (i) fit channel maintenance to boat draft requirements; (ii) minimize impacts on surrounding bay habitats; (iii) prioritize and evaluate management alternatives on a regional basis; (iv) develop map and other information products for boaters and shore residents to encourage environmental awareness and stewardship by users of the neighborhood waters

and boat access channels; and (v) empower waterway communities and boating organizations to take an active role in managing their waterways. These objectives can be pursued through a combination of management tools, with a focus on: (i) acquiring the necessary information on waterway and user characteristics in order to map and evaluate boat access needs; (ii) providing waterway communities with technical support to develop local management implementation strategies; and (iii) disseminating map and guide products to waterway residents which foster stewardship and environmentally responsible boating practices.

Development and implementation of these management tools can be a joint effort between the West Coast Inland Navigation District (WCIND), the Florida Sea Grant College Program (FSG), the Florida Department of Environmental Protection (FDEP), and the Florida Cooperative Extension Service (FCES). Local governments, local waterway communities and boating groups are recognized as critical players and should be encouraged to participate.

The WCIND Comprehensive Waterway Management Plan provides the necessary regional, institutional framework for implementing such a system in southwest Florida (Appendix 7). WCIND networks through liaison staff to provide Manatee, Sarasota, Charlotte and Lee counties with resources for technical support in waterway planning and funding for construction and maintenance of public access projects through its Waterway Development Program.

Florida Sea Grant (FSG) offers the science and technical support of the state university system to carry out field bathymetric surveying, boat and facility census-taking, GIS inventory and evaluation, and regional waterway planning functions. FSG marine extension staff can work with the FDEP regional field staff to carry out local site technical evaluations for habitat rehabilitation. FDEP, also, can coordinate permit reviews on a regional scale. The Florida Cooperative Extension Service (FCES) can perform public outreach and community service functions. These include publication and dissemination of map and guide products to boaters and shore residents, and technical support to waterway communities in local planning and site evaluation through the Florida Yards and Neighborhoods Program.

3. Immediate Applications

There are three ways in which the results of the pilot project can be applied immediately to improve waterway conditions in Sarasota Bay.

a. Disseminate Findings to Governments and Communities

Presentations and workshops should be offered to the state regulatory agencies (FDEP, Florida Department of Community Affairs), local governments (Sarasota County, Manatee County, City of Sarasota, Town of Longboat Key) and to residential waterfront homeowner associations and boat clubs in the region. The FCES can assist with organizing these meetings, which should focus on providing an explanation of the waterway management program, its products and services. The products available to local communities can include trafficshed maps which portray existing conditions of boat accessibility (Figure 14) and channel restrictions (Figure 15), and regional maps of general bathymetry and habitat (Figure 8a). Services can include technical support through the FCES Florida Yards and Neighborhoods Program for planning habitat restoration and traffic management, and promoting best boat maintenance practices.

b. Generate Local Action Projects

The Option A approach should be adopted to design channel maintenance based on boat draft requirements for normal tide conditions (0 ft. mllw datum). This approach provides reasonable access while minimizing impacts on surrounding bay habitats.

Five trafficsheds account for 44 percent of the access-problem boats and 65 percent of the restricted channel segments. These are priority problem areas that require immediate attention, and include: Bowlees Creek, Trailer Estates West, Mt. Vernon/Coral Shores, Tarawitt, and Bay Isles/Longboat Key Moorings. Bowlees Creek and Trailer Estates West recently have been dredged to -5 MLLW; channel restrictions are eliminated in these trafficsheds. The Mt. Vernon/Coral Shores case is an especially critical situation due to restricted depths in the long, narrow entrance channel and the tendency of boaters to seek alternate routes to deeper water in the surrounding seagrass meadows. Tarawitt, one of the earliest built multiple finger canal systems situated on the barrier island, is plagued with severe silting due to stormwater runoff. Original $\geq$8 ft. depths have been reduced to an average 2 ft. mllw.

Bay Isles (see Section IV1) has multiple problems, the most immediate is restoration of the barrier mangrove strip. Restoring this habitat will reduce shoaling in the adjacent perimeter channel. This habitat restoration work should commence as soon as possible. A navigation signage plan is being implemented. Work should begin with waterfront home owners and the marina management to promote environmentally-responsible boat maintenance practices. The FCES Florida Yards and Neighborhoods Program staff can assist with this community conservation effort.

c. Incorporate Waterway Management into the Planning Process

A major planning issue facing southwest Florida is how to balance population growth and coastal development with conservation and management of baywater resources. Most of the region's residents live on or near the coast, barrier islands, bays and rivers, and it is anticipated there will be increased on-the-water recreation and added pressure for marine recreational facilities. Increased use intensifies competition which adds pressure for management in order to prevent conflicts among competing users, to insure privacy, and to protect scarce resources and sensitive habitats. The information contained in this study, and subsequent waterway surveys, should be incorporated into the planning process, in order to designate marine use areas and recognize maintainable navigation access as a scarce and high priority component of providing for water access and for water dependent activities.

The geographic information systems (GIS) technology is a powerful instrument for site analysis and regional evaluations. Local planning and natural resource staff should be encouraged to acquire the skills and equipment that will enable them to utilize the information developed in this pilot project, and to perform local trafficshed planning and management applications. FSG can provide in-service training to assist with this local community institution-building process.

4. Improvements in the Methodology

A critical element of information for waterway management is up-to-date and accurate information on boats, their characteristics and locations. The pilot project relied on field-based boat census-taking which is expensive and time-consuming. The Florida vessel registration data base, the only available statewide census of boats, was originally designed as an accounting system to levy fees and to determine vessel ownership, and it contains inconsistencies

which limit its present use for planning and management purposes. These inconsistencies can be removed and the data base can be transformed into a planning instrument. Appendix 8 summarizes the rationale for this action, and suggests information which should be retained, removed and added.

The decision to adopt changes in the vessel registration form is taken at the state level, but the implementation is based on support at the county level in the Tax Collector's Office. State officials in charge of vessel registration have agreed to consider revision of the form and have suggested that such a revision be tested in a pilot county. The WCIND, as the regional tax district authorized to maintain public waterways in southwest Florida, should sponsor this revision of the vessel registration form. The four tax collector offices in the district should be contacted to determine which counties are willing and able to participate. Sarasota and Manatee counties should be considered prime candidate locations for the pilot since project data cover these areas. In subsequent years, the revised form should be used annually throughout the district in the four counties of the WCIND, and the boat information should be updated in the waterway management system. Local planning staff can assume this responsibility once they have received in-service training and have access to GIS equipment.

5. Develop Products for the General Public

The resource planning information, contained in the four atlases accompanying this report, should be transformed into maps and photomaps for the public. The atlas information is large-scale and up-to-date, and can provide boaters and shore residents with the kind of information needed to make wise management decisions on where and whether to boat in given localities. Detailed (large-scale) maps can be compiled and printed for individual trafficsheds and distributed through waterfront homeowner associations and boat clubs. Semi-detailed (intermediate-scale) maps can be prepared for larger areas and distributed through boat clubs, marinas, shore restaurants and businesses. A proposal to produce 4 pilot maps is included in Appendix 9. A proposal for a nature-tourism map with text and illustrations is included in Appendix 5.

Product research indicates that ortho-photomaps provide boaters with more easily interpretable and useable information (Antonini et al, 1994). Orthophotos combine the image characteristics of a photograph with the geometric qualities of a map. The U.S. Geological Survey will begin to make available orthophotoquads for southwest Florida in January 1997. Resolution will be 1-meter and photo

images can be produced at 1:12,000 scale. Orthophotos should be used as the mapping base in all future waterway management surveys.

6. Project Completion Schedule

Work began in June 1996 on Phase 2 of the Project, which covers the remainder of Sarasota County, from the Siesta Key bridge south to the Charlotte County line. Phase 2 will be completed by December 1997.

The remaining work in southwest Florida can be completed as follows: Phase 3, Manatee County (Cortez bridge north to the Hillsborough County line; Phase 4, Charlotte County; and Phase 5, Lee County.

VI EXECUTIVE SUMMARY

1. Background

Inland coastal waterways of the United States, since 1960, have been transformed along much of their length by recreational boating and fishing, and by accompanying tourist and residential uses. Florida's coastal population has increased 169 percent since 1960, from 4.8 to 12.8 million, four times the national rate. Seventy-nine percent of Florida's population lives within this coastal zone. The number of recreational boats in Florida, between 1973 and 1989 grew by 176 percent. Today (1995) there are an estimated 750,000 registered vessels in the state, and tourists pilot or trailer another 300,000 into the state each year. In southwest Florida, the number of boats has increased by three times the national rate. Coastal population pressures and unprecedented boating intensities are stressing these water bodies. The region's near-pristine baywater environment is now ecologically threatened by the continuing wave of development.

A unique element of the coastal development process has been the creation of thousands of miles of dredged canals, basins and access channels. These waterways were dredged to provide waterfront access for residential developments. In many instances, the original dredged depth depended on the amount of borrow material required, and not on the provision of adequate channel depth for navigation. Finger canals were dredged deep, but entrance channels were minimally improved or left in a natural state. Over time, these waterways have either silted in by storm water runoff or shoaled from boat wake and storm fetch. Maintenance dredging has been piecemeal and projects have targeted segments of the waterways. Criteria for improving water depth have been based either on the historic dredged depth or an arbitrary depth. Neither approach has produced satisfactory results.

Waterways include arterials, collectors and residential canals and basins. In barrier island coastal locations, waterway boat traffic is governed by the relationship of boat draft to water depth. Boat access is by ramp, private dock, marina or permanent mooring. Unrestricted access from trip origin to open water is uncommon. Source areas of boats -- trafficsheds -- are connected to bays by access channels, which may pass through ecologically sensitive grass and hard-bottom areas. Boat traffic adjoining these habitats may create management

problems. Issues of special concern are channel siltation, boating safety, wildlife protection, and habitat restoration.

There is a need to maintain a viable waterway system in the face of mounting shoreside and boating pressures. Recreational boating and fishing make significant contributions to the Florida economy, but these activities are dependent upon a healthy, high quality environment. This report presents a geographic information system (GIS)-based method for planning and managing regional waterway systems. A pilot application of the methodology, carried out in Sarasota Bay, provides an example of how boat traffic can be managed in ways that reduce stress on surrounding natural habitats and waterfront communities. The methodology is consistent with prevailing state and federal coastal policy initiatives and offers an integrated, place-based approach to boat traffic management which may be applicable in other coastal areas.

2. Waterway Analysis

The GIS analysis is undertaken at large-scale, small-area and high-resolution in order to provide sufficiently detailed results for regional analysis and local community applications. Section aerials at 1:1,200 scale are used to locate boats, facilities, signs and channel centerline. Two types of habitat information – seagrass and mangrove – are incorporated into the GIS analysis. Boat draft and water depth information are collected to the nearest foot resolution.

The USGS 7.5' digital shoreline is updated by photo interpretation methods. Bathymetry includes NOS digital files at 1:10,000, COE centerline field surveys at 1:1,200 - 1:24,000, and centerline boat channel field surveys at 1:1,200 scale. Project maps portray depth in two ways: as arcs showing centerline controlling depths at 1 ft. increments representing waterway boat channels; and as polygons corresponding to bay-wide depth areas. The polygon topology is compiled by two methods: a bay method, which processes the 1:10,000 scale digital NOS depth information from open bay locations where most water depths exceed boat draft requirements, and where channel depth constraints to navigation are minimal; and a trafficshed method, which processes the 1:1,200 scale field survey information for residential canals, basins and access channels, and where minor variations in bathymetry translate into serious navigation problems.

Boat and facility information from an on-the-water census is compiled into GIS coverages. Boat information includes type, length, age and draft; facilities are

described by accessibility, type, berthing, and services. All boating-related signs are located by GPS methods and inventoried in a GIS coverage.

The geographical analysis evaluates the relationship between boat draft and channel depth for each vessel in each trafficshed in order to measure boat accessibility and channel restrictions. An examination of the results of this trafficshed analysis provides a strategy for evaluating the functionality of the regional waterway system and for prioritizing maintenance and remediation of system channel components.

Boat accessibility is a five step evaluation: (1) a network of boat traffic paths is created in all the trafficsheds; (2) the water depth of each path segment in the network is entered into the channel data base as an attribute of that segment; (3) a boat path is traced representing the most likely route each boat would travel from its point of origin to the open bay; (4) the water depth of each segment is noted, and the shallowest depth that each boat would traverse is recorded, and becomes an attribute of each individual boat in the data base; (5) the shallowest depth is compared to the draft of the boat. As a result of this boat accessibility evaluation, if the boat draft is less than the shallowest depth, then the boat is considered not restricted. If, however, the shallowest depth is equal to or less than the boat draft, then, the boat is considered restricted according to the systems' design criteria. The accessibility rating for each boat is plotted on maps.

Channel restrictions is a three step evaluation: (1) all boats are linked with each segment in every pathway leading from each boat trip's origin to the open bay exit of the trafficshed; (2) the drafts of all those boats is noted, and the maximum draft of that group is recorded for each channel segment; and (3) the maximum boat draft is compared to the depth of the corresponding channel segment. The difference between the deepest draft boat and the depth of the segment -- referred to as channel restriction -- identifies the depth of dredging required for that segment to accommodate the deepest draft boat that would traverse it. As a result of this channel restrictions analysis, if the draft of the deepest draft boat is less than the depth of the channel segment, then, that segment is classified as not restricting any boats. If, however, the draft of the boat is greater than the segment's depth, then, that segment is deemed as restricting that boat. The rating for each restricted channel segment is plotted on maps.

Alternate scenario methods are used to assess a range of decision options influencing waterway management. One method is an *accessibility index*

which evaluates the ratio of boat draft to channel depth. Each boat's accessibility is classified relative to the shallowest segment of its access channel leading to the open bay. A boat may be: (1) somewhat restricted, if its access channel depth (ACD) = vessel draft (VD); (2) restricted, if its ACD ≥ 1 ft. shallower than VD; (3) severely restricted, if its ACD ≥ 2 ft. shallower than VD; or (4) blocked, it its ACD ≥ 3 ft. shallower than VD. Evaluation of a trafficshed's boat population by accessibility classes uncovers boat-channel relationships that affect the magnitude and geographic extent of channel improvement needs.

A second analysis provides for evaluating boat accessibility under *normal or below normal tidal conditions.* An additional foot of clearance is added to take into account "below normal" tidal conditions (there were only 16 daily occurrences of this condition in 1995).

Map products are presented in four ways: (1) regional characterization, 1:24,000 scale, showing color-shaded bathymetry (as 15 zones, 1 ft. resolution), seagrass, mangrove, boats, facilities, and signage; (2) detailed inventory, 1:4,800 scale, including color-shaded bathymetry (1 ft. resolution), supplemental 3 ft. contours, centerline controlling depth, boats, facilities, signage, seagrass, and mangrove; (3) neighborhood boat accessibility, 1:4,800 scale, showing levels of boat accessibility to open bay; and (4) neighborhood channel restrictions, 1:4,800 scale, showing the location and extent of channel depth restrictions at 1 ft. intervals.

3. Regional Results

Sarasota Bay is a 35.3 sq.mi. area consisting of 32.5 sq. mi. of open bay and 2.8 sq. mi. of trafficsheds. Twenty-three percent of the open bay is < 3 ft. deep; another 20 percent is 3 to 6 ft. deep. Fifty-seven percent of the open bay is relatively deep water (≥ 6 ft.) which is adequate for all boating activities. There are over 8 sq. mi. of seagrass meadows and about 3 sq. mi. of mangroves. Trafficsheds represent only 8 percent (2.8 sq. mi.) of the bay, but their shoreline locations and close proximity to mangrove and seagrass make these boat source areas of special environmental concern. Much of the boating activity which takes place on the bay comes into direct contact with these sensitive bay habitats, due to the locational geography of the trafficsheds and the origin-destination pathways of the boats. Five percent of the seagrass in the region (0.4 sq. mi.) is situated in these trafficsheds, and 28 percent of the mangroves (0.8 sq. mi.) is located there as well.

There are 5 types of trafficshed systems in the bay: (1) finger canal or basin with one access channel; (2) multiple finger canals and/or basins with one or more access channel(s); (3) shoreline channel with one or more access channel(s); (4) shoreline channel linked to multiple finger canals, basins, streams and/or creeks, with one or more access channel(s); and (5) natural stream or tidal creek with one access channel. Simple shoreline canals have the largest proportion of sensitive habitat areas, followed by complex shoreline canal systems and multiple finger canals. Both natural creeks and single finger canals contain negligible natural habitat areas. Trafficshed channels, on the average, have relatively deep water: 12 percent are ≤ 3 ft., 37 percent are 4 - 5 ft., and 51 percent are ≥ 6 ft. Boat accessibility problems are due to limited channel segments with restricted depths.

Restricted boats are evaluated under normal tide (0 mllw datum, Option A) and below normal tide (-1 ft. mllw, Option B) conditions. There were 4,552 boats using Sarasota Bay in 1992. Most boats have unrestricted access (87 percent, Option A., 73 percent, Option B). There are 532 restricted boats under A, and roughly double the number, 1,213, under B. This doubling of the restricted boats, from A to B, is reflected by the two lower index levels (≤1 ft. difference between draft and depth), but there are four times the number of restricted boats under B at the higher index levels. Restricted boats are clustered spatially: three trafficsheds account for 38 percent; eight others represent 40 percent; and 23 to 26 additional locations include 22 percent, under both Options A and B.

Restricted channels also are evaluated under Options A and B. Ten percent (28,680 ft.) of the waterway system restricts boat traffic under Option A; the length of restricted channels is four times this amount (117,829 ft.) under Option B. There are significant differences in these results. Twenty percent of all trafficsheds under A have no restricted segments; that declines to 5 percent under B. The number of trafficsheds with low and medium (≤9.9) percentages of restricted channels doubles from A to B; conversely, locations with a high (≥10) percentages of restricted channels decline to half from B to A. Relatively few trafficsheds require channel improvements under Option A, while many more locations do so under B.

Maintenance dredging under Options A and B reflect relative amounts of dredged material that must be removed to provide unrestricted access. Under Option A, a 1 ft. cut will satisfy 70 percent of the dredging requirement; 2,3, and 4 ft. dredging depths satisfy 14, 11 and 4 percent of the needs, respectively.

Conversely, a 1 ft. cut satisfies only 23 percent of the Option B; deeper dredging is required to satisfy most boat access needs.

4. Community Waterway Management

A community application in Bay Isles, Longboat Key, illustrates how project results can be transformed into action projects at the local level. This 680 acre community includes 1,267 dwelling units, a 27 hole golf course, and a resort marina. A 3.6 mi. boat channel parallels the perimeter of the community and is connected to the marina. There are 437 boat slips and in 1992 there were 252 boats. There is transient boat traffic throughout this waterway, due to the resort marina and restaurant, and the natural attractiveness of the perimeter canal as a nature preserve and prime fishing locale. The outer mangrove buffer which originally protected the perimeter channel has been depleted and this has led to shoaling of the waterway. Other landside pressures have created additional problems that are reflected in water quality and habitat conditions. Boat wake is washing away soil, and contaminants from boats accumulate because of the low tidal exchange within the canal system. The management needs include: habitat restoration; channel maintenance; traffic management (signage); and public education.

Florida Sea Grant is providing project data and technical support to the community to evaluate present waterway conditions. A local demonstration project is being developed to restore critical areas of the mangrove buffer. The project's channel restrictions analysis provides data on the extent and location of required dredging; this will be initiated once the restoration work stabilizes the vegetative buffer. Sarasota County has designated and posted the waterway as an idle speed, no wake zone. The community intends to remove abandoned signs and pilings. Work is underway to remark the perimeter channel with navigation day beacons. Community leaders acknowledge that education benefits could be achieved by publishing and distributing a map of the Bay Isles waterway based on project information, which would advise boaters of channel depths, seagrass areas, signs, and shore facilities.

5. Management System

A regional waterway management system is proposed, the long-term goal of which is to preserve the ecological and recreational values of southwest Florida waterways in a manner that maintains the widest possible degree of freedom for

users. In order to attain this goal, the following supporting objectives are proposed: (1) fit channel maintenance to boat draft requirements; (2) minimize impacts on surrounding bay habitats; (3) prioritize and evaluate management alternatives on a regional basis; (4) develop map and other information products for boaters and shore residents to encourage environmental awareness and stewardship by users of the neighborhood waters and boat access channels; and (5) empower waterway communities and boating organizations to take an active role in managing their waterways. These objectives can be pursued through a combination of management tools, with a focus on: (1) acquiring the necessary information on waterway and user characteristics in order to map and evaluate boat access needs; (2) providing waterway communities with technical support to develop local management implementation strategies; and (3) disseminating map and guide products to waterway residents which foster stewardship and environmentally responsible boating practices.

Development and implementation of these management tools can be a joint effort between the West Coast Inland Navigation District (WCIND), the Florida Sea Grant College Program (FSG), the Florida Department of Environmental Protection (FDEP), and the Florida Cooperative Extension Service (FCES). Local governments, local waterway communities and boating groups are recognized as critical players and are encouraged to participate.

6. Recommendations

1. Disseminate findings through presentations and workshops to the state regulatory agencies (FDEP, Florida Department of Community Affairs), local governments, and to residential waterfront homeowner associations and boat clubs in the region.

2. Design channel maintenance projects based on boat draft requirements for normal tide conditions (0 ft. mllw datum). This approach provides reasonable access while minimizing impacts on surrounding bay habitats.

3. Address boat access and channel restriction problems in the priority problem trafficsheds: Bowlees Creek, Trailer Estates West, Mt. Vernon/Coral Shores, Tarawitt, and Bay Isles/Longboat Key Moorings. There areas account for 44 percent of the access-problem boats and 65 percent of the restricted channel segments.

4. Incorporate waterway management into the state, region, county and local planning process by designating marine use areas and recognizing maintainable navigation access as a valuable and high priority requirement for water dependent activities.

5. Encourage the State to revise the present permit review process by allowing for the joint and concurrent evaluation of multiple requests for channel maintenance and habitat restoration in a given region, for those permit applications which adhere to rigorous waterway management systems criteria as described in this report.

6. Provide local staff with GIS training and equipment so that they may service local trafficshed planning and management needs.

7. Sponsor changes in the Florida vessel registration data base in order to transform this information into an effective waterway planning and management resource.

8. Publish and distribute information contained in the atlases which accompany this report into maps, photomaps and nature-tourism brochures, in order to promote stewardship through a better understanding of environmental history and boating geography of the region.

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Appendix 1

Data Inventory on Trafficshed Habitat, Waterway, Boat and Facility Characteristics

WATERWAY MANAGEMENT SYSTEM

BIG SARASOTA BAY

DATA INVENTORY ON TRAFFICSHED HABITAT, WATERWAY, BOAT AND FACILITY CHARACTERISTICS

WCIND AND FLORIDA SEA GRANT

MAY 1996

Data Inventory
for
Waterway Management System:
Big Sarasota Bay, Florida

Introduction

Information contained in this report was obtained and prepared by Dr. Gustavo A. Antonini (Principal Investigator) and Paul Box (Ph.D candidate), Department of Geography, University of Florida, Gainesville. Research was conducted under the Florida Sea Grant College Program (FSG) with support from the National Oceanic and Atmospheric Administration, Office of Sea Grant, U.S. Department of Commerce, Grant No. NA 89AA-D-SG053, West Coast Inland Navigation District (WCIND), and Sarasota County Natural Resources Department, in cooperation with Sarasota Bay National Estuary Program.

Big Sarasota Bay, from Cortez bridge (north) to Siesta Key bridge (south), is a 34 square mile area. There are 83 miles of waterways which are used by recreational boats as arteries in traversing these bay waters. The waterway system contains three elements: arterials (inlets and the Gulf Intracoastal Waterway), collectors, and trafficsheds. Trafficsheds are source areas which contain 95 percent of the berthed recreational boats and represent 64 percent of the waterway channels, canals and basins.

This report presents information on boats, moorings, facilities, signage, site characteristics, boat and channel restrictions, and required dredging to provide boat access from trafficshed to open bay under several options (for an explanation of analytical procedures see *Preliminary Results, Waterway Management Project: Sarasota Bay Pilot Study, G.A. Antonini and P. Box, WCIND and FSG, January 1996*).

Boats, moorings and facilities information is based on a field on-the-water census conducted between December 1991 and April 1992. Canal depth is from a center-line canal survey taken May 1992. Signage data are from a May 1993 survey. Survey data were plotted on 1:2,400-scale section aerials and transformed into geographic information system (ARC/INFO) files. Mangrove and sea grass information are from Southwest Florida Water Management District and the Florida Marine Research Institute. Sea grass information was updated based on interpretation of color infrared aerial photography.

Trafficsheds

There are 49 trafficsheds (boat source areas) in Big Sarasota Bay. Their locations are shown in Figure 1 and listed in Table 1. Summary data are given for combined trafficsheds (TNo. 88). Information also is reported for Open Bay (TNo. 0) and Study Area (TNo. 99).

Boats

There are 4,552 boats, excluding dinghies, in the study area (TNo. 99). Boat types are reported as: row, sail, speed (including personal watercraft), power, recreational fish, commercial fish, other (ferry, dredge, tug, barge, cargo salvage, safety/law enforcement, survey, floating home or office, pilot, excursion, research). Information for each boat type includes count, percent and draft (average, maximum, minimum, and standard deviation [measure of variability]).

Facilities

There are 2,297 boating facilities in the region. Facilities are reported as: residential (both single and multi-family), marina/yard/club (including high-dry), motel (hotel)/ restaurant/shop, anchorage, other (industrial, government, charter, brokerage, commercial). Forty-one locations are unclassified.

Moorings

The region includes 7,058 boat moorings. These include wet slip, hoist/dry-stack, beached/blocked, trailer, ramp.

Signage

There are 968 boat-related signs (both permitted and un-permitted). All signs in the water and along the waterfront in the boaters' view are included in this inventory. Signs are group into the following classes: commercial, manatee-related, navigation (channel, cable, bridge), piling, recreation (artificial reef, water sport), sea grass, other (anchor, crime, pollution).

Site

Site characteristics include the physical and biological features of the water body. They are presented in area (square feet) or length (feet) or as percentages. Area measurements are given for surface water, sea grass, mangrove and tidal (mangrove area plus water area less than -1 ft mllw). Water and sea grass area also are expressed as a percent of each water depth class in 1 ft. increments. Percentages

relate to the trafficshed. Boat channel (canal) and shoreline length, and depth, are in feet. Entrance channel depth is the controlling depth measured at the time of the survey (May 1992). Standard deviation refers to the range of variability in the average canal (channel) depth. Canal (channel) depth also is expressed as a percent of each water depth class (in 1 foot increments).

Restrictions

The ability of a boat to access the open bay from a trafficshed is directly related to the relation of vessel draft to channel depth. Option A is based on normal tidal conditions, where 0 ft. = mean lower low water, while Option B refers to abnormal tidal conditions, where -1 ft. = mean lower low water. Boat count is the number of restricted boats under either option (it is also expressed as the percent that the trafficshed represents of Big Sarasota Bay (region). Channel length is the number of feet of restricted channel under either option (expressed also as the percent that the trafficshed represents of the region). There are 533 restricted boats (11.71 percent of the total) under Option A, and 1213 restricted boats (26.65 percent) under Option B. Restricted channels represent 10.25 percent of all trafficshed channels in Option A and 42.09 percent under Option B.

Required Dredge

These are estimated amounts of maintenance dredging and assume a 20 ft channel width at the center-line channel depth. The amount is expressed as a volume measure (cubic ft) and percent that the trafficshed represents in the region.

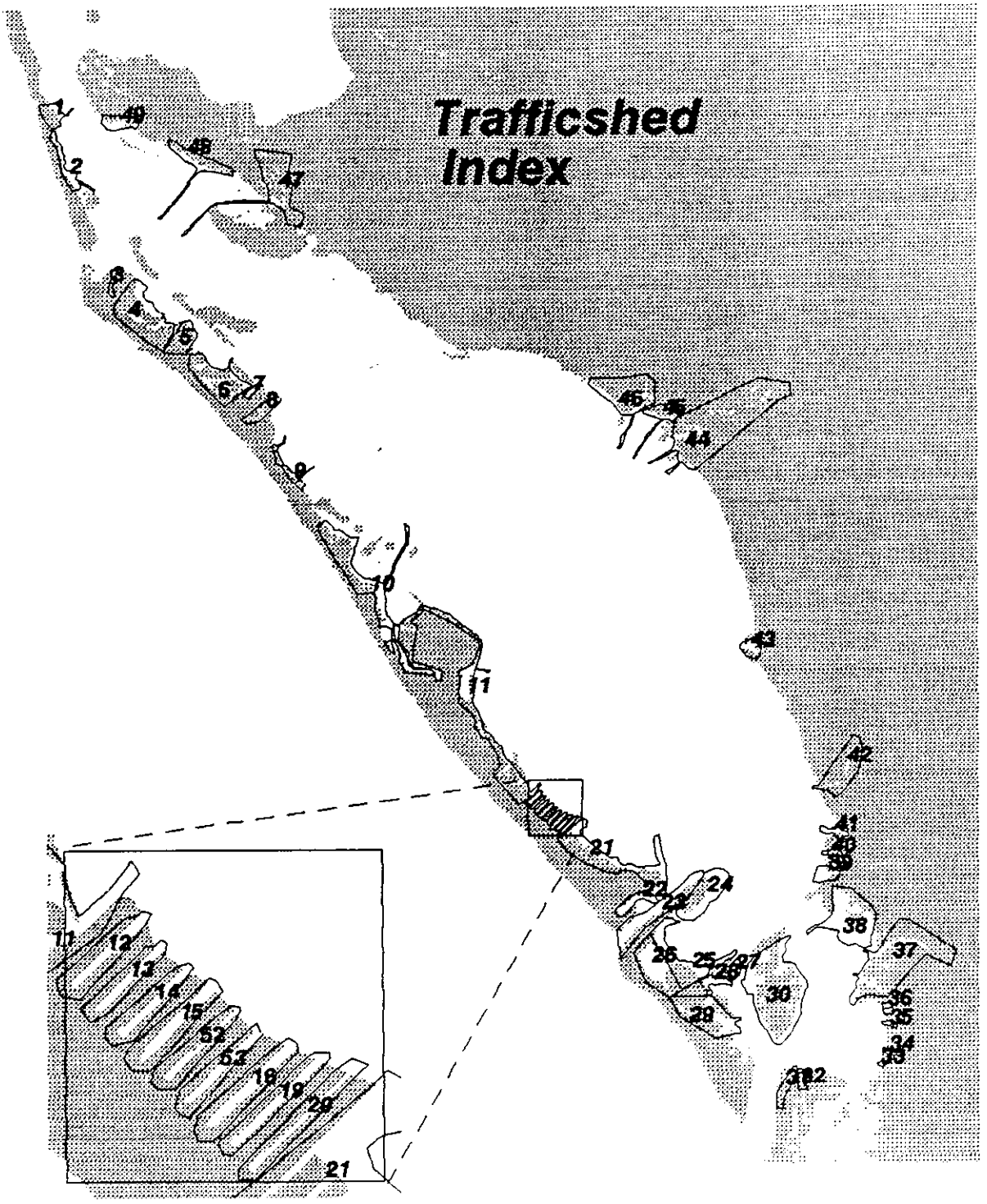


Figure 1: Trafficsheds Index of Sarasota Bay

Trafficshed (TNo).	Name (Location)	Jurisdiction
1	Bradenton Beach North	Manatee County
2	Bradenton Beach South	Manatee County
3	Whitney Beach North	Longboat Key
4	Whitney Beach South	Longboat Key
5	General Harris	Longboat Key
6	Emerald Harbour	Longboat Key
7	Gulf Bay Basin	Longboat Key
8	Tarawitt	Longboat Key
9	No Name	Longboat Key
10	Buttonwood Harbor	Longboat Key
11	Bay Isles/Longboat Key Moorings	Longboat Key
12	Golf Links	Longboat Key
13	Chipping	Longboat Key
14	Wedge	Longboat Key
15	Birdie	Longboat Key
16	Bowsprit	Longboat Key
19	Ranger	Longboat Key
20	Halyard	Longboat Key
21	Boat Name Lanes	Longboat Key
22	New Pass Lagoon	Longboat Key
23	City Island/New Pass Channel	Sarasota City
24	City Island Southeast	Sarasota City
25	St. Armands/Coon Key North	Sarasota City
26	North Lido Lagoon	Sarasota City
27	Sarasota Yacht Club	Sarasota City
28	Coon Key South	Sarasota City
29	Otter Key	Sarasota City
30	Bird Key	Sarasota City
31	Louise Bayou	Sarasota City
32	Hanson Bayou	Sarasota City
33	Spring Creek (Cherokee Park)	Sarasota City
34	Cherokee Park	Sarasota City
35	Blue Heron (McClellan Park)	Sarasota City
36	Hyde Park (McClellan Park)	Sarasota City
37	Hudson Bayou/Harbor Acres	Sarasota City
38	Marina Jacks/Island Park	Sarasota City
39	Quay	Sarasota City
40	Library Channel	Sarasota City
41	Centennial Park	Sarasota City
42	Whitaker Bayou	Sarasota City
44	Bowlees Creek	Manatee County
45	Trailer Estates East	Manatee County
46	Trailer Estates West	Manatee County
47	Mt. Vernon/Coral Shores	Manatee County
48	Paradise Bay	Manatee County
49	Cortez	Manatee County
50	Mallard Lane (McClellan Park)	Sarasota City
52	Putting Green	Longboat Key
53	Yardarm	Longboat Key

Table 1. Trafficsheds in Big Sarasota Bay

Location: Bradenton Beach North Jurisdiction: Manatee Trafficshed : 1

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	18	22.2 %	3.56	6	1	1.58
Speed :	11	13.8 %	1.91	2	1	0.30
Power :	12	14.8 %	2.58	3	2	0.51
Recreational Fish:	31	38.3 %	1.61	3	1	0.72
Commercial Fish :	3	3.7 %	2.33	4	1	1.53
Other:	5	6.2 %	3.00	6	1	2.00
Total:	80	100.0 %	2.27	6	1	1.28

Moorings

Wet Slips:	57
Hoist / Drystack:	37
Seawall:	
Beached/Blocked:	5
Trailer:	
Ramp:	
Total:	99

Facilities

Residential:	4
Marina/Yard/Club :	1
Motel/Restaurant/Shop:	1
Anchorage:	1
Other	0
Unclassified:	2
Total:	9

Signage

Commercial:	5
Manatee:	
Navigation:	3
Piling :	
Recreational:	1
Seagrass :	
Other:	
Total Signage:	9

Site:

	square feet
Water Area :	451653
Seagrass Area:	98046
Mangrove Area :	0
Tidal Area:	39976

	feet
Channel Length :	1081
Shoreline Length :	2383
Average Canal Depth :	6.10
Standard Deviation :	3.68
Entrance Channel :	

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	8.85	0	14.89		
1:	6.26	1	15.89	1 :	0
2:	6.54	2	12.57	2 :	0
3:	6.80	3	9.54	3 :	7
4:	7.80	4	4.90	4 :	27
5	10.45	5	4.24	5 :	4
6	8.13	6+:	37.74	6 :	9
7	8.26			7 :	32
8	10.42			8 :	6
9+:	26.49			9+ :	16

Restrictions:

	Option A	Option B
Boat count:	18	30
Channel Length (ft) :	0	690
Boats (percent of region):	3.38	2.47
Channel (percent of region) :	0.00	0.59

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.59
Amount (cubic ft):	0	19292

Location: **Bradenton Beach South** Jurisdiction: Manatee Trafficshed : 2

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	3.3 %	1.00	1	1	0.00
Sail :	8	26.7 %	2.38	3	1	0.74
Speed :	1	3.3 %	2.00	2	2	0.00
Power :	3	10.0 %	2.33	4	1	1.53
Recreational Fish:	17	56.7 %	1.29	2	1	0.47
Commercial Fish :						
Other:						
Total:	30	100.0 %	1.62	4	1	0.82

Moorings

Wet Slips:	68
Hoist / Drystack:	3
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	71

Facilities

Residential:	14
Marina/Yard/Club :	
Motel/Restaurant/Shop:	1
Anchorage:	
Other	3
Unclassified:	6
Total:	24

Signage

Commercial:	
Manatee:	
Navigation:	3
Piling :	
Recreational:	
Seagrass :	
Other:	1
Total Signage:	4

Site:

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	12.91	0	22.04		
1:	12.65	1	17.39	1 :	1
2:	12.18	2	12.25	2 :	2
3:	16.49	3	17.26	3 :	0
4:	18.99	4	16.30	4 :	9
5	14.41	5	9.86	5 :	28
6	8.97	6+:	4.91	6 :	32
7	2.23			7 :	24
8	0.83			8 :	3
9+:	0.32			9+ :	1

	square feet
Water Area :	1304231
Seagrass Area:	754489
Mangrove Area :	126408
Tidal Area:	168419
	feet
Channel Length :	5331
Shoreline Length :	4222
Average Canal Depth :	5.80
Standard Deviation :	1.75
Entrance Channel :	4

Restrictions:

	Option A	Option B
Boat count:	5	16
Channel Length (ft) :	0	1939
Boats (percent of region):	0.94	1.32
Channel (percent of region) :	0.00	1.65

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	1.65
Amount (cubic ft):	0	48147

Location: Whitney Beach North Jurisdiction: Longboat Key Trafficshed : 3

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	3	15.0 %	0.67	1	0	0.58
Sail :	2	10.0 %	3.00	4	2	1.41
Speed :	2	10.0 %	2.00	2	2	0.00
Power :						
Recreational Fish:	13	65.0 %	1.38	2	1	0.51
Commercial Fish :						
Other:						
Total:	20	100.0 %	1.52	4	1	0.75

Moorings

Wet Slips:	10
Hoist / Drystack:	5
Seawall:	1
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	16

Facilities

Residential:	10
Marina/Yard/Club :	
Motel/Restaurant/Shop:	1
Anchorage:	
Other	0
Unclassified:	
Total:	11

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	34.79	0	0.00		
1:	9.92	1	0.00	1 :	0
2:	8.47	2	0.00	2 :	4
3:	10.96	3	0.00	3 :	15
4:	13.17	4	0.00	4 :	24
5	10.14	5	0.00	5 :	38
6	8.98	6+:	0.00	6 :	14
7	3.57			7 :	6
8	0.00			8 :	0
9+:	0.00			9+ :	0

	square feet
Water Area :	113470
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	39470
	feet
Channel Length :	1750
Shoreline Length :	3717
Average Canal Depth :	4.60
Standard Deviation :	1.39
Entrance Channel :	2

Restrictions:

	Option A	Option B
Boat count:	9	19
Channel Length (ft) :	242	382
Boats (percent of region):	1.69	1.57
Channel (percent of region) :	0.84	0.32

Required Dredge:

	Option A	Option B
Percent of total area:	0.88	0.32
Amount (cubic ft):	6155	19601

Location: Whitney Beach South Jurisdiction: Longboat Key Trafficshed : 4

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	15	14.2 %	1.00	1	1	0.00
Sail :	20	18.9 %	1.80	4	1	1.11
Speed :	4	3.8 %	1.25	3	0	1.50
Power :	7	6.6 %	2.86	3	2	0.38
Recreational Fish:	58	54.7 %	1.48	3	1	0.54
Commercial Fish :	2	1.9 %	2.00	2	2	0.00
Other:						
Total:	106	100.0 %	1.57	4	1	0.76

Moorings

Wet Slips:	118
Hoist / Drystack:	31
Seawall:	11
Beached/Blocked:	0
Trailer:	
Ramp:	2
Total:	162

Facilities

Residential:	79
Marina/Yard/Club :	
Motel/Restaurant/Shop:	2
Anchorage:	1
Other	3
Unclassified:	2
Total:	87

Signage

Commercial:	8
Manatee:	
Navigation:	13
Piling :	
Recreational:	
Seagrass :	
Other:	4
Total Signage:	25

Site:

	square feet
Water Area :	2587861
Seagrass Area:	1860594
Mangrove Area :	94905
Tidal Area:	381485

	feet
Channel Length :	12977
Shoreline Length :	19378
Average Canal Depth :	5.20
Standard Deviation :	4.19
Entrance Channel :	4

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	14.74	0	19.59		
1:	8.12	1	9.78	1 :	2
2:	11.74	2	14.21	2 :	8
3:	14.94	3	17.85	3 :	8
4:	17.01	4	19.78	4 :	20
5	9.26	5	10.10	5 :	22
6	5.82	6+:	8.71	6 :	20
7	2.01			7 :	10
8	1.67			8 :	2
9+:	14.69			9+ :	8

Restrictions:

	Option A	Option B
Boat count:	19	49
Channel Length (ft) :	390	4299
Boats (percent of region):	3.57	4.04
Channel (percent of region) :	1.36	3.65

Required Dredge:

	Option A	Option B
Percent of total area:	1.12	3.65
Amount (cubic ft):	7795	135143

Location: General Harris Jurisdiction: Longboat Key Trafficshed : 5

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	6	8.8 %	1.00	1	1	0.00
Sail :	18	26.5 %	2.67	4	1	1.14
Speed :	11	16.2 %	1.82	3	1	0.75
Power :	4	5.9 %	3.00	3	3	0.00
Recreational Fish:	29	42.6 %	1.55	4	1	0.74
Commercial Fish :						
Other:						
Total:	68	100.0 %	1.82	4	1	0.98

Moorings

Wet Slips:	90
Hoist / Drystack:	42
Seawall:	13
Beached/Blocked:	0
Trailer:	
Ramp:	6
Total:	151

Facilities

Residential:	97
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	10
Unclassified:	1
Total:	108

Signage

Commercial:	
Manatee:	
Navigation:	1
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	1

Site:

	square feet
Water Area :	556922
Seagrass Area:	93913
Mangrove Area :	108437
Tidal Area:	93041

	feet
Channel Length :	7808
Shoreline Length :	14099
Average Canal Depth :	5.50
Standard Deviation :	1.72
Entrance Channel :	5

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	16.71	0	0.91		
1:	7.66	1	7.06	1 :	0
2:	11.30	2	10.81	2 :	0
3:	12.36	3	21.75	3 :	10
4:	11.20	4	27.17	4 :	14
5	18.71	5	20.96	5 :	16
6	15.86	6+:	11.37	6 :	36
7	5.02			7 :	23
8	1.39			8 :	1
9+:	0.00			9+ :	1

Restrictions:

	Option A	Option B
Boat count:	8	19
Channel Length (ft) :	0	2896
Boats (percent of region):	1.50	1.57
Channel (percent of region) :	0.00	2.46

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	2.46
Amount (cubic ft):	0	80283

Location: Emerald Harbour Jurisdiction: Longboat Key Trafficshed: 6

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	3	1.5 %	1.00	1	1	0.00
Sail :	18	8.9 %	3.67	7	1	1.65
Speed :	20	9.9 %	1.80	3	0	0.83
Power :	45	22.3 %	3.09	5	1	0.87
Recreational Fish:	115	56.9 %	1.66	4	1	0.72
Commercial Fish :						
Other:	1	0.5 %	3.00	3	3	0.00
Total:	202	100.0 %	2.07	7	1	1.14

Moorings

Wet Slips:	210
Hoist / Drystack:	55
Seawall:	8
Beached/Blocked:	20
Trailer:	25
Ramp:	3
Total:	321

Facilities

Residential:	102
Marina/Yard/Club :	2
Motel/Restaurant/Shop:	1
Anchorage:	
Other	0
Unclassified:	4
Total:	109

Signage

Commercial:	3
Manatee:	5
Navigation:	16
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	24

Site:

	square feet
Water Area :	2690525
Seagrass Area:	1105470
Mangrove Area :	80867
Tidal Area:	1209791

	feet
Channel Length :	11732
Shoreline Length :	20912
Average Canal Depth :	6.10
Standard Deviation :	0.72
Entrance Channel :	5

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	44.97	0	91.35		
1:	4.06	1	1.97	1 :	0
2:	8.36	2	1.74	2 :	0
3:	4.52	3	1.99	3 :	2
4:	11.11	4	2.31	4 :	1
5	8.57	5	0.27	5 :	14
6	11.90	6+:	.37	6 :	52
7	6.11			7 :	29
8	0.42			8 :	1
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	17	36
Channel Length (ft) :	1523	3986
Boats (percent of region):	3.20	2.97
Channel (percent of region) :	5.31	3.38

Required Dredge:

	Option A	Option B
Percent of total area:	4.64	3.38
Amount (cubic ft):	32322	160318

Location: Gulf Bay Basin Jurisdiction: Longboat Key Trafficshed : 7

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	6	20.7 %	3.33	5	2	1.21
Speed :	11	37.9 %	2.09	3	2	0.30
Power :	6	20.7 %	3.00	4	2	0.63
Recreational Fish:	6	20.7 %	1.67	3	1	0.82
Commercial Fish :						
Other:						
Total:	29	100.0 %	2.27	5	1	1.01

Moorings

Wet Slips:	63
Hoist / Drystack:	0
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	63

Facilities

Residential:	
Marina/Yard/Club :	1
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	1

Signage

Commercial:	
Manatee:	1
Navigation:	
Piling :	1
Recreational:	
Seagrass :	
Other:	
Total Signage:	2

Site:

	square feet
Water Area :	178063
Seagrass Area:	5920
Mangrove Area :	0
Tidal Area:	16232

	feet
Channel Length :	914
Shoreline Length :	2175
Average Canal Depth :	8.80
Standard Deviation :	0.17
Entrance Channel :	8

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	9.11	0	0.00		
1:	3.40	1	0.00	1 :	0
2:	3.58	2	0.00	2 :	0
3:	4.18	3	4.55	3 :	0
4:	5.28	4	21.09	4 :	0
5	5.49	5	22.18	5 :	0
6	5.94	6+:	52.18	6 :	0
7	6.01			7 :	0
8	12.31			8 :	22
9+:	44.71			9+ :	78

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Tarawitt Jurisdiction: Longboat Key Traffic shed : 8

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	4	8.2 %	1.00	1	1	0.00
Sail :	7	14.3 %	2.57	5	1	1.40
Speed :	14	28.6 %	1.93	3	1	0.47
Power :	4	8.2 %	2.25	3	2	0.50
Recreational Fish:	20	40.8 %	1.45	3	1	0.69
Commercial Fish :						
Other:						
Total:	49	100.0 %	1.75	5	1	0.84

Moorings

Wet Slips:	44
Hoist / Drystack:	21
Seawall:	15
Beached/Blocked:	0
Trailer:	
Ramp:	1
Total:	81

Facilities

Residential:	63
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	63

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	25.73	0	0.00		
1:	17.54	1	0.00	1 :	25
2:	12.80	2	0.00	2 :	39
3:	10.04	3	31.29	3 :	15
4:	10.61	4	40.86	4 :	6
5	9.36	5	11.56	5 :	1
6	7.63	6+:	16.30	6 :	1
7	5.18			7 :	3
8	1.12			8 :	1
9+:	0.00			9+ :	7

	square feet
Water Area :	492964
Seagrass Area:	25424
Mangrove Area :	10443
Tidal Area:	126817
	feet
Channel Length :	6502
Shoreline Length :	12040
Average Canal Depth :	2.80
Standard Deviation :	4.93
Entrance Channel :	1

Restrictions:

	Option A	Option B
Boat count:	46	47
Channel Length (ft) :	3245	5193
Boats (percent of region):	8.65	3.87
Channel (percent of region) :	11.31	4.41

Required Dredge:

	Option A	Option B
Percent of total area:	19.71	4.41
Amount (cubic ft):	137354	289989

Location: No Name Jurisdiction: Longboat Key Trafficshed : 9

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	2	7.4 %	1.00	1	1	0.00
Sail :	4	14.8 %	1.75	3	1	0.96
Speed :	7	25.9 %	2.00	3	1	0.82
Power :	2	7.4 %	3.00	3	3	0.00
Recreational Fish:	12	44.4 %	1.42	2	1	0.51
Commercial Fish :						
Other:						
Total:	27	100.0 %	1.66	3	1	0.77

Moorings

Wet Slips:	47
Hoist / Drystack:	7
Seawall:	2
Beached/Blocked:	0
Trailer:	
Ramp:	1
Total:	57

Facilities

Residential:	18
Marina/Yard/Club :	
Motel/Restaurant/Shop:	1
Anchorage:	
Other	0
Unclassified:	5
Total:	24

Signage

Commercial:	
Manatee:	
Navigation:	1
Piling :	2
Recreational:	1
Seagrass :	
Other:	
Total Signage:	4

Site:

	square feet
Water Area :	558612
Seagrass Area:	553079
Mangrove Area :	8036
Tidal Area:	113966

	feet
Channel Length :	4414
Shoreline Length :	4283
Average Canal Depth :	3.40
Standard Deviation :	1.06
Entrance Channel :	3

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	20.40	0	19.81		
1:	49.66	1	50.15	1 :	3
2:	13.77	2	13.91	2 :	13
3:	9.76	3	9.86	3 :	48
4:	5.26	4	5.32	4 :	19
5	1.10	5	1.11	5 :	15
6	0.05	6+:	.05	6 :	2
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	11	25
Channel Length (ft) :	313	3243
Boats (percent of region):	2.07	2.06
Channel (percent of region) :	1.09	2.81

Required Dredge:

	Option A	Option B
Percent of total area:	0.90	2.81
Amount (cubic ft):	6253	119915

Location: Buttonwood Harbor Jurisdiction: Longboat Key Trafficshed : 10

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	11	5.0 %	0.82	1	0	0.40
Sail :	43	19.5 %	3.12	5	1	1.24
Speed :	45	20.5 %	1.96	3	0	0.67
Power :	34	15.5 %	2.71	5	1	1.00
Recreational Fish:	86	39.1 %	1.62	4	1	0.60
Commercial Fish :						
Other:	1	0.5 %	2.00	2	2	0.00
Total:	220	100.0 %	2.06	5	1	1.03

Moorings

Wet Slips:	345
Hoist / Drystack:	33
Seawall:	30
Beached/Blocked:	0
Trailer:	
Ramp:	6
Total:	414

Facilities

Residential:	109
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	6
Unclassified:	3
Total:	118

Signage

Commercial:	1
Manatee:	6
Navigation:	51
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	58

Site:

	square feet
Water Area :	5442843
Seagrass Area:	804400
Mangrove Area :	267103
Tidal Area:	770613

	feet
Channel Length :	29959
Shoreline Length :	38298
Average Canal Depth :	6.30
Standard Deviation :	3.22
Entrance Channel :	5

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	14.16	0	33.81		
1:	11.67	1	23.68	1 :	0
2:	8.41	2	9.16	2 :	0
3:	9.65	3	8.65	3 :	1
4:	13.36	4	16.99	4 :	11
5	8.91	5	1.74	5 :	23
6	14.33	6+:	5.98	6 :	26
7	13.07			7 :	25
8	4.68			8 :	8
9+:	3.74			9+ :	7

Restrictions:

	Option A	Option B
Boat count:	31	50
Channel Length (ft) :	447	10596
Boats (percent of region):	5.83	4.16
Channel (percent of region) :	1.56	8.99

Required Dredge:

	Option A	Option B
Percent of total area:	1.54	8.99
Amount (cubic ft):	10748	300904

Location: Bay Isles/Longboat Key Moorings Jurisdiction: Longboat Key Trafficshed : 11

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	5	2.0 %	1.00	1	1	0.00
Sail :	64	25.4 %	4.47	6	1	1.36
Speed :	18	7.1 %	2.00	3	0	0.91
Power :	128	50.8 %	3.45	5	1	0.86
Recreational Fish:	36	14.3 %	2.67	5	1	1.20
Commercial Fish :						
Other:	1	0.4 %	2.00	2	2	0.00
Total:	252	100.0 %	2.93	6	1	1.53

Moorings

Wet Slips:	396
Hoist / Drystack:	35
Seawall:	2
Beached/Blocked:	0
Trailer:	
Ramp:	4
Total:	437

Facilities

Residential:	102
Marina/Yard/Club :	1
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	6
Total:	109

Signage

Commercial:	4
Manatee:	1
Navigation:	22
Piling :	5
Recreational:	
Seagrass :	
Other:	1
Total Signage:	33

Site:

	square feet
Water Area :	3785963
Seagrass Area:	196512
Mangrove Area :	630439
Tidal Area:	981602

	feet
Channel Length :	19300
Shoreline Length :	40763
Average Canal Depth :	5.90
Standard Deviation :	2.53
Entrance Channel :	5

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	25.93	0	65.18		
1:	6.13	1	21.87	1 :	0
2:	10.69	2	9.28	2 :	1
3:	6.99	3	2.77	3 :	1
4:	9.10	4	0.65	4 :	8
5	8.45	5	0.25	5 :	38
6	7.62	6+:	.01	6 :	27
7	15.66			7 :	10
8	4.81			8 :	6
9+:	4.62			9+ :	9

Restrictions:

	Option A	Option B
Boat count:	68	142
Channel Length (ft) :	763	4431
Boats (percent of region):	12.78	11.70
Channel (percent of region) :	2.66	3.76

Required Dredge:

	Option A	Option B
Percent of total area:	2.57	3.76
Amount (cubic ft):	17880	137805

Location: Golf Links Jurisdiction: Longboat Key Trafficshed : 12

Boats
(excluding dinghies)

	Number	Percent	Draft (ft) Average	Max	Min	Std. Dev.
Row :						
Sail :	5	33.3 %	2.20	5	1	1.79
Speed :	2	13.3 %	2.00	2	2	0.00
Power :	4	26.7 %	2.25	3	2	0.50
Recreational Fish:	4	26.7 %	1.25	2	1	0.50
Commercial Fish :						
Other:						
Total:	15	100.0 %	1.88	5	1	1.09

Moorings

Wet Slips:	18
Hoist / Drystack:	15
Seawall:	1
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	34

Facilities

Residential:	20
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	20

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	2
Recreational:	
Seagrass :	
Other:	
Total Signage:	2

Site:

	square feet
Water Area :	98617
Seagrass Area:	3670
Mangrove Area :	0
Tidal Area:	12949

	feet
Channel Length :	1067
Shoreline Length :	2130
Average Canal Depth :	5.80
Standard Deviation :	1.32
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	13.13	0	0.00		
1:	11.43	1	0.00	1 :	0
2:	11.87	2	0.00	2 :	0
3:	12.30	3	2.93	3 :	0
4:	16.16	4	80.35	4 :	17
5	14.16	5	17.01	5 :	24
6	12.94	6+:	0.00	6 :	16
7	8.00			7 :	43
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	1	3
Channel Length (ft) :	178	610
Boats (percent of region):	0.19	0.25
Channel (percent of region) :	0.62	0.52

Required Dredge:

	Option A	Option B
Percent of total area:	0.51	0.52
Amount (cubic ft):	3570	24562

Location: Chipping Jurisdiction: Longboat Key Trafficshed : 13

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	16.7 %	1.00	1	1	0.00
Sail :						
Speed :	2	33.3 %	2.00	2	2	0.00
Power :	2	33.3 %	2.50	5	0	3.54
Recreational Fish:	1	16.7 %	1.00	1	1	0.00
Commercial Fish :						
Other:						
Total:	6	100.0 %	2.20	5	1	1.64

Moorings

Wet Slips:	14
Hoist / Drystack:	6
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	20

Facilities

Residential:	15
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	15

Signage

Commercial:	
Manatee:	
Navigation:	1
Piling :	1
Recreational:	
Seagrass :	
Other:	
Total Signage:	2

Site:

	square feet
Water Area :	84936
Seagrass Area:	86
Mangrove Area :	0
Tidal Area:	10129

	feet
Channel Length :	1018
Shoreline Length :	1944
Average Canal Depth :	6.20
Standard Deviation :	1.58
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	11.93	0	0.00		
1:	7.99	1	0.00	1 :	0
2:	11.62	2	0.00	2 :	0
3:	12.12	3	0.00	3 :	0
4:	22.95	4	100.00	4 :	14
5	12.24	5	0.00	5 :	15
6	9.81	6+:	0.00	6 :	18
7	10.33			7 :	40
8	1.01			8 :	12
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	1	1
Channel Length (ft) :	148	148
Boats (percent of region):	0.19	0.08
Channel (percent of region) :	0.51	0.12

Required Dredge:

	Option A	Option B
Percent of total area:	0.42	0.12
Amount (cubic ft):	2953	8851

Location: Wedge Jurisdiction: Longboat Key Trafficshed : 14

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	3	21.4 %	3.67	5	2	1.53
Speed :	5	35.7 %	2.20	3	1	0.84
Power :	4	28.6 %	2.25	3	1	0.96
Recreational Fish:	2	14.3 %	1.50	2	1	0.71
Commercial Fish :						
Other:						
Total:	14	100.0 %	2.43	5	1	1.16

Moorings

Wet Slips:	16
Hoist / Drystack:	18
Seawall:	3
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	37

Facilities

Residential:	19
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	1
Unclassified:	
Total:	20

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	1
Recreational:	
Seagrass :	
Other:	1
Total Signage:	2

Site:

	square feet
Water Area :	81524
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	10990

	feet
Channel Length :	1034
Shoreline Length :	2071
Average Canal Depth :	5.20
Standard Deviation :	0.55
Entrance Channel :	4

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	13.48	0	0.00		
1:	12.44	1	0.00	1 :	0
2:	15.30	2	0.00	2 :	0
3:	16.45	3	0.00	3 :	0
4:	21.14	4	0.00	4 :	19
5	15.82	5	0.00	5 :	39
6	5.15	6+:	0.00	6 :	43
7	0.23			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	2	6
Channel Length (ft) :	191	591
Boats (percent of region):	0.38	0.49
Channel (percent of region) :	0.67	0.50

Required Dredge:

	Option A	Option B
Percent of total area:	0.55	0.50
Amount (cubic ft):	3825	22040

Location: **Birdie** Jurisdiction: **Longboat Key** Trafficshed : **15**

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	3	37.5 %	2.33	4	1	1.53
Speed :	1	12.5 %	2.00	2	2	0.00
Power :	2	25.0 %	2.50	3	2	0.71
Recreational Fish:	2	25.0 %	2.50	3	2	0.71
Commercial Fish :						
Other:						
Total:	8	100.0 %	2.38	4	1	0.92

Moorings

Wet Slips:	19
Hoist / Drystack:	11
Seawall:	1
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	31

Facilities

Residential:	21
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	21

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	1
Recreational:	
Seagrass :	
Other:	1
Total Signage:	2

Site:

	square feet
Water Area :	110844
Seagrass Area:	915
Mangrove Area :	0
Tidal Area:	12992

	feet
Channel Length :	1111
Shoreline Length :	2270
Average Canal Depth :	6.30
Standard Deviation :	0.66
Entrance Channel :	5

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	11.72	0	0.00		
1:	11.93	1	0.00	1 :	0
2:	12.82	2	0.00	2 :	0
3:	16.02	3	69.41	3 :	0
4:	19.40	4	30.59	4 :	2
5	12.15	5	0.00	5 :	16
6	9.33	6+:	0.00	6 :	34
7	6.46			7 :	48
8	0.18			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	1	3
Channel Length (ft) :	0	131
Boats (percent of region):	0.19	0.25
Channel (percent of region) :	0.00	0.11

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.11
Amount (cubic ft):	0	3143

Location: Bowsprit Jurisdiction: Longboat Key Trafficshed : 16

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	10.0 %	1.00	1	1	0.00
Sail :	2	20.0 %	4.00	4	4	0.00
Speed :	3	30.0 %	1.33	2	1	0.58
Power :	2	20.0 %	3.00	3	3	0.00
Recreational Fish:	2	20.0 %	2.50	3	2	0.71
Commercial Fish :						
Other:						
Total:	10	100.0 %	2.40	4	1	1.17

Moorings

Wet Slips:	21
Hoist / Drystack:	12
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	33

Facilities

Residential:	21
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	0
Unclassified:	
Total:	21

Signage

Commercial:	
Manatee:	
Navigation:	2
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	2

Site:

	square feet
Water Area :	122372
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	14456

	feet
Channel Length :	1252
Shoreline Length :	2520
Average Canal Depth :	5.90
Standard Deviation :	1.29
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	11.82	0	0.00		
1:	10.28	1	0.00	1 :	0
2:	10.49	2	0.00	2 :	0
3:	10.66	3	0.00	3 :	0
4:	10.89	4	0.00	4 :	17
5	19.88	5	0.00	5 :	17
6	12.54	6+:	0.00	6 :	21
7	13.45			7 :	45
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	2	5
Channel Length (ft) :	0	346
Boats (percent of region):	0.38	0.41
Channel (percent of region) :	0.00	0.29

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.29
Amount (cubic ft):	0	11125

Location: Ranger Jurisdiction: Longboat Key Trafficshed : 19

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	2	16.7 %	2.50	4	1	2.12
Speed :	6	50.0 %	2.33	3	1	0.82
Power :	2	16.7 %	3.00	3	3	0.00
Recreational Fish:	2	16.7 %	2.00	3	1	1.41
Commercial Fish :						
Other:						
Total:	12	100.0 %	2.42	4	1	1.00

Moorings

Wet Slips:	22
Hoist / Drystack:	13
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	35

Facilities

Residential:	24
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	24

Signage

Commercial:	
Manatee:	
Navigation:	2
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	2

Site:

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	13.48	0	0.00		
1:	9.61	1	0.00	1 :	0
2:	11.58	2	0.00	2 :	0
3:	14.03	3	0.00	3 :	0
4:	12.30	4	0.00	4 :	14
5	15.37	5	0.00	5 :	20
6	10.04	6+:	0.00	6 :	62
7	13.37			7 :	2
8	0.21			8 :	2
9+:	0.00			9+ :	0

	square feet
Water Area :	129896
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	17512
	feet
Channel Length :	1370
Shoreline Length :	2690
Average Canal Depth :	5.60
Standard Deviation :	0.67
Entrance Channel :	4

Restrictions:

	Option A	Option B
Boat count:	1	7
Channel Length (ft) :	0	373
Boats (percent of region):	0.19	0.58
Channel (percent of region) :	0.00	0.32

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.32
Amount (cubic ft):	0	11327

Location: Halyard Jurisdiction: Longboat Key Trafficshed : 20

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	3	30.0 %	4.00	5	3	1.00
Speed :	1	10.0 %	2.00	2	2	0.00
Power :	3	30.0 %	2.67	3	2	0.58
Recreational Fish:	3	30.0 %	1.00	1	1	0.00
Commercial Fish :						
Other:						
Total:	10	100.0 %	2.50	5	1	1.35

Moorings

Wet Slips:	21
Hoist / Drystack:	9
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	1
Total:	31

Facilities

Residential:	25
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	25

Signage

Commercial:	
Manatee:	
Navigation:	2
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	2

Site:

	square feet
Water Area :	127194
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	11582

	feet
Channel Length :	1560
Shoreline Length :	3126
Average Canal Depth :	5.70
Standard Deviation :	0.53
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	9.11	0	0.00		
1:	8.79	1	0.00	1 :	0
2:	10.51	2	0.00	2 :	0
3:	11.62	3	0.00	3 :	0
4:	12.86	4	0.00	4 :	4
5	15.41	5	0.00	5 :	29
6	22.87	6+:	0.00	6 :	62
7	8.84			7 :	2
8	0.00			8 :	3
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	2	5
Channel Length (ft) :	70	1187
Boats (percent of region):	0.38	0.41
Channel (percent of region) :	0.24	1.01

Required Dredge:

	Option A	Option B
Percent of total area:	0.20	1.01
Amount (cubic ft):	1391	32043

Location: Boat Name Lanes Jurisdiction: Longboat Key Trafficshed : 21

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	2	0.9 %	0.50	1	0	0.71
Sail :	14	6.1 %	3.57	5	1	1.65
Speed :	66	28.7 %	2.23	3	0	0.67
Power :	74	32.2 %	2.51	4	1	0.71
Recreational Fish:	74	32.2 %	1.71	3	1	0.65
Commercial Fish :						
Other:						
Total:	230	100.0 %	2.24	5	1	0.88

Moorings

Wet Slips:	141
Hoist / Drystack:	250
Seawall:	
Beached/Blocked:	0
Trailer:	1
Ramp:	
Total:	392

Facilities

Residential:	131
Marina/Yard/Club :	1
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	
Total:	132

Signage

Commercial:	1
Manatee:	
Navigation:	9
Piling :	1
Recreational:	
Seagrass :	
Other:	1
Total Signage:	12

Site:

	square feet
Water Area :	4821189
Seagrass Area:	488939
Mangrove Area :	958755
Tidal Area:	529324
	feet
Channel Length :	12603
Shoreline Length :	25953
Average Canal Depth :	6.90
Standard Deviation :	9.00
Entrance Channel :	5

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	10.98	0	13.37		
1:	4.73	1	19.28	1 :	0
2:	5.68	2	29.20	2 :	0
3:	6.66	3	11.48	3 :	3
4:	9.94	4	7.81	4 :	22
5	8.58	5	9.39	5 :	23
6	8.65	6+:	9.47	6 :	9
7	7.66			7 :	10
8	7.37			8 :	8
9+:	29.76			9+ :	25

Restrictions:

	Option A	Option B
Boat count:	7	24
Channel Length (ft) :	0	1355
Boats (percent of region):	1.32	1.98
Channel (percent of region) :	0.00	1.15

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	1.15
Amount (cubic ft):	0	32191

Location: New Pass Lagoon Jurisdiction: Longboat Key Trafficshed : 22

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	1	8.3 %	5.00	5	5	0.00
Speed :	2	16.7 %	2.50	3	2	0.71
Power :	3	25.0 %	2.67	3	2	0.58
Recreational Fish:	6	50.0 %	1.50	2	1	0.55
Commercial Fish :						
Other:						
Total:	12	100.0 %	2.25	5	1	1.14

Moorings

Wet Slips:	14
Hoist / Drystack:	0
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	14

Facilities

Residential:	1
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	0
Unclassified:	1
Total:	2

Signage

Commercial:	
Manatee:	
Navigation:	3
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	3

Site:

	square feet
Water Area :	936093
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	77003
	feet
Channel Length :	2538
Shoreline Length :	4421
Average Canal Depth :	12.20
Standard Deviation :	9.17
Entrance Channel :	7

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	8.23	0	0.00		
1:	7.49	1	0.00	1 :	0
2:	7.32	2	0.00	2 :	0
3:	7.28	3	0.00	3 :	0
4:	7.27	4	0.00	4 :	0
5	7.24	5	0.00	5 :	0
6	7.50	6+:	0.00	6 :	0
7	7.84			7 :	8
8	7.54			8 :	4
9+:	32.30			9+ :	88

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: City Island New Pass Channel Jurisdiction: Sarasota City Trafficshed : 23

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	37	12.0 %	2.89	5	1	1.24
Speed :	107	34.6 %	2.53	3	0	0.78
Power :	136	44.0 %	2.44	3	1	0.59
Recreational Fish:	24	7.8 %	2.21	3	1	0.83
Commercial Fish :						
Other:	5	1.6 %	1.80	3	1	1.10
Total:	309	100.0 %	2.50	5	1	0.79

Moorings

Wet Slips:	63
Hoist / Drystack:	63
Seawall:	
Beached/Blocked:	229
Trailer:	3
Ramp:	
Total:	358

Facilities

Residential:	10
Marina/Yard/Club :	1
Motel/Restaurant/Shop	1
Anchorage:	
Other	2
Unclassified:	
Total:	14

Signage

Commercial:	5
Manatee:	5
Navigation:	27
Piling :	
Recreational:	
Seagrass :	
Other:	1
Total Signage:	38

Site:

	square feet
Water Area :	3591711
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	165394

	feet
Channel Length :	162
Shoreline Length :	10727
Average Canal Depth :	10.00
Standard Deviation :	0.00
Entrance Channel :	

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	4.60	0	0.00		
1:	3.92	1	0.00	1 :	0
2:	4.76	2	0.00	2 :	0
3:	4.71	3	0.00	3 :	0
4:	3.30	4	0.00	4 :	0
5	2.80	5	0.00	5 :	0
6	2.73	6+:	0.00	6 :	0
7	3.15			7 :	0
8	3.18			8 :	0
9+:	66.82			9+ :	100

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: City Island Southeast Jurisdiction: Sarasota City Trafficshed : 24

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	20	4.9 %	0.85	1	0	0.37
Sail :	365	89.0 %	1.82	5	0	1.15
Speed :						
Power :	1	0.2 %	2.00	2	2	0.00
Recreational Fish:	3	0.7 %	1.33	2	1	0.58
Commercial Fish :	1	0.2 %	2.00	2	2	0.00
Other:	20	4.9 %	2.15	3	1	0.67
Total:	410	100.0 %	1.88	5	1	1.02

Moorings

Wet Slips:	52
Hoist / Drystack:	221
Seawall:	
Beached/Blocked:	45
Trailer:	230
Ramp:	5
Total:	553

Facilities

Residential:	
Marina/Yard/Club :	2
Motel/Restaurant/Shop	
Anchorage:	2
Other	2
Unclassified:	
Total:	6

Signage

Commercial:	2
Manatee:	5
Navigation:	7
Piling :	10
Recreational:	14
Seagrass :	
Other:	3
Total Signage:	41

Site:

	square feet
Water Area :	3394241
Seagrass Area:	453397
Mangrove Area :	122550
Tidal Area:	240331

	feet
Channel Length :	4868
Shoreline Length :	6072
Average Canal Depth :	7.70
Standard Deviation :	3.57
Entrance Channel :	7

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	7.08	0	1.90		
1:	0.73	1	1.55	1 :	0
2:	5.30	2	12.37	2 :	0
3:	2.19	3	7.00	3 :	0
4:	4.34	4	13.49	4 :	3
5	5.18	5	14.88	5 :	8
6	7.40	6+:	48.80	6 :	27
7	17.59			7 :	4
8	23.98			8 :	27
9+:	26.20			9+ :	31

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: St. Armands/Coon Key North Jurisdiction: Sarasota City Trafficshed : 25

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	3	9.4 %	1.67	2	1	0.58
Speed :	11	34.4 %	1.45	3	0	1.13
Power :	5	15.6 %	2.60	3	2	0.55
Recreational Fish:	13	40.6 %	1.92	3	1	0.86
Commercial Fish :						
Other:						
Total:	32	100.0 %	2.03	3	1	0.78

Moorings

Wet Slips:	12
Hoist / Drystack:	3
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	15

Facilities

Residential:	10
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	1
Total:	11

Signage

Commercial:	
Manatee:	2
Navigation:	6
Piling :	
Recreational:	9
Seagrass :	
Other:	
Total Signage:	17

Site:

	square feet
Water Area :	2908844
Seagrass Area:	654290
Mangrove Area :	100191
Tidal Area:	371883
	feet
Channel Length :	8362
Shoreline Length :	8625
Average Canal Depth :	10.10
Standard Deviation :	6.15
Entrance Channel :	5

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	12.78	0	33.39		
1:	0.34	1	0.99	1 :	0
2:	5.71	2	11.01	2 :	0
3:	5.86	3	8.48	3 :	0
4:	8.05	4	8.43	4 :	0
5	10.30	5	7.68	5 :	2
6	9.10	6+:	30.02	6 :	11
7	8.39			7 :	7
8	6.99			8 :	7
9+:	32.47			9+ :	73

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: North Lido Lagoon Jurisdiction: Sarasota City Trafficshed : 26

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	2	11.8 %	1.00	1	1	0.00
Sail :						
Speed :	4	23.5 %	2.25	3	1	0.96
Power :	3	17.6 %	2.33	3	2	0.58
Recreational Fish:	8	47.1 %	1.25	3	1	0.71
Commercial Fish :						
Other:						
Total:	17	100.0 %	1.61	3	1	0.85

Moorings

Wet Slips:	3
Hoist / Drystack:	0
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	3

Facilities

Residential:	3
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	3

Signage

Commercial:	
Manatee:	7
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	7

Site:

	square feet
Water Area :	2881117
Seagrass Area:	2067977
Mangrove Area :	631338
Tidal Area:	1584452

	feet
Channel Length :	2628
Shoreline Length :	8826
Average Canal Depth :	11.70
Standard Deviation :	4.81
Entrance Channel :	5

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	54.99	0	72.54		
1:	0.00	1	0.00	1 :	0
2:	11.68	2	14.75	2 :	0
3:	8.43	3	9.80	3 :	0
4:	2.80	4	1.59	4 :	0
5	2.15	5	0.61	5 :	0
6	2.05	6+:	.72	6 :	5
7	2.31			7 :	1
8	1.90			8 :	2
9+:	13.67			9+ :	92

Restrictions:

	Option A	Option B
Boat count:	4	3
Channel Length (ft) :	0	0
Boats (percent of region):	0.75	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Sarasota Yacht Club Jurisdiction: Sarasota City Trafficshed: 27

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	20	28.6 %	4.50	6	1	1.24
Speed :	3	4.3 %	1.67	2	1	0.58
Power :	42	60.0 %	3.24	5	1	0.96
Recreational Fish:	5	7.1 %	2.20	3	1	0.84
Commercial Fish :						
Other:						
Total:	70	100.0 %	3.00	6	1	1.50

Moorings

Wet Slips:	97
Hoist / Drystack:	13
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	110

Facilities

Residential:	1
Marina/Yard/Club :	1
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	2

Signage

Commercial:	3
Manatee:	
Navigation:	4
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	7

Site:

	square feet
Water Area :	447122
Seagrass Area:	
Mangrove Area :	0
Tidal Area:	18223

	feet
Channel Length :	
Shoreline Length :	1443
Average Canal Depth :	
Standard Deviation :	
Entrance Channel :	7

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	4.08	0	0.00		
1:	0.00	1	0.00	1 :	0
2:	2.45	2	0.00	2 :	0
3:	2.58	3	0.00	3 :	0
4:	2.69	4	0.00	4 :	0
5	2.74	5	0.00	5 :	0
6	2.80	6+:	0.00	6 :	0
7	3.11			7 :	0
8	3.27			8 :	0
9+:	76.28			9+ :	0

Restrictions:

	Option A	Option B
Boat count:		
Channel Length (ft) :	0	0
Boats (percent of region):		
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:		
Amount (cubic ft):	0	0

Location: Coon Key South Jurisdiction: Sarasota City Trafficshed : 28

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	3	50.0 %	2.33	3	1	1.15
Speed :	2	33.3 %	2.00	3	1	1.41
Power :						
Recreational Fish:	1	16.7 %	2.00	2	2	0.00
Commercial Fish :						
Other:						
Total:	6	100.0 %	2.17	3	1	0.98

Moorings

Wet Slips:	7
Hoist / Drystack:	5
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	12

Facilities

Residential:	8
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	
Total:	8

Signage

Commercial:	
Manatee:	1
Navigation:	2
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	3

Site:

	square feet
Water Area :	694750
Seagrass Area:	172380
Mangrove Area :	0
Tidal Area:	54733
	feet
Channel Length :	2636
Shoreline Length :	3095
Average Canal Depth :	9.20
Standard Deviation :	4.29
Entrance Channel :	6

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	7.88	0	0.00		
1:	0.20	1	0.02	1 :	0
2:	5.04	2	3.18	2 :	0
3:	6.43	3	8.93	3 :	0
4:	7.20	4	12.33	4 :	3
5	8.40	5	15.77	5 :	5
6	10.01	6+:	59.77	6 :	8
7	10.84			7 :	5
8	10.95			8 :	7
9+:	33.06			9+ :	72

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Otter Key Jurisdiction: Sarasota City Trafficshed : 29

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	2.0 %	1.00	1	1	0.00
Sail :	13	26.0 %	2.15	5	1	1.68
Speed :	16	32.0 %	1.69	3	0	1.25
Power :	6	12.0 %	3.17	4	2	0.75
Recreational Fish:	12	24.0 %	1.17	2	1	0.39
Commercial Fish :						
Other:	2	4.0 %	0.50	1	0	0.71
Total:	50	100.0 %	1.98	5	1	1.22

Moorings

Wet Slips:	89
Hoist / Drystack:	26
Seawall:	2
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	117

Facilities

Residential:	80
Marina/Yard/Club :	
Motel/Restaurant/Shop	1
Anchorage:	
Other	
Unclassified:	
Total:	81

Signage

Commercial:	
Manatee:	5
Navigation:	4
Piling :	3
Recreational:	
Seagrass :	
Other:	1
Total Signage:	13

Site:

	square feet
Water Area :	2855284
Seagrass Area:	266885
Mangrove Area :	693211
Tidal Area:	921756
	feet
Channel Length :	6906
Shoreline Length :	12882
Average Canal Depth :	9.10
Standard Deviation :	6.08
Entrance Channel :	6

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	32.28	0	17.76		
1:	2.04	1	10.32	1 :	0
2:	6.48	2	11.56	2 :	0
3:	2.38	3	6.55	3 :	0
4:	6.79	4	15.63	4 :	1
5	2.40	5	7.15	5 :	5
6	5.80	6+:	31.01	6 :	12
7	4.00			7 :	14
8	5.00			8 :	12
9+:	32.84			9+ :	55

Restrictions:

	Option A	Option B
Boat count:	0	2
Channel Length (ft) :	0	787
Boats (percent of region):	0.00	0.16
Channel (percent of region) :	0.00	0.67

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.67
Amount (cubic ft):	0	18761

Location: Bird Key Jurisdiction: Sarasota City Traffic shed : 30

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	4	2.3 %	1.00	1	1	0.00
Sail :	29	17.0 %	3.45	6	0	1.66
Speed :	37	21.6 %	1.86	3	0	0.89
Power :	54	31.6 %	3.04	5	1	0.91
Recreational Fish:	46	26.9 %	1.93	5	1	1.00
Commercial Fish :						
Other:	1	0.6 %	1.00	1	1	0.00
Total:	171	100.0 %	2.36	6	1	1.25

Moorings

Wet Slips:	254
Hoist / Drystack:	124
Seawall:	6
Beached/Blocked:	0
Trailer:	
Ramp:	3
Total:	387

Facilities

Residential:	228
Marina/Yard/Club :	1
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	
Total:	229

Signage

Commercial:	2
Manatee:	2
Navigation:	21
Piling :	2
Recreational:	
Seagrass :	
Other:	
Total Signage:	27

Site:

	square feet
Water Area :	15757702
Seagrass Area:	125138
Mangrove Area :	0
Tidal Area:	9775965

	feet
Channel Length :	26779
Shoreline Length :	34548
Average Canal Depth :	10.60
Standard Deviation :	7.59
Entrance Channel :	7

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	62.04	0	0.00		
1:	1.37	1	5.42	1 :	0
2:	1.93	2	57.90	2 :	0
3:	1.99	3	17.24	3 :	1
4:	1.40	4	15.04	4 :	0
5	1.31	5	0.01	5 :	1
6	3.24	6+:	4.39	6 :	5
7	2.57			7 :	11
8	2.68			8 :	11
9+:	21.46			9+ :	71

Restrictions:

	Option A	Option B
Boat count:	4	9
Channel Length (ft) :	162	1580
Boats (percent of region):	0.75	0.74
Channel (percent of region) :	0.56	1.34

Required Dredge:

	Option A	Option B
Percent of total area:	0.82	1.34
Amount (cubic ft):	5741	42313

Location: Louise Bayou Jurisdiction: Sarasota City Trafficshed : 31

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	5	13.2 %	0.60	1	0	0.55
Sail :	15	39.5 %	1.87	4	1	0.83
Speed :	4	10.5 %	2.00	3	1	1.15
Power :	3	7.9 %	2.00	3	1	1.00
Recreational Fish:	10	26.3 %	1.60	3	1	0.84
Commercial Fish :	1	2.6 %	1.00	1	1	0.00
Other:						
Total:	38	100.0 %	1.72	4	1	0.85

Moorings

Wet Slips:	40
Hoist / Drystack:	14
Seawall:	5
Beached/Blocked:	0
Trailer:	
Ramp:	2
Total:	61

Facilities

Residential:	36
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	36

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	14.45	0	0.00		
1:	11.69	1	0.00	1 :	0
2:	13.27	2	0.00	2 :	1
3:	14.65	3	0.00	3 :	5
4:	14.03	4	0.00	4 :	24
5	12.16	5	0.00	5 :	24
6	14.70	6+:	0.00	6 :	31
7	2.63			7 :	13
8	1.28			8 :	0
9+:	1.15			9+ :	1

	square feet
Water Area :	275485
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	39815
	feet
Channel Length :	2774
Shoreline Length :	6289
Average Canal Depth :	5.30
Standard Deviation :	1.84
Entrance Channel :	4

Restrictions:

	Option A	Option B
Boat count:	1	7
Channel Length (ft) :	118	719
Boats (percent of region):	0.19	0.58
Channel (percent of region) :	0.41	0.61

Required Dredge:

	Option A	Option B
Percent of total area:	0.34	0.61
Amount (cubic ft):	2370	24123

Location: Hanson Bayou Jurisdiction: Sarasota City Trafficshed : 32

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	9.1 %	1.00	1	1	0.00
Sail :	6	54.5 %	3.83	5	1	1.60
Speed :	2	18.2 %	1.00	2	0	1.41
Power :	1	9.1 %	1.00	1	1	0.00
Recreational Fish:	1	9.1 %	3.00	3	3	0.00
Commercial Fish :						
Other:						
Total:	11	100.0 %	3.00	5	1	1.70

Moorings

Wet Slips:	17
Hoist / Drystack:	5
Seawall:	6
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	28

Facilities

Residential:	17
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	17

Signage

Commercial:	
Manatee:	
Navigation:	1
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	1

Site:

	square feet
Water Area :	149755
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	17534

	feet
Channel Length :	1330
Shoreline Length :	2387
Average Canal Depth :	6.30
Standard Deviation :	1.43
Entrance Channel :	6

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	11.71	0	0.00		
1:	12.61	1	0.00	1 :	0
2:	13.64	2	0.00	2 :	0
3:	14.24	3	0.00	3 :	0
4:	18.92	4	0.00	4 :	0
5	12.58	5	0.00	5 :	22
6	11.46	6+:	0.00	6 :	50
7	4.55			7 :	13
8	0.29			8 :	7
9+:	0.00			9+ :	8

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Spring Creek (Cherokee Park) Jurisdiction: Sarasota City Trafficshed : 33

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :						
Speed :						
Power :	1	100.0 %	2.00	2	2	0.00
Recreational Fish:						
Commercial Fish :						
Other:						
Total:	1	100.0 %	2.00	2	2	0.00

Moorings

Wet Slips:	0
Hoist / Drystack:	1
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	1

Facilities

Residential:	1
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	1

Signage

Commercial:	
Manatee:	
Navigation:	3
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	3

Site:

	square feet
Water Area :	25854
Seagrass Area:	1017
Mangrove Area :	0
Tidal Area:	25854

	feet
Channel Length :	
Shoreline Length :	
Average Canal Depth :	
Standard Deviation :	
Entrance Channel :	6

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	100.00	0	100.00		
1:	0.00	1	0.00	1 :	0
2:	0.00	2	0.00	2 :	0
3:	0.00	3	0.00	3 :	0
4:	0.00	4	0.00	4 :	0
5	0.00	5	0.00	5 :	0
6	0.00	6+:	0.00	6 :	0
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:		
Channel Length (ft) :	0	0
Boats (percent of region):		
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:		
Amount (cubic ft):	0	0

Location: Cherokee Park Jurisdiction: Sarasota City Trafficshed : 34

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	1	10.0 %	1.00	1	1	0.00
Speed :	2	20.0 %	2.00	2	2	0.00
Power :						
Recreational Fish:	7	70.0 %	1.43	2	1	0.53
Commercial Fish :						
Other:						
Total:	10	100.0 %	1.50	2	1	0.53

Moorings

Wet Slips:	5
Hoist / Drystack:	14
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	19

Facilities

Residential:	14
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	14

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

	square feet
Water Area :	88703
Seagrass Area:	1087
Mangrove Area :	0
Tidal Area:	33723

	feet
Channel Length :	1036
Shoreline Length :	2235
Average Canal Depth :	2.90
Standard Deviation :	0.76
Entrance Channel :	3

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	38.02	0	26.73		
1:	23.92	1	73.27	1 :	12
2:	14.78	2	0.00	2 :	8
3:	19.74	3	0.00	3 :	58
4:	3.55	4	0.00	4 :	21
5	0.00	5	0.00	5 :	0
6	0.00	6+:	0.00	6 :	0
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	9	10
Channel Length (ft) :	123	686
Boats (percent of region):	1.69	0.82
Channel (percent of region) :	0.43	0.58

Required Dredge:

	Option A	Option B
Percent of total area:	0.35	0.58
Amount (cubic ft):	2467	19224

Location: **Blue Heron (McClellan Park)** Jurisdiction: Sarasota City Trafficshed : 35

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	1	20.0 %	2.00	2	2	0.00
Speed :	1	20.0 %	3.00	3	3	0.00
Power :	1	20.0 %	3.00	3	3	0.00
Recreational Fish:	2	40.0 %	1.00	1	1	0.00
Commercial Fish :						
Other:						
Total:	5	100.0 %	2.00	3	1	1.00

Moorings

Wet Slips:	8
Hoist / Drystack:	4
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	12

Facilities

Residential:	9
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	
Total:	9

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

	square feet
Water Area :	88219
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	16404

	feet
Channel Length :	796
Shoreline Length :	1597
Average Canal Depth :	3.00
Standard Deviation :	0.04
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	18.59	0	0.00		
1:	16.42	1	0.00	1 :	0
2:	22.09	2	0.00	2 :	0
3:	28.98	3	0.00	3 :	96
4:	13.93	4	0.00	4 :	4
5	0.00	5	0.00	5 :	0
6	0.00	6+:	0.00	6 :	0
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	2	3
Channel Length (ft) :	33	763
Boats (percent of region):	0.38	0.25
Channel (percent of region) :	0.11	0.68

Required Dredge:

	Option A	Option B
Percent of total area:	0.09	0.68
Amount (cubic ft):	656	17226

Location: Hyde Park (McClellan Park) Jurisdiction: Sarasota City Trafficshed : 36

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	3	33.3 %	1.00	1	1	0.00
Sail :	2	22.2 %	1.00	1	1	0.00
Speed :						
Power :	2	22.2 %	3.00	3	3	0.00
Recreational Fish:	2	22.2 %	1.00	1	1	0.00
Commercial Fish :						
Other:						
Total:	9	100.0 %	1.40	3	1	0.84

Moorings

Wet Slips:	7
Hoist / Drystack:	0
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	1
Total:	8

Facilities

Residential:	6
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	
Total:	6

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

	square feet
Water Area :	70093
Seagrass Area:	3584
Mangrove Area :	0
Tidal Area:	19299

	feet
Channel Length :	379
Shoreline Length :	1047
Average Canal Depth :	4.00
Standard Deviation :	0.00
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	27.53	0	9.01		
1:	0.00	1	0.00	1 :	0
2:	35.38	2	43.54	2 :	0
3:	0.00	3	0.00	3 :	0
4:	36.69	4	40.84	4 :	100
5	0.40	5	6.91	5 :	0
6	0.00	6+:	0.00	6 :	0
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	0	2
Channel Length (ft) :	0	379
Boats (percent of region):	0.00	0.16
Channel (percent of region) :	0.00	0.32

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.32
Amount (cubic ft):	0	15169

Location: Hudson Bayou/Harbor Acres Jurisdiction: Sarasota City Trafficshed: 37

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	11	5.6 %	0.91	1	0	0.30
Sail :	63	32.1 %	2.89	7	0	1.50
Speed :	32	16.3 %	2.09	3	0	0.93
Power :	37	18.9 %	2.43	5	1	1.04
Recreational Fish:	53	27.0 %	1.58	4	1	0.77
Commercial Fish :						
Other:						
Total:	196	100.0 %	2.20	7	1	1.22

Moorings

Wet Slips:	211
Hoist / Drystack:	63
Seawall:	11
Beached/Blocked:	0
Trailer:	
Ramp:	7
Total:	292

Facilities

Residential:	118
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	2
Unclassified:	3
Total:	123

Signage

Commercial:	
Manatee:	8
Navigation:	20
Piling :	1
Recreational:	
Seagrass :	
Other:	
Total Signage:	29

Site:

	square feet
Water Area :	2849019
Seagrass Area:	255152
Mangrove Area :	0
Tidal Area:	521639

	feet
Channel Length :	12711
Shoreline Length :	24176
Average Canal Depth :	5.60
Standard Deviation :	4.40
Entrance Channel :	5

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	18.31	0	45.71		
1:	5.82	1	12.31	1 :	4
2:	12.83	2	11.94	2 :	10
3:	4.36	3	7.37	3 :	3
4:	8.89	4	7.35	4 :	8
5	10.16	5	8.48	5 :	7
6	13.70	6+:	6.83	6 :	27
7	14.13			7 :	28
8	6.86			8 :	8
9+:	4.95			9+ :	3

Restrictions:

	Option A	Option B
Boat count:	26	54
Channel Length (ft) :	1745	6819
Boats (percent of region):	4.89	4.45
Channel (percent of region) :	6.08	5.79

Required Dredge:

	Option A	Option B
Percent of total area:	5.87	5.79
Amount (cubic ft):	40918	254852

Location: **Marina Jacks/Island Park** Jurisdiction: Sarasota City Trafficshed : 38

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	12	3.9 %	1.08	2	1	0.29
Sail :	153	49.8 %	3.84	7	1	1.39
Speed :	14	4.6 %	1.00	3	0	1.04
Power :	71	23.1 %	3.35	6	2	0.78
Recreational Fish:	27	8.8 %	2.56	5	1	1.05
Commercial Fish :	14	4.6 %	3.36	8	2	1.55
Other:	16	5.2 %	2.44	4	0	0.96
Total:	307	100.0 %	2.79	8	1	1.55

Moorings

Wet Slips:	233
Hoist / Drystack:	0
Seawall:	
Beached/Blocked:	60
Trailer:	
Ramp:	
Total:	302

Facilities

Residential:	3
Marina/Yard/Club :	1
Motel/Restaurant/Shop:	1
Anchorage:	1
Other	
Unclassified:	
Total:	6

Signage

Commercial:	
Manatee:	1
Navigation:	4
Piling :	1
Recreational:	7
Seagrass :	
Other:	
Total Signage:	13

Site:

	square feet
Water Area :	6452937
Seagrass Area:	39604
Mangrove Area :	0
Tidal Area:	100382
	feet
Channel Length :	7325
Shoreline Length :	8948
Average Canal Depth :	9.71
Standard Deviation :	1.58
Entrance Channel :	7

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	1.56	0	0.00		
1:	1.24	1	3.05	1 :	0
2:	1.35	2	9.57	2 :	0
3:	2.29	3	39.13	3 :	0
4:	3.97	4	25.12	4 :	0
5	5.26	5	16.35	5 :	0
6	5.09	6+:	6.77	6 :	0
7	9.41			7 :	12
8	25.44			8 :	19
9+:	44.38			9+ :	69

Restrictions:

	Option A	Option B
Boat count:		0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Quay Jurisdiction: Sarasota City Trafficshed : 39

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	14	33.3 %	3.57	5	2	1.09
Speed :	7	16.7 %	1.00	3	0	1.29
Power :	12	28.6 %	3.25	5	2	1.06
Recreational Fish:	8	19.0 %	2.12	4	1	1.13
Commercial Fish :						
Other:	1	2.4 %	3.00	3	3	0.00
Total:	42	100.0 %	2.79	5	1	1.24

Moorings

Wet Slips:	117
Hoist / Drystack:	1
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	118

Facilities

Residential:	2
Marina/Yard/Club :	
Motel/Restaurant/Shop:	1
Anchorage:	
Other	2
Unclassified:	
Total:	5

Signage

Commercial:	6
Manatee:	4
Navigation:	2
Piling :	
Recreational:	
Seagrass :	
Other:	2
Total Signage:	14

Site:

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	7.67	0	0.00		
1:	4.76	1	0.00	1 :	0
2:	6.79	2	0.00	2 :	0
3:	2.16	3	0.00	3 :	0
4:	3.67	4	0.00	4 :	0
5	10.93	5	0.00	5 :	0
6	42.67	6+:	0.00	6 :	0
7	7.86			7 :	17
8	11.10			8 :	64
9+:	2.39			9+ :	19

	square feet
Water Area :	922025
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	70760
	feet
Channel Length :	1437
Shoreline Length :	3480
Average Canal Depth :	8.10
Standard Deviation :	0.47
Entrance Channel :	7

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Library Channel Jurisdiction: Sarasota City Trafficshed : 40

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :						
Speed :						
Power :						
Recreational Fish:	1	100.0 %	1.00	1	1	0.00
Commercial Fish :						
Other:						
Total:	1	100.0 %	1.00	1	1	0.00

Moorings

Wet Slips:	0
Hoist / Drystack:	0
Seawall:	2
Beached/Blocked:	0
Trailer:	
Ramp:	2
Total:	4

Facilities

Residential:	
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	1
Unclassified:	
Total:	1

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	

Site:

	square feet
Water Area :	105118
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	51547
	feet
Channel Length :	934
Shoreline Length :	1852
Average Canal Depth :	3.60
Standard Deviation :	0.38
Entrance Channel :	3

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	49.04	0	0.00		
1:	0.00	1	0.00	1 :	0
2:	34.53	2	0.00	2 :	0
3:	0.00	3	0.00	3 :	50
4:	8.83	4	0.00	4 :	45
5	7.60	5	0.00	5 :	4
6	0.00	6+:	0.00	6 :	1
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Centennial Park Jurisdiction: Sarasota City Trafficshed : 41

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :						
Speed :						
Power :						
Recreational Fish:						
Commercial Fish :						
Other:	2	100.0 %	3.00	3	3	0.00
Total:	2	100.0 %	3.00	3	3	0.00

Moorings

Wet Slips:	3
Hoist / Drystack:	0
Seawall:	6
Beached/Blocked:	0
Trailer:	
Ramp:	3
Total:	12

Facilities

Residential:	
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	3
Unclassified:	
Total:	3

Signage

Commercial:	
Manatee:	1
Navigation:	3
Piling :	
Recreational:	5
Seagrass :	
Other:	
Total Signage:	9

Site:

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	5.81	0	0.00		
1:	4.41	1	0.00	1 :	0
2:	4.31	2	0.00	2 :	0
3:	4.74	3	0.00	3 :	0
4:	5.39	4	0.00	4 :	0
5	11.41	5	0.00	5 :	21
6	14.18	6+:	0.00	6 :	58
7	8.14			7 :	5
8	5.58			8 :	5
9+:	36.03			9+ :	13

	square feet
Water Area :	378030
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	21979
	feet
Channel Length :	766
Shoreline Length :	1848
Average Canal Depth :	6.40
Standard Deviation :	1.95
Entrance Channel :	6

Restrictions:

	Option A	Option B
Boat count:	0	0
Channel Length (ft) :	0	0
Boats (percent of region):	0.00	0.00
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.00
Amount (cubic ft):	0	0

Location: Whitaker Bayou Jurisdiction: Sarasota City Trafficshed : 42

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	5	4.3 %	1.00	1	1	0.00
Sail :	30	25.6 %	2.90	5	1	1.16
Speed :	11	9.4 %	2.73	3	1	0.65
Power :	34	29.1 %	2.71	4	1	0.68
Recreational Fish:	34	29.1 %	2.15	5	1	1.02
Commercial Fish :	2	1.7 %	2.50	3	2	0.71
Other:	1	0.9 %	2.00	2	2	0.00
Total:	117	100.0 %	2.42	5	1	1.03

Moorings

Wet Slips:	112
Hoist / Drystack:	6
Seawall:	16
Beached/Blocked:	14
Trailer:	2
Ramp:	4
Total:	154

Facilities

Residential:	39
Marina/Yard/Club :	2
Motel/Restaurant/Shop:	
Anchorage:	
Other	0
Unclassified:	1
Total:	42

Signage

Commercial:	
Manatee:	2
Navigation:	11
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	13

Site:

	square feet
Water Area :	550851
Seagrass Area:	202981
Mangrove Area :	0
Tidal Area:	177697

	feet
Channel Length :	4446
Shoreline Length :	10371
Average Canal Depth :	4.10
Standard Deviation :	1.16
Entrance Channel :	4

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	32.26	0	36.94		
1:	14.10	1	13.24	1 :	2
2:	11.93	2	13.98	2 :	8
3:	22.09	3	14.60	3 :	6
4:	7.40	4	15.07	4 :	53
5	9.35	5	5.01	5 :	25
6	1.82	6+:	1.16	6 :	5
7	0.79			7 :	2
8	0.28			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	20	70
Channel Length (ft) :	982	2924
Boats (percent of region):	3.76	5.77
Channel (percent of region) :	3.42	2.48

Required Dredge:

	Option A	Option B
Percent of total area:	2.82	2.48
Amount (cubic ft):	19632	119491

Location: **Bowlees Creek** Jurisdiction: Manatee County Trafficshed : 44

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	16	6.2 %	0.75	1	0	0.45
Sail :	64	24.8 %	3.59	6	1	1.28
Speed :	27	10.5 %	2.00	3	0	0.83
Power :	84	32.6 %	3.19	6	2	0.91
Recreational Fish:	60	23.3 %	1.68	3	1	0.65
Commercial Fish :	1	0.4 %	2.00	2	2	0.00
Other:	6	2.3 %	2.67	3	2	0.52
Total:	258	100.0 %	2.45	6	1	1.30

Moorings

Wet Slips:	242
Hoist / Drystack:	65
Seawall:	18
Beached/Blocked:	9
Trailer:	23
Ramp:	6
Total:	363

Facilities

Residential:	107
Marina/Yard/Club :	3
Motel/Restaurant/Shop:	
Anchorage:	
Other	1
Unclassified:	3
Total:	114

Signage

Commercial:	3
Manatee:	1
Navigation:	11
Piling :	1
Recreational:	
Seagrass :	
Other:	
Total Signage:	16

Site:

	square feet
Water Area :	2584815
Seagrass Area:	180819
Mangrove Area :	125047
Tidal Area:	904846

	feet
Channel Length :	28116
Shoreline Length :	32997
Average Canal Depth :	4.70
Standard Deviation :	1.52
Entrance Channel :	5

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	35.01	0	1.35		
1:	5.13	1	6.60	1 :	1
2:	9.09	2	9.24	2 :	4
3:	10.64	3	22.44	3 :	9
4:	11.40	4	24.88	4 :	30
5	13.44	5	23.74	5 :	33
6	12.69	6+:	11.76	6 :	16
7	2.41			7 :	7
8	0.18			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	64	138
Channel Length (ft) :	4745	20163
Boats (percent of region):	12.03	11.37
Channel (percent of region) :	16.55	17.11

Required Dredge:

	Option A	Option B
Percent of total area:	14.39	17.11
Amount (cubic ft):	100301	727222

Location: **Trailer Estates East** Jurisdiction: Manatee County Trafficshed : 45

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	2	4.2 %	0.50	1	0	0.71
Sail :	6	12.5 %	3.50	5	2	1.05
Speed :	8	16.7 %	2.12	3	2	0.35
Power :	9	18.8 %	3.00	4	2	0.50
Recreational Fish:	23	47.9 %	1.70	3	1	0.56
Commercial Fish :						
Other:						
Total:	48	100.0 %	2.18	5	1	0.93

Moorings

Wet Slips:	56
Hoist / Drystack:	11
Seawall:	11
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	78

Facilities

Residential:	45
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	
Total:	45

Signage

Commercial:	
Manatee:	
Navigation:	6
Piling :	2
Recreational:	
Seagrass :	
Other:	
Total Signage:	8

Site:

	square feet
Water Area :	823129
Seagrass Area:	107454
Mangrove Area :	857
Tidal Area:	134126

	feet
Channel Length :	6256
Shoreline Length :	7061
Average Canal Depth :	3.90
Standard Deviation :	1.67
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	16.30	0	16.03		
1:	17.22	1	30.60	1 :	5
2:	19.36	2	39.10	2 :	15
3:	9.93	3	7.41	3 :	13
4:	18.37	4	3.97	4 :	32
5	14.02	5	2.99	5 :	29
6	4.80	6+:	0.00	6 :	7
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	22	38
Channel Length (ft) :	1281	5500
Boats (percent of region):	4.14	3.13
Channel (percent of region) :	4.47	4.67

Required Dredge:

	Option A	Option B
Percent of total area:	4.02	4.67
Amount (cubic ft):	27979	213405

Location: **Trailer Estates West** Jurisdiction: **Manatee County** Trafficshed : **46**

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	10	3.0 %	0.80	1	0	0.42
Sail :	94	27.9 %	3.10	5	1	1.12
Speed :	73	21.7 %	1.99	3	0	0.61
Power :	50	14.8 %	2.78	5	1	0.65
Recreational Fish:	103	30.6 %	1.80	3	1	0.66
Commercial Fish :	3	0.9 %	2.00	2	2	0.00
Other:	4	1.2 %	2.00	2	2	0.00
Total:	337	100.0 %	2.29	5	1	1.00

Moorings

Wet Slips:	367
Hoist / Drystack:	45
Seawall:	24
Beached/Blocked:	8
Trailer:	44
Ramp:	2
Total:	490

Facilities

Residential:	122
Marina/Yard/Club :	3
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	1
Total:	126

Signage

Commercial:	2
Manatee:	5
Navigation:	8
Piling :	4
Recreational:	
Seagrass :	
Other:	1
Total Signage:	20

Site:

	square feet
Water Area :	2038527
Seagrass Area:	321069
Mangrove Area :	3821
Tidal Area:	689078

	feet
Channel Length :	10196
Shoreline Length :	17904
Average Canal Depth :	4.00
Standard Deviation :	1.25
Entrance Channel :	4

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	33.80	0	5.48		
1:	9.85	1	16.04	1 :	3
2:	13.82	2	28.56	2 :	6
3:	17.40	3	38.83	3 :	18
4:	9.43	4	5.46	4 :	39
5	10.73	5	4.44	5 :	27
6	4.97	6+:	1.19	6 :	7
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	69	171
Channel Length (ft) :	3606	9040
Boats (percent of region):	12.97	14.09
Channel (percent of region) :	12.57	7.76

Required Dredge:

	Option A	Option B
Percent of total area:	11.32	7.76
Amount (cubic ft):	78857	410221

Location: Mt. Vernon/Coral Shores Jurisdiction: Manatee County Trafficshed : 47

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	16	6.5 %	0.25	1	0	0.45
Sail :	25	10.1 %	2.60	5	1	1.29
Speed :	71	28.6 %	1.82	3	0	0.68
Power :	33	13.3 %	2.24	3	1	0.56
Recreational Fish:	101	40.7 %	1.42	3	1	0.59
Commercial Fish :	1	0.4 %	4.00	4	4	0.00
Other:	1	0.4 %	1.00	1	1	0.00
Total:	248	100.0 %	1.78	5	1	0.80

Moorings

Wet Slips:	295
Hoist / Drystack:	156
Seawall:	4
Beached/Blocked:	0
Trailer:	
Ramp:	2
Total:	457

Facilities

Residential:	281
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	1
Unclassified:	
Total:	282

Signage

Commercial:	
Manatee:	
Navigation:	33
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	33

Site:

	square feet
Water Area :	2074047
Seagrass Area:	124891
Mangrove Area :	797908
Tidal Area:	778341

	feet
Channel Length :	18533
Shoreline Length :	32089
Average Canal Depth :	4.10
Standard Deviation :	0.28
Entrance Channel :	3

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	37.53	0	4.57		
1:	17.24	1	13.13	1 :	0
2:	9.63	2	7.62	2 :	0
3:	9.55	3	31.48	3 :	9
4:	15.96	4	22.23	4 :	75
5	7.73	5	18.89	5 :	16
6	2.36	6+:	2.08	6 :	1
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	35	143
Channel Length (ft) :	7210	15685
Boats (percent of region):	6.58	11.78
Channel (percent of region) :	25.14	13.31

Required Dredge:

	Option A	Option B
Percent of total area:	23.48	13.31
Amount (cubic ft):	163646	698243

Location: Paradise Bay Jurisdiction: Manatee County Trafficshed : 48

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	2	2.2 %	0.50	1	0	0.71
Sail :	4	4.5 %	2.00	3	1	0.82
Speed :	27	30.3 %	1.74	3	1	0.53
Power :	3	3.4 %	2.67	3	2	0.58
Recreational Fish:	50	56.2 %	1.50	3	1	0.61
Commercial Fish :	2	2.2 %	1.00	1	1	0.00
Other:	1	1.1 %	2.00	2	2	0.00
Total:	89	100.0 %	1.63	3	1	0.63

Moorings

Wet Slips:	133
Hoist / Drystack:	4
Seawall:	3
Beached/Blocked:	0
Trailer:	
Ramp:	3
Total:	143

Facilities

Residential:	14
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	14

Signage

Commercial:	
Manatee:	
Navigation:	9
Piling :	1
Recreational:	
Seagrass :	
Other:	1
Total Signage:	11

Site:

	square feet
Water Area :	1456623
Seagrass Area:	433969
Mangrove Area :	87653
Tidal Area:	354791

	feet
Channel Length :	8414
Shoreline Length :	7590
Average Canal Depth :	4.10
Standard Deviation :	2.48
Entrance Channel :	3

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	24.36	0	42.80		
1:	11.46	1	7.09	1 :	0
2:	16.90	2	11.55	2 :	11
3:	22.38	3	17.09	3 :	29
4:	15.53	4	20.17	4 :	36
5	3.18	5	0.88	5 :	7
6	2.79	6+:	.41	6 :	5
7	2.47			7 :	7
8	0.93			8 :	5
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	8	54
Channel Length (ft) :	836	6134
Boats (percent of region):	1.50	4.45
Channel (percent of region) :	2.91	5.21

Required Dredge:

	Option A	Option B
Percent of total area:	2.40	5.21
Amount (cubic ft):	16719	201702

Location: Cortez Jurisdiction: Manatee County Trafficshed : 49

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	0.5 %	1.00	1	1	0.00
Sail :						
Speed :	1	0.5 %	2.00	2	2	0.00
Power :						
Recreational Fish:	1	0.5 %	2.00	2	2	0.00
Commercial Fish :	177	93.2 %	1.53	9	0	1.83
Other:	10	5.3 %	1.50	4	0	1.08
Total:	190	100.0 %	1.90	9	1	1.79

Moorings

Wet Slips:	182
Hoist / Drystack:	3
Seawall:	
Beached/Blocked:	11
Trailer:	1
Ramp:	
Total:	197

Facilities

Residential:	3
Marina/Yard/Club :	
Motel/Restaurant/Shop:	1
Anchorage:	
Other	6
Unclassified:	
Total:	10

Signage

Commercial:	1
Manatee:	
Navigation:	7
Piling :	11
Recreational:	
Seagrass :	
Other:	
Total Signage:	19

Site:

	square feet
Water Area :	881080
Seagrass Area:	287852
Mangrove Area :	0
Tidal Area:	103729
	feet
Channel Length :	1637
Shoreline Length :	4582
Average Canal Depth :	7.30
Standard Deviation :	4.81
Entrance Channel :	7

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	11.77	0	14.19		
1:	7.48	1	8.90	1 :	0
2:	7.46	2	8.69	2 :	0
3:	9.52	3	11.86	3 :	0
4:	12.23	4	15.54	4 :	12
5	13.42	5	15.12	5 :	7
6	10.39	6+:	25.69	6 :	31
7	5.51			7 :	7
8	4.34			8 :	8
9+:	17.88			9+ :	35

Restrictions:

	Option A	Option B
Boat count:	10	12
Channel Length (ft) :	93	520
Boats (percent of region):	1.88	0.99
Channel (percent of region) :	0.32	0.44

Required Dredge:

	Option A	Option B
Percent of total area:	0.27	0.44
Amount (cubic ft):	1850	19680

Location: Mallard Lane (McClellan Park) Jurisdiction: Sarasota City Trafficshed : 50

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	11.1 %	1.00	1	1	0.00
Sail :	1	11.1 %	1.00	1	1	0.00
Speed :						
Power :	2	22.2 %	2.00	3	1	1.41
Recreational Fish:	5	55.6 %	1.80	3	1	1.10
Commercial Fish :						
Other:						
Total:	9	100.0 %	1.80	3	1	0.97

Moorings

Wet Slips:	4
Hoist / Drystack:	5
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	9

Facilities

Residential:	6
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	6

Signage

Commercial:	
Manatee:	
Navigation:	2
Piling :	4
Recreational:	
Seagrass :	
Other:	
Total Signage:	6

Site:

	square feet
Water Area :	42409
Seagrass Area:	42409
Mangrove Area :	0
Tidal Area:	21947

	feet
Channel Length :	376
Shoreline Length :	1034
Average Canal Depth :	4.20
Standard Deviation :	0.77
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	51.74	0	51.75		
1:	0.33	1	0.33	1 :	0
2:	21.68	2	21.68	2 :	0
3:	0.16	3	0.15	3 :	31
4:	26.08	4	26.09	4 :	20
5	0.01	5	0.00	5 :	49
6	0.00	6+:	0.00	6 :	0
7	0.00			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	3	3
Channel Length (ft) :	0	190
Boats (percent of region):	0.56	0.25
Channel (percent of region) :	0.00	0.16

Required Dredge:

	Option A	Option B
Percent of total area:	0.00	0.16
Amount (cubic ft):	0	6108

Location: Putting Green Jurisdiction: Longboat Key Traffic shed : 52

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	1	7.1 %	1.00	1	1	0.00
Sail :	4	28.6 %	3.75	5	2	1.26
Speed :	1	7.1 %	1.00	1	1	0.00
Power :	3	21.4 %	2.33	3	2	0.58
Recreational Fish:	5	35.7 %	1.20	2	1	0.45
Commercial Fish :						
Other:						
Total:	14	100.0 %	2.07	5	1	1.33

Moorings

Wet Slips:	18
Hoist / Drystack:	9
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	27

Facilities

Residential:	19
Marina/Yard/Club :	
Motel/Restaurant/Shop	
Anchorage:	
Other	
Unclassified:	
Total:	19

Signage

Commercial:	
Manatee:	
Navigation:	
Piling :	1
Recreational:	
Seagrass :	
Other:	
Total Signage:	1

Site:

	square feet
Water Area :	69686
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	11636

	feet
Channel Length :	1051
Shoreline Length :	423
Average Canal Depth :	5.30
Standard Deviation :	0.30
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	16.76	0	0.00		
1:	10.50	1	0.00	1 :	0
2:	12.35	2	0.00	2 :	0
3:	14.22	3	0.00	3 :	0
4:	15.78	4	0.00	4 :	5
5	16.30	5	0.00	5 :	64
6	9.45	6+:	0.00	6 :	31
7	4.65			7 :	0
8	0.00			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	3	4
Channel Length (ft) :	55	1051
Boats (percent of region):	0.56	0.33
Channel (percent of region) :	0.19	0.89

Required Dredge:

	Option A	Option B
Percent of total area:	0.16	0.89
Amount (cubic ft):	1109	36633

Location: Yardam Jurisdiction: Longboat Key Trafficshed : 53

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :						
Sail :	4	80.0 %	3.50	5	1	1.73
Speed :						
Power :						
Recreational Fish:	1	20.0 %	1.00	1	1	0.00
Commercial Fish :						
Other:						
Total:	5	100.0 %	3.00	5	1	1.87

Moorings

Wet Slips:	14
Hoist / Drystack:	4
Seawall:	
Beached/Blocked:	0
Trailer:	
Ramp:	
Total:	18

Facilities

Residential:	15
Marina/Yard/Club :	
Motel/Restaurant/Shop:	
Anchorage:	
Other	
Unclassified:	
Total:	15

Signage

Commercial:	
Manatee:	
Navigation:	1
Piling :	
Recreational:	
Seagrass :	
Other:	
Total Signage:	1

Site:

	square feet
Water Area :	76648
Seagrass Area:	0
Mangrove Area :	0
Tidal Area:	15984

	feet
Channel Length :	1090
Shoreline Length :	2163
Average Canal Depth :	5.70
Standard Deviation :	1.09
Entrance Channel :	4

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	20.85	0	0.00		
1:	8.66	1	0.00	1 :	0
2:	11.23	2	0.00	2 :	0
3:	13.30	3	0.00	3 :	3
4:	14.37	4	0.00	4 :	13
5	12.76	5	0.00	5 :	17
6	9.38	6+:	0.00	6 :	46
7	7.72			7 :	20
8	1.74			8 :	0
9+:	0.00			9+ :	0

Restrictions:

	Option A	Option B
Boat count:	3	3
Channel Length (ft) :	181	379
Boats (percent of region):	0.56	0.25
Channel (percent of region) :	0.63	0.32

Required Dredge:

	Option A	Option B
Percent of total area:	0.62	0.11
Amount (cubic ft):	4324	17513

Location: Open Bay Jurisdiction: All Trafficshed : 0

Boats
(excluding dinghies)

	Number	Percent	Draft (ft.) Average	Max	Min	Std. Dev.
Row :	12	8.0 %	1.00	1	1	0.00
Sail :	50	33.3 %	2.06	5	1	1.27
Speed :	27	18.0 %	1.74	3	0	0.70
Power :	13	8.7 %	2.38	3	0	0.67
Recreational Fish:	40	26.7 %	1.55	4	1	0.75
Commercial Fish :	4	2.7 %	2.50	5	1	1.73
Other:	4	2.7 %	3.25	5	2	1.26
Total:	150	100.0 %	1.94	5	1	1.09

Moorings

Wet Slips:	148
Hoist / Drystack:	47
Seawall:	1
Beached/Blocked:	4
Trailer:	2
Ramp:	9
Total:	211

Facilities

Residential:	95
Marina/Yard/Club :	2
Motel/Restaurant/Shop:	
Anchorage:	2
Other	5
Unclassified:	2
Total:	106

Signage

Commercial:	17
Manatee:	26
Navigation:	280
Piling :	37
Recreational:	34
Seagrass :	24
Other:	11
Total Signage:	429

Site:

	square feet
Water Area :	906276504
Seagrass Area:	232953676
Mangrove Area :	32539928
Tidal Area:	58873208

	feet
Channel Length :	158674
Shoreline Length :	273736
Average Canal Depth :	9.89
Standard Deviation :	4.44
Entrance Channel :	

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	6.50	0	12.81		
1:	11.17	1	39.32	1 :	0
2:	5.33	2	16.63	2 :	0
3:	4.85	3	11.23	3 :	1
4:	7.04	4	11.97	4 :	3
5	7.75	5	5.74	5 :	6
6	8.04	6+:	2.29	6 :	7
7	8.06			7 :	7
8	9.39			8 :	13
9+:	31.86			9+ :	63

Restrictions:

	Option A	Option B
Boat count:	1	
Channel Length (ft) :	0	0
Boats (percent of region):		
Channel (percent of region) :	0.00	0.00

Required Dredge:

	Option A	Option B
Percent of total area:		
Amount (cubic ft):	0	0

Location: **Combined Trafficsheds** Jurisdiction: All Trafficshed : 88

Boats
(excluding dinghies)

	Number	Percent	Draft (ft) Average	Max	Min	Std. Dev.
Row :	167	3.8 %	1.03	2	1	0.34
Sail :	1198	27.2 %	2.89	7	1	1.48
Speed :	693	15.7 %	2.15	3	1	0.67
Power :	934	21.2 %	2.88	6	1	0.88
Recreational Fish:	1125	25.6 %	1.89	5	1	0.78
Commercial Fish :	207	4.7 %	2.07	9	1	1.80
Other:	78	1.8 %	2.29	6	1	0.96
Total:	4402	100.0 %	104.47			

Moorings

Wet Slips:	4375
Hoist / Drystack:	1468
Seawall:	201
Beached/Blocked:	401
Trailer:	329
Ramp:	64
Total:	6847

Facilities

Residential:	2072
Marina/Yard/Club :	20
Motel/Restaurant/Shop	12
Anchorage:	5
Other	43
Unclassified:	39
Total:	2191

Signage

Commercial:	46
Manatee:	62
Navigation:	321
Piling :	55
Recreational:	37
Seagrass :	0
Other:	18
Total Signage:	539

Site:

	square feet
Water Area :	79209596
Seagrass Area:	11692791
Mangrove Area :	4847969
Tidal Area:	21882177
	feet
Channel Length :	279992
Shoreline Length :	455294
Average Canal Depth :	6.54
Standard Deviation :	2.92
Entrance Channel :	

Water Area Feet	Water Area Percent	Seagrass Area Feet	Seagrass Area Percent	Canal Depth Feet	Canal Depth Percent
0:	27.52	0	37.12		
1:	5.33	1	10.50	1 :	1
2:	7.00	2	13.27	2 :	4
3:	6.61	3	12.47	3 :	7
4:	7.67	4	11.16	4 :	19
5	6.64	5	6.11	5 :	18
6	7.28	6+:	9.38	6 :	17
7	6.37			7 :	12
8	6.11			8 :	5
9+:	19.47			9+ :	17

Restrictions:

	Option A	Option B
Boat count:	532	1213
Channel Length (ft) :	28680	117829
Boats (percent of region):	100.02	99.75
Channel (percent of region) :	99.96	99.99

Required Dredge:

	Option A	Option B
Percent of total area:	99.99	99.78
Amount (cubic ft):	696817	4353204

Location: Study Area Jurisdiction: All Trafficshed : 99

Boats
(excluding dinghies)

	Number	Percent	Draft (ft) Average	Max	Min	Std. Dev.
Row :	179	3.9 %	1.01	2	1	0.09
Sail :	1248	27.4 %	2.93	7	1	1.48
Speed :	720	15.8 %	2.15	3	1	0.67
Power :	947	20.8 %	2.89	6	1	0.88
Recreational Fish:	1165	25.6 %	1.70	5	1	0.78
Commercial Fish :	211	4.6 %	2.06	9	1	1.80
Other:	82	1.8 %	2.24	6	1	0.93
Total:	4552	100.0 %	98.73			

Moorings

Wet Slips:	4523
Hoist / Drystack:	1515
Seawall:	202
Beached/Blocked:	405
Trailer:	331
Ramp:	73
Total:	7058

Facilities

Residential:	2167
Marina/Yard/Club :	22
Motel/Restaurant/Shop:	12
Anchorage:	7
Other	48
Unclassified:	41
Total:	2297

Signage

Commercial:	63
Manatee:	88
Navigation:	601
Piling :	92
Recreational:	71
Seagrass :	24
Other:	29
Total Signage:	968

Site:

	square feet
Water Area :	985486100
Seagrass Area:	244646467
Mangrove Area :	37387897
Tidal Area:	80755385

	feet
Channel Length :	437424
Shoreline Length :	729030
Average Canal Depth :	6.56
Standard Deviation :	4.50
Entrance Channel :	

Water Area Feet	Percent	Seagrass Area Feet	Percent	Canal Depth Feet	Percent
0:	8.20	0	13.99		
1:	10.70	1	37.92	1 :	3
2:	5.46	2	16.49	2 :	4
3:	4.99	3	11.29	3 :	5
4:	7.09	4	11.93	4 :	9
5	7.66	5	5.75	5 :	12
6	7.98	6+:	2.64	6 :	12
7	7.93			7 :	9
8	9.12			8 :	8
9+:	30.87			9+ :	61

Restrictions:

	Option A	Option B
Boat count:	533	1213
Channel Length (ft) :	28680	117829
Boats (percent of region):	100.02	99.75
Channel (percent of region) :	99.98	99.99

Required Dredge:

	Option A	Option B
Percent of total area:	99.99	99.78
Amount (cubic ft):	696817	4353204

Appendix 2

Boat and Facility Census Data Forms

FLORIDA SEA GRANT COLLEGE

Building 803, IFAS 0341, University of Florida, Gainesville 32611 - 0341
(904) 392-5870 Suncom 622-5870

SARASOTA BAY BOAT TRAFFIC PROJECT
BOAT CENSUS

IDENTIFICATION

Date _____ Time _____
Boat ID _____ Facility ID _____ Trafficshed ID _____
Aerial ID _____
Vessel Name _____ Hailing Port _____
State Reg. No. _____ Segment ID _____
Manufacturer (Model) _____
Boat Photograph Roll No. ____ Print(s)/Slide(s) _____

CHARACTERISTICS

Length (ft.)
___ <16
___ 16-25
___ 26-39
___ 40-65
___ >65

Draft (ft.) ____

Estimated Age
1990+ ____
1980-89 ____
=<1979 ____

Derelict Vessel (Y/N) ____
Condition (I/PBU/W) ____
Beached (Y/N) ____
Afloat (Y/N) ____
Submerged (%) ____

USE

___ Recreational
___ Mother
___ Residential
___ Mother ID
___ Commercial
___ Satellite
___ Government

TYPE

____ Dinghy
____ Power Type (Lo/Hi)
____ Sail
____ Row
____ In Water
____ Row, Canoe, Kayak
____ Sailboard
____ Daysailer
____ Racing
____ Cruising
____ Speed (Runabout)
____ Bass, John, Skiff, Utility (Open)
____ Sportsfisherman
____ Power Cabin
____ Power Trawler
____ Power Houseboat
____ Floatboat
____ Personal Watercraft

____ Ferry (Taxi)
____ Dredge
____ Tug
____ Barge
____ Cargo
____ Fishing
____ Head
____ Bay
____ Gulf
____ Bay/Gulf
____ Salvage
____ Safety/Law Enforcement
____ Survey
____ Floating Home (Office)
____ Pilot
____ Excursion
____ Research
____ Other (Specify)
____ _____

RENTAL ___ (Y/N) **FOR SALE** ___ (Y/N) Broker _____
Phone _____

Florida A&M University, Florida Atlantic University, Florida Institute of Technology, Florida International University, Florida State University, University of Central Florida, University of Florida, University of Miami, University of North Florida, University of South Florida, University of West Florida.

The State University System of Florida is an Equal Opportunity Affirmative Action Employer.

SARASOTA BAY BOAT TRAFFIC PROJECT
FACILITY CENSUS

SEA GRANT

IDENTIFICATION

Date _____ Time _____
Facility ID _____ Trafficshed ID _____
Aerial ID _____ Segment ID _____
Name _____
Address _____ Telephone _____
Facility Photograph Roll No. _____ Print(s)/Slide(s) _____

ACCESSIBILITY

Marked Entrance Channel (Y/N) _____

Entrance Channel Contrl. Depth
_____ Observed (ft.)
_____ Date
_____ Time
_____ Wind Dir.
_____ Wind Vel.
_____ Corrected (ft./mlw)

Dockside Contrl. Depth
_____ Observed (ft.)
_____ Date
_____ Time
_____ Wind Dir.
_____ Wind Vel.
_____ Corrected (ft./mlw)

FACILITY TYPE (may be more than one category)

_____ Single-Family
_____ Multi-Family
_____ Club
_____ Marina
_____ Yard
_____ High-Dry
_____ Restaurant/Shopping
_____ Motel/Hotel
_____ Anchorage
_____ Industrial
_____ Government — Private Research — Town
_____ Charter
_____ Brokerage
_____ Ramp (motorized craft)
_____ Ramp (non-motorized craft)
_____ ~~Other~~ (Specify)
Bait + Tackle

PERMANENT BERTH CHARACTERISTICS

Type	Size	Number	Status	Condition

TYPE: In Water - **Seawall, Dock, Pier, Alongside Vessel** (indicate if mooring whips used); On Land - **Beached, Blocked, Hoist**(davits), **Hi-Dri, Trailer.**
NUMBER (numerical count). **SIZE** (boat length class [ft.]): 1 (<16), 2 (16-25), 3 (26-39), 4 (40-65), 5 (=>65). **STATUS**: **Y** (occupied), **N** (unoccupied).
CONDITION: **Y** (useable), **N** (unuseable).

FLORIDA SEA GRANT COLLEGE
Building 803, IFAS 0341, University of Florida, Gainesville 32611 - 0341
(904) 392-5870 Suncom 622-5870

TRANSIENT BERTH CHARACTERISTICS

Type	Size	Number	Status	Condition

TYPE: In Water - **Seawall, Dock, Pier, Alongside Vessel** (indicate if mooring whips used); On Land - **Beached Blocked, Hoist** (davits), **Hi-Dri, Trailer.** **NUMBER** (numerical count). **SIZE** (boat length class [ft.]): 1 (<16), 2 (16-25), 3 (26-39), 4 (40-65), 5 (=>65). **STATUS:** Y (occupied), N (unoccupied). **CONDITION:** Y (useable), N (unuseable).

ANCHORAGE CHARACTERISTICS

Type	Size	Number

TYPE: P (permanent), T (transient). **NUMBER** (numerical count). **SIZE** (boat length class [ft.]): 1 (<16), 2 (16-25), 3 (26-39), 4 (40-65), 5 (=>65).

OTHER BOAT SERVICES

_____ Water
_____ Shorepower
_____ 110v _____ 220v
_____ Telephone
_____ Fuel
_____ Gas
_____ Diesel
_____ Haulout
_____ Lift Cap. (tn.)
_____ Forklift
_____ Engine Repair
_____ Hull Repair
_____ Marine Supplies
_____ Groceries
_____ Dealership (Specify)

_____ Ice
_____ Bottled Gas
_____ Pumpout
_____ Showers
_____ Laundry
_____ Restaurant
_____ Snacks
_____ Radio Watch
_____ Launching Ramp
_____ Paved (Y/N)
_____ Empty Trailers in Lot (No.)
_____ Parking Lot
_____ Spaces

Appendix 3

Trafficshed Class Listings by Location and Land Use

Appendix 3. Trafficshed class listings by location and land use

1. Finger canal or basin with one access channel
   - A. Mainland
     - a. Residential Use
       - 33 Spring Creek
       - 34 Cherokee Park
       - 35 Blue Heron
       - 50 Mallard Lane
       - 36 Hyde Park
     - b. Residential/Commercial/Public/Other
       - 39 Quay
       - 40 Library
       - 41 Centennial Park
       - 43 Stephens Point
   - B. Barrier Island
     - a. Residential
       - 32 Hanson Bayou
       - 20 Halyard
       - 19 Ranger
       - 16 Bowsprit
       - 53 Yardam
       - 52 Putting Green
       - 15 Birdie
       - 14 Wedge
       - 13 Chipping
       - 12 Golf Links
       - 7 Gulf Bay Basin
     - b. Residential/Commercial/Public/Other
       - 27 Sarasota Yacht Club
       - 22 New Pass Lagoon (soft shoreline)

2. Multiple finger canals and/or basins with one or more access channel(s)
   - A. Mainland
     - a. Residential Use
       - 47 Mt. Vernon/Coral Shores
     - b. Residential/Commercial/Public/Other
       - 38 Marina Jacks/Island Park
   - B. Barrier Island
     - a. Residential
       - 4 Whitney Beach South

5 General Harris
8 Tarawitt

b. Residential/Commercial/Public/Other
6 Emerald Harbour

C. Mid-Bay Island
a. 30 Bird Key

3. Shoreline channel with one or more access channel(s)

A. Mainland
a. Residential
48 Paradise Bay
b. Residential/Commercial/Public/Other
49 Cortez

B. Barrier Island
a. Residential
51 *missing name and data sheet*
9 No Name
b. Residential/Commercial/Public/Other
1 Bradenton Beach North
2 Bradenton Beach South
23 City Island/New Pass Channel
24 City Island Southeast
25 St. Armands/Coon Key North
26 North Lido Lagoon
28 Coon Key South
29 Otter Key

4. Shoreline channel linked to multiple finger canals, basins, streams and/or tidal creeks with one or more access channel(s)

A. Mainland
a. Residential
37 Hudson Bayou/Harbor Acres
b. Residential/Commercial/Public/Other
44 Bowlees Creek
45 Trailer Estates East
46 Trailer Estates West

B. Barrier Island
a. Residential
10 Buttonwood Harbor
11 Bay Isles/Longboat Key Moorings
21 Boat Name Lanes

5. Natural stream or tidal creek with one access channel
   A. Mainland
      a. Residential
      b. Residential/Commercial/Public/Other
         42 Whitaker Bayou
   B. Barrier Island
      a. Residential
         31 Louise Bayou
      b. Residential/Commercial/Public/Other
         3 Whitney Beach North

Appendix 4

Publication: Environmental Guide for Boaters

An Environmental Guide for Boaters

Dr. Gus Antonini
Florida Sea Grant Extension Specialist
University of Florida
Gainesville, Fl 32611

What's the Problem !!!

- **SW Florida fortunate**

  local waters have not degenerated to levels of distress seen elsewhere
  Lake Erie, Chesapeake Bay, San Francisco Bay cost millions to clean up and rehabilitate

- **Pressures growing**

  population, coastal development, boating & fishing

- **Still time**

- **We're taking actions!**

  Improving sewage treatment plants, upgrading septic systems, coping better with stormwater runoff, containing oil spills, cutting down pollution

- **Boaters becoming involved too**

What can boaters do !!!

What's the *law*, and what's *common-sense*

- Fuel management
- Engine maintenance
- Sewage
- Boat care
- Marine debris
- Recycling
- Other tips on thoughtful boating

Fuel Management & Engine Maintenance

■ What's the law !

No discharge of oil and fuel into marine waters
Boats over 26' must display an "Oil Discharge Is Prohibited" placard

■ What's the penalty?

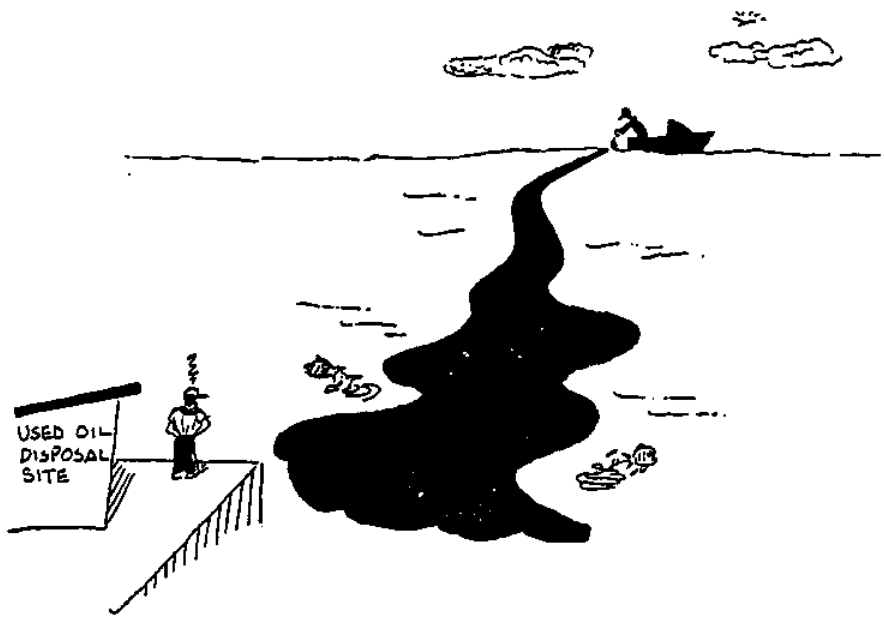
Fine - $20,000 per day per occurrence, plus costs of environmental clean-up, plus any forthcoming damage claims

■ What causes spills

Sloppy engine maintenance and repair
Careless fueling habits
Discharging oily bilge waste
Improper disposal of oil products

■ Tips to avoid oil & fuel spills

Tune and operate your engine at peak efficiency
Keep pan under engine and wipe up drips and spills
Know fuel capacity before "topping off" tanks *and* don't overfill
Fix fuel or oil leaks immediately
Check lines and hoses for deterioration or chafe
Dispose of all hazardous waste properly



■ Tips to improve efficiency and reduce fuel consumption

Boat preparations before heading out
Clean hull bottom
Tune engine
Check propeller and match to boating conditions
Balance load and watch weight

Trip planning before heading out
Check the tides
Watch the weather

While under weigh
Use mid-range throttle settings - not max
Avoid excessive idling
Have sails? Use them whenever possible

Sewage Disposal

■ What's the law !

Illegal to discharge untreated sewage anywhere within the three-mile territorial limit

■ What's the penalty ?

Fine - $2,000 for illegal discharge of sewage

■ What's allowed ?

Installed toilet (*Marine Sanitation Device, MSD*) must be Coast Guard-approved design to either (A) hold sewage for disposal ashore, or (B) treat sewage before discharge

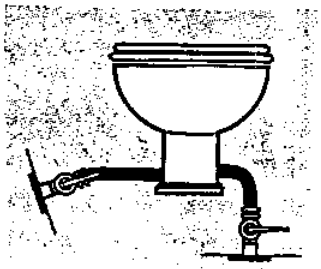
■ Boat sewage

degrades water quality
introduces disease-causing microorganisms
depresses oxygen levels as sewage decays
fecal count of 14/100 ml closes shellfish beds
fecal count of 200/100 ml closes swim beaches

MSD Systems

- ***Illegal* direct discharge**

  This is "history" - don't continue to operate this way



- **Portable head "Porta-Potti"**

  Holds about 25 flushes

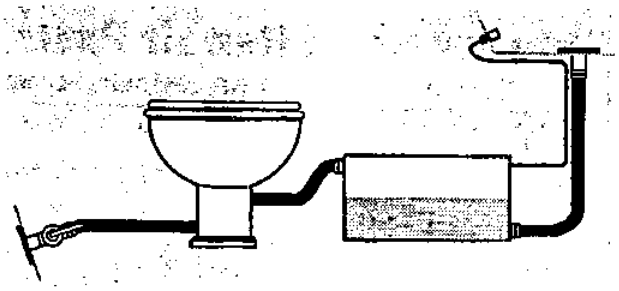
  Don't dump overboard

- **Holding tank - no discharge**

  Can only discharge to shore facility

  Good where pump-out available

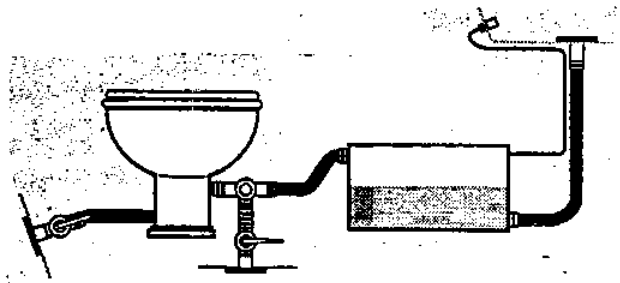
  Good for no discharge areas



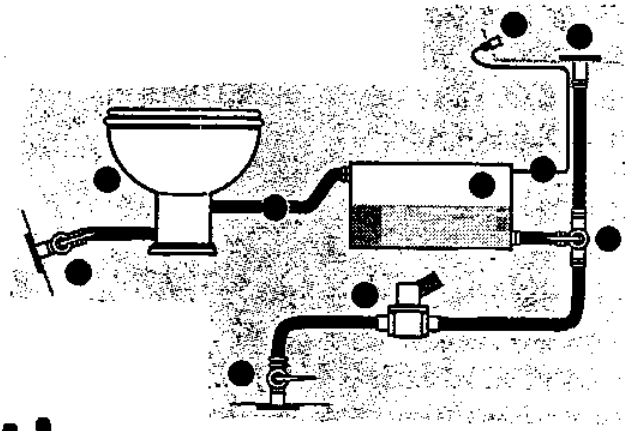
MSD Systems

- **Holding tank - overboard discharge**

Option "A"



Option "B"



Y-value position

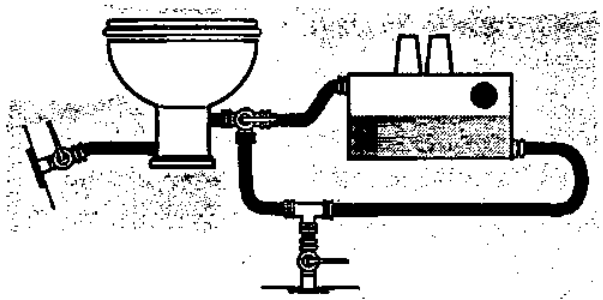
Must direct sewage to holding tank and be locked or secured in that position

According to USCG, plastic wire-ties are acceptable securing devices

MSD Systems

■ Treatment Method

Heats, chlorinates, digests, "sanitizes" sewage
EPA-certified (low bacteria count)
Legal to dump overboard within 3-mile limit,
except in "No Discharge Areas" (Destin, Fl.)



Lectra/San Type

■ Holding Tank Additives

Treatment "Lectra/San" MSD *requires* additives
Optional overboard MSD *does not require* additives
but additives help control tank odor
Don't use additives that contain: formaldehyde, formalin, phenol, alcohol, chlorine bleach
(some RV products contain above chemicals which kill fish and damage marine life)

MSD Systems

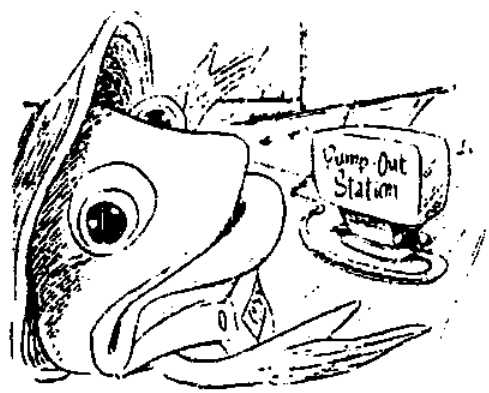
■ Sanitary Hoses

Use heavy duty vinyl type designed for sewage

All other types permeate odor through hosewall

Pour vinegar into bowl and pump seawater out before leaving vessel idle

■ Pump-Out Stations in Charlotte County



Lemon Bay

Stump Pass Marina (697-3600)

Cape Haze

Gulfwind Marine at Palm Island (697-2161)

Boca Grande

Miller's Marina (964-2283)

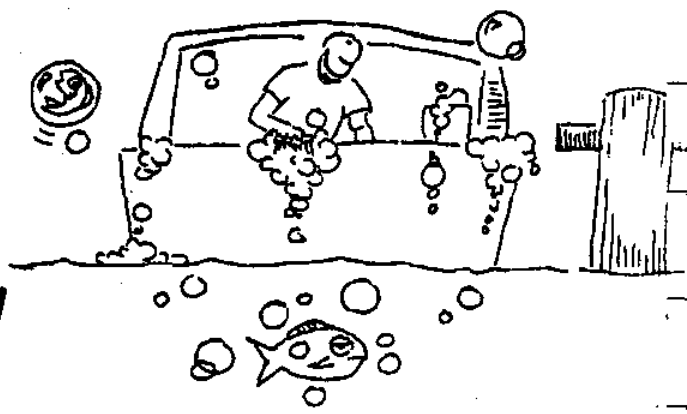
Punta Gorda

Fishermen's Village (575-3000)

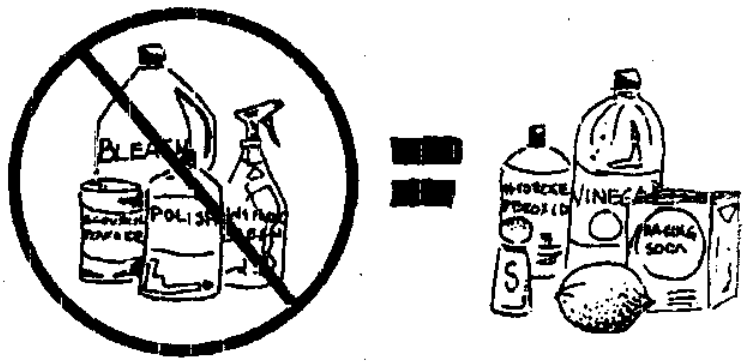
Riviera Marina (639-2008)

Boat Care in the Slip

■ Washing

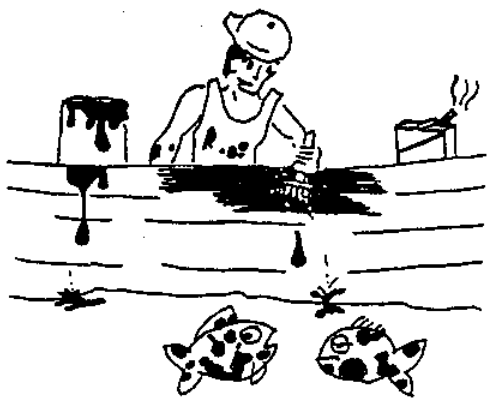


Scrub and rinse frequently
without soap
Use soap only when necessary
Only phosphate-free,
biodegradable soap
Use alternative products



■ Sanding and Chipping

Don't let it reach the water
Use dust bag on sander
Sweep and vacuum debris



Painting, Varnishing & Epoxying

■ Protect yourself

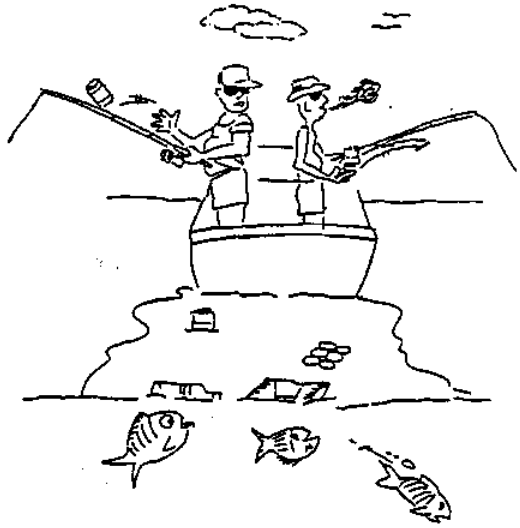
Carcinogenic ingredients can impact your health!
Wear gloves, goggles, respirator

■ Protect the environment

Wipe up spills and drips
Tarp work area
Reuse thinners and solvents
Dry-out paint in cans before disposing in trash

■ Under-water maintenance

Use environmentally friendly (green) bottom paint
Avoid soft self-sloughing paint that adds contaminants to bottom sediments
Try hard-finish paint - can scrub slime off without taking off paint
Avoid raising colored plumes when cleaning bottom
Don't abrade the surface



Marine Debris

■ What's the law !

Boat over 26' must display MARPOL trash placard
Boats over 40'must display placard *and* have onboard written Waste Management Plan
Illegal to throw *anything* overboard 3 miles of land
Illegal to throw plastic overboard *anywhere*

■ What's the penalty ?

Fines - up to $25,000 in civil penalties
$50,000 in criminal penalties *and* up to 5 years in jail

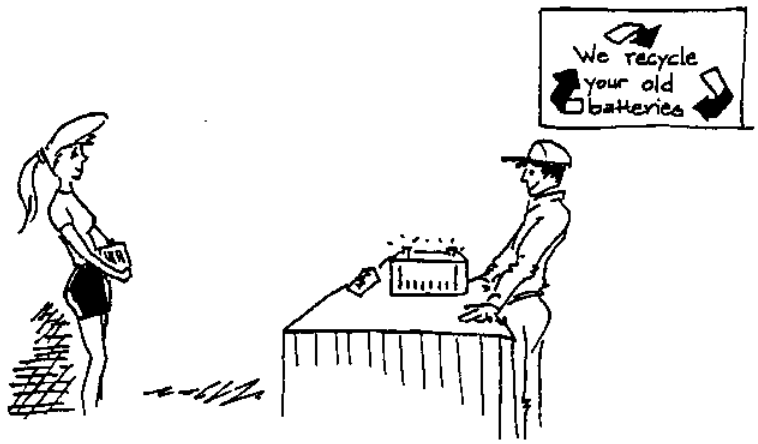
■ How can *you* help ?

Reduce plastic taken aboard
Use recyclable containers
If plastic goes overboard, if possible, retrieve it
If you see plastic in water, retrieve it
Bring all trash ashore and dispose of properly

Recycling and Recovering

■ Lead acid batteries

The law - must be disposed of properly: by exchanging old for new, or by recycling
The penalty - $1,000 fine for improper disposal



■ Freon (CFCs)

The law - deliberate venting prohibited
Only *certified technicians* may purchase freon and service units

■ Fuel and Lube Oil

Don't mix with ***anything***, otherwise considered *hazardous waste*

Don't dispose of in dumpster

Uncontaminated fuel and oil can be recycled - take to collection center or service station

■ Filters

Drain fuel or oil

Take filters to recycling center

■ Antifreeze, Transmission Fluid, Solvents

Considered hazardous waste

Keep in separate labeled plastic containers

Dispose of at hazardous waste facility

Other Tips on Thoughtful Boating

- **Be a knowledgeable boater**
  Take a boating education course

- **Help with waterway cleanups**

- **Make a commitment to keeping Florida waters clean**
  Take the Florida Boaters and Anglers Pledge

Thank you!

Appendix 5

Proposal: Sarasota's Historic Barrier Island Waterways and Anchorage

NATURE-TOURISM PUBLICATION:
SARASOTA'S HISTORIC BARRIER ISLAND WATERWAYS AND ANCHORAGE

A. Background

The Southwest Florida Anchorage Management Project (Anchorage Project) began in July 1995 as a 5-year partnership effort by the Boaters' Action and Information League (BAIL), the Florida Department of Environmental Protection (FDEP), the Florida Sea Grant College Program (FSG), the Southwest Florida Regional Planning Council (SWFRPC), and the West Coast Inland Navigation District (WCIND). The Anchorage Project is based on the premise, supported by prior research, that a "non-regulatory" approach to anchorage use is a realistic management option if boaters practice stewardship and make wise choices on where and how to boat, so as to minimize negative impacts on waterways and shore communities.

The project has developed a Guidebook and Supplement as mechanisms to develop this stewardship ethic. Other education materials are needed, however, to increase boater awareness of the negative effects of poor use choices on the quality of the recreational experience. Prior research indicates that a better understanding of the environmental history and boating geography of our waterways and anchorages would instill stewardship, which in turn would sustain water quality, contribute to safer boating and encourage wise resource use practices. The proposed nature-tourism publication provides the basis to address these needs on the barrier islands and waterways in the City of Sarasota.

B. Objectives

The overall objective of the proposed publication is to produce nature-based tourism maps of Sarasota's historic barrier island waterways and anchorage which convey an understanding and appreciation of the area's boating geography.

The specific objectives are:

(1) to characterize the present bio-physical conditions of the waterways and anchorage (bathymetry, signage, bottom sediments, sea grass) and shore facilities (docks, marinas, parks, ramps); and

(2) to present historical and resource management interpretations that give boaters information to more fully enjoy Sarasota's barrier island natural and cultural amenities, and foster an appreciation for the coastal development that has occurred in the area.

C. Products

There are two products:

(1) Camera-ready copy for producing one multi-color publication, 24" x 34" in size, containing large-scale aerial photomaps of waterways and anchorage with selected theme maps and nature tourism text and illustrations. (This will be similar to the National Geographic Society occasional map supplements. A good example is the September 1995 Hawaii issue.)

(2) 5,000 copies of item (1) printed on water-proof, tear-resistant paper and folded accordion-style.

D. Distribution

This nature-tourism publication will be publicized and distributed by the FSG Extension Service.

E. Project Area

The study area includes barrier islands, bay islands and intervening bays, basins, channels and canals adjoining the Gulf Intracoastal Waterway from New Pass to Big Sarasota Pass, including City Island, Lido Key, St. Armands Key, Otter Key, Coon Key and Bird Key.

F. Photomap

The Otter Key anchorage and environs (Sarasota Yacht Club to South Lido Park) will be depicted on a full-color photomap. The aerial photo base will be 1995 normal color photography, 1:2,400 (1" = 200') scale, 24" x 28" in size. The aerial photo portion will show upland areas and boat docks extending into the water.

The map portion will be compiled using Geographic Information System (GIS) technology. It will be based on FSG 1993 field surveys of bay water and marine habitat and will include:

(1) bathymetry, as shaded 1' graduated light to dark blue colored depth zones with dashed red contours at 3' intervals
(2) centerline controlling depth, at 1' intervals, as line-colored segments
(3) sea grass and mangrove, as hachured patterns
(4) bottom sediments, as point symbols
(5) signage, as point symbols
(6) boating facilities (clubs, ramps, dinghy landings, etc.), as point symbols

Small-scale map and aerial insets will show the site's location on Florida's west coast, the anchoring locale, and approach channel conditions.

G. Nature-Tourism Modules

A series of explanatory historical and environmental interpretations will be prepared to show the changing character of the City of Sarasota's barrier island waterways and anchorage. These modules will help to establish the baseline of information which will sensitize boaters to make wise choices on boating practices.

(1) Barrier Island Environmental History
   a. Purpose:
      demonstrate how environmental history has conditioned site quality and the anchoring experience
   b. Tasks:
      (i) depict the evolutionary changes over the past 100 years in the New Pass - Big Sarasota Pass shoreline and barrier island chain
      (ii) highlight anchorage habitat changes from (a) dredging, (b) filling, (c) boating, (d) shore development
      (iii) identify how these changes are affected by boating and shore activities
   c. Graphics:
      (i) maps and aerials showing the area's development: 1883, 1937, 1953, 1995

(2) Anchoring Conditions in the Dredged Basin
   a. Purpose:
      characterize bay bottom conditions resulting from dredging so that boaters are aware of limiting anchor-holding conditions
   b. Tasks:
      (i) describe suction dredging operation which created deep water basins by obtaining fill for adjoining Lido Key
      (ii) describe process of storm water runoff which leads to deposition of flocculated silt-mud sediments
      (iii) characterize holding ability of various types of anchors in flocculated sediments
   c. Graphics:
      (i) map of waterways and anchorage showing natural and dredged areas
      (ii) map of bottom sediment type
      (iii) underwater photo of flocculated sediments (diver's arm extended into material to armpit to illustrate poor-holding characteristics)

(3) Experiencing Nature at Otter Key and South Lido Park

a. Purpose:
provide an interpretive guide to historic changes in the ecology of upland and tidal areas to promote self-guided nature touring using non-motorized dinghy

b. Tasks:
(i) map and describe native and exotic habitat changes from 1883 to 1995
(ii) discuss development impacts (actual, avoided) of proposed waterfront development schemes
(iii) describe the creation of the County park and its intended purpose

c. Graphics:
(i) maps (1883 and 1995) showing changes in native and exotic habitats
(ii) map of Ringling Isles showing planned plats
(iii) 1948 aerial photo showing lot-line scarring of vegetation
(iv) map of nature-touring routes and attractions between Otter Key and Lido Key

(4) Protecting Fragile Sea Grass Habitat to Ensure Quality Boating and Fishing Experiences

a. Purpose:
describe how sea grasses have diminished in area and declined in quality as a result of coastal development and boating pressures

b. Tasks:
(i) measure the area of sea grass reduction between 1948 and 1995; relate to dredge-and-fill and residential waterfront development
(ii) determine the change in sea grass quality by comparing the extent of prop scarring in 1948 and 1995; describe boating practices which reduce these impacts
(iii) describe the role of sea grasses as marine nursery grounds and their importance in fish productivity

c. Graphics:
(i) map of sea grass changes (areal extent, prop scarring) in Sarasota Bay (Ringling bridge - Siesta bridge) area between 1948-1995
(ii) photo example of "yankee tracks" and map identifying prop scarring vulnerable locations
(iii) underwater photos of sea grass habitat (juvenile fish, invertebrates and vertebrates) illustrating importance in estuarine food chain

(5) Sources

The following historical sources will be utilized:

(i) USCGS/NOS, hydrographic (H) and topographic (T) surveys: 1883, H and T, 1:20,000; 1926, T, 1:10,000; 1953, H, 1:10,000

(ii) USACE, hydrographic survey, 1913, 1:45,000

(iii) Ringling Archives, oblique aerials, 1926 and 1937, 1:20,000 (approx.)

(iv) National Archives, vertical aerials, 1945 and 1948,1:20,000 (approx.)

(v) FDOT, vertical aerials, 1969, 1:24,000

(vi) Sarasota Historical Resources, State Archives, McCarthy Collection, miscellaneous photos

H. Allocation of Funds

This is a fixed price contract. It covers the costs of preparing camera-ready copy and printing 5,000 copies of the nature-tourism publication "Sarasota's Historic Barrier Island Waterways and Anchorage."

Funds provided to the University of Florida Sea Grant Program will be for a total of $19,287, and will be in two installments: an initial payment of $10,000 within 60 days of the award of the grant; and a final payment of $9,287 within sixty days of receiving samples of Project Deliverable (Item 2), or by the end of the grant period whichever occurs first.

I. Grant Request Budget

Salary	
Preparation of Camera-ready Copy, 0.8 man-months	$ 2,400
Materials (photo developing, maps, etc.)	$ 100
Printing	
Multi-color map, flat size: 36 x 24 folded to finish size: 6 x 8, waterproof, tear-resistant paper, 5,000 copies	$15,869
Subtotal Grant Direct Costs	$18,369
Subtotal Indirect @ 5%	$ 918
Total Grant Cost	$19,287

J. Sea Grant Matching Funds*

Salary G.A. Antonini, P.I., 2.0 man-months	$16,542
Subtotal Match Direct	$16,542
Subtotal Indirect @ 16.9 (negotiated off-campus extension rate)	$ 2,796
Total Match	$19,338

*Source: NOAA/National Sea Grant Program

K. Grand Total Project Cost
(WCIND Grant Request plus Sea Grant Match Funds) $38,625

StarterChilds

PRINTING PROPOSAL

September 28, 1995

To: Florida Sea Grant College Program; Attention: Susan Grantham

Description: *Outer Key Maps*; flat size: 36 X 24 folded to finished size: 6 X 8; map prints 4/4, 4 color process throughout–full bleeds

Paper: 8pt. Textin, White
OPTION: 80# Kinglcote Book, White

Composition: Customer to supply mechanicals with overlays

Line Art: N.A.

Halftones/Duotones: 1 Halftone

Separations: 6-1 @ 24 X 36, 1 @ 6 X 9, 1 @ 5 X 7, 3 @ 4 X 5

Proofs: Dylux and matchprint provided for final proofing

Prepress: Map prints 4/4, 4 color process throughout–full bleeds

Bindery: Trim and fold to finished size: 6 X 8

Delivery: Box and deliver to Florida Sea Grant Communications

Quantity: 5,000: $16,249.00
OPTION: 5,000: $9,254.00

Terms: Net 30 days

Spanish: N.A.

Steve

Price

This estimate includes all operations and material necessary to complete the work as above specified based on standard printing trade customs (see reverse side). Customer's copy and other material will be checked against the proposed specifications, and modifications made if changes are requested. Delivery FOB, Gainesville, Florida unless otherwise specified.

Acceptance

- Unless otherwise specified the services and materials listed above will be provided by StarterChilds Printing Company, Inc. under the terms set forth.
- After 30 days this proposal is subject to revision at StarterChilds Printing Company's discretion.

Appendix 6

Memorandum of Agreement Relating to a Regional Waterway Management System

MEMORANDUM OF AGREEMENT

AMONG

THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLORIDA SEA GRANT COLLEGE PROGRAM
FLORIDA COOPERATIVE EXTENSION SERVICE
AND
WEST COAST INLAND NAVIGATION DISTRICT

Relating to

A REGIONAL WATERWAY MANAGEMENT SYSTEM

Article I

Whereas, it is recognized by all parties that the waterways of Southwest Florida have high recreational and ecological value and are subject to a wide variety of uses; and

Whereas, it is recognized by all parties that significant use is by recreational vessels traversing sensitive bay habitats while navigating to varied destinations; and

Whereas, it is acknowledged by all parties that a management framework is needed now to deal with issues and problems associated with increasing use; and

Whereas, all parties have the common goal of preserving the recreational and ecological values of Southwest Florida waterways in a manner that balances vessel access with respect for shore community concerns and adequate protection of marine resources; and

Whereas, all parties recognize the benefit of comprehensive planning and associated regional project review for public safety and resource preservation; and

Whereas, all parties are desirous of creating a regional management framework for Southwest Florida that uses science and extension education to fashion environmentally acceptable ways of maintaining boat access in bays and estuaries.

NOW, THEREFORE, in accordance with the purposes of this Memorandum of Agreement, the parties hereto agree to work together in implementing a standardized regional approach to waterway planning, permit review and project application, utilizing methodologies being developed by the Florida Sea Grant Program, the Florida Cooperative Extension Service, and the West Coast Inland Navigation District.

Article II

A. This agreement shall become effective upon execution by all parties.

B. This agreement may be terminated at any time by mutual consent, or any party may withdraw by providing 60 days written notice to all other parties.

C. This agreement is intended to include the waterways of Manatee, Sarasota, Charlotte, and Lee Counties.

D. This agreement provides an effective avenue for pursuing changes to existing laws, rules, or policies that are determined to be problematic. Although encouraging appropriate changes in support of the principals in Article I, this agreement in and of itself in no way waives or modifies any existing laws, rules, or policies governing the activities of any party.

E. Local governments and local waterfront community organizations are recognized as critical players and are encouraged to participate.

IN WITNESS WHEREOF, THIS Memorandum of Agreement has been executed by the undersigned duly authorized parties on _____, 1996.

Department of Environmental Protection

_____
Virginia B. Wetherell
Secretary

Florida Sea Grant College Program

_____
James C. Cato, Ph.D.
Director

Florida Cooperative Extension Service

_____
Christine Taylor Stephens, Ph.D.
Dean for Extension

West Coast Inland Navigation District

_____
Charles W. Listowski
Executive Director

Appendix 7

WCIND Comprehensive Waterway Management Plan

West Coast Inland Navigation District
COMPREHENSIVE WATERWAY MANAGEMENT PLAN

EXECUTIVE SUMMARY

The evolution of the West Coast Inland Navigation District as the local sponsor for the Intracoastal Waterway construction, operation, and maintenance, now requires a concentrated focus on improvements to this waterway transportation system. The federally authorized project, associated passes / inlets between the Gulf of Mexico and bay / inland waterways, and public channelways serving as the local infrastructure for this system are in need of assessment and maintenance. In some instance, physical features must be installed to adhere to federal and state mandates, or simply to allow the waterway network to function efficiently.

Adoption of this framework document will give the district a formalized comprehensive plan for management, in compliance with the enabling state legislation and requirements of the federal project, but also recognizing the immediate and long term needs of the region. The local waterway infrastructure will function as a system only by setting standards for development, operations, and maintenance. An emergency management strategy is a primary element for the comprehensive waterway management plan.

The WCIND Comprehensive Plan will provide: a mission statement, policies and goals, and objectives to be accomplished within an initial five year period. Amendments to this plan may be adopted during an annual review. The plan will facilitate the management process including the following functions: Planning - to deal with the present and anticipate the future, Organizing - to technically establish authority and responsibility relationships, Staffing - to ensure that all available resources within the district are used, Controlling - to technically focus on monitoring, adjusting, and improving performance by establishing standards, techniques and systems, and Decision Making - to choose the most appropriate course of action.

The construction of the Gulf Intracoastal Waterway segment of the national system was a substantial commitment by the federal government to the economic base and quality of life in southwest Florida. The West Coast Inland Navigation District represents the required local commitment to this investment. The preservation and the enhancement of this investment has become the most recent charge of the West Coast Inland Navigation District.

MISSION STATEMENT

To ensure that federally authorized navigation projects be maintained and other navigation improvements within the District jurisdiction be implemented and maintained for the public benefit.

96-1 POLICY

The WCIND will coordinate agreements between the A.C.O.E., the U.S.C.G., the F.D.E.P., appropriate member county, and the Navigation District for the purpose of preserving, maintaining, and/or enhancing navigation through inlets and passes within the District jurisdiction.

GOAL 1: To maximize public safety for navigation vessels by providing standardized conditions, information, and maintenance of all viable inlets/passes.

OBJECTIVE 1: Request W.A.M.S. analysis by the USCG of all District channels not already studied within last five years (to be completed by 09/30/97).

OBJECTIVE 2: Develop and implement an agreement with the U.S.A.C.O.E. to allow WCIND to supplement funding for federally authorized projects, or substitute local funding for these designed / permitted projects that may be unfunded (to be completed by 09/30/97).

96-2 POLICY

The WCIND will develop and maintain an inventory list of bay and inland public waterway channels providing the arterial network between the Intracoastal Waterway, the Gulf of Mexico, and local waters for both commercial and recreational interests.

GOAL 1: A regional waterway management system data base including:

- signage
- channel characteristics
- habitat restoration issues
- public channel inventory of W.C.I.N.D. priorities for maintenance

OBJECTIVE 1: Waterway Management System Project maps and data that will be integrated into the FDEP permit review process to allow regional permit consideration (to be completed by 09/30/98).

OBJECTIVE 2: Implementation of construction projects derived from data/information compilation, sign removal/install, channel marker installation, derelict vessel and submerged hazard removal, etc. (to be completed by 09/30/99).

***96-2 POLICY**, GOAL 1* continued

OBJECTIVE 3: Cooperative funding agreements with member counties and FDEP, P.R.T.F., and U.S.A.C.O.E. Sec. 1135 programs.

96-3 POLICY

The Navigation District will develop and maintain a program for the management of dredged spoil material within the regional jurisdiction.

GOAL 1: A long range plan for dredged material disposal to facilitate channel maintenance projects.

OBJECTIVE 1: Creation of a regional spoil site inventory base map.

OBJECTIVE 2: Develop legal contracts for public and private arrangements to provide temporary and permanent sites for material management.

GOAL 2: Emergency plan for dredge material management resulting from a hurricane or other crisis event.

OBJECTIVE 1: Develop agreements with U.S.C.G., U.S.A.C.O.E., state and local governments.

96-4 POLICY

The WCIND will provide a waterway documentation to member counties indicating economic benefits of the Intracoastal Waterway to the region.

GOAL 1: To redefine "commercial use" of the waterway by including recreational boating and associated marine industry in the definition.

OBJECTIVE 1: Commission economic study (to be completed by 09/30/97)

OBJECTIVE 2: Solicit legislative support

GOAL 2: To include commercial fishing and other commercial uses in the "commercial use" definition held by the federal government.

OBJECTIVE 1: Economic study

OBJECTIVE 2: Legislative support

GOAL 3: To determine feasibility of participation in the Harbor Trust Fund.

96-5 POLICY

The Navigation District will develop an emergency management plan for necessary action after hurricane damage or other crisis conditions affect functional uses of the ICW and associated waterway infrastructure (to be completed by 09/30/97).

GOAL 1: See Policy 96-1

GOAL 2: To develop a procurement strategy with affected member county or counties for contract removal of submerged hazards in the ICW and other arterial waterways (to be completed by 09/30/97).

96-6 POLICY

The WCIND will administer the Waterway Development Program (WWDP) with a primary focus on county navigation improvements and a secondary focus on other "as needed" eligible projects per statute.

GOAL 1: To provide waterway infrastructure as described in 96-2 Policy

OBJECTIVE 1: Implement a "moratorium" on supplemental funding for marine enforcement until a member county has an established channelway system (i.e. official marked channels and speed zones etc.) that is functional including local ordinances adoption.

OBJECTIVE 2: To assist county governments in the planning and permitting of official channelways and improvements (see 96-2 Policy, Objective 1).

OBJECTIVE 3: To coordinate environmental education efforts within the region to ensure that the district resources are maximized for the public benefit and the projects are directly related to the ICW and associated waterways.

96-7 POLICY

The WCIND will administer a capital improvement program (CIP) to facilitate enhancement of inlets/passes (both federally authorized and local jurisdiction), and to provide supplemental or match funding for other capital navigation related improvements and other related projects as approved by the WCIND Board.

GOAL 1: A funding source to either supplement ACOE project funding, or substitute for ACOE required funding for planned/permitted federal projects

OBJECTIVE 1: An approved memorandum of agreement between WCIND and the ACOE

96-8 POLICY

The WCIND will administer projects of regional significance for the public benefit and in collaboration with county staff when possible.

GOAL 1: The WCIND annual Work Plan measures adherence to state enabling legislation through qualitative and quantitative budget indicators

GOAL 2: Development of a Waterway Management System

OBJECTIVE 1: See 96-3 Policy

GOAL 3: Regional Anchorage Management Pilot Program

OBJECTIVE 1: Regional Harbor Board (FDEP, SWFRPC/TBRPC, WCIND, FSG, BAIL)

GOAL 4: Regional Spoil Management Team

OBJECTIVE 1: See 96-3 Policy

GOAL 5: Next Generation Water Level Measurement System

OBJECTIVE 1: Analysis of Lee County installations

OBJECTIVE 2: Installation of platforms for regional coverage throughout District jurisdiction - eight platforms functional by 09/30/99

GOAL 6: Venice Police special services (Due to extensive land holdings in Venice area)

OBJECTIVE 1: Patrol of Venice Intracoastal Waterway banks and canals

OBJECTIVE 2: Patrol of District lands in Venice area

GOAL 7: Land reclamation projects (property management)

OBJECTIVE 1: Exotic removal and site preparation on District owned lands

OBJECTIVE 2: Survey and security of District owned lands

GOAL 8: Waterway Guide publishing and distribution

OBJECTIVE 1: Update and revise the Waterway Guide, per FS 9B-50 relative to special districts

96-8 POLICY continued

GOAL 9: Distribution of District funded publications via database strategy

OBJECTIVE 1: Deliver and record distribution of "Tackle Box Guides", 12,500 copies by 09/30/97

OBJECTIVE 2: Deliver and record distribution of "Boater's Guide to Charlotte Harbor", 10,000 copies by 09/30/97

OBJECTIVE 3: Deliver and record distribution of "WCIND Guide Map", 25,000 copies

OBJECTIVE 4: Create and distribute Waterway Management System Maps region wide by 09/30/98

GOAL 10: Develop a WCIND Information Management System that is in compliance with Public Records Management Statutes

OBJECTIVE 1: Electronic record keeping

OBJECTIVE 2: Preservation and management of District archives

OBJECTIVE 3: Update air photos, charts, deeds, files, maps, and surveys relating to the District

96-9 POLICY

The WCIND will resolve all outstanding issues involving the historic District participation by Hillsborough and Pinellas Counties.

GOAL 1: A final determination by the U.S.A.C.O.E. that WCIND is no longer considered the local sponsor for ICW issues in Hillsborough and Pinellas Counties.

Appendix 8

Inconsistencies in the State of Florida Vessel Registration Data Base Which Limit its Use for Waterway Planning and Coastal Management

UNIVERSITY OF
FLORIDA

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Florida Sea Grant Program

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TO: Commissioner Sue Dudley
Chair, Citizens Advisory Committee
Florida Coastal Management Program
Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100

SUBJECT: Inconsistencies in the State of Florida Vessel Registration Data Base Which Limit its Use for Waterway Planning and Coastal Management

Date: April 3, 1996

This document explains the inconsistencies, limitations and problems associated with using the State's vessel registration data for planning purposes. The analysis is based on my report to the West Coast Inland Navigation District (WCIND) on August 12, 1995, and is an outgrowth of the District's search for boating statistics which it can use in planning and managing southwest Florida's waterways. The need for more reliable statewide boating statistics is shared by inlet, beach and navigation districts elsewhere in Florida, and by the marine industries of the state.

The vessel registration data base is the only available statewide census of boats. It was originally designed as an accounting system to levy fees and to determine vessel ownership. As the boating population has grown, however, the demands on this information source have surpassed its original intent. Counties and municipalities rely on it as a source of roleback funds through the State's Boating Improvement Trust Fund Program, to build and maintain local boating facilities, and to provide for marine safety. Those coastal counties facing heavy boating pressures levy a surcharge on renewal registrations to defray these expenses. There is an overriding local need for accurate information on boats, their characteristics and location, in order to plan and manage local waterways, and because the alternative of undertaking field-based boat census-taking is expensive and restrictive in scope.

This memo summarizes the rationale for CAC action. I have analyzed the current condition of the State of Florida Vessel Registration Form and suggest information which should be retained, removed and added (see Table 1).

Equal Opportunity/Affirmative Action Institution

1. Inconsistencies and Limitations in the State Boat Registration Data Base

a. Owner Address
A boat owner who changes address is required to provide the State with the new address and check the *Address Correction* box on the decal renewal form. If the box is not checked, the new address will not be recorded in the State file. *Example*: owner changed address in 1984 from Gainesville to Clearwater but did not check the *Address Correction* box; the vessel owner's address appears as Clearwater in the county file but Gainesville in the Tallahassee State file.

b. Propulsion
Categories are not mutually exclusive. *Example*: A common class of sailboat is auxiliary-powered. The classification allows for: sail (only), inboard, outboard, but no combination (i.e., sail inboard, sail outboard).

c. Manufacturer's Name
There are limitless variations in the spelling of manufacturer names. *Example:* cheoylee, cheoy lee, etc. This impedes linking the State file with BUC and other national boat indexing systems, and with marine internet data bases.

d. Use
There are 7 general use categories. The only distinctions among "pleasure" are "pleasure" and "pleasure canoe." (There are, however, 12 unique commercial boat classes.)

2. Planning Information Not Currently Available in the State Boat Data Base

a. Location
Street address where boat is located for wet slip boats, or principal waterway and ramp used by trailered boats.

b. Type
Characterization of boat into meaningful pleasure boat categories: e.g., row, day sail, cruise sail, race sail, speed, fish, cabin cruise, etc.

c. Draft
Sail (fixed keel, centerboard (up/down), power (idle, plane)

d. Use
Power engine hours (month/year); sail days (month/year)

3. Problems With the Current State Date Base for Planning and Income Generation

a. Estimating Boat Population

Projection errors may occur due to: (i) using county code (where renewal purchased as surrogate for county of residence; (ii) using owner address (where no correction made for address change); (iii) using owner address as surrogate for boat location.

b. Determining Income from Vessel Registration

Boat renewal fees are collected by county tax collector offices. Charges are by boat length class. There is a base fee levied by all counties in the State; boaters who renew their registration in Manatee and Charlotte counties are charged the State's base rate. Some counties, as Sarasota and Lee, levy an additional charge to cover local marine enforcement and safety programs. Boaters may renew in the county where they reside, or where they boat (which may be a different locality), or elsewhere in the state.

Summary tables were compiled from the 1992 State file to illustrate these inconsistencies. Boater address zip codes were grouped by counties (most zip codes are county exclusive; only a few counties share zip codes). Table 2 shows number of renewals by resident and non-resident boaters in Charlotte, Lee, Manatee and Sarasota counties. Non-resident renewals account for 15, 14, 11, 9 percent, respectively, of total renewals. Table 3 shows the cross-over by county residents who register their boats in other counties. Sixty-five percent (6959 boaters) cross-over between counties within the four-county area; 3764 boaters purchase renewals in counties outside the four counties. Table 3 shows which counties gain and which lose from each other in numbers of boat renewals.

Table 1. Suggested Modifications to the State of Florida Vessel Registration Form

Information Which Should be Retained

1. Decal Number
2. Decal Issuance Date
3. Decal Expiration Date
4. Florida Registration Number
5. Vessel Title Number
6. Hull Identification Number
7. Name and Address of Owner
8. Owner Birth Date
9. Manufacturer's Name
10. Model Year
11. Length
12. Commercial Type

Information Which Should be Removed

1. Address Correction
2. Owner Residence and Nationality
3. Motor Data
4. Hull
5. Propulsion
6. Fuel

Information Which Should be Added

1. Vessel Name
2. Hailing Port
3. Street Address of Vessel Location (or name of ramp and location of principal waterbody used by trailered vessel)
4. Mooring (wet slip, dry stack or hoist, trailer, beached or blocked)
5. Manufacturer's Model
6. Draft (sailboat [centerboard up,down], power boat [idle speed, planing speed])
7. Recreational Type (row, dinghy, sail, speed, fishing, cabin cruiser, other)
8. Use (power boat [engine hrs/yr], sail boat [sail days/yr]; % weekday, weekend, winter/spring/summer/fall)

Table 2. 1992 Pleasure Boat Registrations (# of boats)

County	Resident renewed in county	Non-resident renewed in county	Total renewals
Charlotte	8341	1474	9815
Lee	23158	3895	27053
Manatee	9616	1179	10795
Sarasota	12560	1308	13868
WCIND District	53675	7856	61531

Table 3. 1992 Renewal of County Resident Boats in Other Counties (# of boats)

Boater resident county	Registration renewal in other counties					
	Charlotte	Lee	Manatee	Sarasota	Other	Total
Charlotte		475	47	179	325	1026
Lee	750		61	92	1959	2862
Manatee	64	42		1228	621	1955
Sarasota	2723	146	1152		859	4880
WCIND	6959				3764	10723

Appendix 9

Proposal to UF/IFAS Extension State Major Program Enhancement Award

UF/IFAS EXTENSION STATE MAJOR
PROGRAM ENHANCEMENT AWARD 1996-97

1. Number and Title of State Major Program/4-H Core Program:
   FL315: Coastal/Marine Recreation and Tourism in Florida

2. Design Team Leader: Gustavo A. Antonini

3. Goals and Rationale for Enhancement Award:
FL315 calls for the dissemination of information on physical conditions of bay waters and boating infrastructure to the public (Annual Objective b). Grant funds will be used to test the adoption and marketability of nature-tourism maps by boaters and recreational fishermen, to promote baywater resource sustainability, in the face of increasing, competing and conflicting recreational use and waterfront urban development. The grant will strengthen this State Major Program as well as add a waterway management element to the Florida Yards and Neighborhoods efforts in southwest Florida. The project utilizes state-of-the art geographic information system (GIS) computer technology to compile extension publications.

4. Deliverables
a. Publish five maps and photomaps as FSG extension bulletins showing water depth, channel depth, sea grass, mangrove, signage, shore facilities. Four maps will show detailed characterizations of anchorages and residential waterways; one map will be a regional depiction of Sarasota Bay. Two maps will be printed as place-mats, and will be used and distributed by cooperating waterfront restaurants frequented by local and transient boaters. Two maps will be distributed to members of boating and shore resident organizations. The map of Sarasota Bay will be provided to all of the test participants.
b. Identify and contact boater and shore resident organizations in the area, inform them of the pilot products and proposed future waterway extension bulletins (source materials are available for an additional 50 waterway communities).

Tests will be conducted in Sarasota Bay which is used by 5,000 resident boaters and thousands of transient boaters. They are all potential users of the products. Extension staff in Manatee and Sarasota counties are collaborators in this proposed effort. Other counties have requested similar products.

5. Plan of Action for Accomplishing Deliverables:
a. Contact restaurants, boater and shore resident organizations and invite their participation. (Several have been contacted and have agreed to participate.)
b. Compile camera-ready black-and-white photomaps and multi-color maps and print five FSG extension bulletins; distribute as place-mats for use by waterfront restaurants, maps of residential waterways for use by boaters and shore residents, and as a regional bay-wide map for all test participants.
c. Distribute products, monitor use, obtain feedback on adoption and marketability. (The Design Team Leader and Extension Agent will collaborate on this task).

d. Use feedback on test products to finalize preparation of camera-ready copies of future extension bulletins of other southwest Florida waterways.
e. Prepare and distribute media releases and promotional flyer on map products.
f. Organize meeting and invite representatives from waterfront restaurants, boating and shore resident groups in the area, present nature-tourism map and guide products developed by this project.

6. Guidelines for Assessing Effectiveness of Funding Enhancement for this State Major or 4-H Core Program:

a. Responses from boaters using test maps which indicate value of information presented and willingness to pay for products.
b. Reorders of place-mats from participating restaurants.
c. Requests for map products from other waterfront businesses and boaters.
d. Requests from organizations and individuals in other areas of Florida to prepare similar extension education map products.

7. Budget

Grant Request

Salary (OPS), 250 hours @ $20/hr	$5,000
Printing	
Place-mats, 5,000 copies, one location	800
Waterway maps, 100 copies	400
Total Grant Cost	$6,200

Sea Grant Match

Salary	
G.A. Antonini, Design Team Leader, 0.5 man-months	$4,136
J. Stevely, Extension Agent, Manatee/Sarasota, 1.0 man-month	$4,000
Travel	
Gainesvile-Sarasota & return, 400 mi @ .29/mi = $116; 1 day/trip x 3 trips = $498	498
Printing	
Place-mats, 5,000 copies, second location	800
Telephone	200
Total Match	$9,634

8. Signatures (type name beneath signature):

Design Team Leader _____
Gustavo A. Antonini

Department Chair _____
James C. Cato, Florida Sea Grant

Center Director not applicable