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Regional Waterway Management System For Lee County, Phase 2



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**Sea Grant**
Florida

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Abbreviations

DGPS	Differential Global Positioning Systems
DOQQ	Digital Orthophoto Quarter Quadrangles
ESRI	Environmental Systems Research Institute, Inc.
FDEP	Florida Department of Environmental Protection
FMRI	Florida Marine Research Institute
FSG	Florida Sea Grant
GIS	Geographic Information System
ICW	Intracoastal Waterway
MLLW	Mean Lower Low Water
MOA	Memorandum of Agreement
NOAA	National Oceanic and Atmospheric Administration
PID	Parcel Identification Number
SFWMD	South Florida Water Management District
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WCIND	West Coast Inland Navigation District

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Executive Summary

The Regional Waterway Management System for Lee County is a collaborative effort by the Lee County Division of Natural Resources, the West Coast Inland Navigation District, and the University of Florida Sea Grant Program. The Phase 2 report addresses the Pine Island Sound Basin and the region's principal waterway management issue—balancing the phenomenal growth of its boating population with conservation and management of its estuarine resource. The project devises and uses methods that allow for the simultaneous use and protection of coastal waters, while still maintaining the economic vitality of coastal communities. This approach evaluates the human ecosystem (boat user) and waterway system (environment) jointly, concurrently, and spatially; and is consistent with municipal, county, Florida Department of Environmental Protection (FDEP), and WCIND goals of facilitating safe boating and reducing boating impacts on natural resources. The project's design criteria are: (a) fit channel maintenance to boat draft needs; (b) minimize impacts on bay habitats; (c) prioritize and evaluate management alternatives on a regional scale; and (d) identify information products, for boaters and shore residents, which encourage environmental awareness by users of neighborhood waterways and boat access channels.

The Phase 2 region extends from the Charlotte County Line south to Sanibel Island, including Pine Island Sound, Matlacha Pass, San Carlos Bay, and the western Cape Coral canals accessed from Matlacha Pass. Information is presented in tables and maps for approximately 223 miles of navigable waterways, 7911 boats, 13,387 moorings, 4542 shore facilities, and 2005 boating-related signs. The report is based on regional (1:24,000) and large-scale (1:2400) mapping of water depth, boat and facility characteristics, signage, and habitat (sea grass, mangrove).

The waterway management needs of the Pine Island Sound Basin are uniquely defined by the geography of boat source areas ("trafficsheds"¹); there are waterways with many boats and areas with few boats. The relations of (1) concentrations of boats to access channel length and (2) boat draft to controlling channel depth determine the degree of boat accessibility and channel restrictions. An understanding of these relations is fundamental to developing and implementing rational waterway management policy.

The report provides a planning tool and decision options to stabilize channel conditions in order to avoid further deterioration of bay resources. A detailed, comparative analysis of water depth and boat draft relations provides a comprehensive overview of channel conditions and the geographic distribution and severity of waterway restrictions. The analysis delineates and quantifies, at a 0.5 ft resolution, levels of boat accessibility to the open bay, and the location and extent of channel depth restrictions.

¹The term trafficshed is used to define an area that contains a concentration of boats that use a common channel, exclusive to the trafficshed, to gain access to secondary access channels and, ultimately, to deep, open water. Secondary access channels generally correspond to the "Minor Boating Channels" shown on *A Boaters Guide to Lee County*, published by the Lee County Environmental Services Division.

Two planning options are illustrated: (1) normal low tide conditions (2) and below normal (winter Cold Front) conditions. Data for a third option are presented: (3) adjusting waterway maintenance standards to the variable draft capability of restricted boats.

Estimated dredging requirements are provided for trafficsheds that contain waterway restrictions. The 20-foot wide improvement footprint used in the study conforms with the WCIND "surgical" approach to maintenance dredging adopted for regional waterway management in southwest Florida in order to minimize environmental impacts to bay resources.

The study results suggest that channel improvements should be prioritized according to those waterways and trafficsheds with the greatest need. The trafficsheds that contain the greatest numbers of restricted boats are Punta Rassa/Connie Mack Island, Bokeelia (west), Pine Island Creek, Bokeelia (east), Gault Island/Cherry Estates, Pine Island Cove/Flamingo Bay, Matlacha Isles/Cape Coral (northwest), Matlacha (northwest), Blind Pass, and Saint James City (south 1); they account for 75 percent of the boat access problems and 49 percent of the channel restrictions. Another 13 waterways [Roosevelt Channel, Sanibel/Tarpon Bay, South Seas Plantation, Eighth Avenue Canal, Burnt Store Marina, Saint James City (east), Sanibel/Point Ybel, Matlacha (southwest 2), Useppa (north), Saint James City (south 2), Manatee Bay, Demere Key, and Saint James City (south 3)] account for an additional 21 percent of the boat access problems and 16 percent of the channel restrictions. In some cases, such as Punta Rassa/Connie Mack Island, relatively short segments of channel restrictions impede relatively large numbers of boats: the high benefit-to-cost is an incentive to make channel improvements at these locations. Several secondary access channels² serve two or more trafficsheds and are heavily used by boaters to transit the Phase 2 project area and to access open bay waters. The relatively heavy volume of boat traffic that traverses these arteries will assure them a high priority status when Lee County determines waterway management policy.

Lee County should consider implementing these recommendations under the Memorandum of Agreement (MOA) for Regional Waterway Systems Management (Appendix A). This MOA is designed to offer local governments and local waterfront community organizations a mechanism to effect regional waterway improvements within an ecosystem-wide, place-based management approach. The MOA provides an avenue for pursuing regional permit review and project applications. A comprehensive proposal for the Pine Island vicinity should be submitted to the FDEP for needed maintenance dredging, based on project results covering Lee County Phase 2 waterways.

Lee County and the WCIND have an investment in this Regional Waterway Management System. This system should be maintained and enhanced in order to respond to the county's growing needs for rapid assessment and comprehensive geographic analysis of its bay water resources.

²Secondary channels generally correspond to the "Minor Boating Channels" shown on *A Boaters Guide to Lee County*, published by the Lee County Environmental Services Division.

The project's database should be updated periodically with countywide boat information. The WCIND has developed a preliminary plan based on revising the annual Vehicle/Vessel Registration Form. This plan, to incorporate information on boat type, draft, and location onto the form, offers a systematic updating method that should be pursued through the County Tax Collector's Office and the Division of Motor Vehicles.

The bathymetric surveys should be updated, as needed, to identify shoaling conditions of the waterways. The WCIND is collaborating, through Florida Sea Grant, with the National Oceanic and Atmospheric Administration (NOAA) Marine Chart Division in a program to redesign coastal charts for recreational waterway users. There are opportunities for Lee County to partner with this federal charting agency and thereby share survey information on a periodic basis.

The Regional Waterway Management System can be strengthened by linkage to the county's upland databases, which will facilitate response to more complex issues that transcend land-water boundaries. For example, sediment sources could be identified and their relative contribution to waterway shoaling quantified. This would allow for a more equitable distribution of maintenance dredging costs among agencies charged with waterway maintenance and those who contribute to shoaling.

The waterway inventory information in the project's Geographic Information System (GIS) database has value and application beyond the bay water planning and management results presented in this report. This information should be reformatted and provided to shorefront residents and boaters in the trafficheds targeted for waterway improvements as waterway maps showing channel center-line depths, boat facilities, and natural resource conditions. (The WCIND and FSG have produced similar maps of anchorages.) This information can sensitize users to the environmental conditions of the waterways and provide a basis for encouraging stewardship and responsible boating practices.

The appropriate County department should be provided with the GIS equipment, software, and training to carry out waterway inventory and analysis, in order to respond to routine customer requests for information and technical services. The Florida Cooperative Extension Service and State University System should continue to provide institutional and professional support.

A measure of the success of the regional waterway management program is whether technical results are translated into meaningful benefits for local communities. A program that includes a strong boater education component will best address the diverse management needs of the Pine Island vicinity. The Lee County Marine Agent, a recently created extension education position that is jointly funded by Lee County and the University of Florida Sea Grant Program, is a timely resource for the dissemination of Project results at the local, community level. The Marine Agent can work with interested waterfront communities to help maintain their waterways. Assistance can be provided in the form of project data, technical support, workshops, and field site inspections. Networking the community with permitting agencies and contractors, in order to develop community-based strategies to restore and maintain their waterway

resources, will increase the effectiveness of the Marine Agent. Boaters, in this fashion, can play an active, critical role in determining whether to boat in a given area, what type of boating should occur, and what level of intervention is necessary.

1. Introduction

Lee County faces a daunting planning dilemma: how to balance the phenomenal growth of its boating population with conservation and management of its estuarine resource. The focus of the Phase 2, Regional Waterway Management System for Lee County is the Pine Island Sound Basin, which includes waterways in the vicinity of Pine Island Sound, Matlacha Pass, and San Carlos Bay. This project is a collaborative effort, by the Lee County Division of Natural Resources, the West Coast Inland Navigation District, and the University of Florida Sea Grant Program, to apply the latest science and technology to the region's waterway management issues.

The waters and adjoining shore ecosystems of the Pine Island Sound Basin are attractive, unique, varied, and vulnerable to pressures from boating and from expanding commercial and residential developments that fringe the coastline. Pine Island Sound, especially, serves as a mecca for boating enthusiasts; increased boat traffic and upland development create problems that are manifested in declining water quality and stressed habitat conditions, such as boat wake that washes away soil and sand supporting mangrove roots or boat contaminants that accumulate due to low tidal exchange within enclosed canal systems.

The pressures brought to bear on the Pine Island Sound Basin offer a glimpse of the challenges that are faced along the entirety of coastal Lee County. The quandary that confronts private citizen users, planners, and elected officials is how to sustain and protect this coastal ecosystem without isolating people from nature. The Florida Sea Grant approach is to devise and use methods that allow for the simultaneous use and protection of coastal waters, while maintaining the economic vitality of coastal communities. This approach is embodied in the report, which evaluates the human ecosystem (boat user) and waterway system (environment) jointly, concurrently, and spatially.

The report focuses on the technical aspects of waterway management and provides a planning tool and decision options to stabilize channel conditions in order to avoid further deterioration of bay resources. A detailed, comparative analysis of water depth and boat draft relations provides a comprehensive overview of channel conditions and the geographic distribution and severity of waterway restrictions. Two planning options are illustrated: (1) normal low tide conditions and (2) below normal (winter Cold Front) conditions. Data for a third option is presented: (3) adjusting waterway maintenance standards to the variable draft capability of restricted boats. The scientific approach presented in the report ensures a rational and objective method of waterway management.

In situations where dredging is selected as an appropriate management option, the prescribed dredge depth and width will depend on a number of factors, including regulatory and historical precedents, potential environmental impacts, draft characteristics of the present boat population, and cost. Designated controlling depths

that have been established via permitting from the Florida Department of Environmental Protection (FDEP) may set practical limits to upstream dredge projects. A central tenet of the Florida Sea Grant approach is that maintained, signed channels discourage resource depletion by encouraging boaters to stay within the channels and away from environmentally sensitive shoal areas. This approach also promotes safe navigation.

Cost, including spoil disposal, is another factor that influences the depth-to-dredge decision. Some restricted waterways are secondary access channels for which there is a clear public need to fully subsidize the maintenance of the waterway. Other waterways are residential canal systems where the maintenance cost should be borne by local citizen users. The Geographic Information System developed for the project provides the necessary information to identify where public/private partnerships may be required to cost-share local waterway restoration or improvement.

Estimated dredging requirements are provided for "trafficsheds"³ that contain waterway restrictions (Appendix D). The 20-foot wide improvement footprint used in the study conforms with the WCIND "surgical" approach to maintenance dredging adopted for regional waterway management in southwest Florida in order to minimize environmental impacts to bay resources.

2. Background

The Phase 2 Regional Waterway Management System for Lee County provides the scientific base and information necessary to meet the waterway management needs of waterfront neighborhoods from the Charlotte County Line south to Sanibel Island, including Pine Island Sound, Matlacha Pass, San Carlos Bay, and the western Cape Coral canals accessed from Matlacha Pass. The Phase 2 area includes approximately 223 miles of navigable waterways, 7911 boats, 13,387 moorings, 4542 shore facilities, and 2005 boating-related signs. Information is presented on boats, channels, and potential dredging required to provide boats with waterway access from berths to secondary channels and, ultimately, to deep, open water—the point at which a vessel is no longer restricted to a channel⁴.

³The term trafficshed is used to define an area that contains a concentration of boats that use a common channel, exclusive to the trafficshed, to gain access to secondary access channels and, ultimately, to deep, open water. Secondary access channels generally correspond to the "Minor Boating Channels" shown on *A Boaters Guide to Lee County*, published by the Lee County Environmental Services Division.

⁴For the purpose of this report, deep, open water—defined as a function of vessel draft—begins at that location in the transit of a vessel, from its berth, beyond which the vessel is no longer restricted to a channel because of environmental or depth limitations. In the Phase 2 study area, the Gulf Intracoastal Waterway (ICW) channel, the Gulf of Mexico, and Charlotte Harbor north of Pine Island are considered "deep, open water." The location of what is considered deep, open water also can be associated with the aggregated draft characteristics of a trafficshed or a boating region.

The report is based on regional (1:24,000) and large-scale (1:2400) mapping of water depth, boat and facility characteristics, signage, and habitat. A detailed analysis delineates and quantifies, at ½ ft resolution, levels of boat accessibility to open bay waters and the location and extent of channel depth restrictions.

The methodology and objectives of the Lee County Project stem from a pilot study (Antonini and Box, 1996) conducted by Florida Sea Grant (FSG) and the West Coast Inland Navigation District (WCIND). The pilot study, designed for southwest Florida waterways, was a test application of a management system that is consistent with municipal, county, Florida Department of Environmental Protection (FDEP), and WCIND goals of facilitating safe boating and reducing boating impacts on natural resources. The design criteria are: (a) fit channel maintenance to boat draft needs; (b) minimize impacts on bay habitats; (c) prioritize and evaluate management alternatives on a regional scale; and (d) identify information products, for boaters and shore residents, which encourage environmental awareness by users of neighborhood waterways and boat access channels.

Results from the pilot study, and from follow-up studies in other areas (Antonini et al., 1998; Swett et al., 1999), prompted the Lee County Board of Commissioners to authorize the evaluation of Lee County waterways. The first Phase of the Lee County Waterway Management System, which covers Estero Bay, was completed in August 2000 (Swett et al., 2000). The Phase 2 results presented in this report provide the County with a rationale and method for implementing a Regional Waterway Management System for the Pine Island Sound Basin, containing the following elements: (a) documentation of existing depths; (b) establishment of maintenance dredging requirements according to user draft specifications; (c) placement of signs to conform with boat density and traffic patterns; (d) management of boat traffic based on detailed knowledge of boat distributions and travel routes; (e) siting of habitat restoration to protect waterways; (f) regional scale permitting to accommodate water-dependent uses and to minimize environmental impacts; and (g) educating the public, using waterway maps and guide materials, to instill stewardship and best boating practices. A Memorandum of Agreement (MOA), signed by the FDEP, FSG, and the WCIND (September 26, 1997), provides the required, state-approved framework for a Regional Waterway Management System that is needed to implement the study results (Appendix A).

3. Information Base

Florida Sea Grant conducted three separate types of on-the-water surveys in order to obtain: (1) tide-corrected depths of waterway access channels (November 1999–July 2000); (2) the location and characteristics of boats, moorings, and related facilities (December 1999–May 2000); and (3) the location and characteristics of signs (August–November 1999). Shoreline, generalized land use/land cover characteristics, and mangrove and sea grass information was obtained from the South Florida Water Management District (SFWMD) and the Florida Marine Research Institute (FMRI). One-

meter resolution, 1994-95 U.S. Geological Survey digital orthophoto quarter quadrangles (DOQQ) in JPEG format were obtained from the Florida Resources and Environmental Analysis Center (www.labins.org).

This report presents boat, channel, signage, and habitat information for the Lee County Phase 2 project area (Figure 1). Boat and channel characteristics are reported for individual trafficsheds. Special consideration also is given to the secondary channels located in Matlacha Pass that provide access to boats from two or more trafficsheds.

The following presents a general overview of key site conditions.

- a. **Trafficsheds.** The study identifies 44 trafficsheds in the Lee County Phase 2 project area. Table 1 and Figure 2 present summary and regional data on the distribution of boats, and Appendix D provides details for each trafficshed.
- b. **Boats.** The boat census observed 7911 boats⁵ berthed on Phase 2 Lee County water bodies or stored on salt-water accessible parcels (Table 2). Boat types are reported as recreational fishing, open utility, (bass, skiff, john, pontoon), speed, row (kayak, canoe), sail, power cabin and trawler, other (market fish, houseboat, excursion, barges, tugs, ferry, safety, law enforcement, US Coast Guard, etc.), and personal watercraft. The characteristics collected for each boat include: facility, mooring type, length, age, make and model, draft (including draft adjustment capability), and the date the boat was surveyed.
- c. **Facilities.** There are approximately 4542 boating facilities in the region.⁶ Facilities are reported as anchorage, government, industrial, marina (including boatyard, yacht club), motel (including hotel, restaurant, shop), residential (single-family or multi-family), and other (vacant commercial or community properties) (Table 3).
- d. **Moorings.** The region includes 13,387 "moorings", which are defined as boat locations that are either occupied (7911) or vacant (5476).⁷ Mooring types

⁵This total excludes 16 derelict vessels located in the Lee County Phase 2 Project area. A derelict vessel is defined to include 1) vessels identified and marked by the DEP and 2) vessels, though not marked by the DEP, determined by Sea Grant personnel to be abandoned at the time of the boat census. Derelict condition is included in the Derelicts GIS database.

⁶The facility count was based on a cross-tabulation of the facility type, the parcel identification number (PID), a unique numerical identifier in the property ownership spatial database of Lee County assigned to each boat and mooring, and the parcel owner name. The facility counts should be regarded as estimates. In some instances, boats and moorings were designated as belonging to a single-family residence, however, there was no corresponding subdivision into single-family residences within the county property ownership spatial database. An example of this is a mobile home park. In these instances, unique identifiers were generated and assigned to these boats and moorings based on the judgment of the project staff. The project's analyst accomplished this by deciding to which parcel a boat or mooring belonged. The adjacency to the parcel of the boat or mooring was the primary criteria for transferring the parcel information. This type of problem is symptomatic of discrepancies between the two databases, which introduced a level of inaccuracy in assigning a facility designation to a parcel.

⁷The PID was assigned to relate boats and moorings to parcel ownership information contained in the Lee County Property Appraiser spatial database. As in the case of relating facility type with parcel ownership, so too there are a number of factors that limit the utility of relating boats and mooring to parcel

are reported as anchorage, beached or blocked, boat lift, davits, dry stack, float/ramp (usually for personal watercraft), hoist, mooring, ramp, seawall, trailer, and wet slip.

- e. ***Derelict Vessels:*** Derelict vessels (16) were mapped separately when encountered during the boat/mooring survey. Attributes recorded included whether each vessel was aground or afloat, condition (good or poor), type (when ascertainable).
- f. ***Signage.*** There are 2005 boating-related signs in the region: business (166), government (76), hazard warning (29), navigation guide (812), private ownership (311), resource protection (226), speed regulation (375), and other (10). All signs in the water and along the waterfront, visible to the boater, are included in this inventory. Signage information includes site (bridge, dock, land, seawall, other, water), type (e.g., buoy, float, other, piling, structure), message, status (non-permitted, permitted, unknown), and condition (damaged, OK).
- g. ***Site.*** Site characteristics include the general distribution of biological features within the water body; namely mangrove areas and sea grass beds (Figure 3). Mangrove forests are found along nearly all undeveloped shoreline in the Phase 2 study area. Mangroves cover most islands in the study area, except where removed by human activity. Sea grass is extensive in the study area.

4. Field Surveys

- a. ***Depths.*** Boat channels were identified by interpretation of section aeriels and by field reconnaissance methods. Permitted and non-permitted channel markers were used for orientation wherever present. Field inspection guided final channel alignment. In some cases, it was necessary to perform multiple transects where shoaling was present. Personnel from the Lee County Division of Natural Resources and local boaters provided information about existing channel conditions for specific locations. When the depth survey was completed, county field staff examined maps of the surveyed boat channels to verify their location and the logical consistency of depth measurements.

A total of 62,745 depth points were recorded for all channel centerlines and approaches to boating facilities. A Trimble Pro XR Differential Global Positioning System (DGPS) with a beacon receiver was used to obtain the geographic position of each depth feature. Positions and measurements were logged using a

information. One factor is the 1-meter resolution digital orthophoto quarter quadrangles (DOQQs) obtained from the United States Geological Survey (USGS), which was utilized as the base map for the project. The DOQQs provided the most consistent representation of physical features, such as shoreline, and land use/land cover for the project area. Boats and moorings were surveyed in the field utilizing GPS and, if necessary, their mapped positions were adjusted to the image base map. In order to transfer PID numbers to each boat and mooring, the image base map was overlaid with the property ownership spatial database. The degree of spatial correspondence between physical features from the base map and the property ownership database required some interpretation when assigning the correct PID to a boat or a parcel.

Trimble TSC1 data logger and were plotted on 1:2400-scale section aerials in the field.

Depths in tidal waters are referenced to the navigation datum: mean lower low water (MLLW). Depths in the Cape Coral canals, isolated from tidal influences by weirs, are referenced to the National Geodetic Vertical Datum of 1927 (NGVD27). Tide gauges were installed at 11 locations (Figure 4) during the data collection period, and observers recorded supplemental tide data as needed. The University of Florida Department of Coastal and Oceanographic Engineering provided computer programs with which to correct depths to MLLW.

- b. **Boats, Facilities, and Signs.** The positions and attributes of boat and waterway features were surveyed using a Trimble Pro XR DGPS with a beacon receiver and a TSC1 data logger. An Advantage range finder (Laser Atlanta Optics, Inc.) was used to determine the offset from the observer's location to the position of the surveyed feature. Information about the feature and its location also were plotted on 1:2400-scale section aerials.
- c. **Data Editing.** A series of integrity checks was carried out on depth measurements, tide records, and all boat, facility and signage features. The logical consistency of attribute values and the accuracy of feature positions were ascertained. Discrepancies were verified in the field and corrected.

5. Printed Data Products

Printed data products provided to Lee County consist of thematic information portrayed at both trafficshed (1:2400) and regional (1:36,000) scales. The trafficshed-scale thematic information is contained in two 145-page atlases, one 167-page atlas, and the regional scale information in one 5-page atlas. All atlases overlie an aerial photo mosaic of the study region.

a. Trafficshed-Scale Atlases

1. **Bathymetry** - 62,745 soundings for channel centerlines and adjacent shoals. Depths are corrected to MLLW (except for the Cape Coral canal depths, which are referenced to NGVD27) and presented at 0.5-ft resolution.
2. **Channel Depths, Boat Drafts, and Signage** - 62,745 soundings, presented in six depth categories (≤ 1 ft, 1.5 or 2.0 ft, 2.5 or 3.0 ft, 3.5 or 4.0 ft, 4.5 or 5.0 ft, and > 5.0 ft); boat draft (7911 vessels) presented in six draft categories (same units as depths); Signs (2005) presented in eight categories: business, government, hazard warning, navigation guide, private ownership, resource protection, speed regulation, and other.
3. **Analysis - Channel Restrictions**, defined as the difference between a channel segment depth and the maximum draft of vessels located up-channel, and portrayed in seven restriction classes (no restriction, 0.0 ft, 0.5 ft, 1.0 ft, 1.5 ft, 2.0 ft, and ≥ 2.5 ft); and **Boat Restrictions** (7911 boats, excluding derelict vessels), defined as the

difference between boat draft and the controlling center-line depth and portrayed in seven restriction classes (same units as Channel Restrictions).

b. Regional Scale Atlases

1. **Bathymetry** – 62,745 soundings that pertain to channel centerlines and adjacent shoals. Depths are corrected to MLLW (except for the Cape Coral canal depths, which are referenced to NGVD27) and presented at 0.5-ft resolution as color-coded symbols in four generalized depth ranges (≤ 2 ft, > 2 ft and ≤ 4 ft, >4 ft and ≤ 6 ft, and > 6 ft).
2. **Boats** – 7911 boats presented as color-coded symbols in four generalized draft categories (≤ 2 ft, > 2 ft and ≤ 4 ft, >4 ft and ≤ 6 ft, and > 6 ft).
3. **Facilities** - the distribution of wet and dry slips per facility. A facility is defined as the land use to which a slip is associated and includes the following categories: anchorage, government, industrial, marina, yacht club, boat yard, residence (single family or multi-family), motel, hotel, restaurant, or shop. A color-coded symbol, graduated in size, indicates the number of slips per facility and is presented in six categories (1 slip, 2 to 5 slips, 6 to 10 slips, 11 to 50 slips, 51 to 100 slips, 101 to 363 slips, and 844 slips).
4. **Signs** - 2005 signs, presented as color-coded symbols in message classes (e.g. bridge clearance, channel mark, crime watch, danger/hazard, shoal, etc.).
5. **Mangroves and Sea Grass** - the map shows the approximate location of mangroves and sea grass in the Phase 2 project area. The Florida Marine Resources Institute (FMRI) provided the mangrove and sea grass map data. The original sources of the mangrove coverage were: (a) the U.S. Fish and Wildlife Service Wetlands Inventory, interpreted from 1:80,000 scale color infrared photographic prints obtained in 1972-73, and (b) mid-1980's 1:58,000 color infrared prints and transparencies from the National High-Altitude Aerial Photography Project. FMRI personnel interpreted sea grass coverage from 1:40,000 scale aerial photographs taken in 1990-94.

6. Geographic Information System (GIS) Data Files, Metadata, and Software Application

The present contract between FSG and Lee County, which is funded through the WCIND, includes delivery of GIS data files and corresponding metadata. The GIS database for the Phase 2 Lee County Regional Waterway Management System includes nine files: boats, boating access channels, access channel depths, USACE ICW depths, derelict vessels, moorings, signage, trafficheds, and the Map Atlas index. They have been provided to the County on a CD-ROM in ARC/INFO export format and as ArcView 3.X shapefiles. The metadata have been provided, consistent with federal standards for reporting GIS data descriptions.⁸

⁸A data dictionary describes each file and includes detailed information on identification, data quality, spatial data organization referencing, entities and attributes, distribution and metadata references.

During implementation of the South Sarasota County Regional Waterway Management System (Antonini et al., 1998), the WCIND commissioned the development of a customized ArcView (ESRI, Inc.) application to produce print copies of one or more atlas pages. This application was modified to include atlas pages for the Phase 2 project area and has been delivered to Lee County and to the WCIND. The application re-creates the printed atlases, which include the following layers, themes, and attributes, at the pre-defined 1:2400 (1in = 200 ft) scale:

- (a) A background black-and-white image that consists of U.S. Geological Survey (USGS) digital orthophoto quarter quadrangles. The orthophotos have a spatial resolution of 1-meter and were derived from 1994-1995 color infrared photography.
- (b) Water depth (0.5 ft increments adjusted to MLLW datum).
- (c) Boat draft, presented as color-coded symbols in six draft classes: ≤ 1 ft, 1.5 or 2.0 ft, 2.5 or 3.0 ft, 3.5 or 4.0 ft, 4.5 or 5.0 ft, and > 5.0 ft.
- (d) Channel center-line depth, accurate to 0.5 ft and corrected to mean lower low water (MLLW), presented as color-coded symbols in six classes: ≤ 1 ft, 1.5 or 2.0 ft, 2.5 or 3.0 ft, 3.5 or 4.0 ft, 4.5 or 5.0 ft, and > 5.0 ft.
- (e) Signage (speed regulation, hazard warning, resource protection, navigation guide, private ownership, government).
- (f) Channel restrictions portrayed in seven classes: no restriction, 0.0 ft, 0.5 ft, 1.0 ft, 1.5 ft, 2.0 ft, and ≥ 2.5 ft.
- (g) Boat accessibility portrayed in seven restriction depth classes: no restriction, 0.0 ft, 0.5 ft, 1.0 ft, 1.5 ft, 2.0 ft, and ≥ 2.5 ft.

Upon starting the application, the user is presented with a view (page) showing an index of the study region that includes general land use/land cover and a variation of the USGS quarter quadrangle grid. Each individual index tile represents 1/16th of a quarter quadrangle and is labeled with a corresponding atlas page number. The user is able to select and print pages at the pre-defined 1:2400 scale. This application requires ArcView 3.X, running under Windows 95, 98, NT, or 2000, and access to the appropriate computer and plotting hardware. Further details are contained in the user notes found on the application CD-ROM.

7. Institutional Framework for Regional Waterway Systems Management

The WCIND met with the FDEP Deputy Secretaries in September 1997 and discussed the state's adoption of the waterway management methodology described in this report. The FDEP, at that meeting, signed a Memorandum of Agreement (MOA),

wherein the agency states that it will work as a partner with FSG and the WCIND in implementing a regional waterway management system in WCIND waters (Appendix A). Since Lee County has taken the initiative by sponsoring these waterway evaluations, the county is well positioned to implement the study's results by proposing to the FDEP an ecosystems-type approach to waterway management, including needed maintenance dredging, habitat restoration, and boat traffic management.

8. Results of the Lee County Project: Phase 2

a. Boats

The Lee County Phase 2 project area contains 7911 small-craft vessels (excluding 16 derelict vessels), which are in the water or on adjacent salt-water accessible upland parcels (Table 2). The majority consists of recreational fishing boats (41 percent), open utility (15 percent), and speed (14 percent); followed by kayak/row/canoe (9 percent), sail (9 percent), and power cabin/trawler-types (7 percent). There are relatively few personal water craft (1.6 percent) at waterfront locations. Other vessel types (market fish, excursion, houseboat, barges, tugs) account for 3.3 percent of the total.

b. Trafficsheds

The term trafficshed is used to define an area that contains a concentration of boats that use a common channel, exclusive to the trafficshed, to gain access to deep, open water. This term refers to a unit of segmentation that was created to facilitate waterway management objectives. Segmentation into trafficsheds permits data generalization and reduction for GIS analysis and subsequent management recommendations.

The Lee County Phase 2 project area includes 44 defined trafficsheds. (Appendix D presents maps showing the location of each trafficshed.) The majority of boats (7904) are located in a trafficshed, while seven vessels are located in the Useppa anchorage, adjacent to the main channel (Table 1 and Figure 2). Over ninety percent of all restricted boats are situated in trafficsheds that contain 100 or more boats (Table 1 and Appendix B).

c. Accessibility

Boat accessibility refers to the difference between a boat's draft and the MLLW depth of the shallowest downstream channel segment that the boat must traverse to gain access to a secondary channel and, ultimately, deep water—the point at which a vessel is no longer restricted to a channel. Four levels of restrictions are denoted:

- (a) Somewhat restricted (0.0 ft or 0.5 ft deeper).
- (b) Restricted (1.0 ft or 1.5 ft deeper).
- (c) Severely restricted (2.0 ft or 2.5 ft deeper).
- (d) Blocked (3.0 ft or more deeper).

Twenty-one percent (1645) of all boats experience some degree of restriction. Of the restricted boats, 1269 (77 percent) are somewhat restricted and only experience problems within 0.5 ft of MLLW; 319 boats (19 percent) are restricted by 1.0 - 1.5 ft; 50 (3 percent) are severely restricted by 2.0 - 2.5 ft; and 7 (0.4 percent) are blocked by shoals \geq 3.0 feet. A summary of the analytical results is presented in Table 4. Figure 5 shows a sample of the mapped results, which appear in the 167-page analysis atlases described on page 6.

The boats in the study area may be grouped into three draft categories: shallow (0.5 to 1.5 ft), medium (2.0 to 3.5 ft), and deeper draft (4.0 ft and greater). Forty-eight percent (3801) of all boats have shallow drafts, 45 percent (3575) have medium drafts, and 7 percent (535) have deeper drafts. Of all restricted boats, 22 percent have shallow drafts, 63 percent have medium drafts, and 15 percent have deeper drafts (Table 5).

Some boats—those propelled by outboards or inboards with out-drives—are capable of varying their draft by partially raising or lowering the outboard unit of the propulsion system. The accessibility analysis for these boats included two options: (a) normal running conditions, with the lower unit fully extended; and (b) shallow water running, with the lower unit partially raised, for temporary shoal operation. Sixty-two percent (1025) of the restricted boats have the ability to raise their lower outboard units (Table 6). These are concentrated at the lower end of the restriction levels, meaning that raising the lower unit by 0.5 -1.0 ft would effectively eliminate, or substantially reduce, the restriction problem. The majority (99 percent) of the restricted boats with "variable draft" capability are in the 1.0 ft (86), 1.5 ft (164), 2.0 ft (247), 2.5 ft (388), and 3.0 ft (130) draft categories (Table 7).

d. Spatial Distribution of Restricted Access Boats

Ten trafficsheds account for 75 percent (1233) of all 1648 restricted boats (Appendix B). The 10 trafficsheds are (number of restricted boats listed in parentheses): Punta Rassa/Connie Mack Island [217], Bokeelia (west) [198], Pine Island Creek [166], Bokeelia (east) [107], Gault Island/Cherry Estates [104], Pine Island Cove/Flamingo Bay [101], Matlacha Isles/Cape Coral (northwest) [95], Matlacha (northwest) [89], Blind Pass [83], and Saint James City (south 1) [73].

An additional 13 trafficsheds, each with 10 or more restricted boats, account for 21 percent of all restricted boats: Roosevelt Channel [56], Sanibel/Tarpon Bay [45], South Seas Plantation [39], Eighth Avenue Canal [38], Burnt Store Marina [36], Saint James City (east) [27], Sanibel/Point Ybel [18], Matlacha (southwest 2) [18], Useppa (north) [17], Saint James City (south 2) [17], Manatee Bay [16], Demere Key [13], and Saint James City (south 3) [11].

Ninety-six percent of all restricted boats are situated in these 23 trafficsheds; the relative proportions of restricted boats at the 23 locations are shown by graduated dots on Figure 6.

e. Channel Restrictions

Approximately 223 statute miles of waterways were surveyed in the Lee County Phase 2 Project area. A total of 62,745 soundings were used to construct channel depth segments for principal travel routes, which include some secondary channels and all trafficshed channels. Principal travel routes were analyzed to determine the location and extent of restrictions (shoals) that impede boat traffic.

To determine the degree to which a channel might impede upstream boat traffic, the MLLW depth of each channel segment was compared to the deepest draft boat located upstream. The summary of channel restrictions presented in Tables 8a, 8b, and 8c were determined on the basis of the deepest draft boat located upstream from each channel segment. A sample of the mapped results (which appear in the trafficshed-scale atlases described on page 5) is shown in Figure 5.

Boat traffic is restricted on approximately 17 percent (38.0 mi.) of the principal travel route waterways. However, 64 percent of the restricted channel length (24.3 mi.) only impedes vessel transit by less than or equal to 0.5 feet at MLLW. The remaining 36 percent of restricted channel length consists of 9.9 mi. that restrict by 1.0 or 1.5 ft, 3.6 mi. that restrict by 2.0 to 2.5 ft, and 0.16 mi. that restrict by 3 ft or greater at MLLW (Table 8).

Forty-nine percent (18.7 miles) of the restricted channel length is found in the 10 trafficsheds that contain 75 percent of all restricted boats (see **7d. Spatial Distribution of Restricted Boats**). The sums of restricted channel lengths for these trafficsheds are: Punta Rassa/Connie Mack Island [1.8 mi], Bokeelia (west) [3.2 mi], Pine Island Creek [1.5 mi], Bokeelia (east) [2.4 mi], Gault Island/Cherry Estates [0.6 mi], Pine Island Cove/Flamingo Bay [1.3 mi], Matlacha Isles/Cape Coral (northwest) [1.5 mi], Matlacha (northwest) [1.3 mi], Blind Pass [2.9 mi], and Saint James City (south 1) [2.2 mi].

An additional 13 trafficsheds, with 10 or more restricted boats, contain 16 percent of all restricted channels (see **7d. Spatial Distribution of Restricted Boats**). The sums of restricted channel lengths for these trafficsheds are: Roosevelt Channel [1.3 mi], Sanibel/Tarpon Bay [0.22 mi], South Seas Plantation [0.15 mi], Eighth Avenue Canal [0.80 mi], Burnt Store Marina [0.40 mi], Saint James City (east) [0.96 mi], Sanibel/Point Ybel [0.24 mi], Matlacha (southwest 2) [0.31 mi], Manatee Bay [0.06 mi], Demere Key [0.59 mi], and Saint James City (south 3) [0.45 mi] (Appendix C).

Twenty-nine percent (11 mi) of restricted channel segments are associated with the secondary waterways of Matlacha Pass that are located outside of trafficsheds, and provide service to two or more trafficsheds and, thus, a higher volume of boat traffic (Table 8b and Figure 7). For reporting purposes, these secondary channels are grouped into: 1) those that lead north from the Matlacha Bridge to Boca Grande Pass, and 2) those that lead south from the Matlacha Bridge to San Carlos Bay.

Thirty-two percent (4.8 mi) of the secondary channels located north of the Matlacha Bridge impede boat traffic at MLLW. However, 71 percent (3.4 mi) of these channels hinder traffic by less than or equal to 0.5 feet; 24 percent (1.2 mi) by 1.0 or 1.5

feet; 4.6 percent (0.2 mi) by 2.0 or 2.5 feet; and 0.3 percent (0.02 mi) by greater than or equal to 3.0 feet MLLW.

The summary restrictions presented in Table 8b for the secondary channels south of the Matlacha Bridge are based on one 6.0 draft sailboat, the deepest vessel recorded south of Matlacha Bridge during the boat census located in the Matlacha (south) trafficshed. Considering this boat, nearly 60 percent (6.2 mi) of secondary channels south of the Matlacha Bridge impede traffic at MLLW: 1.6 miles hinder traffic by less than or equal to 0.5 feet; 2.4 miles by 1.0 or 1.5 feet; 2.2 miles by 2.0 or 2.5 feet; and 0.07 miles by three feet or greater.

Alternative restriction analyses based on different boat drafts may be run using the GIS data provided on the CD-ROM (see section 6. Geographic Information System (GIS) Data Files, Metadata, and Software Application). For instance, only two vessels with draft deeper than 4 feet were logged in the area south of Matlacha Bridge; if they are excluded from the population of boats, then only 13 percent (0.82 mi) of the south secondary channel would impede traffic, and no segment would impose restrictions of more than 1.0 foot at MLLW.

f. Projected Dredging Requirements

Dredging requirements are projected for all trafficsheds (Appendix D). Estimates are based on a 20-foot wide improvement footprint, which conforms with the WCIND "surgical" approach to maintenance dredging adopted for regional waterway management in southwest Florida in order to minimize environmental impacts to bay resources. This improvement footprint, along with the 5 ft margin setbacks for channel markers, is consistent with the WCIND standard of 30 ft wide navigation channels.

Tables 9 and 10 present an analysis for all trafficshed channels and secondary channels in the study region. The ratio of Total Dredge (Tables 9 and 10, right-hand column) to Restricted Boats (Tables 9 and 10, left-hand column) gives a lumped per-boat dredge volume that is applicable within the trafficshed. For example, under the Normal Clearance option (Table 9), Bokeelia (east), with 107 restricted boats and an estimated total dredge of 9354 yd³ (within the trafficshed), would have a per-boat dredge requirement of approximately 87 yd³, whereas Punta Rassa/Connie Mack Island would have an approximate per-boat dredge value of 11 yd³. This ratio is an aggregated value that can be expected to vary within a trafficshed, since restricted boats and channel segments are spatially distributed. Estimates of required dredging were calculated using two scenarios:

- i) Normal (MLLW = 0 ft datum) Depth Clearance (Table 9); and
- ii) Additional Depth Clearance, which requires a 1 ft clearance between lowest point of boat and channel bottom (Table 10).⁹ Dredging amounts are in cubic yards and assume a base channel width¹⁰ of 20 ft.

⁹This may be considered an extended application of the FDEP Rule for Aquatic Preserve Waters, which requires, in non-man-made canals or previously un-dredged portions of coastal streams, a 1 ft

Under Scenario (i) Normal Clearance, the amount of dredge required for a 100-ft channel segment restricted by 1.5 ft, is equal to the restriction amount, multiplied by a 20-ft base channel width, divided by 27 (27 ft³ per yd³), or approximately 111 cubic yards.

$$[100 \text{ ft} \times 1.5 \text{ ft} \times 20 \text{ ft}] / 27 \text{ ft}^3 \text{ per yd}^3$$

Given the above assumptions, the depth of dredge equals the restriction level of the channel, e.g., a 0.0 ft channel restriction level requires no dredging, whereas a channel with a 2.5 restriction level would require a 2.5 ft depth cut.

Under Scenario (ii) Additional Depth Clearance, the same obstruction would require approximately 185 cubic yards:

$$[100 \text{ ft} \times (1.5 \text{ ft} + 1.0 \text{ ft}) \times 20 \text{ ft}] / 27 \text{ ft}^3 \text{ per yd}^3$$

In this case, restricted channel segments would be dredged to the restriction level plus an additional foot, e.g., a somewhat restricted segment (0.5 ft restriction) would be dredged to 0.5 + 1.0 = 1.5 ft.

A comparison of the results between Normal (approximately 99,851 yd³) and Additional (approximately 248,671 yd³) shows that 2.5 times the amount of spoil would need to be removed, overall, to achieve the additional depth clearance. The top 23 trafficsheds (by number of restricted boats) which, combined, contain 96 percent of all restricted boats, represent 55 percent of the Normal dredging needs of the Phase 2 area. Figure 9 shows the locations of these trafficsheds, which are represented on the map by graduated-size dots. The top seven restricted trafficsheds (by required dredge volume) account for 39 percent (38,531 yd³) of projected dredging requirements for Normal Clearance [Bokeelia (east), Blind Pass, Bokeelia (west), Saint James City (south 1), Pine Island Creek, Matlacha (northwest), and Saint James City (south 1)]; and they account for 39 percent (97,324 yd³) for Additional Clearance [Bokeelia (east),

clearance at the dock between the lowest point of the boat hull or fixed drive unit (whichever is lower) and any submerged bottom lands or tops of sea grasses.

¹⁰There is great variation in channel width within the canals and waterways of Lee County. To account for the variation, a base channel width of 20 feet was used to calculate estimated dredge volumes for all restricted channel segments. This 20-foot base channel width, or improvement footprint, will accommodate the majority of recreational boats when two pass abreast of each other. There are locations, however, when a restricted channel will require either a width greater than 20 feet or can only accommodate a narrower width. For example, the marked channels within Estero Bay require a minimum width of 30 feet to accommodate the channel and the placement of navigation aids. To determine an estimated dredge volume that accounts for a wider or narrower channel, simply multiply the estimated dredge volumes contained in the report by the ratio of the required width and the base channel width. For instance, to adjust estimated dredge volumes to account for a required dredge width of 30 feet, multiply the estimated dredge volume within the report by a factor of 1.5 (30 feet / 20 feet). Conversely, to adjust for a 15 ft channel, use a factor of 0.75

Bokeelia (west), Blind Pass, Saint James City (south 1), Pine Island Creek, Punta Rassa/Connie Mack Island, and Matlacha (northwest)].

g. Relation of Boat Accessibility to Channel Restriction

As stated in section d and f, above, 23 trafficsheds contain 96 percent of all restricted boats and 55 percent of the projected Normal dredge for all restricted channels. The boat-channel relations for these locations are shown in Figure 8. Bokeelia (west) stands out from the remaining trafficsheds in terms of combined relative totals, followed by Bokeelia (east), Punta Rassa/Connie Mack Island, Pine Island Creek, and Blind Pass. As a group, these 5 trafficsheds account for 47 percent of restricted boats and 29 percent of estimated total Normal dredge for the Phase 2 project area. For some locations, such as Punta Rassa/Connie Mack Island or Gault Island/Cherry Estates, the estimated dredge requirements are low relative to concentrations of restricted boats. (For trafficshed-specific information on restricted boat counts and channel lengths (ft), see Appendixes B and C).

h. Signage

The study region contains 2005 boating-related signs. Seventy-four percent of all signs (1489) are in trafficsheds. Of all signs, 166 are categorized as for business use, 812 are navigation-type, 311 are categorized as private ownership, 375 post speed regulations, 226 are for resource protection, 29 are for hazard warning, 76 are related to government facilities, and 10 are classified as other. The most common type of sign is "piling" (42 percent) followed by those on structures (34 percent). Tables 11a and 11b detail this information.

9. Special Management Considerations Warranted in Pine Island Sound

Much of Florida's distinctive character lies in the beauty of its natural features, especially its coastlines. Only through careful preservation and management of these resources can the public's continued enjoyment of such activities as boating, swimming and fishing be ensured. To protect these distinctive natural features for the enjoyment of future generations, the Florida Legislature created aquatic preserves. The Pine Island Sound Aquatic Preserve, which covers over 54,000 acres, was designated by the Legislature under the Florida Aquatic Preserve Act of 1975. The area also carries state designations as an Outstanding Florida Waterway, and as Class II and Class III waters. At a national level, Pine Island Sound is designated as an EPA Gulf of Mexico Ecological Management Site (GEMS) and as a National Estuarine Preserve (NEP).

As part of the Department of Environmental Protection's system of Aquatic and State Buffer Preserves, a stringent water quality classification, as identified in section 62-302.700 of the Florida Administrative Codes, governs all activities within the Pine Island Sound Aquatic Preserve. The aquatic preserve status is designed to promote

conservation-oriented use. Permission may be authorized by the state regulatory agency (FDEP), on a case-by-case basis, to carry out water-dependent activities that must have access to sovereign lands and waters, because the activity requires it (e.g., recreation, transportation) and where the use of state land or water is an integral part of the activity. Examples of such cases include: public navigation projects, maintaining existing navigation channels; creating and maintaining commercial or industrial docks, piers, or marinas; creating or maintaining private docks for water access by riparian owners; and maintenance dredging for navigation right-of-way to docks.

A rational management policy for regulating public waterways must balance the needs of users with a careful consideration of natural resources and environmental limitations. An adequate and effective policy will require detailed information, such as boater characteristics or manatee use, in order to make sound management decisions.

10. Conclusions and Recommendations

The waterway management needs of Lee County are uniquely defined by the geography of boat source areas (trafficsheds) and the secondary channels that service the trafficsheds; there are waterways with many boats and areas with few boats. The relations of boat draft to controlling channel depth determine the degree of boat accessibility and channel restrictions. An understanding of these relations is fundamental to developing and implementing rational waterway management policy. The results of this study argue in favor of prioritizing channel improvements based on greatest need; they also highlight conditions within Phase 2 Lee County waters that should guide region-wide bay water use policies. A rational waterway planning policy must address both user needs and environmental limitations.

a. Short-term

1. The Phase 2 study results indicate that the greatest problems of boat access and channel restrictions occur in a relatively few trafficsheds. The trafficsheds that contain the greatest numbers of restricted boats are Punta Rassa/Connie Mack Island, Bokeelia (west), Pine Island Creek, Bokeelia (east), Gault Island/Cherry Estates, Pine Island Cove/Flamingo Bay, Matlacha Isles/Cape Coral (northwest), Matlacha (northwest), Blind Pass, and Saint James City (south 1); they account for 75 percent of the boat access problems and 49 percent of the channel restrictions. Lee County should concentrate initial waterway management efforts at these locations. Another 13 waterways [Roosevelt Channel, Sanibel/Tarpon Bay, South Seas Plantation, Eighth Avenue Canal, Burnt Store Marina, Saint James City (east), Sanibel/Point Ybel, Matlacha (southwest 2), Useppa (north), Saint James City (south 2), Manatee Bay, Demere Key, and Saint James City (south 3)] account for an additional 21 percent of the boat access problems and 16 percent of the channel restrictions. In some cases, such as Punta Rassa/Connie Mack Island or Gault Island/Cherry Estates, relatively short segments of channel restrictions impede relatively large numbers of boats: the

high benefit-to-cost ratio is an incentive to make channel improvements at these locations.

2. Secondary access channels in Matlacha Pass serve several trafficsheds and are heavily used by boaters to gain access to deep, open waters. The relatively high volume of boat traffic traversing these arteries makes them strong candidates for maintenance dredging. The secondary channels in Matlacha Pass pose restrictions for 70 boats (10 percent of boats in the Matlacha Pass vicinity) and account for 29 percent of the total length of restricted channels. It is important to note that the majority of secondary channel restrictions (6.2 mi) are located in South Matlacha Pass, and these restrictions are based on one 6.0-foot draft vessel recorded during the boat census. (Alternative restriction analyses based on different boat drafts may be run using the GIS data provided on the CD-ROM. For instance, only two vessels with draft deeper than 4 feet were logged in the area south of Matlacha Bridge; if they are excluded from the population of boats, then only 13 percent (0.82 mi) of the south secondary channel would impede traffic, and no segment would impose restrictions of more than 1.0 foot at MLLW.)

3. Additional assessment of the needs and operating habits of the deep-draft commercial shrimp boats that dock on the north side of Matlacha should be considered in relation to secondary channel restrictions.

4. The waterway inventory information in the project's GIS database has value and application beyond the bay water planning and management results presented in this report. This information should be reformatted and provided to shorefront residents and boaters in the trafficsheds targeted for waterway improvements, as Waterway Maps, showing channel center-line depths, boat facilities, and natural resource conditions. (The WCIND and FSG have produced similar maps of anchorages.) This information can sensitize users to the environmental conditions of the waterways and provide a basis for instilling stewardship and responsible boating practices.

5. Lee County should consider implementing these recommendations under the Memorandum of Agreement (MOA) for Regional Waterway Systems Management (Appendix A). This MOA is designed to offer local governments and local waterfront community organizations a mechanism to effect regional waterway improvements within an ecosystem, place-based management approach. The MOA provides an avenue for pursuing region-wide permit review and project applications. A proposal should be submitted to the FDEP that is countywide in coverage and comprehensive in scope. The proposal should be based on the results from Phase 1 (Estero Bay); Phase 2 (Pine Island Sound Basin); and Phase 3 (Caloosahatchee River and Cape Coral), which is currently in progress.

b. Long-term

6. Lee County and the WCIND have an investment in this Regional Waterway Management System. This system should be maintained and enhanced in order to respond to the county's growing needs for rapid assessment and comprehensive geographic analysis of its bay water resources.

7. The Regional Waterway Management System can be strengthened by linkage to the county's upland databases, which will facilitate response to more complex issues that transcend land-water boundaries. For example, sediment sources could be identified and their relative contribution to waterway shoaling quantified. This would allow for a more equitable distribution of maintenance dredging costs among those charged with waterway maintenance and those who contribute to shoaling.

8. The Regional Waterway Management System database should be updated periodically with countywide boat information. The WCIND has developed a preliminary plan based on revising the annual Vessel Registration Form. This plan, to incorporate information on boat type, draft and location onto the form, offers a systematic updating method that should be pursued through the County Tax Collector's Office and the State Division of Motor Vehicles.

9. The bathymetric surveys should be updated, as needed, to identify shoaling conditions of the waterways. The WCIND is collaborating, through Florida Sea Grant, with the National Oceanic and Atmospheric Administration (NOAA) Marine Chart Division in a program to redesign coastal charts for recreational waterway users. There are opportunities for Lee County to partner with this federal charting agency and thereby share survey information on a periodic basis.

10. The appropriate County department should be provided with the GIS equipment, software, and training to carry out waterway inventory and analysis, in order to respond to routine customer requests for information and technical services. The Florida Cooperative Extension Service and State University System should continue to provide institutional and professional support.

11. A measure of the success of the regional waterway management program is whether technical results are translated into meaningful benefits for local communities. A program that includes a strong boater education component will best address the diverse management needs of Estero Bay. The Lee County Marine Agent, a recently created extension education position that is jointly funded by Lee County and the University of Florida Sea Grant Program, is a timely resource for the dissemination of Project results at the local, community level. The Marine Agent can work with interested waterfront communities to help maintain their waterways, providing assistance in the form of project data, technical support, workshops, and field site inspections. Networking the community with permitting agencies and contractors, in order to develop community-based strategies to restore and maintain waterway resources, will increase

the effectiveness of the Marine Agent. Boaters can play an active, critical role in determining whether to boat in a given area, what type of boating should occur, and what level of intervention is necessary.

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Table 1. Distribution of Boats by Trafficshed Types for Lee County Phase 2.

Trafficshed Type	Trafficshed Count	Column Percent	Boat Count	Column Percent
Zero Boats*	1	2%	0	0%
1 to 10 Boats	8	18%	45	0.6%
>10 to 100 Boats	14	32%	701	9%
>100 to 500 Boats	16	36%	3851	49%
>500 Boats	5	11%	3307	42%
Total:	44	100%	7904	100%

Note: Seven boats are in Useppa Anchorage, which is not a trafficshed.

*Boca Grande Commercial; no vessels were present at time of survey.

Table 2. Counts of Boat Types for Lee County Phase 2.

Boat Type	Boat Counts	Column Percent
Recreational Fishing	3265	41%
Open Utility	1184	15%
Speed	1076	14%
Kayak/Row/Canoe	714	9%
Sail	711	9%
Power Cabin/Trawler	570	7%
Other*	261	3.3%
Personal Water Craft	130	1.6%
Total:	7911	100%

**"Other" includes vessels in the following categories:

Market Fish, Houseboat, Excursion, Barge, Tug, and other working vessels.

This table excludes 16 derelict vessels tallied in the survey.

Table 3. Distribution of Boat Facilities for Lee County Phase 2.

Facility Type	Count	Column Percent
Anchorage	12	0.3%
Government	7	0.2%
Industrial	11	0.2%
Marina/Yard/Club	33	0.7%
Motel/Hotel/Restaurant/Shop	58	1.3%
Multi-Family Residential	159	3.5%
Other*	17	0.4%
Single Family Residential	4245	93.5%
Total	4542	100.0%

*Vacant commercial or community properties

Table 4. Boat Access Levels for Lee County Phase 2.

Access Level	Boats	Column Percent
All Boats	7911	100%
Unrestricted Boats	6266	79%
Restricted Boats	1645	21%
Somewhat Restricted	1269	77%
Restricted	319	19%
Severely Restricted	50	3%
Blocked	7	0.4%

Boat access levels refer to the difference between a boat's draft and the depth (MLLW) of the shallowest, downstream channel segment:

Somewhat Restricted: 0.0 feet or 0.5 feet deeper.
 Restricted: 1.0 feet or 1.5 feet deeper.
 Severely Restricted: 2.0 feet or 2.5 feet deeper.
 Blocked: 3.0 feet or more deeper.

Table 5. Number of Restricted Boats and Levels of Access by Boat Draft Category for Lee County Phase 2.

Draft Category	Boats	Column Percent
Shallow	367	22%
Medium	1037	63%
Deeper	241	15%
Total	1645	100%

Shallow: 0.5 to 1.5 feet
 Medium: 2.0 to 3.5 feet
 Deeper: 4.0 feet and greater

Table 6. Variable Draft Capability of Restricted Boats for Lee County Phase 2.

Restriction Level	Boats	Variable Draft		Percent Boats Variable Draft
		No	Yes	
Somewhat Restricted	1267	435	832	66%
Restricted	319	141	178	56%
Severely Restricted	49	34	15	31%
Blocked	7	7	0	0%
Total Restricted Boats	1642	617	1025	62%
Percent of Column Total	100	38	62	

Note: The variable-draft category of three restricted boats is unknown.

Table 7. Variable Draft Capability by Boat Draft for Restricted Boats in Lee County Phase 2.

Draft (feet)	Boats	Variable Draft		Row Percent
		No	Yes	
0.5	94	92	2	2%
1.0	107	21	86	80%
1.5	165	1	164	99%
2.0	294	49	245	83%
2.5	427	37	390	91%
3.0	232	102	130	56%
3.5	82	77	5	6%
4.0	97	97	0	0%
4.5	47	46	1	2%
5.0	34	33	1	3%
5.5	21	20	1	5%
6.0	36	36	0	0.0%
6.5	3	3	0	0.0%
7.0	3	3	0	0.0%
Total	1642	617	1025	62%

Note: Row and column percentages are based on the number of restricted boats with variable draft capabilities.

Table 8. Channel Restrictions for Lee County Phase 2.

a. Trafficked Channels.

Restriction Level	Length (feet)	Column Percent	Percent of Total ¹
All Channels	1,039,606	100%	88%
Unrestricted Channels	897,204	86.3%	76.2%
Restricted Channels	142,402	13.7%	12.1%
Somewhat Restricted	101,892	71.6%	8.7%
Restricted	33,785	23.7%	2.9%
Severely Restricted	6,352	4.5%	0.5%
Blocked	373	0.3%	0.0%

b. Secondary Channels Serving Two or More Trafficsheds.

Restriction Level	North Matlacha Pass to Boca Grande Pass			South Matlacha Pass			All Secondary channels		
	Length (feet)	Column Percent	Percent of Total ¹	Length (feet)	Column Percent	Percent of Total ¹	Length (feet)	Column Percent	Percent of Total ¹
All Channels	81,429	100%	7%	56,328	100%	5%	137,757	100%	12%
Unrestricted Channels	55,834	68.6%	4.7%	23,419	41.6%	2.0%	79,253	57.5%	6.7%
Restricted Channels	25,595	31.4%	2.2%	32,909	58.4%	2.8%	58,504	42.5%	5.0%
Somewhat Restricted	18,137	70.9%	1.5%	8,294	25.2%	0.7%	26,431	45.2%	2.2%
Restricted	6,206	24.2%	0.5%	12,523	38.1%	1.1%	18,729	32.0%	1.6%
Severely Restricted	1,168	4.6%	0.1%	11,711	35.6%	1.0%	12,879	22.0%	1.1%
Blocked	84	0.3%	0.0%	381	1.2%	0.0%	465	0.8%	0.0%

c. Trafficked and Secondary Channels Combined.

Restriction Level	Length (feet)	Column Percent	Percent of Total ¹
All Channels	1,177,363	100%	100%
Unrestricted Channels	976,457	82.9%	82.9%
Restricted Channels	200,906	17.1%	17.1%
Somewhat Restricted	128,323	63.9%	10.9%
Restricted	52,513	26.1%	4.5%
Severely Restricted	19,231	9.6%	1.6%
Blocked	838	0.4%	0.1%

Restriction Level Refers to the difference between a channel segment depth (MLLV) and the deepest draft boat located upstream from the segment:

- Somewhat Restricted: 0.0 feet or 0.5 feet shallower.
- Restricted: 1.0 feet or 1.5 feet shallower.
- Severely Restricted: 2.0 feet or 2.5 feet shallower.
- Blocked: 3.0 feet or more shallower.

¹Percentage of the total length of all channels in the study area (224 miles).

**Table 9. Lee County Phase 2 Projected Dredge Requirements for Restricted Channels
Normal Clearance - (Cubic Yards)**

Trafficshed or Secondary Channels	Restricted Boats	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
ALL Trafficsheds and Secondary Channels	1,645	20,784	46,623	30,580	1,863	99,851
South Matlacha Pass	0	1,726	11,583	18,801	848	32,958
North Matlacha Pass/Boca Grande Pass	0	2,545	5,744	1,840	186	10,316
Bokeelia (east)	107	1,562	5,105	2,687	0	9,354
Blind Pass	83	2,035	3,464	1,149	0	6,648
Bokeelia (west)	198	2,386	1,405	1,604	472	5,867
Saint James City (south 1)	73	1,164	3,444	443	0	5,051
Pine Island Creek	166	896	3,382	471	0	4,749
Matalacha (northwest)	89	495	2,337	893	0	3,724
Saint James City (east)	27	382	2,137	619	0	3,138
Matlacha Isles/Cape Coral (northwest)	95	907	1,434	387	0	2,728
Punta Rassa/Connie Mack Island	217	1,234	828	227	0	2,289
Roosevelt Channel	56	798	726	352	155	2,031
Eighth Avenue Canal	38	555	1,147	300	0	2,002
Pine Island Cove/Flamingo Bay	101	1,079	348	0	0	1,428
Saint James City (south 3)	11	208	794	0	0	1,002
Gault Island/Cherry Estates	104	202	540	94	0	836
Saint James City (south 2)	17	312	360	108	0	780
Pelican Bay	8	381	309	0	0	690
South Seas Plantation	39	12	275	146	203	636
Useppa (north)	17	12	319	279	0	609
Sanibel/Tarpon Bay	45	164	411	0	0	575
Demere Key	13	355	137	0	0	493
Matlacha (southwest 2)	18	371	109	0	0	481
Cabbage Key	4	43	189	138	0	370
Boca Grande	9	197	37	0	0	233
Burnt Store Marina	36	218	0	0	0	218
Pineland	2	169	0	0	0	169
Sanibel/Point Ybel	18	118	0	0	0	118
Cayo Costa (north)	2	81	0	0	0	81
Sanibel (northwest)	7	78	0	0	0	78
Manatee Bay	16	60	0	0	0	60
Tropical Point	2	0	59	0	0	59
Matlacha (southwest 3)	6	0	0	42	0	42
Useppa (southwest 2)	1	39	0	0	0	39
Safety Harbor	2	0	0	0	0	0
Matlacha (southeast)	7	0	0	0	0	0

Trafficshed or Secondary Channels	Restricted Boats	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
ALL Trafficsheds and Secondary Channels	1,645	20,784	46,623	30,580	1,863	99,851
Cayo Costa (south)	7	0	0	0	0	0
Gasparilla (2)	1	0	0	0	0	0
Mondongo Island	1	0	0	0	0	0
Matacha (southwest 1)	1	0	0	0	0	0
Boca Bay	0	0	0	0	0	0
Boca Grande Commercial	0	0	0	0	0	0
Useppa (southwest 1)	0	0	0	0	0	0
North Captiva at Redfish Pass	0	0	0	0	0	0
South Seas Plantation (north)	0	0	0	0	0	0
Gasparilla (1)	1	0	0	0	0	0
	1,645	20,784	46,623	30,580	1,863	99,851

**Table 10. Lee County Phase 1 Projected Dredge Requirements for Restricted Channels
Additional Depth (1 ft.) Clearance - (Cubic Yards)**

Trafficsheds and Secondary Channels	Restricted Boats	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
ALL Trafficsheds and Secondary Channels	1,645	115,839	85,522	44,826	2,484	248,671
South Matlacha Pass	0	7,869	20,859	27,476	1,130	57,335
North Matlacha Pass/Boca Grande Pass	0	15,980	10,341	2,705	248	29,275
Bckeelia (east)	107	5,744	9,118	3,959	0	18,821
Bokeelia (west)	198	12,742	2,724	2,305	629	18,400
Blind Pass	83	9,615	6,574	1,689	0	17,878
Saint James City (south 1)	73	6,781	6,235	664	0	13,680
Pine Island Creek	166	3,046	6,699	691	0	10,436
Punta Rassa/Connie Mack Island	217	7,265	1,608	341	0	9,213
Matlacha (northwest)	89	3,275	4,282	1,339	0	8,896
Matlacha Isles/Cape Coral (northwest)	95	5,405	2,691	581	0	8,677
Roosevelt Channel	56	5,093	1,319	517	207	7,136
Saint James City (east)	27	2,295	3,706	907	0	6,908
Pine Island Cove/Fiamingo Bay	101	5,838	697	0	0	6,535
Eighth Avenue Canal	38	2,652	2,010	450	0	5,112
Gault Island/Cherry Estates	104	2,056	1,054	141	0	3,251
Pelican Bay	8	2,311	601	0	0	2,912
Saint James City (south 2)	17	2,022	704	162	0	2,888
Demere Key	13	2,542	258	0	0	2,801
Saint James City (south 3)	11	1,288	1,492	0	0	2,780
Burnt Store Marina	36	1,773	0	0	0	1,773
Matlacha (southwest 2)	18	1,492	218	0	0	1,710
Useppa (north)	17	552	556	419	0	1,527
Pineland	2	1,474	0	0	0	1,474
Sanibel/Tarpon Bay	45	659	762	0	0	1,422
South Seas Plantation	39	241	478	215	270	1,205
Boca Grande	9	1,031	73	0	0	1,104
Sanibel/Point Ybel	18	1,042	0	0	0	1,042
Cabbage Key	4	213	345	201	0	759
Sanibel (northwest)	7	736	0	0	0	736
Cayo Costa (north)	2	632	0	0	0	632
Tropical Point	2	245	118	0	0	363
Matlacha (southwest 1)	1	356	0	0	0	356
Useppa (southwest 2)	1	301	0	0	0	301
Manatee Bay	16	295	0	0	0	295
Safety Harbor	2	261	0	0	0	261
Cayo Costa (south)	7	237	0	0	0	237

Trafficsheds and Secondary Channels	Restricted Boats	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
ALL Trafficsheds and Secondary Channels	1,645	115,839	85,522	44,826	2,484	248,671
Mondongo Island	1	205	0	0	0	205
Mattacha (southwest 3)	6	115	0	64	0	178
Gasparilla (2)	1	104	0	0	0	104
Gasparilla (1)	1	54	0	0	0	54
Mattacha (southeast)	7	0	0	0	0	0
Boca Bay	0	0	0	0	0	0
Boca Grande Commercial	0	0	0	0	0	0
Useppa (southwest 1)	0	0	0	0	0	0
North Captiva at Redfish Pass	0	0	0	0	0	0
South Seas Plantation (north)	0	0	0	0	0	0
	1,645	115,839	85,522	44,826	2,484	248,671

Table 11. Distribution of Boating-Related Signs for Lee County Phase 2.

a. Categories of Signs.

Sign Category	Count	Column Percent
Business	166	8%
Government	76	4%
Hazard Warning	29	1%
Navigation Guide	812	40%
Other	10	0%
Private Ownership	311	16%
Resource Protection	226	11%
Speed Regulation	375	19%
Total	2005	100%

b. Types of Signs.

Sign Type	Count	Column Percent
Buoy	12	0.6%
Float	78	3.9%
Other	169	8.4%
Structure	671	33.5%
Pilings	1075	53.6%
Concrete	17	0.8%
Metal	61	3%
PVC	211	11%
Wood	786	39%
Total	2005	100.0%

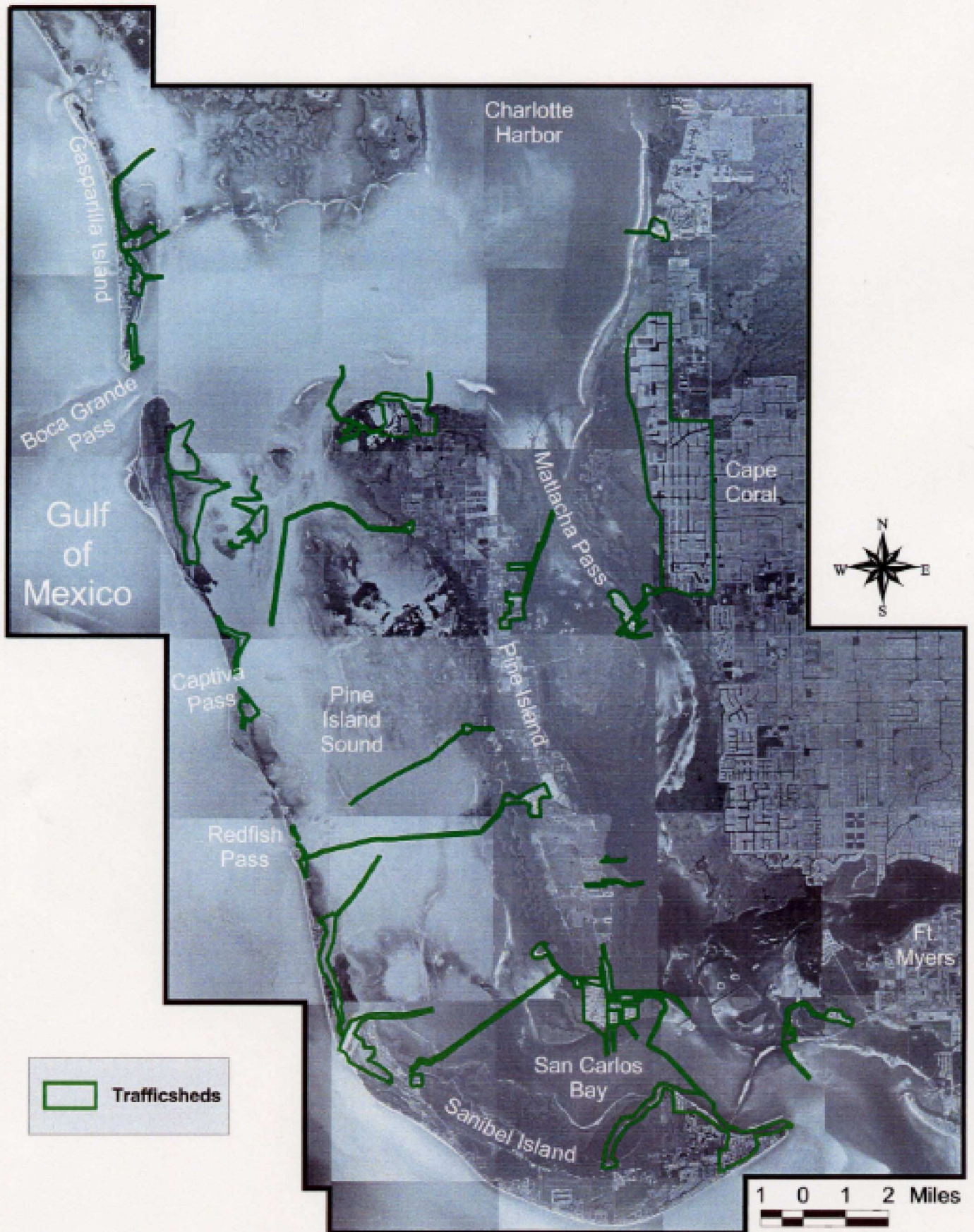


Figure 1. Lee County Phase 2 Project Area

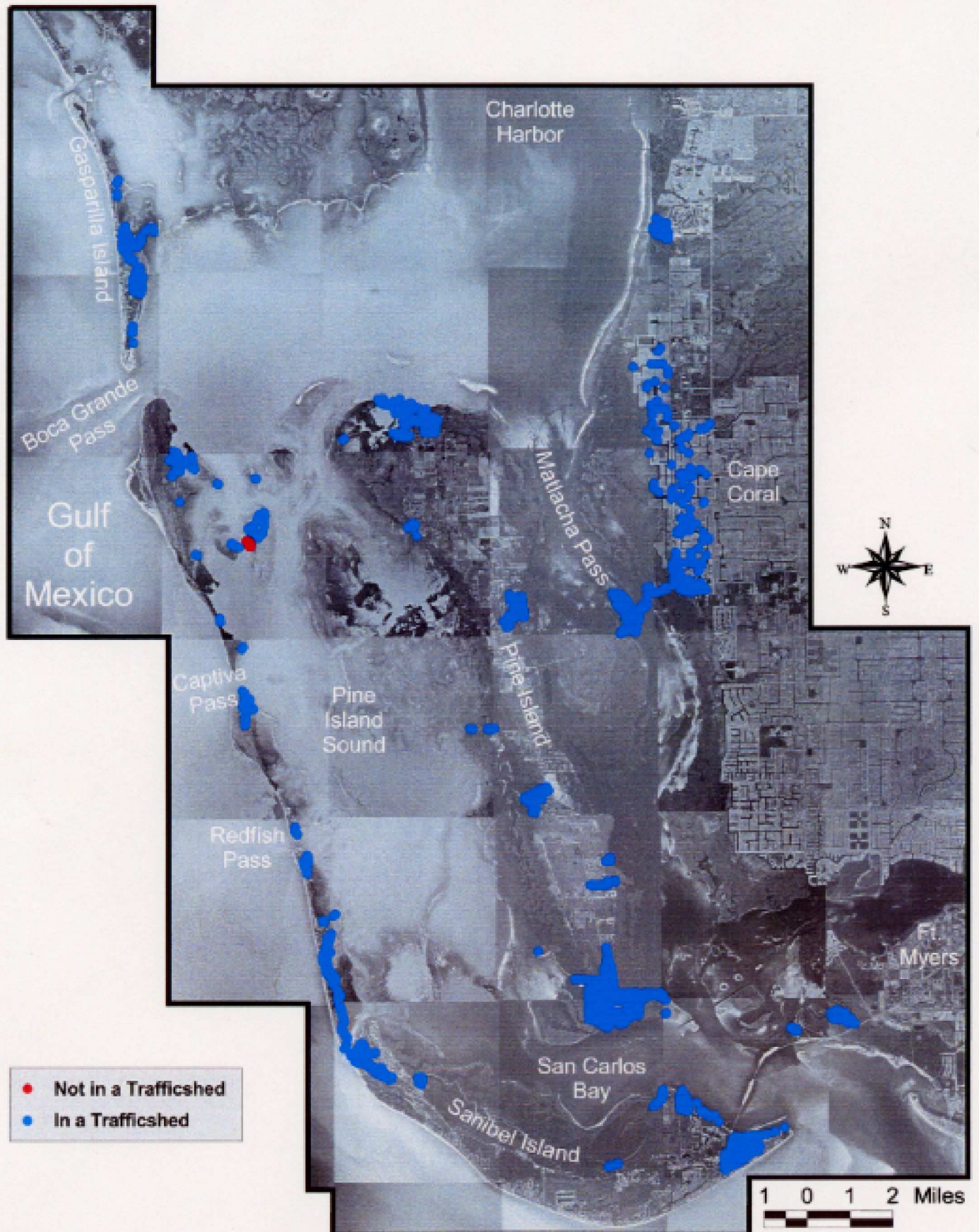


Figure 2. Lee County Phase 2 Boat Distribution

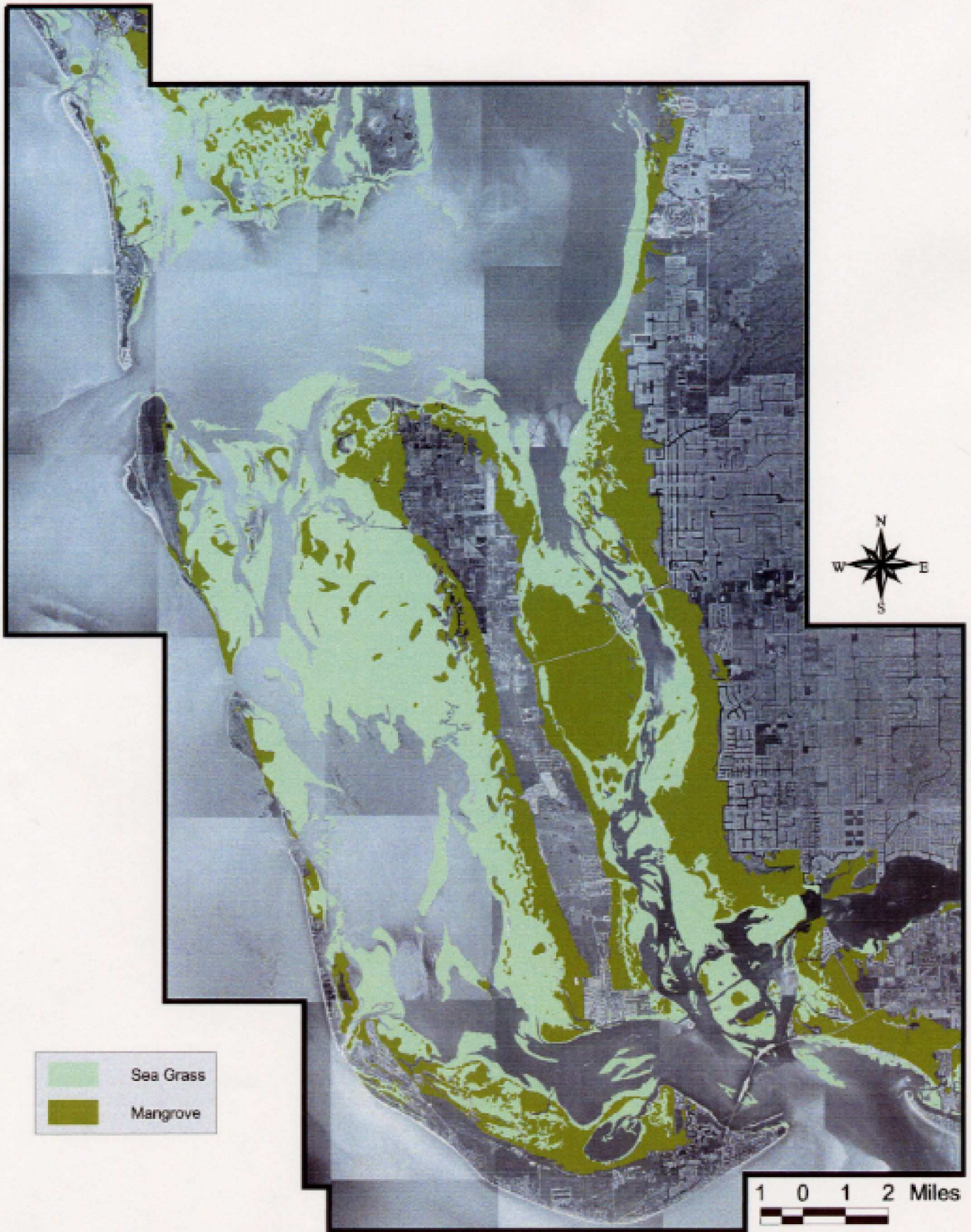


Figure 3. Approximate Distribution of Major Mangrove and Sea Grass Communities for Lee County Phase 2 Study Area

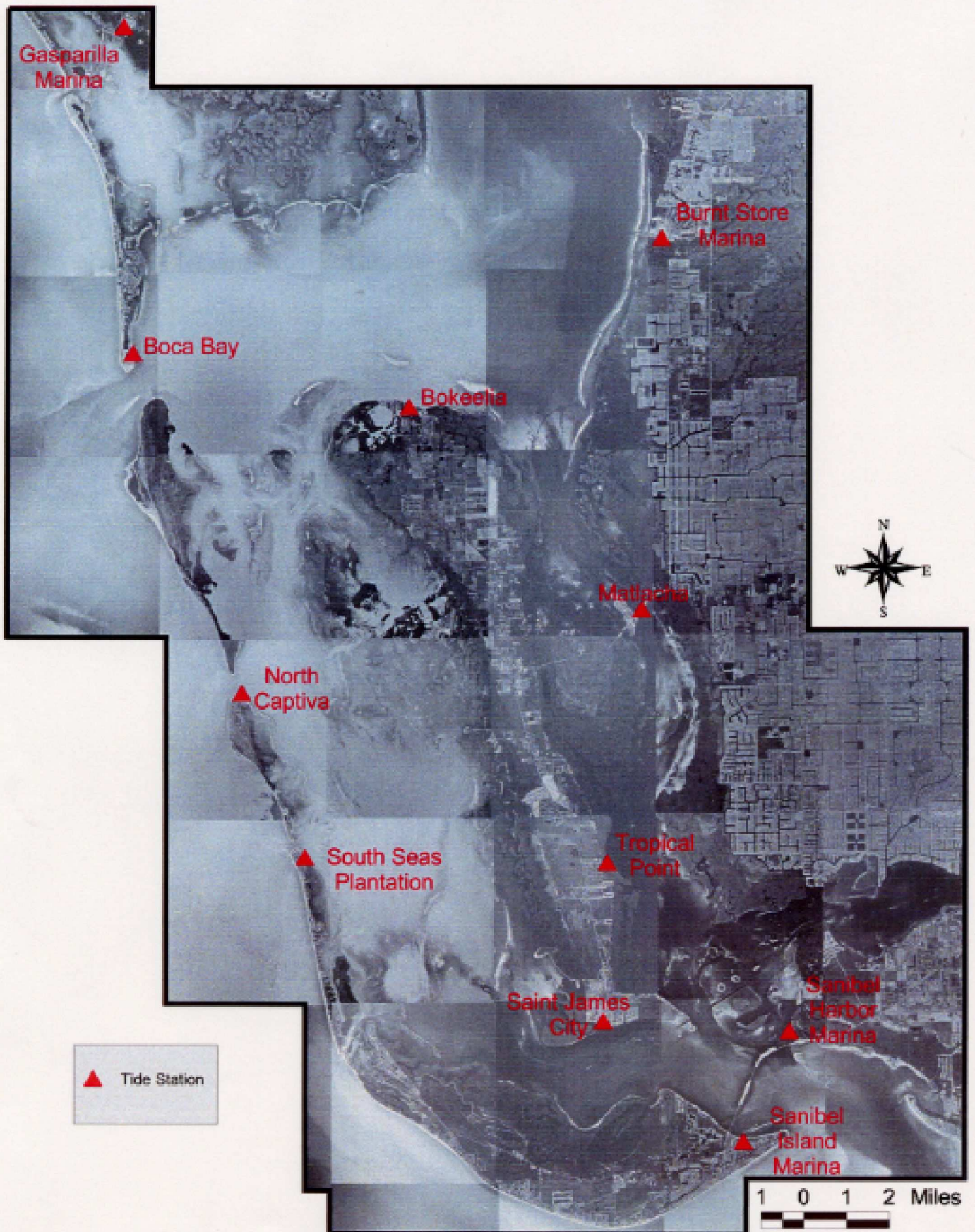


Figure 4. Locations of Tide Stations Used to Correct Depths to MLLW for Lee County Phase 2

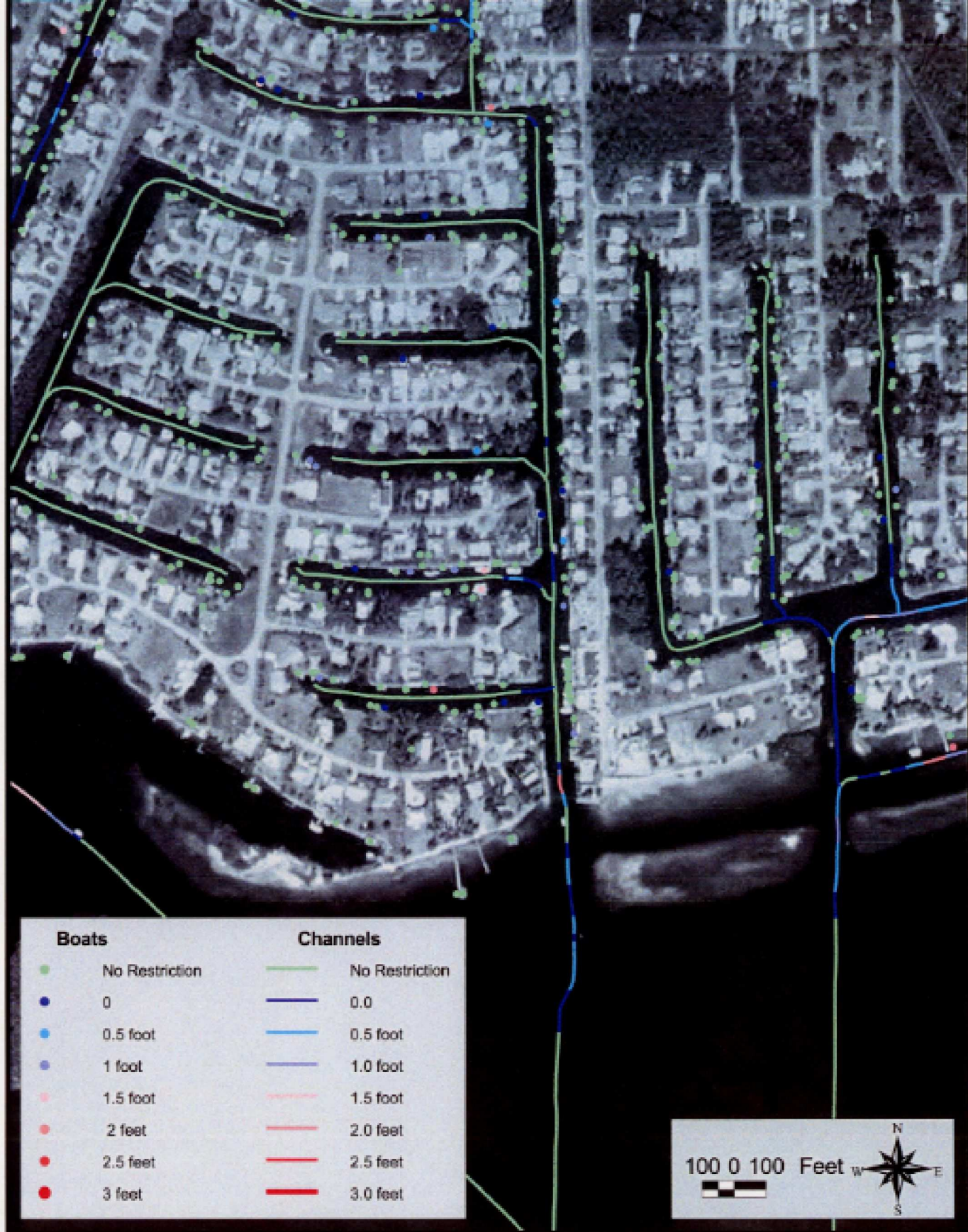


Figure 5. Example of Analysis Results, Showing Restricted Boats and Channels

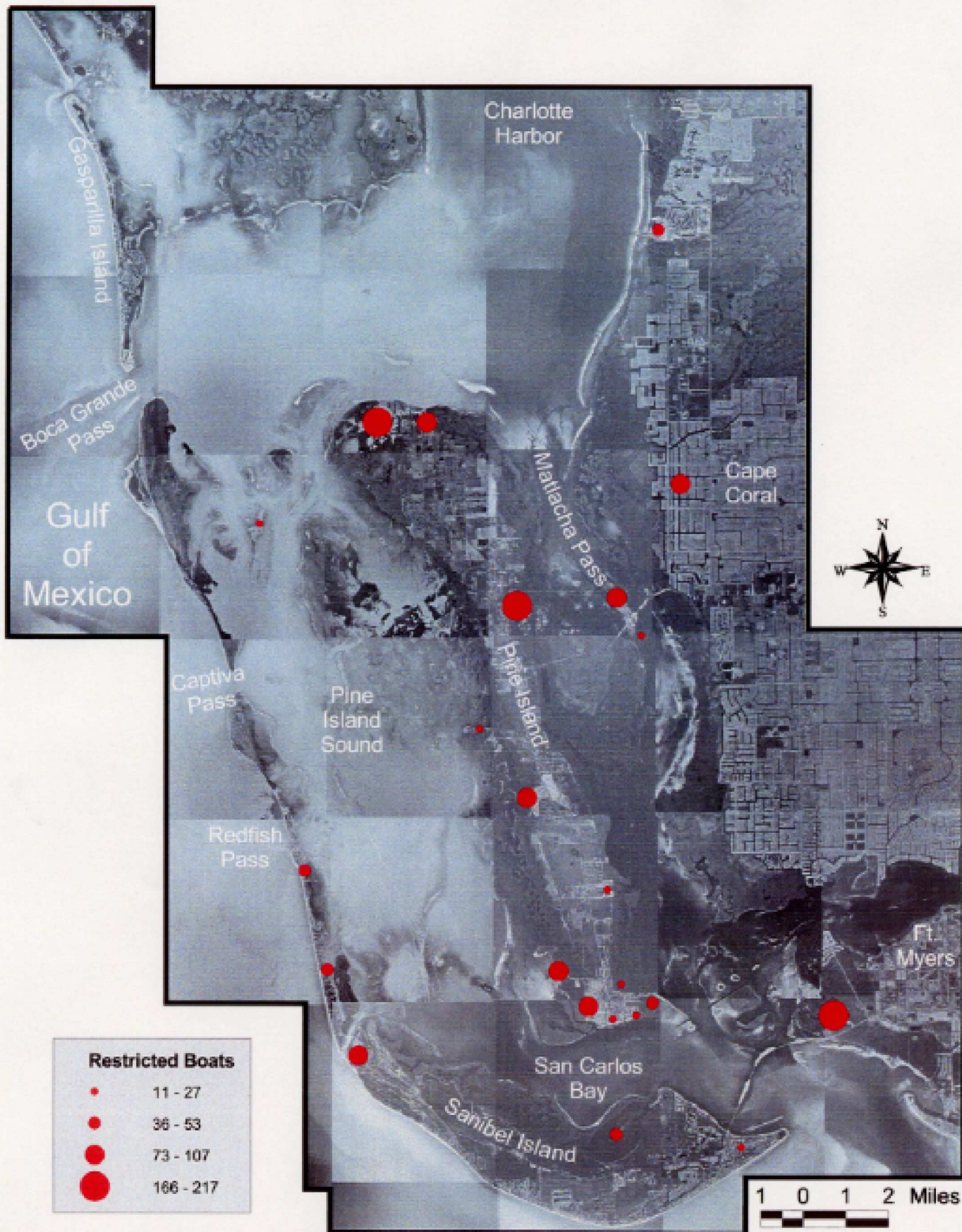


Figure 6. Top Restricted Trafficsheds for Lee County Phase 2, According to Number of Restricted Boats

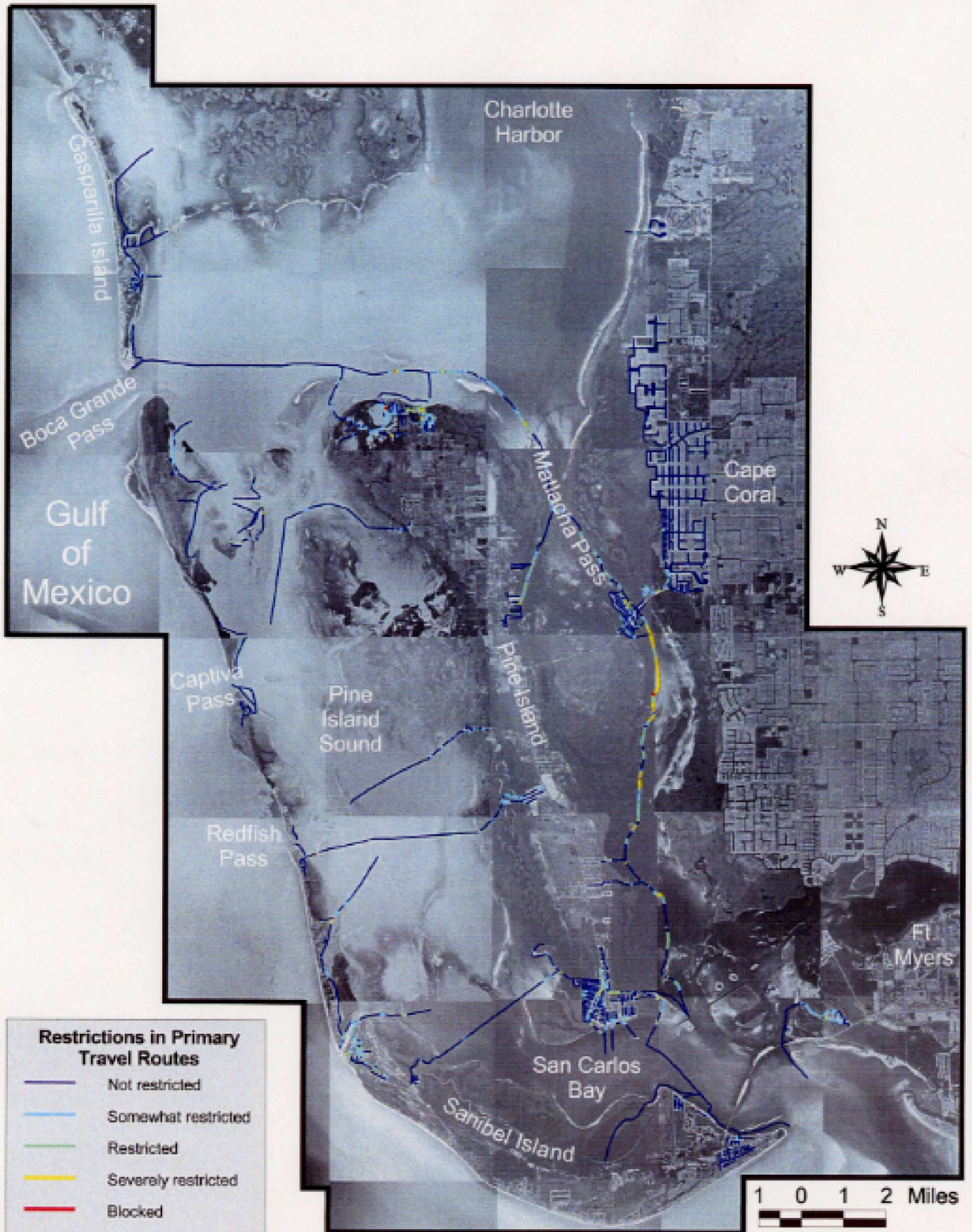


Figure 7. Restrictions in Principal Travel Routes for Lee County Phase 2

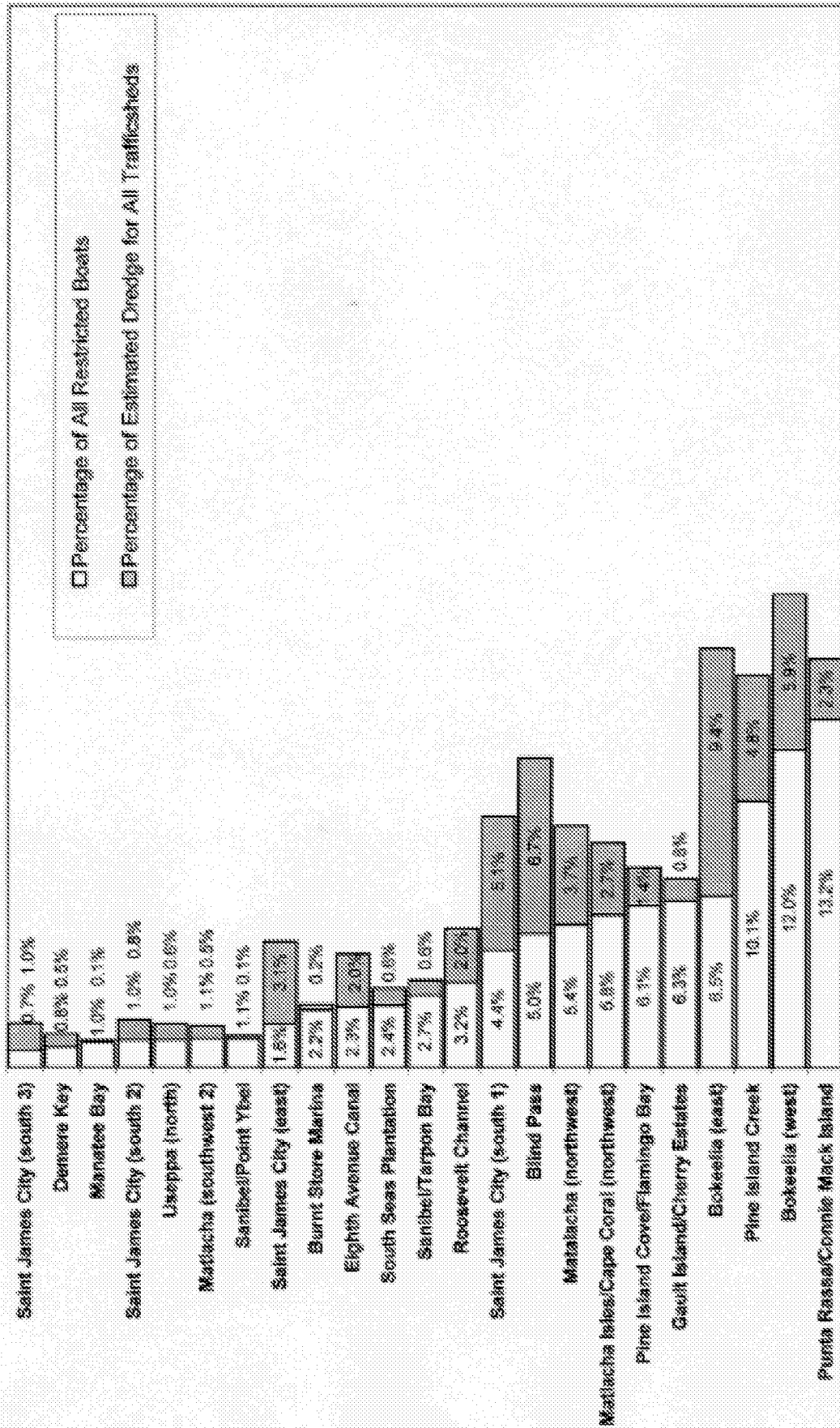


Figure 8. Distribution of Restricted Boats and the Estimated Dredge for Normal Clearance in Trafficsheds with Ten or More Restricted Boats in Lee County Phase 2 Project Area

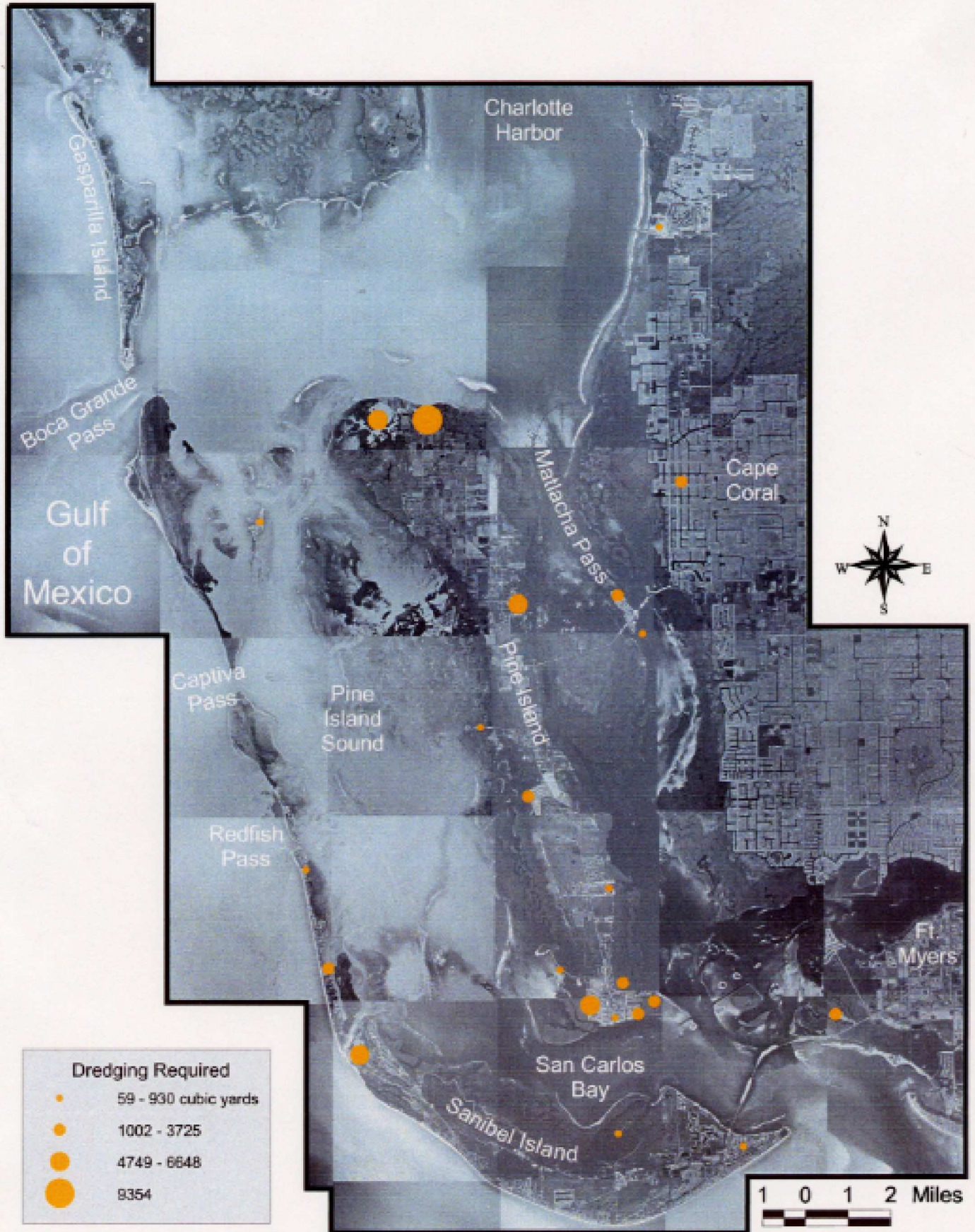


Figure 9. Top Restricted Trafficsheds for Lee County Phase 2 and Estimated Dredge for Normal Clearance

Appendix A
Memorandum of Agreement

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 College Program and the West Coast Inland Navigation District, and included herein as Attachment I.

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 includes 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 modified 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 all parties to this agreement will actively seek their participation.
- F. This agreement serves as a basis and commitment to enter into an agreement in order to take on regional approach with all affected parties to accomplish the objectives of ecosystem management.

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Memorandum of Agreement
Southwest Florida Waterway Management
Page 3 of 3

IN WITNESS WHEREOF, his memorandum of agreement has been executed by the undersigned duly authorized parties on 26 September, 1997.


Department of Environmental Protection


Virginia B. Wetherell
Secretary

Florida Sea Grant College Program


James C. Cato, Ph.D.
Director

West Coast Inland Navigation District


Charles W. Listowski
Executive Director

Attachment 1
A Regional Waterway Management System (Plan)
for Southwest Florida

A. Introduction and Background

Florida's coasts have been transformed over the past two decades as population growth and unprecedented demand for individual shore access to bays and estuaries have led to the creation of residential canal developments. Thousands of miles of channels and basins have been dredged as a by-product of this urbanization process. These navigable waterways are being stressed by boat traffic and canalside activities. Southwest Florida's boating population is increasing at twice the state's rate of change and the region's coastal population is experiencing double the national growth rate. Resource managers, scientists and informed users agree that a holistic, place-based region-wide system is needed to deal with waterway problems associated with channel maintenance, habitat restoration, traffic and signage, and boat maintenance. Such a system can ensure safe, environmentally sustainable waterways for the boating public. Implementation of this system provides a continued opportunity to demonstrate the feasibility of the non-regulatory approach to waterway management on a regional basis.

B. Management Goals

The overall goal of this management initiative is to preserve the ecological and recreational values of southwest Florida waterways. Achieving success will require the following:

- fitting channel maintenance to boat draft requirements
- minimizing impacts on surrounding bay habitats
- prioritizing and evaluating management alternatives on a regional basis
- developing maintenance standards for secondary/arterial waterways
- 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.
- providing waterway communities and boating organizations with information and technical support to enable them to take an active role in managing their waterways

These goals will be 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.

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

B. Creating the Regional Waterway Management System

The Gulf Intracoastal Waterway System (GICW) was dedicated in 1967 prior to most of the coastal development in evidence today. Over the past 30 years, the need has grown for the development and maintenance of appropriate secondary access channels to accommodate boat traffic from residential waterways to the arterial GICW, bays, estuaries, and Gulf waters. The WCIND recognizes the need to provide data for proper decision-making. The WCIND also acknowledges the need for productive agency partnerships to provide cost-efficient public service/resource preservation.

- WCIND to establish the Regional Waterway Management system (RWMS) via a M.O.A.
- Define the RWMS and System Components
 - Data Sources
 - Information Coordination and Storage
 - Analysis (cartographic, statistical, carrying capacity, simulation)
 - Output (map, policy)
 - Application (region, county, local community)

A. Participants and Their Roles

- Florida Department of Environmental Protection
 - Adopt FSG/WCIND data base initiatives
 - Regional permit review and approval
 - Local site technical evaluation/cooperative effort
- Florida Sea Grant
 - Field surveying
 - GIS inventory and evaluation
 - Regional waterway planning
 - Publication and dissemination of map and guide products to boaters and shore residents
 - Technical support to waterway communities in local planning and site evaluation
- West Coast Inland Navigation District
 - Coordination of RWMS
 - Networking with counties and municipalities
 - Funding of public waterway projects through its Waterway Development Program

Page 3.

- **Other Participants**
 - **Waterfront homeowners associations (and informal groups)**
 - **Local boating organizations**

CWL:mms
9/12/97

Appendix B

Restricted Boats by Access Categories

Appendix B

Restricted Boats by Access Categories

Trafficshed Number	Trafficsheds or Boats Associated with Secondary Channels	Number of Boats				All Restricted
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	
32	Punta Rassa/Connie Mack Island	193	21	3		217
43	Bokeelia (west)	172	23	2	1	198
41	Pine Island Creek	82	72	12		166
42	Bokeelia (east)	84	18	5		107
24	Gault Island/Cherry Estates	72	30	2		104
20	Pine Island Cove/Fleming Bay	92	9			101
40	Matlacha Isles/Cape Coral (northwest)	90	3	2		95
39	Matlacha (northwest)	66	18	2	3	89
22	Blind Pass	46	31	6		83
25	Saint James City (south 1)	48	22	3		73
21	Roosevelt Channel	38	11	6	1	56
30	Sanibel/Tarpon Bay	38	7			45
19	South Seas Plantation	16	21	1	1	39
28	Eighth Avenue Canal	32	5	1		38
44	Burnt Store Marina	36				36
29	Saint James City (east)	18	8	1		27
31	Sanibel/Point Ybel	18				18
36	Matlacha (southwest 2)	15	3			18
9	Useppa (north)	16		1		17
26	Saint James City (south 2)	12	4	1		17
33	Manatee Bay	16				16
16	Demere Key	8	5			13
27	Saint James City (south 3)	9	2			11
3	Boca Grande	9				9
6	Pelican Bay	7	1			8
14	Cayo Costa (south)	7				7
23	Sanibel (northwest)	7				7
38	Matlacha (southeast)	2	4	1		7
37	Matlacha (southwest 3)	5			1	6
12	Cabbage Key	3		1		4
13	Pineland	2				2
7	Cayo Costa (north)	2				2
15	Safety Harbor	2				2
34	Tropical Point	1	1			2
1	Gasparilla (1)	1				1
2	Gasparilla (2)	1				1
8	Mondongo Island	1				1
11	Useppa (southwest 2)	1				1
35	Matlacha (southwest 1)	1				1
4	Boca Bay					0
5	Boca Grande Commercial					0
10	Useppa (southwest 1)					0

Trafficshed Number	Trafficsheds or Boats Associated with Secondary Channels	Number of Boats				All Restricted
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	
17	North Captiva at Redfish Pass					0
18	South Seas Plantation (north)					0
-998	South Matacha Pass					0
-999	North Matacha Pass/Boca Grande Pass					0
Total		1,269	319	50	7	1,645

Appendix C

Restricted Channels by Access Categories

Appendix C Restricted Channels by Access Categories

Trafficshed Number	Trafficsheds and Secondary Channels	Channel Length (feet)				All Restricted
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	
32	Punta Rassa/Connie Mack Island	8,141	1,053	153		9,348
43	Bokeelia (west)	13,980	1,781	946	212	16,920
41	Pine Island Creek	2,902	4,477	297		7,676
42	Bokeelia (east)	5,646	5,417	1,718		12,781
24	Gault Island/Cherry Estates	2,503	694	63		3,260
20	Pine Island Cove/Fleming Bay	6,425	470			6,895
40	Matacha Isles/Cape Coral (northwest)	6,073	1,697	261		8,031
39	Matacha (northwest)	3,753	2,626	603		6,982
22	Blind Pass	10,234	4,198	729		15,161
25	Saint James City (south 1)	7,582	3,768	299		11,648
21	Roosevelt Channel	5,798	802	223	70	6,892
30	Sanibel/Tarpon Bay	669	474			1,143
- 19	South Seas Plantation	309	275	93	91	768
28	Eighth Avenue Canal	2,832	1,164	202		4,198
44	Burnt Store Marina	2,100				2,100
29	Saint James City (east)	2,582	2,117	389		5,088
31	Sanibel/Point Ybel	1,248				1,248
36	Matacha (southwest 2)	1,513	147			1,660
9	Useppa (north)	730	320	188		1,239
26	Saint James City (south 2)	2,308	465	73		2,846
33	Manatee Bay	318				318
16	Demere Key	2,952	164			3,116
27	Saint James City (south 3)	1,459	942			2,401
3	Boca Grande	1,126	49			1,176
6	Pelican Bay	2,605	394			2,999
14	Cayo Costa (south)	321				321
23	Sanibel (northwest)	888				888
38	Matacha (southeast)					0
37	Matacha (southwest 3)	155		29		183
12	Cabbage Key	230	211	85		525
13	Pineland	1,763				1,763
7	Cayo Costa (north)	743				743
15	Safety Harbor	353				353
34	Tropical Point	331	79			411
1	Gasparilla (1)	73				73
2	Gasparilla (2)	140				140
8	Mondongo Island	276				276
11	Useppa (southwest 2)	353				353
35	Matacha (southwest 1)	480				480
4	Boca Bay					0
5	Boca Grande Commercial					0
10	Useppa (southwest 1)					0

Traffiched Number	Trafficheds and Secondary Channels	Channel Length (feet)				
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	All Restricted
17	North Captiva at Redfish Pass					0
18	South Seas Plantation (north)					0
-998	South Matlacha Pass	8,294	12,523	11,711	381	32,909
-999	North Matlacha Pass/Boca Grande Pass	18,137	6,206	1,168	84	25,595
Total		128,323	52,513	19,231	838	200,906

Appendix D

Data Inventory on Access Channel and Trafficshed Waterway, Boat, and Facility Characteristics

This appendix presents information on boats, moorings, facilities, boat and channel restrictions, and the estimated dredge amount required to provide boat access from each individual trafficshed to open bay waters under two options: (1) *Normal Clearance* and (2) *Additional Depth (1 ft) Clearance*.

The appendix tables are organized by *trafficshed* (navigable waterways that serve as boat source areas). There are 44 trafficsheds in Lee County Phase 2, which are identified by a *positive number* in the Appendix D tables. The general locations of these trafficsheds are shown on the accompanying map. To locate a particular trafficshed, refer to the *List of Trafficsheds* (pages D-2 and D-3).

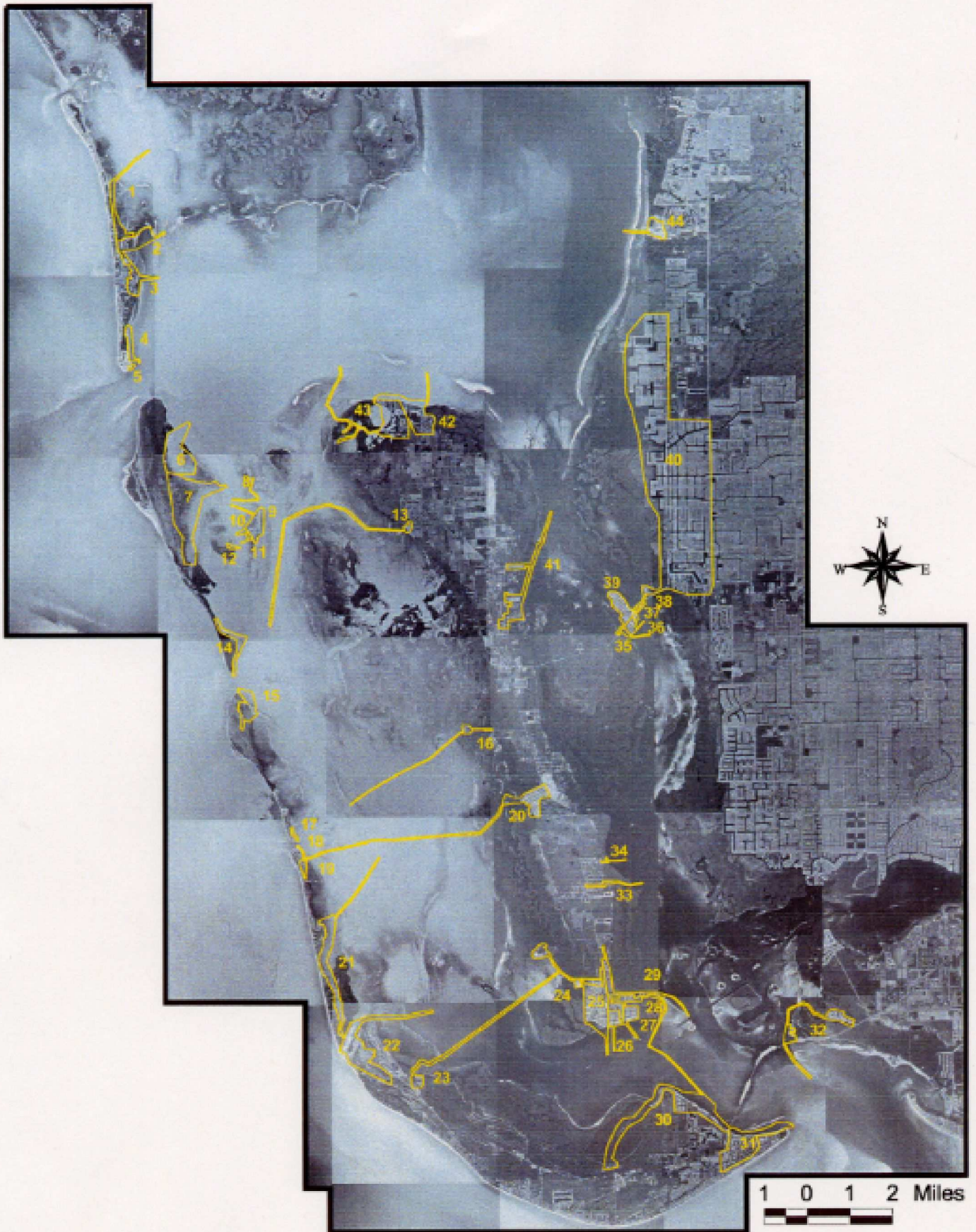
There are separate entries in Appendix D, identified by a negative number, that refer to secondary channels, boats, and moorings that are located outside of trafficsheds. Secondary channels serve two or more trafficsheds and are heavily used by boaters to gain access to open bay waters. Refer to the large-scale maps at the Lee County Environmental Management Department for specific locations and extent.

**Appendix D. List of Trafficsheds
(By Trafficshed Number)**

Trafficshed No.	Name
1	Gasparilla (1)
2	Gasparilla (2)
3	Boca Grande
4	Boca Bay
5	Boca Grande Commercial
6	Pelican Bay
7	Cayo Costa (north)
8	Mondongo Island
9	Useppa (north)
10	Useppa (southwest 1)
11	Useppa (southwest 2)
12	Cabbage Key
13	Pineland
14	Cayo Costa (south)
15	Safety Harbor
16	Demere Key
17	North Captiva at Redfish Pass
18	South Seas Plantation (north)
19	South Seas Plantation
20	Pine Island Cove/Flamingo Bay
21	Roosevelt Channel
22	Blind Pass
23	Sanibel (northwest)
24	Gault Island/Cherry Estates
25	Saint James City (south 1)
26	Saint James City (south 2)
27	Saint James City (south 3)
28	Eighth Avenue Canal
29	Saint James City (east)
30	Sanibel/Tarpon Bay
31	Sanibel/Point Ybel
32	Punta Rassa/Connie Mack Island
33	Manatee Bay
34	Tropical Point
35	Matlacha (southwest 1)
36	Matlacha (southwest 2)
37	Matlacha (southwest 3)
38	Matlacha (southeast)
39	Matlacha (northwest)
40	Matlacha Isles/Cape Coral (northwest)
41	Pine Island Creek
42	Bokeelia (East)
43	Bokeelia (west)
44	Burnt Store Marina

(By Trafficked Name)

Trafficked No.	Name
22	Blind Pass
4	Boca Bay
3	Boca Grande
5	Boca Grande Commercial
42	Bokeelia (east)
43	Bokeelia (west)
44	Burnt Store Marina
12	Cabbage Key
7	Cayo Costa (north)
14	Cayo Costa (south)
16	Demere Key
28	Eighth Avenue Canal
1	Gasparilla (1)
2	Gasparilla (2)
24	Gault Island/Cherry Estates
33	Manatee Bay
39	Matlacha (northwest)
40	Matlacha Isles/Cape Coral (northwest)
38	Matlacha (southeast)
35	Matlacha (southwest 1)
36	Matlacha (southwest 2)
37	Matlacha (southwest 3)
8	Mondongo Island
17	North Captiva at Redfish Pass
6	Pelican Bay
20	Pine Island Cove/Flamingo Bay
41	Pine Island Creek
13	Pineland
32	Punta Rassa/Connie Mack Island
21	Roosevelt Channel
19	South Seas Plantation
18	South Seas Plantation (north)
15	Safety Harbor
29	Saint James City (East)
25	Saint James City (south 1)
26	Saint James City (south 2)
27	Saint James City (south 3)
23	Sanibel (northwest)
31	Sanibel/Point Ybel
30	Sanibel/Tarpon Bay
34	Tropical Point
9	Useppa (north)
10	Useppa (southwest 1)
11	Useppa (southwest 2)



Appendix D. Trafficked Locations

TRAFFICSHED NUMBER: -999 **TRAFFICSHED NAME: North Matlacha Pass/Boca Grande Pass**

<u>Boats</u>	Draft (ft.)				<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max Min Std. Dev.			
Kayak/Row/Canoe:					Anchorage:	Anchorage:	
Open Utility:					Beached/Blocked:	Government:	
Other:					Hoist/Drystack:	Industrial:	Total Channel Length (ft.): 81,429
Personal Water Craft:					Mooring:	Marina/Yard/Club:	Restricted Channel Length (ft.) 25,595
Power Cabin/Trawler:					Ramp:	Motel/Hotel/Restaurant/Shop:	Restricted Channels (Percent of Study Area): 12.74%
Recreational Fishing:					Seawall:	Multi-Family Residential	Dredge (Cubic Yards) Even Clearance: 10,316
Sail:					Trailer:	Other	
Speed:					Wet Slip:	Single Family Residential	Dredge (Cubic Yards) One Foot Clearance: 29,275
Total:					Total:	Total:	

TRAFFICSHED NUMBER: -998 **TRAFFICSHED NAME: South Matlacha Pass**

<u>Boats</u>	Draft (ft.)				<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max Min Std. Dev.			
Kayak/Row/Canoe:					Anchorage:	Anchorage:	
Open Utility:					Beached/Blocked:	Government:	
Other:					Hoist/Drystack:	Industrial:	Total Channel Length (ft.): 56,328
Personal Water Craft:					Mooring:	Marina/Yard/Club:	Restricted Channel Length (ft.) 32,909
Power Cabin/Trawler:					Ramp:	Motel/Hotel/Restaurant/Shop:	Restricted Channels (Percent of Study Area): 16.38%
Recreational Fishing:					Seawall:	Multi-Family Residential	Dredge (Cubic Yards) Even Clearance: 32,958
Sail:					Trailer:	Other	
Speed:					Wet Slip:	Single Family Residential	Dredge (Cubic Yards) One Foot Clearance: 57,335
Total:					Total:	Total:	

TRAFFICSHED NUMBER: 1 **TRAFFICSHED NAME: Gasparilla (1)**

<u>Boats</u>	Draft (ft.)				<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max Min Std. Dev.			
Kayak/Row/Canoe:	3	14.3%	0.5	0.5 0.5 0.0	Anchorage:	Anchorage:	
Open Utility:	1	4.8%	1.5	1.5 1.5 1.5	Beached/Blocked:	Government:	0.06%
Other:	2	9.5%	1.3	1.5 1.0 0.4	Hoist/Drystack:	Industrial:	Restricted Boats with Variable Draft Capability: 1
Personal Water Craft:	1	4.8%	0.5	0.5 0.5	Mooring:	Marina/Yard/Club:	Total Channel Length (ft.): 15,367
Power Cabin/Trawler:	1	4.8%	4.0	4.0 4.0	Ramp:	Motel/Hotel/Restaurant/Shop:	Restricted Channel Length (ft.) 73
Recreational Fishing:	11	52.4%	2.5	4.5 1.5 0.8	Seawall:	Multi-Family Residential	Restricted Channels (Percent of Study Area): 0.04%
Sail:					Trailer:	Other	Dredge (Cubic Yards) Even Clearance: 0
Speed:	2	9.5%	1.8	2.0 1.5 0.4	Wet Slip:	Single Family Residential	Dredge (Cubic Yards) One Foot Clearance: 54
Total:	21	100.0%	2.0	4.5 0.5 1.1	Total:	Total:	

TRAFFICSHED NUMBER: 2 **TRAFFICSHED NAME: Gasparilla (2)**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: (Percent of Study Area):	1
			Avg.	Max	Min				
Kayak/Row/Canoe:	8	2.9%	0.5	0.5	0.0	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:	0.06%
Open Utility:	3	1.1%	1.3	1.5	1.0	Beached/Blocked:	Government:	Total Channel Length (ft.):	16,898
Other:	1	0.4%	2.0	2.0	2.0	Hoist/Drystack:	Industrial:	Restricted Channel Length (ft.):	140
Personal Water Craft:						Mooring:	Marina/Yard/Club:	Restricted Channels (Percent of Study Area):	0.07%
Power Cabin/Trawler:	6	2.2%	4.3	5.5	2.5	Ramp:	1 Motel/Hotel/Restaurant/Shop:	Dredge (Cubic Yards)	0
Recreational Fishing:	225	82.4%	2.1	5.0	1.0	Seawall:	1 Multi-Family Residential	Even Clearance:	
Sail:	9	3.3%	3.4	6.5	0.5	Trailer:	8 Other	Dredge (Cubic Yards)	104
Speed:	21	7.7%	2.0	2.5	1.0	Wet Slip:	210 Single Family Residential	One Foot Clearance:	
Total:	273	100.0%	2.2	6.5	0.5	Total:	442		

TRAFFICSHED NUMBER: 3 **TRAFFICSHED NAME: Boca Grande**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: (Percent of Study Area):	9
			Avg.	Max	Min				
Kayak/Row/Canoe:	8	3.2%	0.5	0.5	0.0	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:	0.55%
Open Utility:	19	7.6%	0.9	2.0	0.5	Beached/Blocked:	Government:	Total Channel Length (ft.):	14,324
Other:	5	2.0%	1.2	2.0	0.5	Hoist/Drystack:	90 Industrial:	Restricted Channel Length (ft.):	1,176
Personal Water Craft:	2	0.8%	0.5	0.5	0.0	Mooring:	14 Marina/Yard/Club:	Restricted Channels (Percent of Study Area):	0.59%
Power Cabin/Trawler:	21	8.4%	3.7	6.0	1.5	Ramp:	1 Motel/Hotel/Restaurant/Shop:	Dredge (Cubic Yards)	233
Recreational Fishing:	163	65.2%	2.2	6.0	0.5	Seawall:	4 Multi-Family Residential	Even Clearance:	
Sail:	22	8.8%	3.4	5.0	0.5	Trailer:	11 Other	Dredge (Cubic Yards)	1,104
Speed:	10	4.0%	2.1	2.5	1.5	Wet Slip:	275 Single Family Residential	One Foot Clearance:	
Total:	250	100.0%	2.2	6.0	0.5	Total:	421		

TRAFFICSHED NUMBER: 4 **TRAFFICSHED NAME: Boca Bay**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: (Percent of Study Area):	5,450
			Avg.	Max	Min				
Kayak/Row/Canoe:	2	13.3%	0.5	0.5	0.0	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:	
Open Utility:						Beached/Blocked:	Government:	Total Channel Length (ft.):	5,450
Other:						Hoist/Drystack:	31 Industrial:	Restricted Channels (Percent of Study Area):	0
Personal Water Craft:						Mooring:	Marina/Yard/Club:	Dredge (Cubic Yards)	
Power Cabin/Trawler:						Ramp:	Motel/Hotel/Restaurant/Shop:	Even Clearance:	
Recreational Fishing:	12	80.0%	1.8	3.0	1.0	Seawall:	9 Multi-Family Residential	Dredge (Cubic Yards)	0
Sail:						Trailer:	Other	One Foot Clearance:	
Speed:	1	6.7%	3.0	3.0	3.0	Wet Slip:	26 Single Family Residential		
Total:	15	100.0%	1.7	3.0	0.5	Total:	59		

TRAFFICSHED NUMBER: 5 **TRAFFICSHED NAME: Boca Grande Commercial**

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:	Government:	Industrial:	(Percent of Study Area):
Kayak/Row/Canoe:							Beached/Blocked:			
Open Utility:							Hoist/Drystack:			
Other:							Moorings:			
Personal Water Craft:							Ramp:			
Power Cabin/Trawler:							Seawall:			
Recreational Fishing:							Trailer:			
Sail:							Wet Slip:	5		
Speed:							Total:	5		
Total:										0

TRAFFICSHED NUMBER: 6 **TRAFFICSHED NAME: Pelican Bay**

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:	Government:	Industrial:	(Percent of Study Area):
Kayak/Row/Canoe:	8	16.7%	0.5	0.5	0.5	0.0	Beached/Blocked:	26		0.49%
Open Utility:	4	8.3%	0.9	1.0	0.5	0.3	Hoist/Drystack:	7		
Other:	1	2.1%	4.5	4.5	4.5		Moorings:			
Personal Water Craft:							Ramp:			
Power Cabin/Trawler:	10	20.8%	3.8	5.5	3.0	0.7	Seawall:			
Recreational Fishing:	8	16.7%	2.1	3.0	1.5	0.5	Trailer:			
Sail:	14	29.2%	3.8	5.0	1.5	1.0	Wet Slip:	23		
Speed:	3	6.3%	1.7	2.0	1.0	0.6	Total:	60		
Total:	48	100.0%	2.6	5.5	0.5	1.5				8

TRAFFICSHED NUMBER: 7 **TRAFFICSHED NAME: Cayo Costa (north)**

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:	Government:	Industrial:	(Percent of Study Area):
Kayak/Row/Canoe:							Beached/Blocked:	4		0.12%
Open Utility:	3	27.3%	0.5	0.5	0.5	0.0	Hoist/Drystack:			
Other:	2	18.2%	1.3	2.0	0.5	1.1	Moorings:			
Personal Water Craft:							Ramp:			
Power Cabin/Trawler:	2	18.2%	3.0	3.0	3.0	0.0	Seawall:			
Recreational Fishing:	1	9.1%	1.0	1.0	1.0		Trailer:			
Sail:	2	18.2%	4.5	5.0	4.0	0.7	Wet Slip:	16		
Speed:	1	9.1%	2.0	2.0	2.0		Total:	25		
Total:	11	100.0%	2.0	5.0	0.5	1.6				2

TRAFFICSHED NUMBER: 8 **TRAFFICSHED NAME: Mondongo Island**

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			(Percent of Study Area):	
Kayak/Row/Canoe:	2	25.0%	0.5	0.5	0.5	0.0	Anchorage:	Anchorage:	0.06%	
Open Utility:	3	37.5%	0.8	1.5	0.5	0.6	Beached/Blocked:	Government:		
Other:							Hoist/Drystack:	Industrial:		
Personal Water Craft:							Mooring:	Marina/Yard/Club:		
Power Cabin/Trawler:	1	12.5%	3.5	3.5	3.5		Ramp:	Motel/Hotel/Restaurant/Shop:		276
Recreational Fishing:	2	25.0%	1.5	2.0	1.0	0.7	Seawall:	Multi-Family Residential:		0.14%
Sail:							Trailer:	Other:		0
Speed:							Wet Slip:	Single Family Residential:		205
Total:	8	100.0%	1.3	3.5	0.5	1.1	Total:	Total:		205

TRAFFICSHED NUMBER: 9 **TRAFFICSHED NAME: Useppa (north)**

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			(Percent of Study Area):	
Kayak/Row/Canoe:	2	2.4%	0.5	0.5	0.5	0.0	Anchorage:	Anchorage:	1.03%	
Open Utility:	6	7.1%	1.1	2.5	0.5	0.7	Beached/Blocked:	Government:		10
Other:	1	1.2%	2.0	2.0	2.0		Hoist/Drystack:	Industrial:		14,521
Personal Water Craft:	1	1.2%	0.5	0.5	0.5		Mooring:	Marina/Yard/Club:		1,239
Power Cabin/Trawler:	20	23.5%	3.8	5.0	2.5	0.8	Ramp:	Motel/Hotel/Restaurant/Shop:		0.62%
Recreational Fishing:	33	38.8%	2.2	4.0	1.0	0.6	Seawall:	Multi-Family Residential:		609
Sail:	19	22.4%	2.5	5.5	1.0	1.6	Trailer:	Other:		
Speed:	3	3.5%	1.7	2.5	0.5	1.0	Wet Slip:	Single Family Residential:		1,527
Total:	85	100.0%	2.5	5.5	0.5	1.3	Total:	Total:		1,527

TRAFFICSHED NUMBER: 10 **TRAFFICSHED NAME: Useppa (southwest 1)**

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			(Percent of Study Area):	
Kayak/Row/Canoe:							Anchorage:	Anchorage:		
Open Utility:							Beached/Blocked:	Government:		
Other:							Hoist/Drystack:	Industrial:		
Personal Water Craft:							Mooring:	Marina/Yard/Club:		1,945
Power Cabin/Trawler:							Ramp:	Motel/Hotel/Restaurant/Shop:		
Recreational Fishing:	2	100.0%	1.5	1.5	1.5	0.0	Seawall:	Multi-Family Residential:		
Sail:							Trailer:	Other:		0
Speed:							Wet Slip:	Single Family Residential:		0
Total:	2	100.0%	1.5	1.5	1.5	0.0	Total:	Total:		0

TRAFFICSHED NUMBER: 11 **TRAFFICSHED NAME: Useppa (southwest 2)**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage: Beached/Blocked: Hoist/Drystack:	Anchorage: Government: Industrial: Marina/Yard/Club:	Restricted Boats with Variable Draft Capability:	
Kayak/Row/Canoe:										0.06%
Open Utility:	2	22.2%	0.8	1.0	0.5	0.4				
Other:	1	11.1%	1.0	1.0	1.0				1,772	
Personal Water Craft:										
Power Cabin/Trawler:	1	11.1%	4.0	4.0	4.0				353	
Recreational Fishing:	4	44.4%	2.1	2.5	2.0	0.3		Motel/Hotel/Restaurant/Shop: Multi-Family Residential		0.18%
Sail:	1	11.1%	1.5	1.5	1.5			Other		39
Speed:								Single Family Residential		
Total:	9	100.0%	1.8	4.0	0.5	1.0		Total:	8	301

TRAFFICSHED NUMBER: 12 **TRAFFICSHED NAME: Cabbage Key**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage: Beached/Blocked: Hoist/Drystack:	Anchorage: Government: Industrial: Marina/Yard/Club:	Restricted Boats with Variable Draft Capability:	
Kayak/Row/Canoe:										0.24%
Open Utility:	12	18.5%	1.0	1.5	0.5	0.5				
Other:	2	3.1%	5.3	6.0	4.5	1.1				
Personal Water Craft:	1	1.5%	0.5	0.5	0.5					
Power Cabin/Trawler:	10	15.4%	3.1	3.5	2.5	0.4				
Recreational Fishing:	22	33.8%	2.0	2.5	1.5	0.4		Motel/Hotel/Restaurant/Shop: Multi-Family Residential		0.26%
Sail:	1	1.5%	4.0	4.0	4.0			Other		370
Speed:	17	26.2%	2.2	3.0	1.0	0.5		Single Family Residential		
Total:	65	100.0%	2.1	6.0	0.5	1.0		Total:	8	759

TRAFFICSHED NUMBER: 13 **TRAFFICSHED NAME: Pineland**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage: Beached/Blocked: Hoist/Drystack:	Anchorage: Government: Industrial: Marina/Yard/Club:	Restricted Boats with Variable Draft Capability:	
Kayak/Row/Canoe:										0.12%
Open Utility:	8	5.3%	1.8	2.5	1.0	0.5				
Other:	7	4.7%	2.2	2.5	2.0	0.3				
Personal Water Craft:										
Power Cabin/Trawler:	1	0.7%	2.0	2.0	2.0					
Recreational Fishing:	93	62.0%	2.1	2.5	1.0	0.4		Motel/Hotel/Restaurant/Shop: Multi-Family Residential		0.88%
Sail:	2	1.3%	2.0	2.0	2.0	0.0		Other		169
Speed:	39	26.0%	2.2	3.5	0.5	0.6		Single Family Residential		
Total:	150	100.0%	2.1	3.5	0.5	0.4		Total:	2	1,474

TRAFFICSHED NUMBER: 14 TRAFFICSHED NAME: Cayo Costa (south)

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: Restricted Boats (Percent of Study Area):	
			Avg.	Max	Min				Std. Dev.
Kayak/Row/Canoe:						Anchorage:			
Open Utility:						Beached/Blocked:			
Other:	2	25.0%	2.0	2.0	2.0	Hoist/Drystack:	1	0.43%	
Personal Water Craft:						Moorings:	2		
Power Cabin/Trawler:						Ramp:			
Recreational Fishing:	3	37.5%	2.2	2.5	2.0	Seawall:			
Sail:						Trailer:			
Speed:	3	37.5%	1.8	2.0	1.5	Wet Slip:	18		
Total:	8	100.0%	2.0	2.5	1.5	Total:	21	237	
							Single Family Residential	9	
							Government:		
							Industrial:		
							Marina/Yard/Club:		
							Motel/Hotel/Restaurant/Shop:		
							Multi-Family Residential		
							Other		
							Total:	9	10,056
							Restricted Channels		321
							(Percent of Study Area):		0.16%
							Dredge (Cubic Yards)		0
							Even Clearance:		
							Dredge (Cubic Yards)		237
							One Foot Clearance:		

TRAFFICSHED NUMBER: 15 TRAFFICSHED NAME: Safety Harbor

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: Restricted Boats (Percent of Study Area):	
			Avg.	Max	Min				Std. Dev.
Kayak/Row/Canoe:	13	14.4%	0.5	0.5	0.0	Anchorage:	1	0.12%	
Open Utility:	14	15.6%	0.9	1.5	0.5	Beached/Blocked:	19		
Other:	3	3.3%	1.7	2.0	1.0	Hoist/Drystacks:	12		
Personal Water Craft:	5	5.6%	0.5	0.5	0.0	Moorings:			
Power Cabin/Trawler:						Ramp:			
Recreational Fishing:	35	38.9%	1.8	2.5	1.0	Seawall:			
Sail:	6	6.7%	2.3	4.0	1.5	Trailer:			
Speed:	14	15.6%	1.8	2.5	1.0	Wet Slip:	207		
Total:	90	100.0%	1.4	4.0	0.5	Total:	241	18,223	
							Marina/Yard/Club:		
							Motel/Hotel/Restaurant/Shop:	7	353
							Multi-Family Residential	16	
							Other	1	
							Single Family Residential	35	
							Total:	63	261
							Restricted Channels		0.18%
							(Percent of Study Area):		0
							Dredge (Cubic Yards)		
							Even Clearance:		
							Dredge (Cubic Yards)		261
							One Foot Clearance:		

TRAFFICSHED NUMBER: 16 TRAFFICSHED NAME: Demere Key

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats: Restricted Boats (Percent of Study Area):	
			Avg.	Max	Min				Std. Dev.
Kayak/Row/Canoe:						Anchorage:			
Open Utility:	6	11.3%	0.6	1.0	0.5	Beached/Blocked:	4	0.79%	
Other:	40	75.5%	1.3	3.5	0.5	Hoist/Drystack:	1		
Personal Water Craft:						Moorings:			
Power Cabin/Trawler:						Ramp:			
Recreational Fishing:	7	13.2%	2.0	3.5	1.5	Seawall:	3		
Sail:						Trailer:	10		
Speed:						Wet Slip:	55		
Total:	53	100.0%	1.3	3.5	0.5	Total:	74	2,801	
							Marina/Yard/Club:	1	3,116
							Motel/Hotel/Restaurant/Shop:		1.55%
							Multi-Family Residential		
							Other		493
							Single Family Residential	1	
							Total:	2	
							Restricted Channels		21,647
							(Percent of Study Area):		0.79%
							Dredge (Cubic Yards)		
							Even Clearance:		
							Dredge (Cubic Yards)		2,801
							One Foot Clearance:		

TRAFFICSHED NUMBER: 17 TRAFFICSHED NAME: North Captiva at Redfish Pass

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorages	Blocked	Government	Industrial	Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	1	14.3%	0.5	0.5	0.5	1				Restricted Boats with Variable Draft Capability:
Open Utility:										Total Channel Length (ft.):
Other:										1,937
Personal Water Craft:										Restricted Channel Length (ft.):
Power Cabin/Trawler:	1	14.3%	1.5	1.5	1.5			Marina/Yard/Club:		Restricted Channels (Percent of Study Area):
Recreational Fishing:	3	42.9%	2.0	2.0	0.0			Motel/Hotel/Restaurant/Shop:		Dredge (Cubic Yards)
Sail:								Multi-Family Residential		Even Clearance:
Speed:	2	28.6%	1.8	3.0	0.5	22		Other		0
Total:	7	100.0%	1.6	3.0	0.5	25		Single Family Residential		Dredge (Cubic Yards)
								Total:		0
										One Foot Clearance:

TRAFFICSHED NUMBER: 18 TRAFFICSHED NAME: South Seas Plantation (north)

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorages	Blocked	Government	Industrial	Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	35	52.2%	0.5	0.5	0.0	63				Restricted Boats with Variable Draft Capability:
Open Utility:										Total Channel Length (ft.):
Other:	1	1.5%	2.5	2.5	2.5					1,981
Personal Water Craft:	22	32.8%	0.5	0.5	0.0					Restricted Channel Length (ft.):
Power Cabin/Trawler:	1	1.5%	1.5	1.5	1.5			Marina/Yard/Club:		Restricted Channels (Percent of Study Area):
Recreational Fishing:	8	11.9%	1.5	1.5	0.0			Motel/Hotel/Restaurant/Shop:		Dredge (Cubic Yards)
Sail:								Multi-Family Residential		Even Clearance:
Speed:								Other		0
Total:	67	100.0%	0.7	2.5	0.5	71		Single Family Residential		Dredge (Cubic Yards)
								Total:		0
										One Foot Clearance:

TRAFFICSHED NUMBER: 19 TRAFFICSHED NAME: South Seas Plantation

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorages	Blocked	Government	Industrial	Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	1	1.7%	0.5	0.5	0.5	20				Restricted Boats with Variable Draft Capability:
Open Utility:										3
Other:	2	3.4%	2.8	3.0	2.5	0.4				Total Channel Length (ft.):
Personal Water Craft:										13,821
Power Cabin/Trawler:	26	44.8%	3.5	5.0	2.5	0.6			Marina/Yard/Club:	768
Recreational Fishing:	14	24.1%	2.4	4.5	1.5	0.8			Motel/Hotel/Restaurant/Shop:	0.38%
Sail:	10	17.2%	4.5	6.0	4.0	0.6			Multi-Family Residential	636
Speed:	5	8.6%	2.4	2.5	2.0	0.2			Other	Even Clearance:
Total:	58	100.0%	3.3	6.0	0.5	110			Single Family Residential	8
									Total:	10
										Dredge (Cubic Yards)
										1,205
										One Foot Clearance:

TRAFFICSHED NUMBER: 20 TRAFFICSHED NAME: Pine Island Cove/Flamingo Bay

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	11	4.2%	0.6	1.5	0.5	0.3	Anchorage:		6.14%	
Open Utility:	88	33.6%	1.3	2.5	0.5	0.6	Beached/Blocked:		95	
Other:							Hoist/Drystack:		32,205	
Personal Water Craft:	1	0.4%	0.5	0.5	0.5		Mooring:		6,895	
Power Cabin/Trawler:	2	0.8%	2.3	2.5	2.0	0.4	Ramp:		3.43%	
Recreational Fishing:	103	39.3%	1.8	3.0	0.5	0.6	Seawall:		1,428	
Sail:	1	0.4%	0.5	0.5	0.5		Trailer:		6,535	
Speed:	56	21.4%	1.7	3.0	0.5	0.6	Wet Slip:			
Total:	262	100.0%	1.6	3.0	0.5	0.7	Total:		220	

TRAFFICSHED NUMBER: 21 TRAFFICSHED NAME: Roosevelt Channel

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	73	24.6%	0.5	1.0	0.5	0.1	Anchorage:		56	
Open Utility:	32	10.8%	0.9	2.0	0.5	0.4	Beached/Blocked:		3.40%	
Other:	6	2.0%	2.7	5.5	1.5	1.5	Hoist/Drystack:		17	
Personal Water Craft:	1	0.3%	1.0	1.0	1.0		Mooring:		29,617	
Power Cabin/Trawler:	26	8.8%	3.4	4.0	2.0	0.5	Ramp:		6,892	
Recreational Fishing:	99	33.3%	2.1	3.5	0.5	0.6	Seawall:		3.43%	
Sail:	33	11.1%	2.8	6.0	1.0	1.6	Trailer:		2,031	
Speed:	27	9.1%	1.9	3.0	1.0	0.5	Wet Slip:		7,136	
Total:	297	100.0%	1.8	6.0	0.5	1.2	Total:		102	

TRAFFICSHED NUMBER: 22 TRAFFICSHED NAME: Blind Pass

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	59	35.3%	0.5	0.5	0.5	0.0	Anchorage:		83	
Open Utility:	28	16.8%	0.8	1.5	0.5	0.3	Beached/Blocked:		5.05%	
Other:	1	0.6%	1.0	1.0	1.0		Hoist/Drystack:		63	
Personal Water Craft:	4	2.4%	0.5	0.5	0.5	0.0	Mooring:		35,723	
Power Cabin/Trawler:	1	0.6%	3.0	3.0	3.0		Ramp:		15,161	
Recreational Fishing:	57	34.1%	2.1	3.5	1.0	0.6	Seawall:		7.55%	
Sail:	7	4.2%	1.7	2.5	0.5	0.7	Trailer:		6,648	
Speed:	10	6.0%	2.1	3.0	1.0	0.6	Wet Slip:		17,878	
Total:	167	100.0%	1.2	3.5	0.5	0.9	Total:		164	

TRAFFICSHED NUMBER: 23 **TRAFFICSHED NAME: Sanibel (northwest)**

<u>Boats</u>	Number Percent		Draft (ft.)			Moorings		Facilities		Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max	Min Std. Dev.	Anchorage:	Blocked:	Anchorage:	Other	
Kayak/Row/Canoe:	6	37.5%	0.8	2.0	0.5	0.6		Anchorage:		0.43%
Open Utility:	2	12.5%	0.8	1.0	0.5	0.4	6	Government:		
Other:							Hoist/Drystack:	Industrial:		7
Personal Water Craft:							Mooring:	Marina/Yard/Club:		15,199
Power Cabin/Trawler:	1	6.3%	2.5	2.5	2.5	2.5	Ramp:	Motel/Hotel/Restaurant/Shop:		888
Recreational Fishing:	4	25.0%	1.9	2.5	1.5	0.5	Seawall:	Multi-Family Residential		0.44%
Sail:							Trailer:	Other		78
Speed:	3	18.8%	2.3	2.5	2.0	0.3	Wet Slip:	Single Family Residential		
Total:	16	100.0%	1.4	2.5	0.5	0.9	Total:	Total:		736

TRAFFICSHED NUMBER: 24 **TRAFFICSHED NAME: Gault Island/Cherry Estates**

<u>Boats</u>	Number Percent		Draft (ft.)			Moorings		Facilities		Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max	Min Std. Dev.	Anchorage:	Blocked:	Anchorage:	Other	
Kayak/Row/Canoe:	5	4.2%	0.5	0.5	0.5	0.0		Anchorage:		6.32%
Open Utility:	33	28.0%	1.0	1.5	0.5	0.4	7	Government:		99
Other:	1	0.8%	3.0	3.0	3.0	3.0	136	Industrial:		30,956
Personal Water Craft:							Mooring:	Marina/Yard/Club:		3,260
Power Cabin/Trawler:	5	4.2%	2.4	3.0	1.5	0.5	Ramp:	Motel/Hotel/Restaurant/Shop:		1,62%
Recreational Fishing:	61	51.7%	1.8	2.5	1.0	0.5	Seawall:	Multi-Family Residential		836
Sail:							Trailer:	Other		
Speed:	13	11.0%	1.6	2.5	1.5	0.3	Wet Slip:	Single Family Residential		
Total:	118	100.0%	1.5	3.0	0.5	0.6	Total:	Total:		3,251

TRAFFICSHED NUMBER: 25 **TRAFFICSHED NAME: Saint James City (south 1)**

<u>Boats</u>	Number Percent		Draft (ft.)			Moorings		Facilities		Restricted Boats (Percent of Study Area):
	Number	Percent	Avg.	Max	Min Std. Dev.	Anchorage:	Blocked:	Anchorage:	Other	
Kayak/Row/Canoe:	53	5.1%	0.5	0.5	0.5	0.0		Anchorage:		4.44%
Open Utility:	233	22.5%	1.1	5.0	0.5	0.5	110	Government:		11
Other:	20	1.9%	2.5	6.0	1.0	1.1	828	Industrial:		52,518
Personal Water Craft:	9	0.9%	0.5	0.5	0.5	0.0	Mooring:	Marina/Yard/Club:		11,648
Power Cabin/Trawler:	47	4.5%	3.0	5.0	2.0	0.6	Ramp:	Motel/Hotel/Restaurant/Shop:		5.80%
Recreational Fishing:	440	42.6%	1.8	4.5	0.5	0.6	Seawall:	Multi-Family Residential		5,051
Sail:	82	7.9%	3.3	6.0	0.5	1.2	Trailer:	Other		
Speed:	150	14.5%	1.8	3.0	0.5	0.6	Wet Slip:	Single Family Residential		13,680
Total:	E+03	100.0%	1.8	6.0	0.5	1.0	Total:	Total:		

TRAFFICSHED NUMBER: 26 **TRAFFICSHED NAME: Saint James City (south 2)**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):
			Avg.	Max	Min			
Kayak/Row/Canoe:	9	6.8%	0.5	0.5	0.0	Anchorage:		17
Open Utility:	33	25.0%	1.1	2.0	0.5	Beached/Blocked:	Anchorage:	1.03%
Other:	5	3.8%	1.4	2.0	1.0	Hoist/Drystack:	Government:	
Personal Water Craft:	7	5.3%	0.6	1.0	0.5	Moorings:	Industrial:	5
Power Cabin/Trawler:	5	3.8%	3.1	3.5	2.0	Ramp:	Marina/Yard/Club:	10,118
Recreational Fishing:	53	40.2%	2.1	3.5	0.5	Seawall:	Motel/Hotel/Restaurant/Shop:	2,846
Sail:	8	6.1%	3.1	4.5	2.0	Trailer:	Multi-Family Residential:	1.42%
Speed:	12	9.1%	1.6	2.5	0.5	Wet Slip:	Other:	780
Total:	132	100.0%	1.7	4.5	0.5	Total:	Single Family Residential:	2,888
						Total:	Total:	

TRAFFICSHED NUMBER: 27 **TRAFFICSHED NAME: Saint James City (south 3)**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):
			Avg.	Max	Min			
Kayak/Row/Canoe:	10	6.6%	0.5	0.5	0.0	Anchorage:		11
Open Utility:	13	8.6%	0.9	1.5	0.5	Beached/Blocked:	Anchorage:	0.67%
Other:	4	2.6%	1.1	1.5	1.0	Hoist/Drystack:	Government:	
Personal Water Craft:	6	4.0%	0.5	0.5	0.0	Moorings:	Industrial:	3
Power Cabin/Trawler:	7	4.6%	3.4	5.0	2.0	Ramp:	Marina/Yard/Club:	10,805
Recreational Fishing:	80	53.0%	2.0	3.5	0.5	Seawall:	Motel/Hotel/Restaurant/Shop:	2,401
Sail:	11	7.3%	2.9	5.0	1.5	Trailer:	Multi-Family Residential:	1.19%
Speed:	20	13.2%	1.7	3.0	0.5	Wet Slip:	Other:	1,002
Total:	151	100.0%	1.8	5.0	0.5	Total:	Single Family Residential:	2,780
						Total:	Total:	

TRAFFICSHED NUMBER: 28 **TRAFFICSHED NAME: Eighth Avenue Canal**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):
			Avg.	Max	Min			
Kayak/Row/Canoe:	14	7.9%	0.5	0.5	0.0	Anchorage:		38
Open Utility:	49	27.4%	1.1	2.0	0.5	Beached/Blocked:	Anchorage:	2.31%
Other:	6	3.4%	2.4	3.5	1.0	Hoist/Drystack:	Government:	
Personal Water Craft:	1	0.6%	0.5	0.5	0.5	Moorings:	Industrial:	26
Power Cabin/Trawler:	5	2.8%	2.4	2.5	2.0	Ramp:	Marina/Yard/Club:	16,950
Recreational Fishing:	73	41.0%	1.9	3.5	0.5	Seawall:	Motel/Hotel/Restaurant/Shop:	4,198
Sail:	7	3.9%	2.6	4.5	1.0	Trailer:	Multi-Family Residential:	2.09%
Speed:	23	12.9%	1.9	3.5	1.0	Wet Slip:	Other:	2,002
Total:	178	100.0%	1.6	4.5	0.5	Total:	Single Family Residential:	5,112
						Total:	Total:	

TRAFFICSHED NUMBER: 29 **TRAFFICSHED NAME: Saint James City (east)**

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats Restricted Boats (Percent of Study Area):	27
			Avg.	Max	Min Std. Dev.				
Kayak/Row/Canoe:	23	10.5%	0.5	0.5	0.0	Anchorage:	Anchorage:	1.64%	
Open Utility:	50	22.8%	0.9	2.0	0.5	Beached/Blocked:	Government:	5	
Other:	4	1.8%	3.0	5.5	2.0	Hoist/Drystack:	Industrial:	23,006	
Personal Water Craft:	3	1.4%	0.5	0.5	0.0	Moorings:	Marina/Yard/Club:	5,088	
Power Cabin/Trawler:	15	6.8%	2.7	4.0	2.5	Ramp:	Motel/Hotel/Restaurant/Shop:	2.53%	
Recreational Fishing:	67	30.6%	1.8	3.0	0.5	Seawall:	Multi-Family Residential	3,138	
Sail:	31	14.2%	2.9	4.5	0.5	Trailer:	Other	6,908	
Speed:	26	11.9%	1.9	2.5	1.0	Wet Slip:	Single Family Residential		
Total:	219	100.0%	1.7	5.5	0.5	Total:	Total:	173	

TRAFFICSHED NUMBER: 30 **TRAFFICSHED NAME: Sanibel/Tarpon Bay**

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats Restricted Boats (Percent of Study Area):	45
			Avg.	Max	Min Std. Dev.				
Kayak/Row/Canoe:	46	22.5%	0.5	0.5	0.0	Anchorage:	Anchorage:	2.74%	
Open Utility:	19	9.3%	0.9	2.0	0.5	Beached/Blocked:	Government:	5	
Other:	3	1.5%	2.0	2.5	1.0	Hoist/Drystack:	Industrial:	46,515	
Personal Water Craft:	7	3.4%	0.5	0.5	0.0	Moorings:	Marina/Yard/Club:	1,143	
Power Cabin/Trawler:	22	10.8%	3.1	5.0	2.5	Ramp:	Motel/Hotel/Restaurant/Shop:	0.57%	
Recreational Fishing:	74	36.3%	2.2	4.5	1.0	Seawall:	Multi-Family Residential	575	
Sail:	12	5.9%	2.3	5.5	0.5	Trailer:	Other		
Speed:	21	10.3%	2.1	3.0	0.5	Wet Slip:	Single Family Residential	1,422	
Total:	204	100.0%	1.7	5.5	0.5	Total:	Total:	165	

TRAFFICSHED NUMBER: 31 **TRAFFICSHED NAME: Sanibel/Point Ybe**

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats Restricted Boats (Percent of Study Area):	18
			Avg.	Max	Min Std. Dev.				
Kayak/Row/Canoe:	55	10.4%	0.6	2.0	0.5	Anchorage:	Anchorage:	1.09%	
Open Utility:	36	6.8%	1.0	2.0	0.5	Beached/Blocked:	Government:	11	
Other:	1	0.2%	2.0	2.0	2.0	Hoist/Drystack:	Industrial:	39,715	
Personal Water Craft:	5	0.9%	0.5	0.5	0.0	Moorings:	Marina/Yard/Club:	1,248	
Power Cabin/Trawler:	51	9.7%	3.3	5.0	1.5	Ramp:	Motel/Hotel/Restaurant/Shop:	0.62%	
Recreational Fishing:	259	49.1%	2.1	4.5	1.0	Seawall:	Multi-Family Residential	118	
Sail:	27	5.1%	2.8	5.0	1.5	Trailer:	Other		
Speed:	93	17.6%	2.0	3.0	0.5	Wet Slip:	Single Family Residential	373	
Total:	527	100.0%	2.0	5.0	0.5	Total:	Total:	393	

TRAFFICSHED NUMBER: 32 **TRAFFICSHED NAME: Punta Rassa/Connie Mack Island**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):	
			Avg.	Max	Min				Std. Dev.
Kayak/Row/Canoe:	21	5.3%	0.5	0.5	0.0	Anchorage: 1	Anchorage:	1	
Open Utility:	11	2.8%	1.3	1.5	0.3	Beached/Blocked: 46	Government:	1	
Other:	4	1.0%	2.9	5.5	2.0	Hoist/Drystack: 319	Industrial:	180	
Personal Water Craft:	15	3.8%	0.5	1.0	0.5	Moorings:	Marina/Yard/Club:	2	
Power Cabin/Trawler:	49	12.4%	3.2	5.0	2.0	Ramp: 6	Motel/Hotel/Restaurant/Shop:	2	
Recreational Fishing:	196	49.5%	2.0	4.0	0.5	Seawall:	Multi-Family Residential	2	
Sail:	10	2.5%	2.9	5.0	1.0	Trailer: 7	Other		
Speed:	90	22.7%	2.0	3.5	1.0	Wet Slip: 191	Single Family Residential	33	
Total:	396	100.0%	2.0	5.5	0.5	Total: 582	Total:	40	
TRAFFICSHED NUMBER: 33 TRAFFICSHED NAME: Manatee Bay								217	
<u>Boats</u>								Restricted Boats (Percent of Study Area):	13.19%
<u>Moorings</u>								Restricted Boats with Variable Draft Capability:	180
<u>Facilities</u>								Total Channel Length (ft.):	28,784
<u>Boats</u>								Restricted Channel Length (ft.):	9,348
<u>Moorings</u>								Restricted Channels (Percent of Study Area):	4.65%
<u>Facilities</u>								Dredge (Cubic Yards)	2,289
<u>Boats</u>								Even Clearance:	
<u>Moorings</u>								Dredge (Cubic Yards)	9,213
<u>Facilities</u>								One Foot Clearance:	

TRAFFICSHED NUMBER: 33 **TRAFFICSHED NAME: Manatee Bay**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):	
			Avg.	Max	Min				Std. Dev.
Kayak/Row/Canoe:	5	8.1%	0.5	0.5	0.0	Anchorage:	Anchorage:	16	
Open Utility:	18	29.0%	0.9	2.0	0.5	Beached/Blocked: 10	Government:	0.97%	
Other:	1	1.6%	2.0	2.0	2.0	Hoist/Drystack: 65	Industrial:	15	
Personal Water Craft:	3	4.8%	0.5	0.5	0.0	Moorings:	Marina/Yard/Club:	7,273	
Power Cabin/Trawler:	6	9.7%	2.8	3.0	2.5	Ramp: 1	Motel/Hotel/Restaurant/Shop:	318	
Recreational Fishing:	14	22.6%	2.0	3.0	1.5	Seawall: 6	Multi-Family Residential	0.16%	
Sail:	2	3.2%	0.8	1.0	0.5	Trailer: 4	Other	60	
Speed:	13	21.0%	2.0	2.5	1.0	Wet Slip: 29	Single Family Residential	295	
Total:	62	100.0%	1.5	3.0	0.5	Total: 117	Total:	51	
TRAFFICSHED NUMBER: 34 TRAFFICSHED NAME: Tropical Point								16	
<u>Boats</u>								Restricted Boats (Percent of Study Area):	0.97%
<u>Moorings</u>								Restricted Boats with Variable Draft Capability:	15
<u>Facilities</u>								Total Channel Length (ft.):	7,273
<u>Boats</u>								Restricted Channel Length (ft.):	318
<u>Moorings</u>								Restricted Channels (Percent of Study Area):	0.16%
<u>Facilities</u>								Dredge (Cubic Yards)	60
<u>Boats</u>								Even Clearance:	
<u>Moorings</u>								Dredge (Cubic Yards)	295
<u>Facilities</u>								One Foot Clearance:	

TRAFFICSHED NUMBER: 34 **TRAFFICSHED NAME: Tropical Point**

<u>Boats</u>	Number	Percent	Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):	
			Avg.	Max	Min				Std. Dev.
Kayak/Row/Canoe:	1	20.0%	0.5	0.5	0.5	Anchorage:	Anchorage:	2	
Open Utility:	1	20.0%	0.5	0.5	0.5	Beached/Blocked: 2	Government:	0.12%	
Other:	1	20.0%	2.0	2.0	2.0	Hoist/Drystack:	Industrial:	1	
Personal Water Craft:						Moorings:	Marina/Yard/Club:	3,052	
Power Cabin/Trawler:						Ramp: 1	Motel/Hotel/Restaurant/Shop:	411	
Recreational Fishing:	1	20.0%	1.0	1.0	1.0	Seawall:	Multi-Family Residential	0.20%	
Sail:						Trailer:	Other	59	
Speed:	1	20.0%	0.5	0.5	0.5	Wet Slip: 24	Single Family Residential	363	
Total:	5	100.0%	0.9	2.0	0.5	Total: 27	Total:	1	
TRAFFICSHED NUMBER: 34 TRAFFICSHED NAME: Tropical Point								2	
<u>Boats</u>								Restricted Boats (Percent of Study Area):	0.12%
<u>Moorings</u>								Restricted Boats with Variable Draft Capability:	1
<u>Facilities</u>								Total Channel Length (ft.):	3,052
<u>Boats</u>								Restricted Channel Length (ft.):	411
<u>Moorings</u>								Restricted Channels (Percent of Study Area):	0.20%
<u>Facilities</u>								Dredge (Cubic Yards)	59
<u>Boats</u>								Even Clearance:	
<u>Moorings</u>								Dredge (Cubic Yards)	363
<u>Facilities</u>								One Foot Clearance:	

TRAFFICSHED NUMBER: 35 **TRAFFICSHED NAME: Matlacha (southwest 1)**

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats (Percent of Study Area):
			Avg.	Max	Min Std. Dev.			
Kayak/Row/Canoe:	1	16.7%	0.5	0.5	0.5	Anchorage:	Anchorage:	0.06%
Open Utility:	3	50.0%	0.5	0.5	0.0	Beached/Blocked:	Government:	1
Other:	1	16.7%	1.0	1.0	1.0	Hoist/Drystack:	Industrial:	4,898
Personal Water Craft:						Mooring:	Marina/Yard/Club:	480
Power Cabin/Trawler:	1	16.7%	1.5	1.5	1.5	Ramp:	Motel/Hotel/Restaurant/Shop:	0.24%
Recreational Fishing:	1	16.7%	1.5	1.5	1.5	Seawall:	Multi-Family Residential	0
Sail:						Trailer:	Other	
Speed:						Wet Slip:	Single Family Residential	356
Total:	6	100.0%	0.8	1.5	0.5 0.4	Total:	Total:	9

TRAFFICSHED NUMBER: 36 **TRAFFICSHED NAME: Matlacha (southwest 2)**

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats (Percent of Study Area):
			Avg.	Max	Min Std. Dev.			
Kayak/Row/Canoe:	10	13.5%	0.5	0.5	0.0	Anchorage:	Anchorage:	1.09%
Open Utility:	30	40.5%	0.9	1.5	0.5 0.4	Beached/Blocked:	Government:	15
Other:	3	4.1%	1.7	2.0	1.5 0.3	Hoist/Drystack:	Industrial:	10,070
Personal Water Craft:						Mooring:	Marina/Yard/Club:	1,660
Power Cabin/Trawler:	1	1.4%	1.0	1.0	1.0	Ramp:	Motel/Hotel/Restaurant/Shop:	0.83%
Recreational Fishing:	18	24.3%	1.5	2.5	0.5 0.6	Seawall:	Multi-Family Residential	481
Sail:	3	4.1%	2.3	3.0	2.0 0.6	Trailer:	Other	
Speed:	9	12.2%	1.7	2.5	1.0 0.6	Wet Slip:	Single Family Residential	1,710
Total:	74	100.0%	1.2	3.0	0.5 0.7	Total:	Total:	18

TRAFFICSHED NUMBER: 37 **TRAFFICSHED NAME: Matlacha (southwest 3)**

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats (Percent of Study Area):
			Avg.	Max	Min Std. Dev.			
Kayak/Row/Canoe:	11	55.0%	1.1	1.5	0.5 0.4	Anchorage:	Anchorage:	0.36%
Open Utility:	1	5.0%	0.5	0.5	0.5	Beached/Blocked:	Government:	5
Other:	1	5.0%	0.5	0.5	0.5	Hoist/Drystack:	Industrial:	2,190
Personal Water Craft:						Mooring:	Marina/Yard/Club:	183
Power Cabin/Trawler:	7	35.0%	1.3	1.5	0.5 0.4	Ramp:	Motel/Hotel/Restaurant/Shop:	0.09%
Recreational Fishing:	1	5.0%	6.0	6.0	6.0	Seawall:	Multi-Family Residential	42
Sail:	1	5.0%	6.0	6.0	6.0	Trailer:	Other	
Speed:						Wet Slip:	Single Family Residential	178
Total:	20	100.0%	1.4	6.0	0.5 1.2	Total:	Total:	6

TRAFFICSHED NUMBER: 38 **TRAFFICSHED NAME: Matlacha (southeast)**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):
	4	25.0%	Avg. 0.5	Max 0.5	Min 0.5			
Kayak/Row/Canoe:	4	25.0%	0.5	0.5	0.5	0.0	Anchorage:	0.43%
Open Utility:							Beached/Blocked: 4	Restricted Boats with Variable Draft Capability:
Other:							Holst/Drystack: 5	Total Channel Length (ft.): 1,265
Personal Water Craft:							Mooring: 1	Restricted Channel Length (ft.):
Power Cabin/Trawler:	3	18.8%	3.2	4.0	2.5	0.8	Ramp:	Restricted Channels (Percent of Study Area):
Recreational Fishing:	2	12.5%	1.0	1.5	0.5	0.7	Scawall: 1	Dredge (Cubic Yards)
Sail:	6	37.5%	3.6	5.0	1.5	1.2	Trailer:	Even Clearance:
Speed:	1	6.3%	2.0	2.0	2.0		Wet Slip: 20	Dredge (Cubic Yards)
Total:	16	100.0%	2.3	5.0	0.5	1.6	Total: 34	One Foot Clearance:

TRAFFICSHED NUMBER: 39 **TRAFFICSHED NAME: Matlacha (northwest)**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):
	82	15.7%	Avg. 0.5	Max 0.5	Min 0.0			
Kayak/Row/Canoe:	82	15.7%	0.5	0.5	0.5	0.0	Anchorage:	5.41%
Open Utility:	137	26.2%	0.9	2.0	0.5	0.4	Beached/Blocked: 111	Restricted Boats with Variable Draft Capability:
Other:	28	5.4%	3.1	7.0	1.0	1.7	Holst/Drystack: 298	Total Channel Length (ft.): 26,060
Personal Water Craft:	17	3.3%	0.5	0.5	0.5	0.0	Mooring:	Restricted Channel Length (ft.): 6,982
Power Cabin/Trawler:	15	2.9%	2.7	4.0	2.5	0.5	Ramp: 9	Restricted Channels (Percent of Study Area):
Recreational Fishing:	144	27.6%	1.6	3.5	0.5	0.6	Seawall: 70	Dredge (Cubic Yards)
Sail:	44	8.4%	2.6	5.5	0.5	1.3	Trailer: 75	Even Clearance:
Speed:	55	10.5%	1.8	3.0	0.5	0.6	Wet Slip: 336	Dredge (Cubic Yards)
Total:	522	100.0%	1.4	7.0	0.5	1.0	Total: 909	One Foot Clearance:

TRAFFICSHED NUMBER: 40 **TRAFFICSHED NAME: Matlacha Isles/Cape Coral (northwest)**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats (Percent of Study Area):
	47	11.1%	Avg. 0.5	Max 0.5	Min 0.0			
Kayak/Row/Canoe:	47	11.1%	0.5	0.5	0.5	0.0	Anchorage:	5.78%
Open Utility:	97	22.9%	0.9	2.5	0.5	0.5	Beached/Blocked: 65	Restricted Boats with Variable Draft Capability:
Other:	9	2.1%	2.9	4.5	1.0	1.6	Holst/Drystack: 238	Total Channel Length (ft.): 265,603
Personal Water Craft:	11	2.6%	0.5	0.5	0.5	0.0	Mooring:	Restricted Channel Length (ft.): 8,031
Power Cabin/Trawler:	24	5.7%	2.7	4.5	2.0	0.5	Ramp: 12	Restricted Channels (Percent of Study Area):
Recreational Fishing:	140	33.0%	1.9	3.5	0.5	0.5	Seawall: 17	Dredge (Cubic Yards)
Sail:	23	5.4%	2.5	5.0	1.5	1.2	Trailer: 93	Even Clearance:
Speed:	73	17.2%	1.9	2.5	0.5	0.6	Wet Slip: 238	Dredge (Cubic Yards)
Total:	424	100.0%	1.6	5.0	0.5	0.9	Total: 670	One Foot Clearance:

TRAFFICSHED NUMBER: 41 **TRAFFICSHED NAME: Pine Island Creek**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats (Percent of Study Area):	166
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:		
Kayak/Row/Canoe:	30	17.5%	0.5	1.0	0.5	0.1	Anchorage:				
Open Utility:	51	29.8%	0.9	1.5	0.5	0.4	Beached/Blocked:	43	Government:		107
Other:	2	1.2%	1.0	1.0	1.0	0.0	Hoist/Drystack:	62	Industrial:		33,519
Personal Water Craft:	3	1.8%	0.5	0.5	0.5	0.0	Moorings:		Marina/Yard/Club:		7,676
Power Cabin/Trawler:							Ramp:	12	Motel/Hotel/Restaurant/Shop:		3,82%
Recreational Fishing:	57	33.3%	1.5	2.5	0.5	0.4	Seawall:	7	Multi-Family Residential:	2	4,749
Sail:	6	3.5%	1.5	2.0	1.0	0.5	Trailer:	22	Other		
Speed:	22	12.9%	1.5	2.5	0.5	0.5	Wet Slip:	134	Single Family Residential	112	
Total:	171	100.0%	1.1	2.5	0.5	0.5	Total:	291	Total:	114	10,436

TRAFFICSHED NUMBER: 42 **TRAFFICSHED NAME: Bokeelia (east)**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats (Percent of Study Area):	107
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:		
Kayak/Row/Canoe:	51	11.1%	0.5	1.0	0.5	0.1	Anchorage:	3	Government:		49
Open Utility:	56	12.2%	0.9	1.5	0.5	0.4	Beached/Blocked:	74	Industrial:		33,026
Other:	61	13.3%	2.2	6.0	0.5	1.3	Hoist/Drystack:	138	Marina/Yard/Club:	3	12,781
Personal Water Craft:							Moorings:	3	Motel/Hotel/Restaurant/Shop:	3	6,36%
Power Cabin/Trawler:	12	2.6%	3.0	4.0	2.0	0.8	Ramp:	14	Multi-Family Residential	5	9,354
Recreational Fishing:	156	34.0%	2.0	4.0	0.5	0.6	Seawall:	9	Single Family Residential	219	18,821
Sail:	59	12.9%	3.0	6.0	0.5	1.5	Trailer:	62	Total:	230	
Speed:	64	13.9%	1.9	3.0	1.0	0.6	Wet Slip:	422			
Total:	459	100.0%	1.9	6.0	0.5	1.1	Total:	731			

TRAFFICSHED NUMBER: 43 **TRAFFICSHED NAME: Bokeelia (west)**

<u>Boats</u>	Number Percent		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats (Percent of Study Area):	198
	Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:		
Kayak/Row/Canoe:	16	3.1%	0.5	0.5	0.5	0.0	Anchorage:				161
Open Utility:	58	11.2%	1.0	2.0	0.5	0.4	Beached/Blocked:	41	Government:		48,431
Other:	22	4.2%	1.6	3.5	0.5	0.9	Hoist/Drystack:	362	Industrial:		16,920
Personal Water Craft:	1	0.2%	0.5	0.5	0.5	0.5	Moorings:	1	Marina/Yard/Club:	1	8,42%
Power Cabin/Trawler:	15	2.9%	2.5	3.0	2.0	0.4	Ramp:	13	Motel/Hotel/Restaurant/Shop:	14	5,867
Recreational Fishing:	294	56.6%	2.1	3.5	1.0	0.5	Seawall:	18	Multi-Family Residential	95	18,400
Sail:	13	2.5%	2.3	4.0	1.0	1.1	Trailer:	47	Single Family Residential	111	
Speed:	100	19.3%	2.0	3.0	1.0	0.5	Wet Slip:	462	Total:	111	
Total:	519	100.0%	1.9	4.0	0.5	0.7	Total:	945			

TRAFFICSHED NUMBER: 44 TRAFFICSHED NAME: Burnt Store Marina

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.	Anchorage:		Anchorage:		Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:										
Open Utility:	13	1.8%	1.3	2.0	0.5	0.4	Beached/Blocked:	55	Government:	1
Other:	7	1.0%	2.7	3.0	2.0	0.4	Hoist/Drystack:	255	Industrial:	18,037
Personal Water Craft:	4	0.6%	0.6	1.0	0.5	0.3	Moorings:		Marina/Yard/Club:	2,100
Power Cabin/Trawler:	158	22.4%	3.2	5.0	1.5	0.7	Ramp:		Motel/Hotel/Restaurant/Shop:	1.05%
Recreational Fishing:	225	31.9%	2.2	5.0	1.0	0.5	Seawall:	19	Multi-Family Residential:	218
Sail:	225	31.9%	4.4	6.5	1.5	1.1	Trailer:	38	Other:	
Speed:	73	10.4%	2.1	3.0	1.0	0.5	Wet Slip:	488	Single Family Residential:	1,773
Total:	705	100.0%	3.1	6.5	0.5	1.3	Total:	857	Total:	

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