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Regional Waterway Management System For Lee County, Phase 1



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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 1 Report focuses on Estero Bay and applies the latest science and technology to address the region's 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, that encourage environmental awareness by users of neighborhood waterways and boat access channels.

The Phase 1 region, Estero Bay, extends from the Collier County Line northwest to Bowditch Point, and includes Hurricane Bay and the navigable portions of the Imperial River, Spring Creek, Estero River, Mullock Creek, Ten Mile Canal, and Hendry Creek. Information is presented in tables and maps for approximately 112 miles of navigable waterways, 6123 boats, 9624 moorings, 3270 shore facilities, and 1514 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 Estero Bay 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, within Estero Bay,

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.

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. 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 Imperial River, Mullock Creek, Spring Creek, Siesta Isles, Bayside Estates, Fairview Isles, Estero River, and Imperial Shores; they account for 75 percent of the boat access problems and 52 percent of the channel restrictions. Another fifteen waterways (Hendry Creek, Fish Trap Bay 2, Salty Sam's Marina, Getaway, Mid-Island Marina, Compass Rose, Port Carlos Cove, Mobile Home Park, Bonita Beach, Pelican Landing, Palermo Circle, El Sol, Fish Tale Marina, Laguna Shores, and McLaughlin Blvd) account for an additional 16 percent of the boat access problems and 16 percent of the channel restrictions. In some cases, such as Siesta Isles, Bonita Beach, Mid-Island Marina, Salty Sam's Marina, Mobile Home Park, and Fish Tale Marina, 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 heavily used by boaters to transit the Phase 1 project area and to access Gulf 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 Estero Bay should be submitted to the FDEP for needed maintenance dredging, based on project results covering Lee County Phase 1 waterways.

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.

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.

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 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 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 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. 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. Estero Bay is the focus of the Phase 1, Regional Waterway Management System for Lee County; 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 Estero Bay are attractive, unique, varied, and vulnerable to boating pressures. Estero Bay, the location of Florida's first Aquatic Buffer Preserve, is fringed by expanding commercial and residential developments. The Bay 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 Estero Bay offer a glimpse of the challenges that are faced along the entirety of coastal Lee County. The quandary faced by 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 still 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, within Estero Bay, 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 1 Regional Waterway Management System for Lee County provides the scientific base and information necessary to meet the waterway management needs of waterfront neighborhoods on and near Estero Bay, in a region extending from the Collier County line northwest to Bowditch Point, including Hurricane Bay and the navigable portions of the Imperial River, Spring Creek, Estero River, Mullock Creek, Ten Mile Canal, and Hendry Creek. The Phase 1 area includes approximately 112 miles of navigable waterways, 6123 boats, 9624 moorings, 3270 shore facilities, and 1514 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.

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

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. Deep, open water for some vessels may occur within Estero Bay and for others in the Gulf. 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.

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, that 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 Phase 1 results presented in this report provide the County with a rationale and method for implementing a Regional Waterway Management System for Estero Bay and its tributaries 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 (January–July 1999); (2) the location and characteristics of boats, moorings and related facilities (January–May 1999); and (3) the location and characteristics of signs (June–July 1999). Shoreline, generalized land use/land cover characteristics, 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 four boating regions located within the Lee County Phase 1 project area (Figure 1). The division of the project area into boating regions is based on the primary routes that boats are assumed to travel to reach Gulf waters through Matanzas Pass, Big Carlos Pass, and Big Hickory Pass. Boats are assigned to a primary route to facilitate the analysis of channel and boat restrictions.

South Estero Bay (Region 1) includes boats from the Collier County line to Big Carlos Pass. The majority of boats (1656) in Region 1 are routed to Big Carlos Pass and New Pass, however, 50 boats located in the vicinity of Big Hickory Pass are routed through that pass. **Central/North Estero Bay** (Region 2) includes boats on Hendry Creek, Mullock Creek, Ten Mile Canal, and the Estero River. The primary destination designated for boats in Region 2 is Big Carlos Pass. **Big Carlos Pass Vicinity** (Region 3) includes boats located on Estero Island, from Fairview Isles to Big Carlos Pass. **Matanzas Pass Vicinity** (Region 4) includes boats on Estero Island from Indian Bayou to Matanzas Pass, and the area surrounding Hurricane Bay. The majority of surveyed boats and channels within these regions are associated with trafficsheds. A trafficshed is defined as a boat source area with a navigable channel that provides access to a secondary channel⁵ (Figure 1). Secondary channels ultimately lead to deep, open water—the point at which a vessel is no longer restricted to a channel.

Boat and channel characteristics are reported for individual trafficsheds. Special consideration also is given to situations where primary and secondary channels provide access to two or more trafficsheds or to boats that are not located within a trafficshed. This situation occurs in every boating region, but is particularly notable in the Matanzas Pass Vicinity (Region 4), where one-third of all boats have direct access to secondary channels and, thus, are not associated with a particular trafficshed.

The following presents a general overview of key site conditions.

- a. **Trafficsheds.** The study identifies 47 trafficsheds in the Lee County Phase 1 project area. Eleven trafficsheds are located in Region 1, from the Collier County line to Big Carlos Pass; three within Region 2: Central/North Estero Bay; four within Region 3, from Fairview Isles to Big Carlos Pass; and twenty-nine in Region 4, from Indian Bayou to Matanzas Pass. Table 1 and Figure 2 present regional and summary data on the distribution of boats by boating region and boat source area, and Appendix D provides details for each trafficshed.
- b. **Boats.** The boat census observed 6123 boats⁶ berthed on Phase 1 Lee County water bodies or stored on salt-water accessible parcels (Table 2).

⁵Secondary channels generally correspond to the “Minor Boating Channels” shown on *A Boaters Guide to Lee County*, published by the Lee County Environmental Services Division.

⁶This total excludes 24 derelict vessels located in the Lee County Phase 1 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.

Boat types are reported as speed, open utility (bass, skiff, john, pontoon), recreational fishing, sail, row (kayak, canoe), power cabin and trawler, other (ferry, safety, law enforcement, US Coast Guard, excursion, 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 3270 boating facilities in the region.⁷ Facilities are reported as residential (single-family, multi-family), marina (including boatyard, yacht club), motel (including hotel, restaurant, shop), anchorage, government, other (vacant commercial properties, office buildings, or locales such as skating rinks or bowling alleys, etc.) (Table 3).
- d. **Moorings.** The region includes 9624 "moorings", which are defined as boat locations that are either occupied (6123) or vacant (3501).⁸ Mooring types are reported as anchorage, beached or blocked, dry stack or hoist, mooring, ramp, seawall, trailer, and wet slip.
- e. **Signage.** There are 1514 boating-related signs in the region: hazard warning (17), navigation guide (598), private ownership (470), resource protection (128), speed regulation (283), government (15), and other (3). 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).
- f. **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

⁷The 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.

⁸The 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 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.

Phase 1 study area, excluding the upper reaches of some rivers, where salinity is relatively low. Mangroves cover most islands in the study area, except where removed by human activity. Sea grass is extensive in the study area, especially in the Central/North Estero Bay and Matanzas Pass Vicinity boating regions, where many channels pass through sea grass beds.

4. Field Surveys

- a. **Depths.** Boat channels were identified by interpretation of section aerials 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 22,859 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 Trimble TSC1 data logger and were plotted on 1:2400-scale section aerials in the field.

Depths are referenced to the navigation datum; mean lower low water (MLLW). Tide gauges were installed at six locations (Figure 4) during the data collection period, January–July 1999, 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. (Depths in some Bayside Estates canals, isolated from tidal waters by a weir, are referenced to the "normal" water level maintained there, rather than to MLLW; the water was at approximately the desired level when the canals were sounded, so depths shown are as measured, with no further correction. On the Imperial River, upstream from the railroad bridge in Bonita Springs, depth is influenced more by stream discharge, which varies with precipitation, than by tides. Depths measured in that reach can not be meaningfully related to MLLW in the tidal waters downstream and in the channels leading to open water, so channel restriction analyses for the 28 boats surveyed there were begun at the railroad bridge.)

- 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 (1:24,000) scales. The trafficshed-scale thematic information is contained in three 63-page atlases and the regional scale information in one 5-page atlas. All atlases contain an index of page numbers that overlies an aerial photo mosaic of the study region.

a. Trafficshed-Scale Atlases

1. **Bathymetry** - 22,859 soundings for channel centerlines and adjacent shoals. Depths are corrected to MLLW and presented at 0.5-ft resolution.
2. **Channel Depths, Boat Drafts, and Signage** - 22,859 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 (6123 vessels) presented in six draft categories (same units as depths); Signs (1514) presented in six categories: speed regulation, hazard warning, resource protection, navigation guide, private ownership, government.
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** (6123 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** - 22,859 soundings that pertain to channel centerlines and adjacent shoals. Depths are corrected to MLLW 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** - 6123 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, >1 to 5 slip, >5 to 10 slips, >10 to 50 slips, >50 to 100 slips, and >100 to 300 slips).

4. **Signs** - 1514 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 1 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 made 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 1 Lee County Regional Waterway Management System includes eight files: boats, boating access channels, access channel 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.⁹

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 1 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.

⁹A data dictionary describes each file and includes detailed information on identification, data quality, spatial data organization referencing, entities and attributes, distribution and metadata references.

- (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 $1/16^{\text{th}}$ 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 1

a. Boats

The Lee County Phase 1 project area contains 6123 small-craft vessels (excluding 24 derelict vessels), which are in the water or on adjacent salt-water accessible upland parcels (Table 2). The majority consists of speed boats (24 percent), open utility (24 percent), and recreational fishing (23 percent); followed by sail (9 percent), kayak/row/canoe (7 percent), and power cabin/trawler-types (6 percent). There are relatively few personal water craft (3 percent) at adjacent waterfront locations.

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 1 project area includes 47 defined trafficsheds. (Appendix D presents maps showing the location of each trafficshed.) Overall, 81% (4979) of surveyed boats belong to trafficsheds while 19% (1144) have direct access to secondary channels. Ninety-six percent (2951) of all boats from the Collier County line to Fairview Isles (Regions 1, 2, and 3) are situated within trafficsheds, whereas one-third (1016) of all boats from Indian Bayou to Matanzas Pass (Region 4) have direct access to secondary channels and are situated outside of defined trafficsheds (Table 1 and Figure 2). Sixty-two percent of all boats are found in one-fourth (12) of Phase 1 trafficsheds: Imperial River (934), Fish Tale Marina (466), Bayside Estates (350), Mullock Creek (321), Spring Creek (302), Siesta Isles (302), Fairview Isles (262), Mid-Island Marina (237), Estero River (165), Imperial Shores (163), Compass Rose (154), and Salty Sam's Marina (147); 91 percent of all restricted boats are situated in trafficsheds that contain 15 or more boats (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).

Forty-eight percent (2924) of all boats experience some degree of restriction. Of the restricted boats, 1913 (65 percent) are somewhat restricted and only experience problems within 0.5 ft of MLLW; 721 boats (25 percent) are restricted by 1.0 - 1.5 ft; 200 (7 percent) are severely restricted by 2.0 - 2.5 ft; and 90 (3 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 63-page analysis atlases described on page 5.

The boats in the Phase 1 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). Fifty percent (3034) of all boats have shallow drafts, 42 percent (2551) have medium drafts,

and 9 percent (538) have deeper drafts. Of all restricted boats, 39 percent have shallow drafts, 49 percent have medium drafts, and 12 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 (see Table 6). Seventy-three percent (2146) 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 (98 percent) of the restricted boats with "variable draft" capability are in the 1.0 ft (139), 1.5 ft (806), 2.0 ft (770), 2.5 ft (253), and 3.0 ft (143) draft categories (Table 7).

d. Spatial Distribution of Restricted Access Boats

Restricted boats are unevenly distributed among the four Phase 1 boating regions. Regions 1 (South Estero Bay) and 2 (Central/North Estero Bay) include 37 percent of all boats (2246), but contain 61 percent (1777) of all restricted boats. In contrast, Regions 3 (Big Carlos Pass Vicinity) and 4 (Matanzas Pass Vicinity) contain 63 percent (3877) of all boats and 39 percent (1147) of all restricted boats (Table 8). Twenty-five percent of South Estero Bay restricted boats are limited solely by shallows located within common waterways, while 27 percent are limited solely by shallows within trafficsheds and 48 percent by restrictions located both within trafficsheds and common waterways. The majority of restricted boats in Big Carlos Pass Vicinity (97 percent) and Matanzas Pass Vicinity (58 percent) are limited by channel restrictions contained solely within trafficsheds.

Of the 1144 boats that are not located in trafficsheds (Figure 1), 147 are restricted solely by channel segments associated with secondary channels. The majority (112) is located in Matanzas Pass Vicinity, while five restricted boats are located in Big Carlos Pass Vicinity. Thirty restricted boats are located in South Estero Bay, 15 of which are routed to Big Carlos Pass and 15 to Big Hickory Pass.

Eight trafficsheds account for 75 percent (2205) of all 2924 restricted boats (Appendix B). Four of the eight trafficsheds are located in South Estero Bay and Central/North Estero; together, they account for nearly 50 percent of all restricted boats. The eight trafficsheds are (number of restricted boats listed in parentheses): Imperial River (798), Mullock Creek (259), Spring Creek (258), Siesta Isles (249), Bayside Estates (192), Fairview Isles (187), Estero River (141), and Imperial Shores (121).

An additional fifteen trafficsheds, each with 15 or more restricted boats, account for 16 percent of all restricted boats: Hendry Creek (54), Fish Trap Bay 2 (47), Salty Sam's Marina (44), Getaway (43), Mid-Island Marina (41), Compass Rose (40), Port Carlos Cove (39), Mobile Home Park (26), Bonita Beach (26), Pelican Landing (19),

Palermo Circle (17), El Sol (15), Fish Tale Marina (15), Laguna Shores (15), and McLaughlin Blvd. (15).

Ninety-one percent of all restricted boats are situated in these 23 trafficsheds, ten of which are in Matanzas Pass Vicinity, seven in South Estero Bay, and three apiece in Central/North Estero Bay and Big Carlos Pass Vicinity. The relative proportions of restricted boats at the twenty-three locations are shown by graduated dots on Figure 6.

e. Channel Restrictions

There are approximately 112 statute miles of waterways in the Lee County Phase 1 Project area. A total of 22,859 soundings were used to construct channel depth segments. The principal travel routes, which include some secondary channels and all trafficshed channels, consist of approximately 105 miles of waterways. These principal travel routes were analyzed to determine the location and extent of restrictions (shoals) that impede boat traffic. Results of the analysis are presented in Tables 9a, 9b, and 9c. 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 37 percent (38.7 mi.) of the principal travel route waterways. However, 48 percent of the restricted channel length (18.4 mi.) only impedes vessel transit by less than or equal to 0.5 feet at MLLW. The remaining 52 percent of restricted channel length consists of 13.9 mi. that restrict by 1.0 or 1.5 ft, 5.1 mi. that restrict by 2.0 to 2.5 ft, and 1.3 mi. that restrict by 3 ft or greater at MLLW (Table 9).

Fifty-two percent (20.0 miles) of the restricted channel length is found in the eight 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: Imperial River (4.7 mi), Mullock Creek (4.0 mi), Spring Creek (3.0 mi), Siesta Isles (0.4 mi), Bayside Estates (1.1 mi), Fairview Isles (1.9 mi), Estero River (4.1 mi), and Imperial Shores (1.0 mi).

An additional 15 trafficsheds, with 15 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: Hendry Creek (2.5 mi), Fish Trap Bay 2 (0.5 mi), Salty Sam's Marina (0.08 mi), Getaway (0.2 mi), Mid-Island Marina (0.06 mi), Compass Rose (0.2 mi), Port Carlos Cove (0.4 mi), Mobile Home Park (0.1 mi), Bonita Beach (0.3 mi), Pelican Landing (0.7 mi), Palermo Circle (0.3 mi), El Sol (0.2 mi), Fish Tale Marina (0.06 mi), Laguna Shores (0.2 mi), and McLaughlin Blvd. (0.2 mi) (Appendix C).

Twenty-two percent (8.7 mi.) of restricted channel segments are associated with secondary waterways that are located outside of trafficsheds and that provide service to a higher volume of boat traffic (Table 9b and Figure 7). Restrictions on secondary channels in Matanzas Pass Vicinity account for 12 percent (4.8 mi.) of all restricted segments and for 56 percent of secondary channels restrictions. However,

approximately one-third of these restrictions are related solely to 66 deep-draft (≥ 8 ft.) commercial fishing boats (e.g. shrimpers) docked north of the Matanzas Pass anchorage

Channel restrictions on the secondary waterways of South Estero Bay account for 7 percent (2.9 mi.) of all restricted segments and 33 percent of restricted secondary channels. The principal channel restrictions, of greater than 1 foot, occur along a stretch that begins at the mouth of the Imperial River, passes through Fish Trap Bay and Intrepid Pass, and ends before the southern entrance to Hogue Channel (Figure 7). Additional restrictions occur where Hogue and Broadway Channels meet.

Ten percent (0.9 mi.) of secondary waterway restrictions occur in Central/North Estero Bay, in the vicinity of the confluence of Hendry and Mullock Creeks. These restrictions are 1 foot or less and could be accommodated by the 81 percent of upstream boats with variable draft capability. Boat traffic is restricted by 1/10th mile of secondary channels in Big Carlos Pass Vicinity (Figure 7).

f. Relation of Boat Accessibility to Channel Restriction

As stated in section d, above, 23 trafficsheds contain 91 percent of all restricted boats and 60 percent of the projected dredge for all restricted channels. The boat-channel relations for these locations are shown in Figure 8. Imperial River stands out from the remaining trafficsheds in terms of combined relative totals, followed by Mullock Creek, Spring Creek, Estero River, Fairview Isles, and Bayside Estates. As a group, these 6 trafficsheds account for 63 percent of restricted boats and 43 percent of estimated total dredge for the Phase 1 project area. For some locations, such as Siesta Isles, Salty Sam's Marina, Mid-Island Marina, and Bonita Beach, 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).

g. 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 10 and 11 present an analysis for all trafficshed channels and secondary channels in the study region. The ratio of Total Dredge (Tables 10 and 11, right-hand column) to Restricted Boats (Tables 10 and 11, left-hand column) gives a lumped per-boat dredge volume that is applicable within the trafficshed. For example, under the Normal Clearance option (Table 10), Imperial River, with 798 restricted boats and an estimated total dredge of 16,398 yd³ (within the trafficshed), would have a per-boat

dredge requirement of approximately 21 yd³, whereas Mid-Island Marina would have an approximate per-boat dredge value of 3.4 yd³. This ratio is an aggregated value that can be expected to vary within a trafficked, 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 10); and
- ii) Additional Depth Clearance, which requires a 1 ft clearance between lowest point of boat and channel bottom (Table 11).¹⁰ Dredging amounts are in cubic yards and assume a base channel width¹¹ of 20 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.

¹⁰This 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 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.

¹¹There 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

A comparison of the results between Normal (approximately 142,084 yd³) and Additional (approximately 293,675 yd³) shows that twice the amount of spoil would need to be removed, overall, to achieve the additional depth clearance. The top 23 trafficheds which, combined, contain 91 percent of all restricted boats, represent 60 percent of the dredging needs of the Phase 1 area. Figure 9 shows the locations of these trafficheds, which are represented on the map by graduated-size dots. The top six restricted trafficheds account for 43 percent (61,407 yd³) of projected dredging requirements for Normal Clearance (Imperial River, Estero River, Fairview Isles, Bayside Estates, Mullock Creek, and Hendry Creek); and they account for 47 percent (138,624 yd³) for Additional Clearance (Imperial River, Estero River, Mullock Creek, Spring Creek, Hendry Creek, and Fairview Isles).

h. Signage

The study region contains 1514 boating-related signs. Forty percent (603) are in Matanzas Pass Vicinity, 35 percent (527) are in South Estero Bay, 13 percent (200) are in Central/North Estero Bay, and 12 percent (184) are in Big Carlos Pass Vicinity. Fifty-two percent of all signs (794) are in trafficheds. Of all signs, 598 are navigation-type, 470 are categorized as private ownership, 283 post speed regulations, 128 are for resource protection, 17 are for hazard warning, 15 are related to government facilities, and 3 are classified as other. The most common type of sign is "piling" (48 percent) followed by those on structures (41 percent). Tables 12a and 12b detail this information.

9. Special Management Considerations Warranted in Estero Bay

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 first aquatic preserve was established in Estero Bay in 1966.

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 Estero Bay. 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 1 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 1 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 Imperial River, Mullock Creek, Spring Creek, Siesta Isles, Bayside Estates, Fairview Isles, Estero River and Imperial Shores; they account for 75 percent of the boat access problems and 52 percent of the channel restrictions. Lee County should concentrate initial waterway management efforts at these locations. Another fifteen waterways (Hendry Creek, Fish Trap Bay 2, Salty Sam's Marina, Getaway, Mid-Island Marina, Compass Rose, Port Carlos Cove, Mobile Home Park, Bonita Beach, Pelican Landing, Palermo Circle, El Sol, Fish Tale Marina, Laguna Shores, and McLaughlin Blvd) account for an additional 16 percent of the boat access problems and 16 percent of the channel restrictions. In some cases, such as Siesta Isles, Bonita Beach, Mid-Island Marina, Salty Sam's Marina, Mobile Home Park, and Fish Tale Marina, 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. Several secondary access channels serve two or more trafficsheds and are heavily used by boaters to transit the Phase 1 project area or to gain access to Gulf waters. The high volume of boat traffic traversing these arteries makes them strong candidates for maintenance dredging. These secondary channels impact 1613 boats (55 percent) and account for 22 percent of the total length of restricted channels.

3. Additional assessment of the needs and operating habits of the deep-draft commercial shrimp boats that dock on the north side of Matanzas Pass 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 of this project covering Phase 1 county waters and on the results from Phases 2 and 3, which are 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 Boating Region and Boat Source Area for Lee County Phase 1.

Boating Region	Bay Water Access	Boat Count	Region Percent	Total Percent
Region 1: South Estero Bay	Trafficshed Based	1589	93%	26%
	Direct Access	117	7%	2%
	Total	1706	100%	28%
Region 2: Central/North Estero Bay	Trafficshed Based	540	100%	9%
	Direct Access	0	0%	0%
	Total	540	100%	9%
Region 3: Big Carlos Pass Vicinity	Trafficshed Based	822	99%	13%
	Direct Access	11	1%	0%
	Total	833	100%	14%
Region 4: Matanzas Pass Vicinity	Trafficshed Based	2028	67%	33%
	Direct Access	1016	33%	17%
	Total	3044	100%	50%
Total:All Lee County Phase 1	Trafficshed Based	4979	81%	81%
	Direct Access	1144	19%	19%
	Total	6123	100%	100%

Table 2. Counts of Boat Types for Lee
County Phase 1.

Boat Type	Boats	Percent
Speed	1498	24%
Open Utility	1449	24%
Recreational Fishing	1386	23%
Sail	557	9%
Kayak/Row/Canoe	414	7%
Power Cabin/Trawler	393	6%
Other*	234	4%
Personal Water Craft	192	3%
Total:	6123	100%

*"Other" includes vessels in the following categories: Market fish, gambling, excursion, ferry, and safety, along with miscellaneous vessels, such as barges and sailboards.

This table excludes 24 derelict vessels tallied in the survey.

Table 3. Distribution of Boating Facilities by Boating Region for Lee County Phase 1.

Facility Type	South Estero Bay	Central/North Estero Bay	Big Carlos Pass Vicinity	Matanzas Pass Vicinity	Total
Anchorage	1			2	3
Government	2			2	4
Industrial				7	7
Marina/Yard/Club	7		1	28	36
Motel/Hotel/Restaurant/Shop	11	1		25	37
Multi-Family Residential	32		22	35	89
Other*	1	1		12	14
Single Family Residential	1022	383	372	1295	3072
Total	1076	385	395	1406	3262

*Vacant commercial properties, office buildings, or locales such as skating rinks or bowling alleys, etc.

Table 4. Boat Access Levels for Lee County Phase 1, by Boating Region.

Restriction Level	Region 1				Region 2				Region 3				Region 4				All Boating Regions			
	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total
All Boats	1708	28%	100%	28%	540	9%	100%	9%	853	14%	100%	14%	3044	50%	100%	50%	8123	100%	100%	100%
Unrestricted Boats	383	12%	22%	6%	86	3%	16%	1%	606	19%	73%	10%	2124	66%	70%	35%	3199	100%	52%	52%
Restricted Boats	1323	48%	78%	22%	454	16%	84%	7%	227	8%	27%	4%	920	31%	30%	15%	2824	100%	48%	48%
Somewhat Restricted	1054	55%	80%	17%	192	10%	42%	3%	164	9%	72%	3%	503	26%	55%	8%	1913	100%	65%	31%
Restricted	207	29%	16%	3%	234	32%	52%	4%	48	7%	21%	1%	252	32%	25%	4%	771	100%	25%	12%
Severely Restricted	55	28%	4%	0.9%	28	14%	6%	0.5%	13	7%	6%	0.2%	104	52%	11%	2%	200	100%	7%	3%
Blocked	7	8%	0.5%	0.1%	0	0%	0%	0.0%	2	2%	0.2%	0.0%	81	90%	6%	1%	90	100%	3%	1%

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 1.

Draft Category	Region 1				Region 2				Region 3				Region 4				All Boating Regions			
	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total	Boats	Row Percent	Column Percent	Percent of Total
Shallow	834	74%	63%	29%	83	7%	18%	3%	88	8%	38%	3%	131	12%	14%	4%	1134	100%	39%	38%
Medium	484	34%	37%	17%	371	26%	82%	13%	127	9%	56%	4%	456	32%	50%	16%	1438	100%	49%	49%
Deeper	5	1%	0%	0%	0	0%	0%	0%	14	4%	6%	0%	333	85%	36%	11%	352	100%	12%	12%
Total	1323	45%	100%	45%	454	16%	100%	16%	227	8%	100%	8%	920	31%	100%	31%	2924	100%	100%	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 1.

Restriction Level	Region 1				Region 2				Region 3				Region 4				All Boating Regions			
	Variable Draft		Percent Boats Variable Draft		Variable Draft		Percent Boats Variable Draft		Variable Draft		Percent Boats Variable Draft		Variable Draft		Percent Boats Variable Draft		Variable Draft		Percent Boats Variable Draft	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Somewhat Restricted	1064	860	84%	192	24	166	88%	164	26	138	84%	503	146	357	71%	1913	360	1553	81%	81%
Restricted	207	178	86%	234	16	218	93%	48	8	40	83%	232	164	68	29%	721	217	504	70%	70%
Severely Restricted	56	41	75%	28	1	27	98%	13	7	6	46%	104	86	9	9%	200	117	83	42%	42%
Blocked	7	5	71%	0	0	0	0%	2	2	0	0%	81	80	1	1%	90	84	6	7%	7%
Total Restricted Boats	1323	1114	84%	454	41	413	91%	227	43	184	81%	920	486	436	47%	2824	778	2146	73%	73%
Percent of Column Total	100	16	84	100	9	91	100	100	19	81	100	100	53	47	100	27	73	100	73	100

Table 7. Variable Draft Capability by Boat Draft for Restricted Boats in Lee County Phase 1.

Draft (feet)	Region 1				Region 2				Region 3				Region 4				All Boating Regions			
	Variable Draft		Row Percent		Variable Draft		Row Percent		Variable Draft		Row Percent		Variable Draft		Row Percent		Variable Draft		Row Percent	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
8.5	122	121	0%	0%	0	0	0%	0%	40	9	31	22%	27	7	20	14%	128	138	2	1%
1.0	104	23	81	59%	18	11	7	5%	46	1	46	8%	106	8	100	12%	189	50	139	100%
1.5	608	1	607	75%	60	8	94	7%	74	8	68	9%	182	25	187	20%	817	11	806	100%
2.0	356	33	323	42%	237	13	224	29%	28	2	26	10%	70	6	81	24%	840	79	770	100%
2.5	68	6	87	84%	53	4	79	51%	21	11	10	7%	174	105	69	49%	274	21	253	100%
3.0	32	17	15	10%	51	2	49	34%	4	2	2	22%	30	28	7	78%	278	136	143	100%
3.5	3	3	0%	0%	3	0	0%	0%	12	9	3	33%	128	122	6	67%	37	28	8	100%
4.0	3	3	0%	0%	3	0	0%	0%	1	1	1	60%	38	37	1	100%	143	134	9	100%
4.5	2	2	0%	0%	2	0	0%	0%	2	1	1	50%	52	51	1	100%	42	40	2	100%
5.0													21	17	4	100%	52	51	1	100%
5.5													25	20	5	100%	25	20	5	100%
6.0													4	4	0	100%	4	4	0	100%
6.5													65	65	0	0%	75	65	0	0%
> 6.5																				
Total	1333	209	1114	83%	484	47	413	100%	227	43	184	81%	920	486	436	47%	2824	778	2146	100%

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

Table 8: Distribution of Boats Between and Within Lee County Phase 1 Boating Regions.

Boating Region	Boats Restricted Solely by Secondary Channel Segments		Boats Restricted Solely by Trafficked Channel Segments		Boats Restricted Both by Trafficked and Secondary Channel Segments		All Restricted Boats			All Boats	
	Count	Row ¹ Percent	Count	Row ¹ Percent	Count	Row ¹ Percent	Count	Row ² Percent	Column Percent	Count	Percent of Total
Region 1: South Estero Bay	327	25%	357	27%	639	48%	1323	78%	45%	1706	28%
Region 2: Central/North Estero Bay	3	1%	197	43%	254	56%	454	84%	16%	540	9%
Region 3: Big Carlos Pass Vicinity	5	2%	220	97%	2	1%	227	27%	8%	833	14%
Region 4: Matanzas Pass Vicinity	181	20%	537	58%	202	22%	920	30%	31%	3044	50%
Total: Lee County Phase 1	516	18%	1311	45%	1097	38%	2824	48%	100%	6123	100%

¹Percentage based on total of restricted boats in the region.

²Percentage based on total of all boats in the region

Table 9. Channel Restrictions for Lee County Phase 1.

a. Trafficked Channels.

Restriction Level	South Estero Bay			Central/North Estero Bay			Big Carlos Pass Vicinity			Matanzas Pass Vicinity			All Boating Regions		
	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹
All Channels	151,448	36%	100%	115,617	28%	100%	37,816	9%	100%	111,261	27%	100%	416,233	100%	100%
Unrestricted Channels	95,044	37%	63%	59,639	23%	52%	24,589	10%	65%	78,082	30%	70%	257,365	100%	62%
Restricted Channels	56,402	36%	37%	55,977	35%	48%	13,320	8%	35%	33,180	21%	30%	158,868	100%	38%
Somewhat Restricted	29,747	37%	53%	31,298	39%	56%	6,166	8%	46%	12,829	16%	39%	80,040	100%	50%
Severely Restricted	22,328	37%	40%	23,939	40%	43%	3,365	6%	25%	10,507	17%	32%	60,139	100%	36%
Blocked	4,176	27%	7%	741	5%	1%	2,913	19%	22%	7,789	50%	23%	15,618	100%	10%
	151	5%	0.5%		0%	0%	876	23%	2%	2,044	67%	6%	3,072	100%	2%

b. Secondary Channels Serving Two or More Trafficsheds.

Restriction Level	South Estero Bay			Central/North Estero Bay			Big Carlos Pass Vicinity			Matanzas Pass Vicinity			All Boating Regions		
	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹
All Channels	72,134	41%	100%	23,208	13%	100%	18,020	8%	100%	54,151	37%	100%	178,512	100%	100%
Unrestricted Channels	57,083	44%	79%	18,692	14%	81%	15,329	12%	96%	38,632	30%	60%	129,737	100%	74%
Restricted Channels	15,050	33%	21%	4,516	10%	19%	691	1.5%	4%	25,519	58%	40%	46,778	100%	26%
Somewhat Restricted	4,485	26%	30%	4,131	24%	91%	243	1%	35%	8,305	48%	33%	17,163	100%	37%
Severely Restricted	8,504	47%	43%	385	3%	9%	448	3.2%	66%	6,465	47%	25%	13,802	100%	30%
Blocked	3,884	35%	26%							7,289	65%	29%	11,173	100%	24%
	178	5%	1.2%		0.0%	0.1%				3,480	95%	14%	9,638	100%	8%

c. Trafficked and Secondary Channels Combined.

Restriction Level	South Estero Bay			Central/North Estero Bay			Big Carlos Pass Vicinity			Matanzas Pass Vicinity			All Boating Regions		
	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹	Length (feet)	Row Percent	Column Percent of Total ¹
All Channels	223,580	38%	100%	138,825	23%	100%	53,938	9%	100%	176,402	30%	100%	591,746	100%	100%
Unrestricted Channels	152,128	39%	68%	78,331	20%	56%	39,928	10%	74%	116,714	30%	67%	387,101	100%	65%
Restricted Channels	71,452	35%	32%	60,493	30%	44%	14,011	7%	26%	58,688	28%	33%	204,845	100%	35%
Somewhat Restricted	34,232	35%	48%	35,429	36%	59%	6,409	7%	46%	21,134	22%	36%	97,203	100%	47%
Severely Restricted	28,832	39%	40%	24,324	33%	40%	3,813	6%	27%	18,972	23%	28%	73,940	100%	36%
Blocked	8,060	30%	11%	741	3%	1.2%	2,913	11%	21%	15,078	56%	26%	26,791	100%	13%
	329	5%	0.5%		0.0%	0.0%	876	13%	6%	5,504	82%	9%	6,708	100%	3%

¹Percentage of the total length of all channels in the study area (112 miles).

Restriction level refers to the difference between a channel segment depth (MLLW) 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

**Table 10. Lee County Phase 1 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	2,924	16,322	66,411	43,848	15,503	142,084
Matanzas Pass Vicinity Sec. Channels	112	1,727	5,821	12,478	8,044	28,070
Imperial River	798	2,038	9,152	4,816	392	16,398
South Estero Bay Sec. Channels	30	452	6,288	6,210	395	13,345
Estero River	141	1,734	10,524	97	0	12,355
Fairview Isles	187	621	1,688	4,741	2,023	9,073
Bayside Estates	192	59	1,163	6,353	809	8,384
Mullock Creek	259	2,227	5,594	225	0	8,046
Hendry Creek	54	1,636	4,725	790	0	7,151
Spring Creek	258	978	5,858	103	0	6,939
Imperial Shores	121	140	3,269	101	0	3,509
Primo Drive 1	12	0	14	1,117	1,577	2,709
Fish Trap Bay 2	47	72	792	1,576	0	2,440
Siesta Isles	249	108	611	333	1,128	2,181
Port Carlos Cove	39	52	1,231	343	0	1,626
Island Shores 2	11	97	470	864	0	1,431
Fairview Cove	5	144	1,121	158	0	1,423
Getaway	43	28	270	674	385	1,357
Compass Rose	40	12	747	596	0	1,354
Palermo Circle	17	0	750	585	0	1,335
Island Shores 1	10	39	153	494	646	1,332
Pelican Landing	19	712	618	0	0	1,329
Yachtsman's Cove	13	76	713	269	104	1,162
Primo Drive 2	7	48	656	423	0	1,127
Donara Blvd/Madison Ct	6	243	580	212	0	1,034
Central/North Estero Bay Sec. Channels	0	729	285	0	0	1,014
Tropical Shores	9	484	444	0	0	928
Miramar	6	148	549	0	0	697
McLaughlin Blvd	15	129	380	0	0	509
Holiday Heights	5	221	250	0	0	471
Salty Sam's Marina	44	40	159	219	0	419
Glenview	2	67	344	0	0	411
McPhie Park	10	190	216	0	0	406
Big Carlos Pass Vicinity Sec. Channels	5	53	332	0	0	385
Laguna Shores	15	184	180	0	0	364
El Sol	15	188	153	6	0	347
Bonita Beach	26	190	124	0	0	314

Trafficshed or Secondary Channels	Restricted Boats	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
ALL Trafficsheds and Secondary Channels	2,924	16,322	66,411	43,848	15,503	142,084
Fish Trap Bay 1	5	254	18	0	0	273
Mid-Island Marina	41	66	109	0	0	175
Bay Harbour Club	3	3	59	66	0	128
Mobile Home Park	26	76	0	0	0	76
Washington Ct	2	23	0	0	0	23
Fish Tale Marina	15	17	0	0	0	17
Hogue Channel	1	17	0	0	0	17
Jefferson Ct	0	0	0	0	0	0
Andre-Mar	0	0	0	0	0	0
Williams Drive	3	0	0	0	0	0
San Carlos RV Park/Campgrnd	1	0	0	0	0	0
Indian Bayou	3	0	0	0	0	0
Old Pelican Bay	1	0	0	0	0	0
Carl Johnson Park	0	0	0	0	0	0
Bayview Heights	1	0	0	0	0	0
	2,924	16,325	66,410	43,847	15,503	142,086

Table 11. Lee County Phase 1 Projected Dredge Requirements for Restricted Channels
Additional Depth (1 ft.) Clearance - (Cubic Yards)

Trafficsheds and Secondary Channels	Restricted		Somewhat		Severely		Total
	Boats	Restricted	Restricted	Restricted	Blocked		
ALL Trafficsheds and Secondary Channels	2,924	88,325	121,184	63,693	20,474		293,675
Matanzas Pass Vicinity Sec. Channels	112	7,878	10,610	17,878	10,607		46,973
Imperial River	798	10,567	16,545	7,079	504		34,695
Estero River	141	9,186	19,243	146	0		28,575
South Estero Bay Sec. Channels	30	3,774	11,106	9,087	527		24,494
Mullock Creek	259	12,775	10,420	337	0		23,532
Spring Creek	258	7,571	10,754	155	0		18,480
Hendry Creek	54	6,819	8,913	1,178	0		16,910
Fairview Isles	187	3,867	3,073	6,820	2,672		16,432
Bayside Estates	192	430	2,030	9,289	1,079		12,828
Imperial Shores	121	1,385	5,768	151	0		7,304
Fish Trap Bay 2	47	715	1,447	2,271	0		4,433
Central/North Estero Bay Sec. Channels	0	3,789	571	0	0		4,359
Pelican Landing	19	2,938	1,219	0	0		4,157
Siesta Isles	249	717	1,075	486	1,482		3,759
Primo Drive 1	12	0	28	1,576	2,091		3,695
Port Carlos Cove	39	534	2,179	515	0		3,229
Fairview Cove	5	448	2,049	237	0		2,734
Island Shores 2	11	567	830	1,296	0		2,692
Tropical Shores	9	1,786	846	0	0		2,632
Palermo Circle	17	69	1,436	866	0		2,371
Donara Blvd/Madison Ct	6	851	1,113	317	0		2,282
Compass Rose	40	49	1,283	882	0		2,213
Yachtsman's Cove	13	237	1,398	390	138		2,164
Getaway	43	171	500	960	513		2,144
Island Shores 1	10	144	255	729	861		1,989
Primo Drive 2	7	171	1,139	634	0		1,944
McPhie Park	10	1,461	393	0	0		1,853
Holiday Heights	5	1,222	465	0	0		1,687
Miramar	6	462	994	0	0		1,455
McLaughlin Blvd	15	752	687	0	0		1,439
Bonita Beach	26	1,150	248	0	0		1,398
Fish Trap Bay 1	5	1,302	37	0	0		1,338
Laguna Shores	15	957	359	0	0		1,317
El Sol	15	685	303	9	0		997
Big Carlos Pass Vicinity Sec. Channels	5	233	664	0	0		897
Glenview	2	247	643	0	0		890

Trafficsheds and Secondary Channels	Restricted Boats	Somewhat Restricted	Restricted	Severely Restricted	Blocked	Total
ALL Trafficsheds and Secondary Channels	2,924	88,325	121,184	63,693	20,474	293,675
Salty Sam's Marina	44	164	275	307	0	747
Mobile Home Park	26	614	0	0	0	614
Mid-Island Marina	41	229	181	0	0	410
Indian Bayou	3	383	0	0	0	383
Fish Tale Marina	15	262	0	0	0	262
Bay Harbour Club	3	24	105	99	0	228
Hogue Channel	1	164	0	0	0	164
Bayview Heights	1	161	0	0	0	161
Washington Ct	2	130	0	0	0	130
Williams Drive	3	111	0	0	0	111
Old Pelican Bay	1	108	0	0	0	108
San Carlos RV Park/Campgmd	1	67	0	0	0	67
Jefferson Ct	0	0	0	0	0	0
Andre-Mar	0	0	0	0	0	0
Carl Johnson Park	0	0	0	0	0	0
	2,924	88,328	121,181	63,692	20,473	293,674

Table 12. Distribution of Boating-Related Signs for Lee County Phase 1.

a. Categories of Signs by Boating Region.

Boating Region	Total	Hazard Warning	Government	Navigation Guide	Private Ownership	Resource Protection	Speed Regulation	Other
South Estero Bay	527	4	1	260	111	46	105	
Central/North Estero Bay	200	1	5	96	38	14	46	
Big Carlos Pass Vicinity	184	2	3	50	55	27	44	3
Matanzas Pass Vicinity	603	10	6	192	266	41	88	
Totals	1514	17	15	598	470	128	283	3

b. Types of Signs by Boating Region.

Boating Region	Total	Buoy	Float	Other	PILINGS			Structure
					Concrete	Metal	PVC	
South Estero Bay	527	4	13	46		9	56	151
Central/North Estero Bay	200	5	6	23	4	13	58	37
Big Carlos Pass Vicinity	184	3	14	12		1	16	102
Matanzas Pass Vicinity	603	5	6	20	4	6	35	337
Totals	1514	17	39	101	8	29	165	627



Figure 1. Distribution of Lee County Phase 1 Trafficsheds by Boating Region

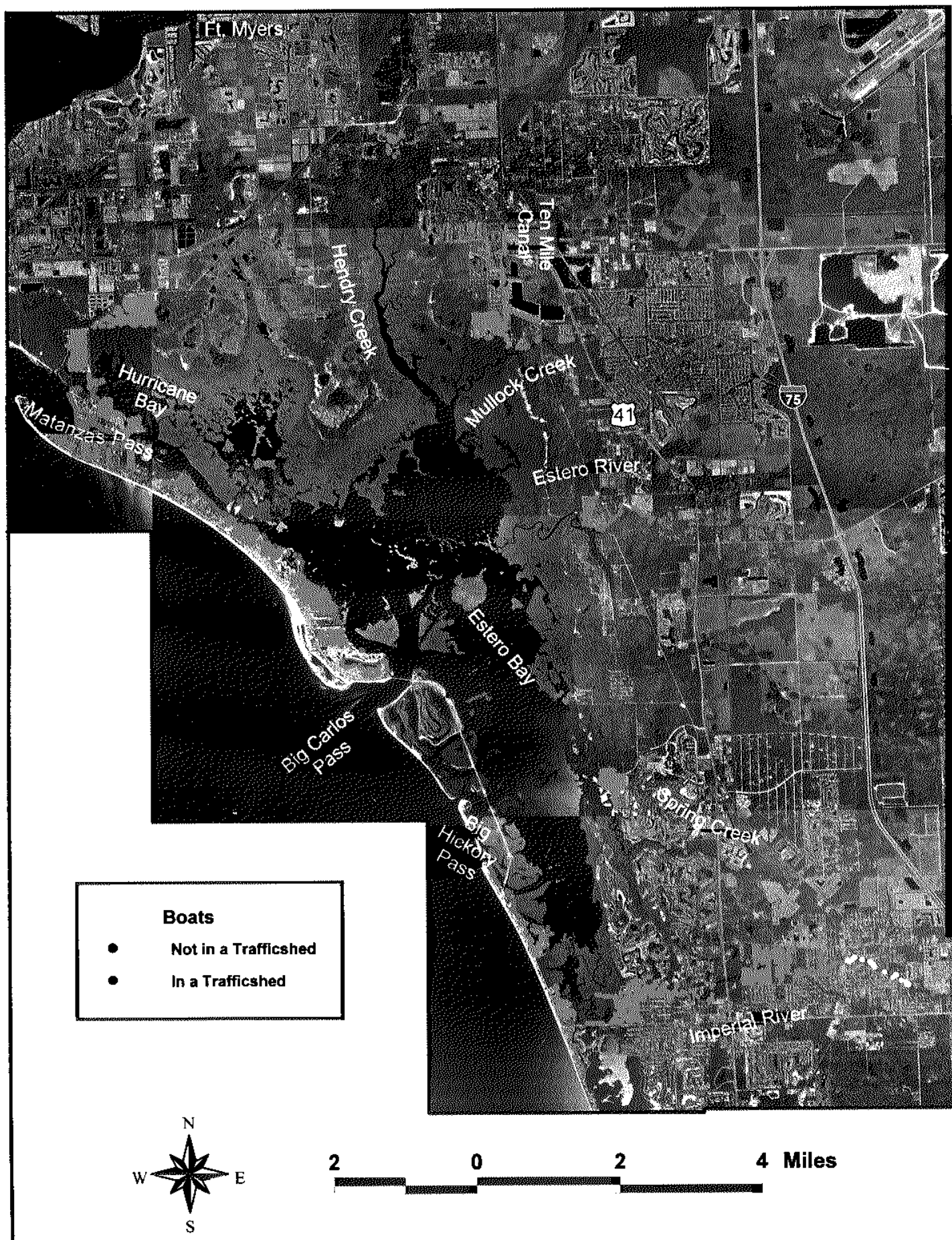


Figure 2. Distribution of Lee County Phase 1 Boats by Boat Source Area

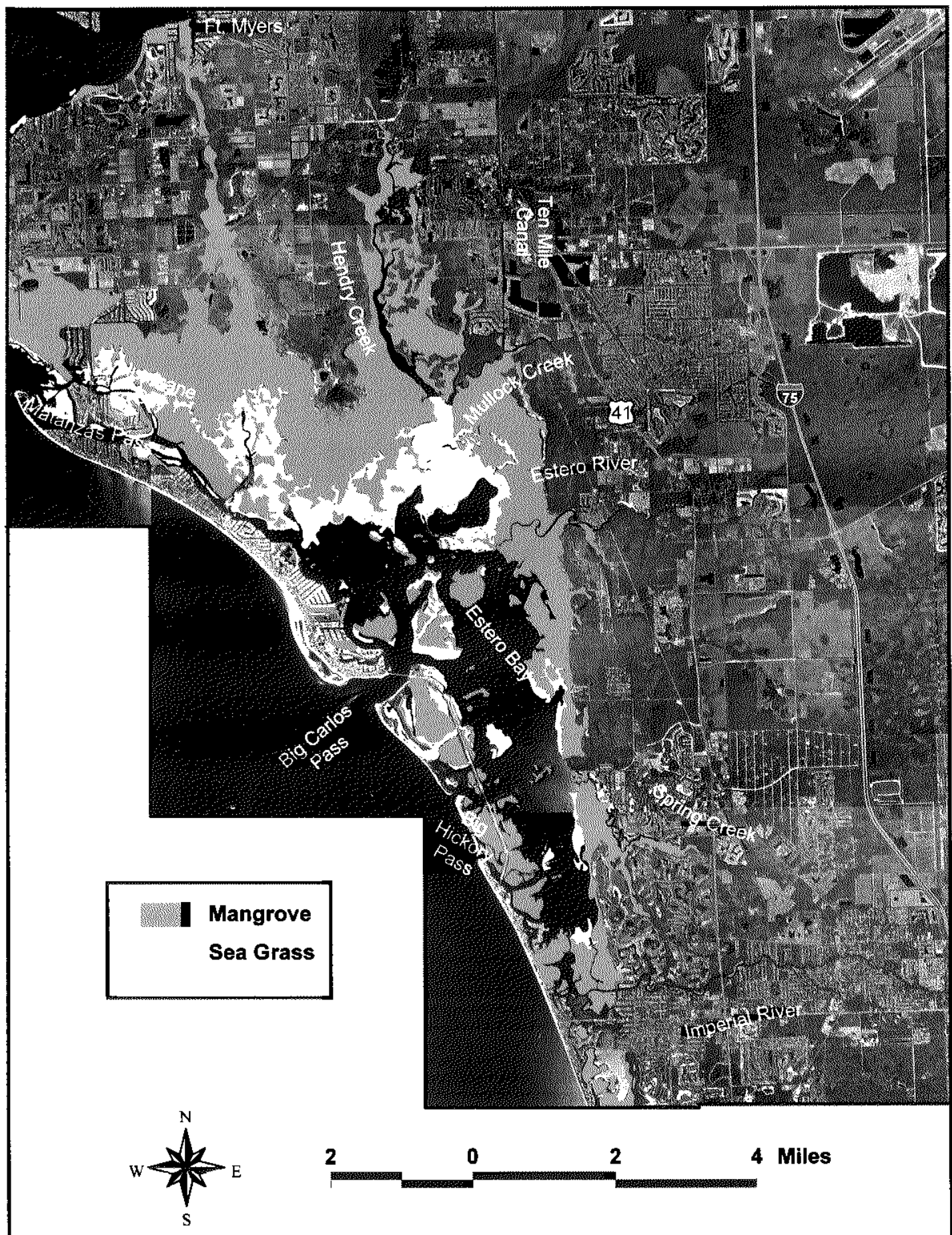


Figure 3. Approximate Distribution of Major Mangrove and Sea Grass Communities for Lee County Phase 1 Study Area



Figure 4. Locations of Tide Stations used to Correct Depths to MLLW for Lee County Phase 1

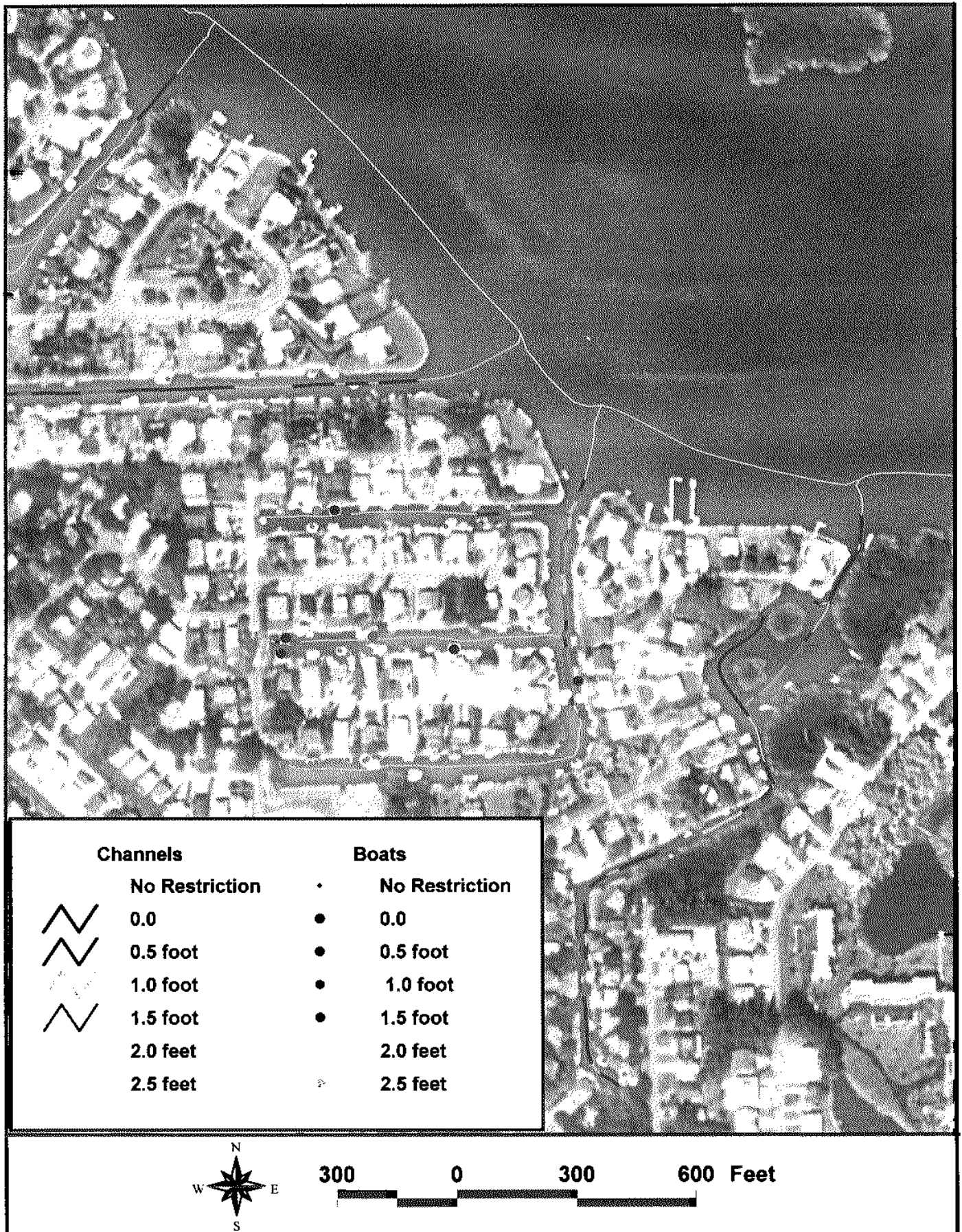


Figure 5. Example of Analysis Results, Showing Restricted Boats and Channels

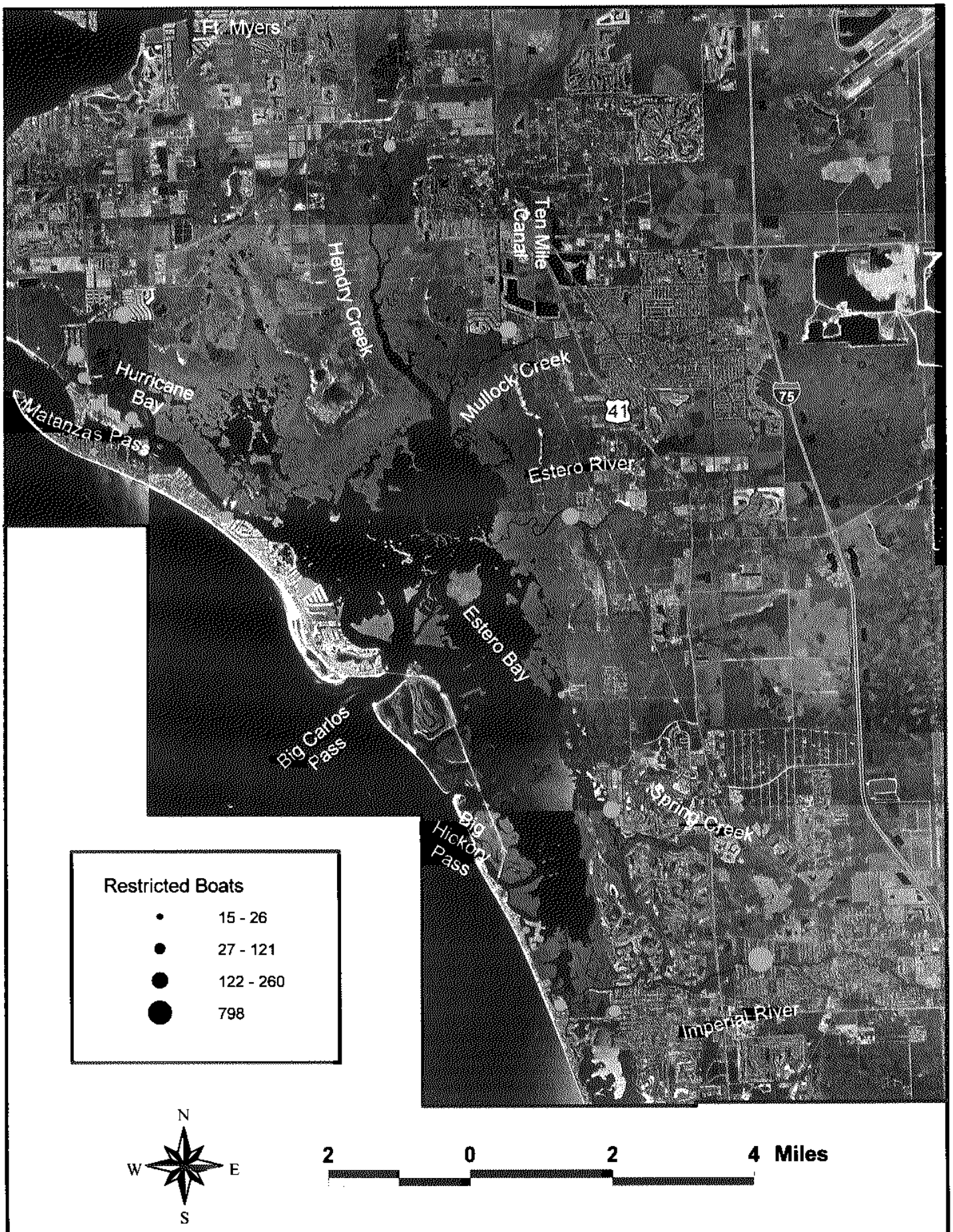


Figure 6. Top Restricted Trafficsheds for Lee County Phase 1, According to Number of Restricted Boats

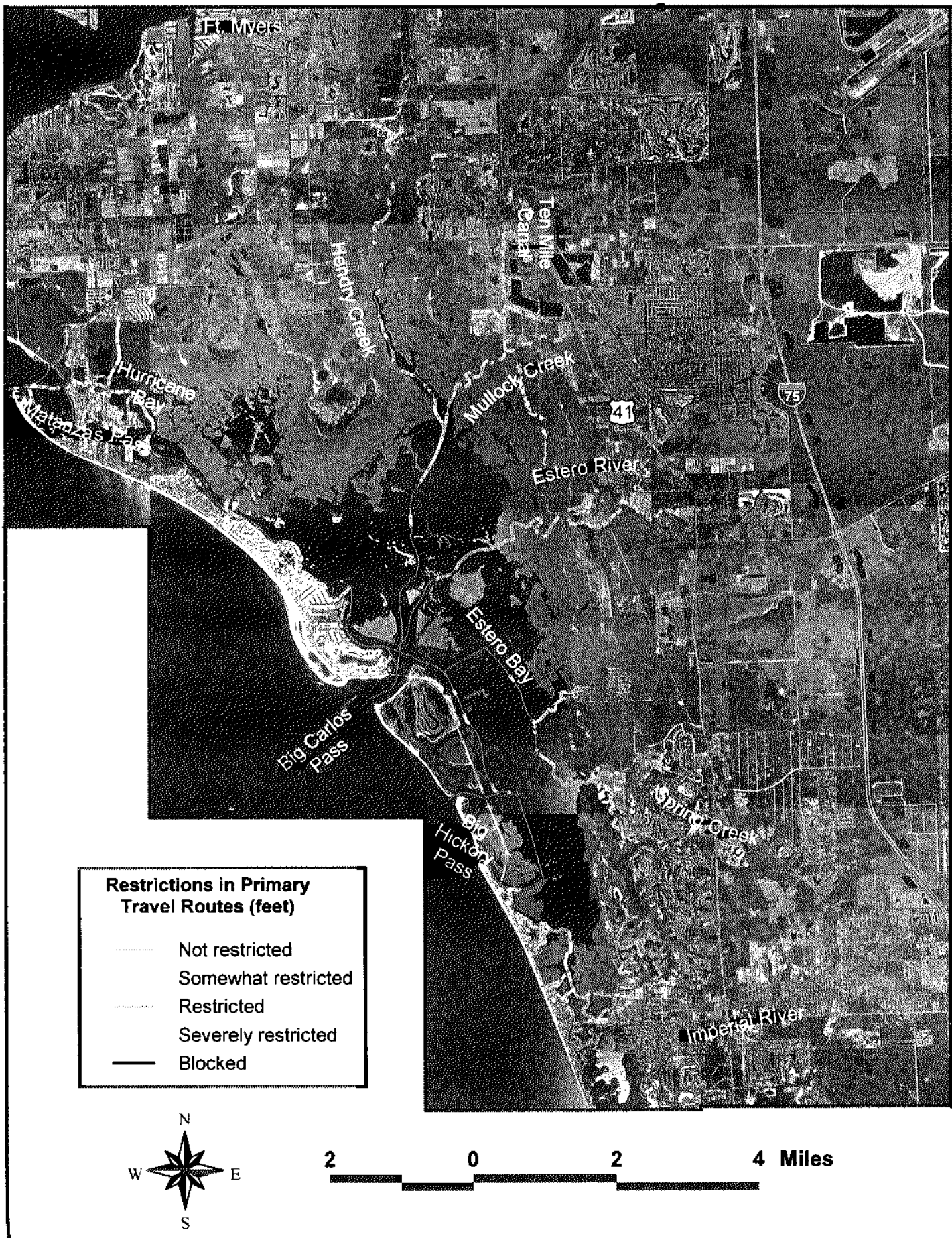


Figure 7. Restrictions in Principal Travel Routes for Lee County Phase 1

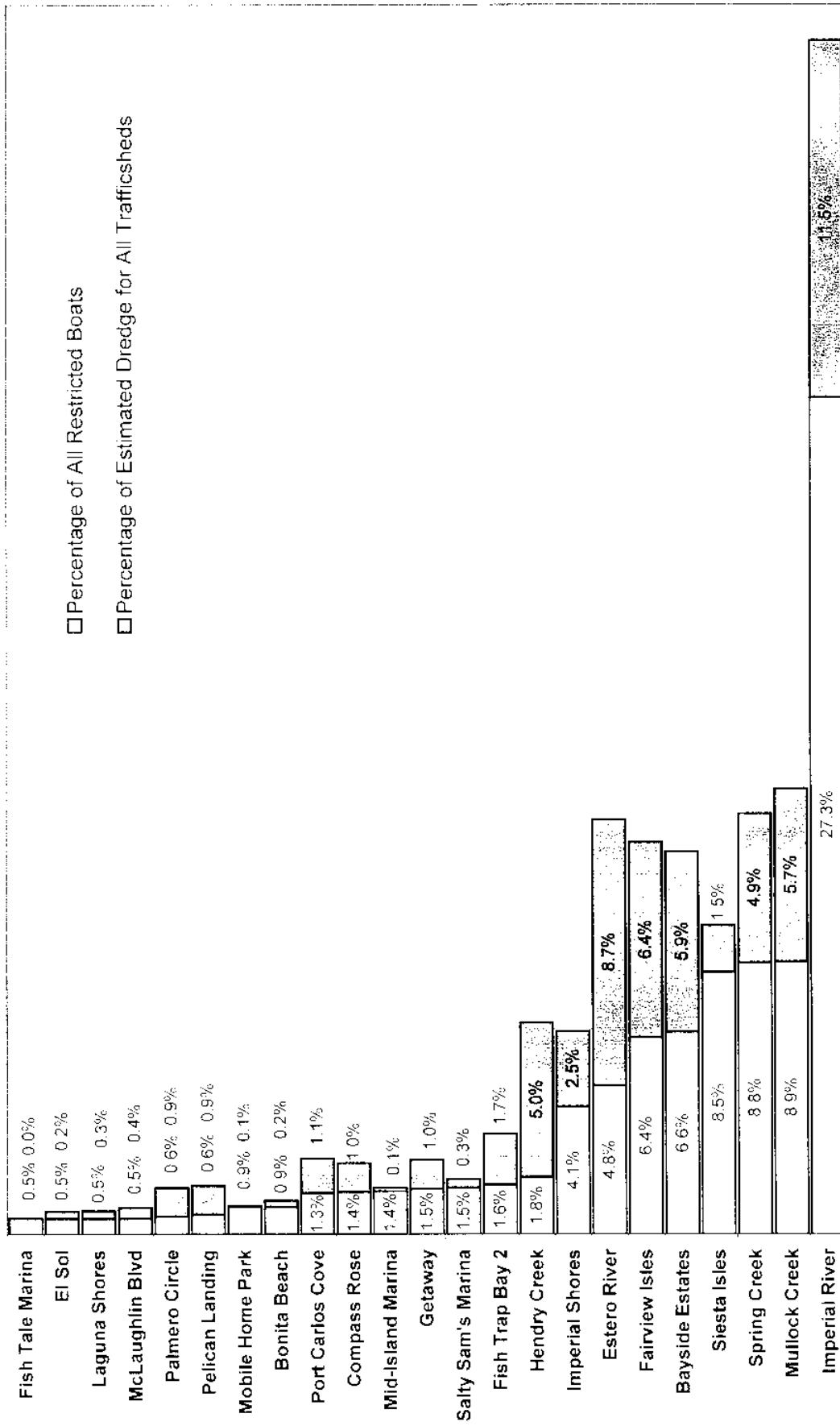


Figure 8. Distribution of Restricted Boats and the Estimated Dredge for Normal Clearance in Trafficsheds with Fifteen or More Restricted Boats in Lee County Phase 1 Project Area

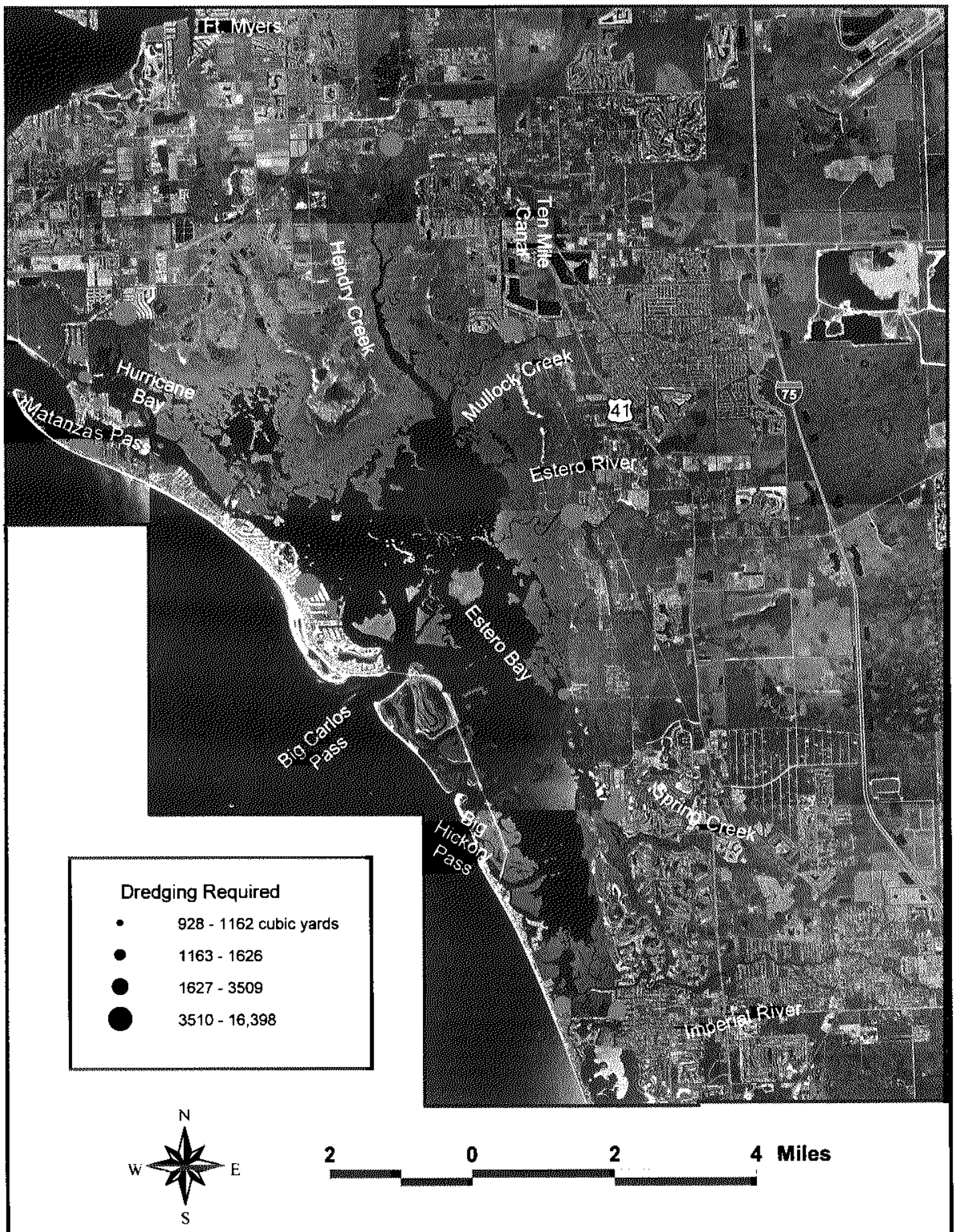


Figure 9. Top Restricted Trafficheds in Lee County Phase 1 and Estimated Dredge for Normal Clearance

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

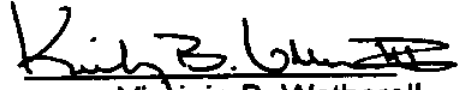
- A. This agreement shall become effective upon execution by all parties.
- B. This agreement may be terminated at any time by mutual consent, or any party may withdraw by providing 60 days written notice to all other parties.
- C. This agreement includes waterways of Manatee, Sarasota, Charlotte and 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

Trafficshed Number	Trafficsheds or Boats Associated with Secondary Channels	Number of Boats				
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	All Restricted
47	Imperial River	591	152	49	6	798
35	Mullock Creek	154	102	3		259
39	Spring Creek	237	20	1		258
2	Siesta Isles	96	73	42	38	249
5	Bayside Estates	150	33	8	1	192
30	Fairview Isles	130	43	12	2	187
36	Estero River	27	97	17		141
46	Imperial Shores	108	12	1		121
-996	Matanzas Pass Vicinity Sec. Channels	27	39	14	32	112
34	Hendry Creek	11	35	8		54
45	Fish Trap Bay 2	44	2		1	47
16	Salty Sam's Marina	30	10	4		44
3	Getaway	12	18	9	4	43
21	Mid-Island Marina	26	12	3		41
6	Compass Rose	23	7	9	1	40
8	Port Carlos Cove	32	6	1		39
-999	South Estero Bay Sec. Channels	25	2	3		30
7	Mobile Home Park	22	3	1		26
42	Bonita Beach	15	11			26
38	Pelican Landing	18	1			19
13	Palermo Circle	7	6	4		17
27	El Sol	7	5	3		15
32	Fish Tale Marina	15				15
33	Laguna Shores	12	3			15
43	McLaughlin Blvd	10	5			15
23	Yachtsman's Cove	8	2	1	2	13
11	Primo Drive 1	10	1		1	12
10	Island Shores 2	9		2		11
9	Island Shores 1	5	2	1	2	10
28	McPhie Park	6	4			10
15	Tropical Shores	8	1			9
12	Primo Drive 2	3	3	1		7
14	Miramar	5	1			6
17	Donara Blvd/Madison Ct	4	1	1		6
26	Holiday Heights	4	1			5
31	Fairview Cove	4		1		5
44	Fish Trap Bay 1	4	1			5
25	Williams Drive	1	2			3
29	Indian Bayou	3				3
40	Bay Harbour Club	1	1	1		3
18	Washington Ct	2				2
24	Glenview		2			2

Trafficshed Number	Trafficsheds or Boats Associated with Secondary Channels	Number of Boats				All Restricted
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	
-997	Big Carlos Pass Vicinity Sec. Channels	3	2			5
1	Old Pelican Bay	1				1
4	San Carlos RV Park/Campgmd	1				1
22	Bayview Heights	1				1
41	Hogue Channel	1				1
-998	Central/North Estero Bay Sec. Channels					0
19	Jefferson Ct					0
20	Andre-Mar					0
37	Carl Johnson Park					0
Total		1,913	721	200	90	2,924

Appendix C

Restricted Channels by Access Categories

Trafficshed Number	Trafficsheds and Secondary Channels	Channel Length (feet)				
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	All Restricted
47	Imperial River	11,514	9,980	3,055	151	24,701
35	Mullock Creek	14,239	6,516	152		20,906
39	Spring Creek	8,901	6,610	70		15,580
2	Siesta Isles	821	625	207	477	2,130
5	Bayside Estates	501	1,170	3,963	364	5,998
30	Fairview Isles	4,382	1,870	2,806	876	9,935
36	Estero River	10,061	11,770	66		21,897
46	Imperial Shores	1,682	3,373	68		5,123
-996	Matanzas Pass Vicinity Sec. Channels	8,305	6,465	7,289	3,460	25,519
34	Hendry Creek	6,997	5,653	524		13,175
45	Fish Trap Bay 2	868	885	938		2,690
16	Salty Sam's Marina	167	157	118		443
3	Getaway	193	310	386	173	1,062
21	Mid-Island Marina	219	98			317
6	Compass Rose	49	724	386		1,159
8	Port Carlos Cove	651	1,281	232		2,163
-999	South Estero Bay Sec. Channels	4,485	6,504	3,884	178	15,050
7	Mobile Home Park	726				726
42	Bonita Beach	1,296	167			1,463
38	Pelican Landing	3,006	812			3,818
13	Palermo Circle	94	925	380		1,399
27	El Sol	671	202	4		877
32	Fish Tale Marina	330				330
33	Laguna Shores	1,043	243			1,286
43	McLaughlin Blvd	841	414			1,255
23	Yachtsman's Cove	217	924	165	47	1,352
11	Primo Drive 1		19	620	693	1,332
10	Island Shores 2	634	485	583		1,703
9	Island Shores 1	141	137	317	291	887
28	McPhie Park	1,715	239			1,954
15	Tropical Shores	1,758	543			2,302
12	Primo Drive 2	165	652	285		1,103
14	Miramar	424	601			1,024
17	Donara Blvd/Madison Ct	822	720	143		1,684
26	Holiday Heights	1,352	290			1,642
31	Fairview Cove	411	1,252	107		1,769
44	Fish Trap Bay 1	1,414	25			1,439
25	Williams Drive	150				150
29	Indian Bayou	517				517
40	Bay Harbour Club	27	63	45		135
18	Washington Ct	144				144
24	Glenview	242	404			646

Trafficshed Number	Trafficsheds and Secondary Channels	Channel Length (feet)				
		Somewhat Restricted	Restricted	Severely Restricted	Blocked	All Restricted
-997	Big Carlos Pass Vicinity Sec. Channels	243	448			691
1	Old Pelican Bay	146				146
4	San Carlos RV Park/Campgnd	91				91
22	Bayview Heights	217				217
41	Hogue Channel	198				198
-998	Central/North Estero Bay Sec. Channels	4,131	385			4,516
19	Jefferson Ct					0
20	Andre-Mar					0
37	Carl Johnson Park					0
Total		97,203	73,940	26,791	6,709	204,645

Appendix D:

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

This appendix presents information on boats, mooring, 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 47 trafficsheds in Lee County, which are identified by a *positive number* in the Appendix D tables. The general locations of these trafficsheds are shown on the accompanying maps. To locate a particular trafficshed, refer to the *List of Trafficsheds and Corresponding Map Numbers*, which immediately precedes the maps.

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 within the four boating regions: South Estero Bay (-999), Central/North Estero Bay (-998), Big Carlos Pass Vicinity (-997), and Matanzas Pass Vicinity (-996). 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 County Environmental Management Department for specific locations and extent.

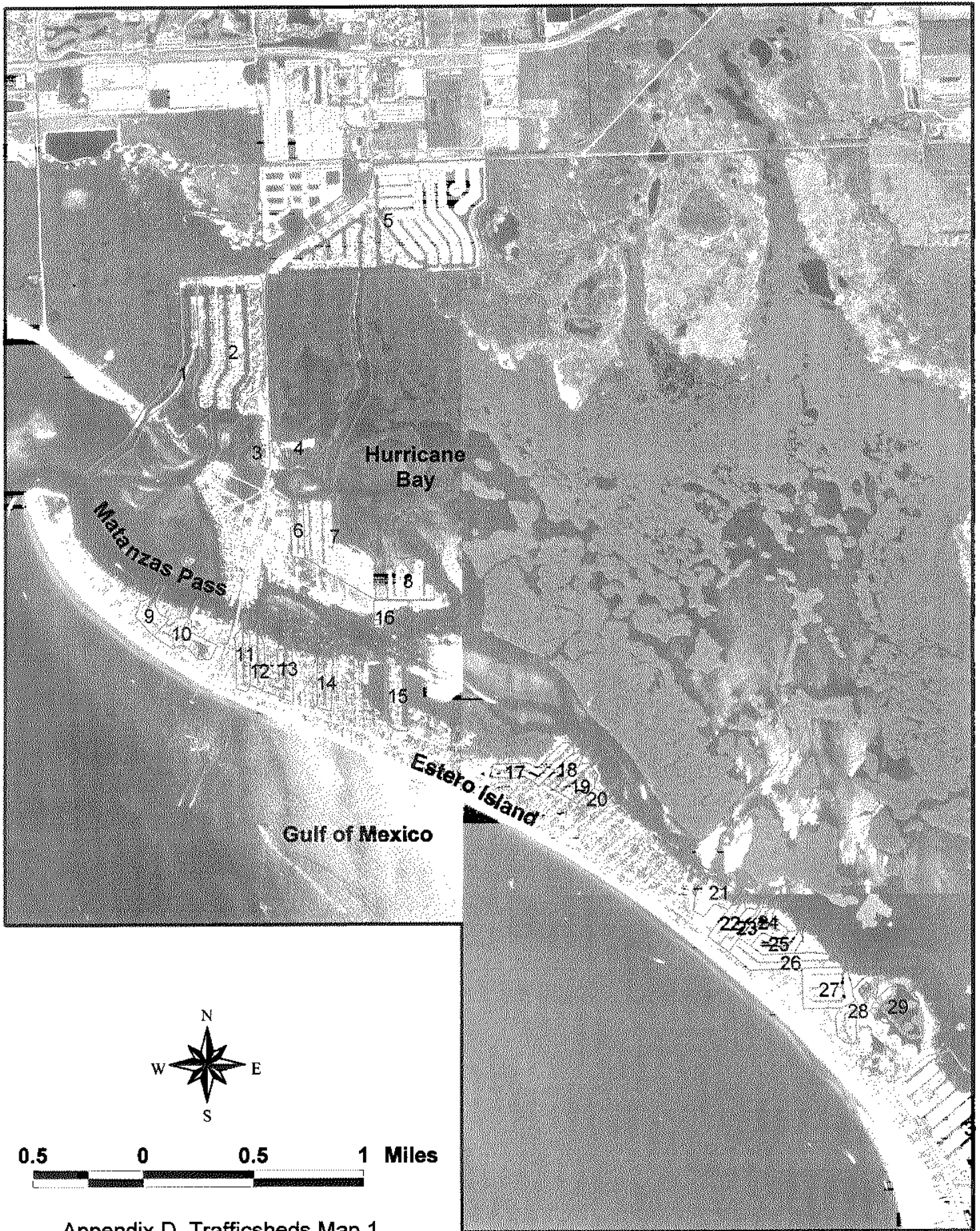
Appendix D. List of Trafficsheds and Corresponding Map Numbers

(By Trafficshed Number)

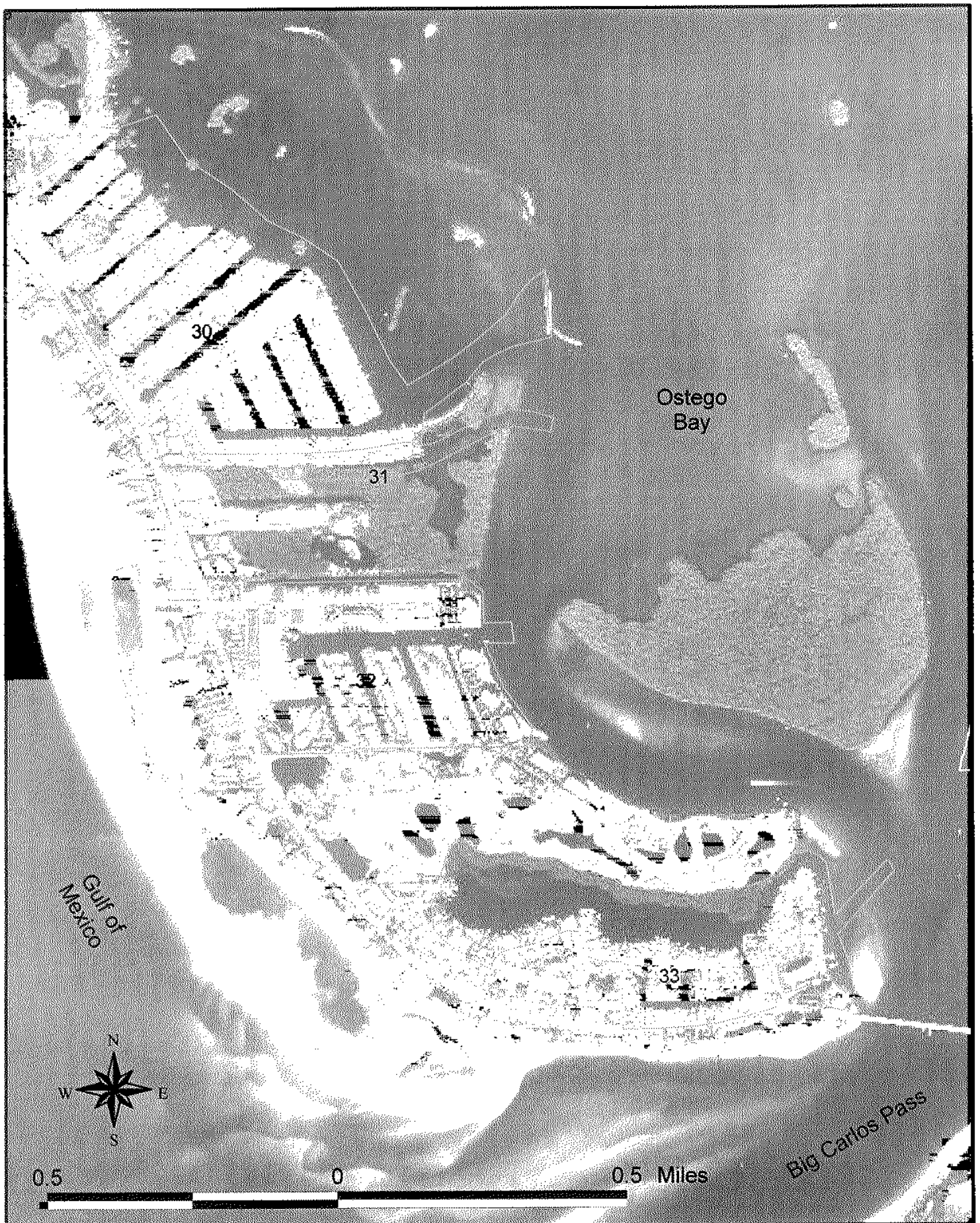
Trafficshed No.	Name	Map No.
1	Old Pelican Bay	1
2	Siesta Isles	1
3	Getaway	1
4	San Carlos RV Park and Campground	1
5	Bayside Estates	1
6	Compass Rose	1
7	Mobile Home Park	1
8	Port Carlos Cove	1
9	Island Shores 1	1
10	Island Shores 2	1
11	Primo Drive 1	1
12	Primo Drive 2	1
13	Palermo Circle	1
14	Miramar	1
15	Tropical Shores	1
16	Salty Sam's Marina	1
17	Donara Blvd/Madison Ct	1
18	Washington Ct	1
19	Jefferson Ct	1
20	Andre-Mar	1
21	Mid-Island Marina	1
22	Bayview Heights	1
23	Yachtsman's Cove	1
24	Glenview	1
25	Williams Drive	1
26	Holiday Heights	1
27	El Sol	1
28	McPhie Park	1
29	Indian Bayou	1
30	Fairview Isles	2
31	Fairview Cove	2
32	Fish Tale Marina	2
33	Laguna Shores	2
34	Hendry Creek	3
35	Mullock Creek	3
36	Estero River	3
37	Carl Johnson Park	4
38	Pelican Landing	4
39	Spring Creek	4
40	Bay Harbour Club	4
41	Hogue Channel	4
42	Bonita Beach	4
43	McLaughlin Blvd	4
44	Fish Trap Bay 1	4
45	Fish Trap Bay 2	4
46	Imperial Shores	4
47	Imperial River	4

(By Trafficshed Name)

Trafficshed No.	Name	Map No.
20	Andre-Mar	1
40	Bay Harbour Club	4
5	Bayside Estates	1
22	Bayview Heights	1
42	Bonita Beach	4
37	Carl Johnson Park	4
6	Compass Rose	1
17	Donara Blvd/Madison Ct	1
27	El Sol	1
36	Estero River	3
31	Fairview Cove	2
30	Fairview Isles	2
32	Fish Tale Marina	2
44	Fish Trap Bay 1	4
45	Fish Trap Bay 2	4
3	Getaway	1
24	Glenview	1
34	Hendry Creek	3
41	Hogue Channel	4
26	Holiday Heights	1
47	Imperial River	4
46	Imperial Shores	4
29	Indian Bayou	1
9	Island Shores 1	1
10	Island Shores 2	1
19	Jefferson Ct	1
33	Laguna Shores	2
43	McLaughlin Blvd	4
28	McPhie Park	1
21	Mid-Island Marina	1
14	Miramar	1
7	Mobile Home Park	1
35	Mullock Creek	3
1	Old Pelican Bay	1
13	Palermo Circle	1
38	Pelican Landing	4
8	Port Carlos Cove	1
11	Primo Drive 1	1
12	Primo Drive 2	1
16	Salty Sam's Marina	1
4	San Carlos RV Park and Campground	1
2	Siesta Isles	1
39	Spring Creek	4
15	Tropical Shores	1
18	Washington Ct	1
25	Williams Drive	1
23	Yachtsman's Cove	1

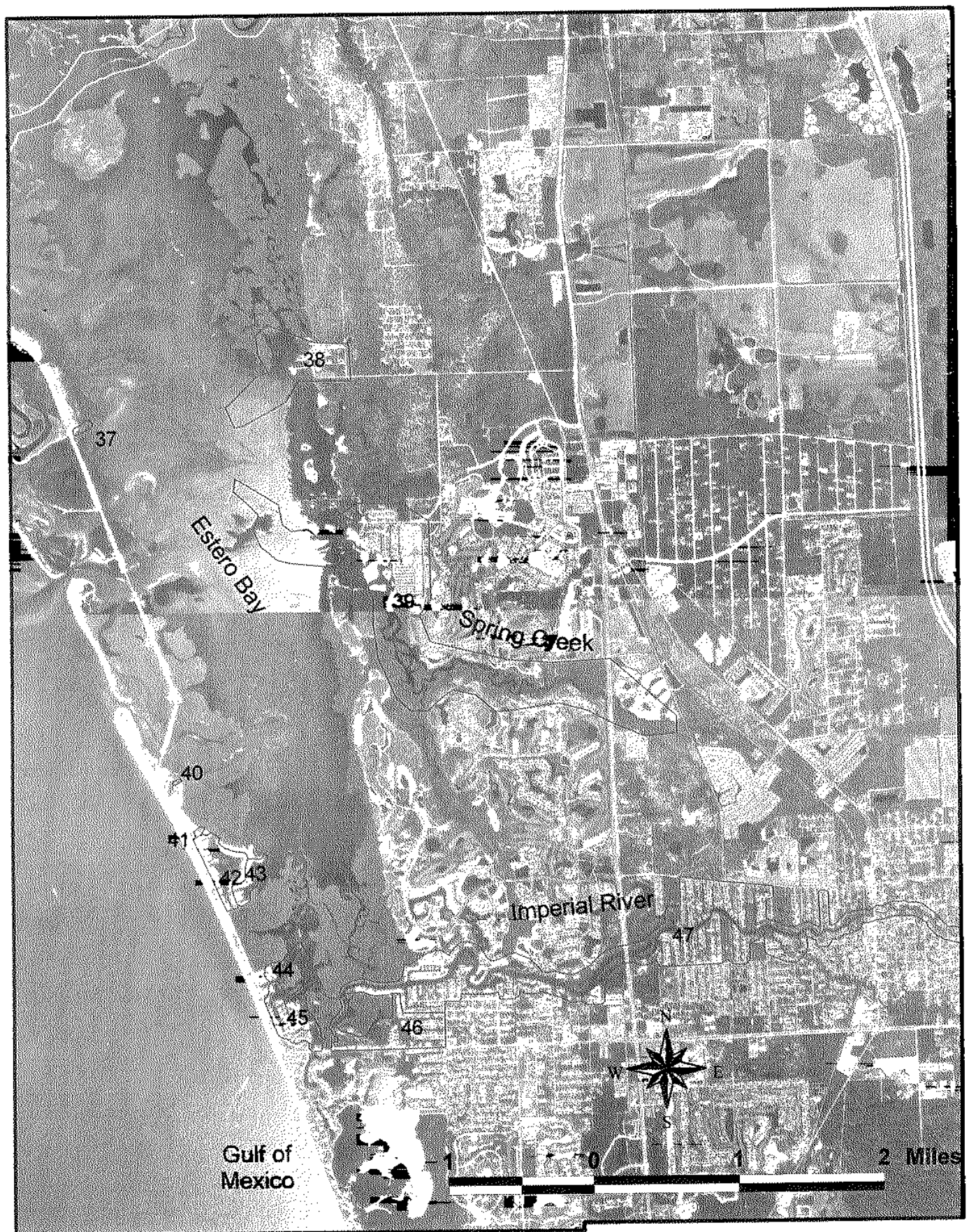


Appendix D. Trafficsheds Map 1



Appendix D. Trafficsheds Map 2





Appendix D. Trafficsheds Map 4

TRAFFICSHED NUMBER: -999 TRAFFICSHED NAME: South Estero Bay Sec. Channels

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
Number	Percent	Avg.	Max	Min	Std. Dev.				(Percent of Study Area):	
Kayak/Row/Canoe:	5	4.3%	0.5	0.5	0.0	Anchorage:	Anchorage:		1.03%	30
Open Utility:	31	26.5%	1.5	2.5	0.5	Beached/Blocked:	Government:			
Other:	1	0.9%	2.0	2.0	0.0	Hoist/Drystack:	Industrial:			
Personal Water Craft:	8	6.8%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club:			
Power Cabin/Trawler:	1	0.9%	4.0	4.0	4.0	Ramp:	Motel/Hotel/Restaurant/Shop:			
Recreational Fishing:	31	26.5%	1.9	3.0	1.0	Seawall:	Multi-Family Residential			
Sail:	4	3.4%	3.4	4.5	3.0	Trailer:	Other			
Speed:	36	30.8%	1.9	3.0	1.5	Wet Slip:	Single Family Residential			
Total:	117	100.0%	1.7	4.5	0.5	Total:	Total:			
Dredge (Cubic Yards)										13,345
Even Clearance:										7.35%
Restricted Channel Length (ft.):										15,050
Restricted Channel Length (ft.):										71,958
Restricted Boats with Variable Draft Capability:										22
Restricted Boats (Percent of Study Area):										1.03%
Total Channel Length (ft.):										30

TRAFFICSHED NUMBER: -998 TRAFFICSHED NAME: Central/North Estero Bay Sec. Channels

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:						Moorings:	Marina/Yard/Club:			
Power Cabin/Trawler:						Ramp:	Motel/Hotel/Restaurant/Shop:			
Recreational Fishing:						Seawall:	Multi-Family Residential			
Sail:						Trailer:	Other			
Speed:						Wet Slip:	Single Family Residential			
Total:						Total:	Total:			
Dredge (Cubic Yards)										1,014
Even Clearance:										2.21%
Restricted Channel Length (ft.):										23,208
Restricted Channel Length (ft.):										4,516
Restricted Boats with Variable Draft Capability:										4
Restricted Boats (Percent of Study Area):										0.17%
Total Channel Length (ft.):										5

TRAFFICSHED NUMBER: -997 TRAFFICSHED NAME: Big Carlos Pass Vicinity Sec. Channels

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:	3	27.3%	1.0	1.5	0.5	Beached/Blocked:	Government:			
Other:						Hoist/Drystack:	Industrial:			
Personal Water Craft:						Moorings:	Marina/Yard/Club:			
Power Cabin/Trawler:	4	36.4%	4.3	5.0	4.0	Ramp:	Motel/Hotel/Restaurant/Shop:			
Recreational Fishing:						Seawall:	Multi-Family Residential			
Sail:	1	9.1%	1.0	1.0	1.0	Trailer:	Other			
Speed:	3	27.3%	1.8	2.0	1.5	Wet Slip:	Single Family Residential			
Total:	11	100.0%	2.4	5.0	0.5	Total:	Total:			
Dredge (Cubic Yards)										897
Even Clearance:										385
Restricted Channel Length (ft.):										16,020
Restricted Channel Length (ft.):										691
Restricted Boats with Variable Draft Capability:										4
Restricted Boats (Percent of Study Area):										0.17%
Total Channel Length (ft.):										5

TRAFFICSHED NUMBER: -996 **TRAFFICSHED NAME: Matanzas Pass Vicinity Sec. Channels**

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.						Restricted Boats	112
Kayak/Row/Canoe:	23	2.3%	0.5	0.5	0.0		Anchorage:	73	Anchorage:	2	Restricted Boats	3.83%
Open Utility:	82	8.1%	1.5	7.0	0.5	1.1	Beached/Blocked:	141	Government:	1	Restricted Boats with Variable Draft Capability:	15
Other:	117	11.5%	7.6	12.0	1.0	4.0	Holst/Drystack:	550	Industrial:	4	Total Channel Length (ft.):	64,327
Personal Water Craft:	17	1.7%	1.0	1.0	1.0	0.0	Moorings:	1	Marina/Yard/Club:	15	Restricted Channel Length (ft.):	25,519
Power Cabin/Trawler:	132	13.0%	3.2	6.0	2.0	0.8	Ramp:	5	Motel/Hotel/Restaurant/Shop:	7	Restricted Channels	12.47%
Recreational Fishing:	216	21.3%	2.1	4.0	1.0	0.6	Seawall:	12	Multi-Family Residential	9	Dredge (Cubic Yards)	28,070
Sail:	190	18.7%	4.4	8.0	1.0	1.3	Trailer:	51	Other		Even Clearance:	
Speed:	239	23.5%	2.0	3.0	0.5	0.5	Wet Slip:	646	Single Family Residential	122	Dredge (Cubic Yards)	46,973
Total: E+03	100.0%	3.2	12.0	0.5	2.5		Total:	1479	Total:	160	One Foot Clearance:	

TRAFFICSHED NUMBER: 1 **TRAFFICSHED NAME: Old Pelican Bay**

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.						Restricted Boats	1
Kayak/Row/Canoe:							Anchorage:		Anchorage:		Restricted Boats	0.03%
Open Utility:							Beached/Blocked:		Government:		Restricted Boats with Variable Draft Capability:	1
Other:							Holst/Drystack:		Industrial:		Total Channel Length (ft.):	5,572
Personal Water Craft:							Moorings:		Marina/Yard/Club:		Restricted Channel Length (ft.):	146
Power Cabin/Trawler:							Ramp:		Motel/Hotel/Restaurant/Shop:		Restricted Channels	0.07%
Recreational Fishing:							Seawall:		Multi-Family Residential		Dredge (Cubic Yards)	0
Sail:							Trailer:		Other		Even Clearance:	
Speed:	1	100.0%	1.5	1.5	1.5		Wet Slip:	1	Single Family Residential	1	Dredge (Cubic Yards)	108
Total:	1	100.0%	1.5	1.5	1.5		Total:	1	Total:	1	One Foot Clearance:	

TRAFFICSHED NUMBER: 2 **TRAFFICSHED NAME: Sitsa Isles**

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.						Restricted Boats	249
Kayak/Row/Canoe:	15	5.0%	0.5	0.5	0.0		Anchorage:		Anchorage:		Restricted Boats	8.52%
Open Utility:	22	7.3%	1.1	1.5	0.5	0.4	Beached/Blocked:	26	Government:		Restricted Boats with Variable Draft Capability:	113
Other:	5	1.7%	3.2	4.0	3.0	0.4	Holst/Drystack:	100	Industrial:		Total Channel Length (ft.):	17,962
Personal Water Craft:	14	4.6%	1.0	1.0	1.0	0.0	Moorings:		Marina/Yard/Club:	1	Restricted Channel Length (ft.):	2,130
Power Cabin/Trawler:	63	20.9%	3.1	4.0	2.0	0.6	Ramp:		Motel/Hotel/Restaurant/Shop:	1	Restricted Channels	1.04%
Recreational Fishing:	77	25.5%	2.1	4.0	1.0	0.7	Seawall:		Multi-Family Residential	13	Dredge (Cubic Yards)	2,181
Sail:	69	22.8%	4.2	6.0	1.0	1.3	Trailer:	2	Other		Even Clearance:	
Speed:	37	12.3%	1.9	3.5	0.5	0.6	Wet Slip:	398	Single Family Residential	117	Dredge (Cubic Yards)	3,759
Total:	302	100.0%	2.6	6.0	0.5	1.4	Total:	526	Total:	132	One Foot Clearance:	

TRAFFICSHEDED NUMBER: 3 **TRAFFICSHEDED NAME: Getaway**

Boats			Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent			Avg. Max Min Std. Dev.			Anchorage:		Anchorage:		Restricted Boats	
Kayak/Row/Canoe:						Beached/Blocked:		Government:		(Percent of Study Area):	
Open Utility:			1.4 3.0 0.5 1.0			Holst/Drystack:		Industrial:		Restricted Boats with Variable	
Other:			3.9 6.0 1.0 1.3			Mooring:		Marina/Yard/Club:		Draft Capability:	
Personal Water Craft:			1.0 1.0 1.0 0.0			Ramp:		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	
Power Cabin/Trawler:			3.1 4.0 2.0 0.7			Seawall:		Multi-Family Residential		Restricted Channel Length (ft.):	
Recreational Fishing:			3.0 4.0 2.0 1.0			Trailer:		Single Family Residential		Restricted Channels	
Sail:			4.2 6.0 2.0 1.3			Wet Slip:		Total:		(Percent of Study Area):	
Speed:			1.0 1.0 1.0 0.0			Total:		Dredge (Cubic Yards)		Even Clearance:	
Total:			3.2 6.0 0.5 1.6			Total:		Dredge (Cubic Yards)		One Foot Clearance:	
Total:			65 100.0%			Total:		Total:		Total:	

TRAFFICSHEDED NUMBER: 4 **TRAFFICSHEDED NAME: San Carlos RV Park/Campground**

Boats			Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent			Avg. Max Min Std. Dev.			Anchorage:		Anchorage:		Restricted Boats	
Kayak/Row/Canoe:			0.5 0.5 0.5 0.0			Beached/Blocked:		Government:		(Percent of Study Area):	
Open Utility:			1.1 1.5 0.5 0.4			Holst/Drystack:		Industrial:		Restricted Boats with Variable	
Other:						Mooring:		Marina/Yard/Club:		Draft Capability:	
Personal Water Craft:			1.0 1.0 1.0 0.0			Ramp:		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	
Power Cabin/Trawler:						Seawall:		Multi-Family Residential		Restricted Channel Length (ft.):	
Recreational Fishing:			1.3 2.0 1.0 0.3			Trailer:		Single Family Residential		Restricted Channels	
Sail:						Wet Slip:		Total:		(Percent of Study Area):	
Speed:			1.3 1.5 1.0 0.4			Total:		Dredge (Cubic Yards)		Even Clearance:	
Total:			1.1 2.0 0.5 0.4			Total:		Dredge (Cubic Yards)		One Foot Clearance:	
Total:			52 100.0%			Total:		Total:		Total:	

TRAFFICSHEDED NUMBER: 5 **TRAFFICSHEDED NAME: Bayside Estates**

Boats			Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent			Avg. Max Min Std. Dev.			Anchorage:		Anchorage:		Restricted Boats	
Kayak/Row/Canoe:			0.6 1.0 0.5 0.2			Beached/Blocked:		Government:		(Percent of Study Area):	
Open Utility:			1.4 3.0 0.5 0.5			Holst/Drystack:		Industrial:		Restricted Boats with Variable	
Other:			1.9 4.0 1.0 0.9			Mooring:		Marina/Yard/Club:		Draft Capability:	
Personal Water Craft:			1.0 1.0 1.0 0.0			Ramp:		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	
Power Cabin/Trawler:			2.8 4.0 1.0 0.5			Seawall:		Multi-Family Residential		Restricted Channel Length (ft.):	
Recreational Fishing:			1.9 3.0 1.0 0.4			Trailer:		Single Family Residential		Restricted Channels	
Sail:			3.1 5.0 1.0 1.3			Wet Slip:		Total:		(Percent of Study Area):	
Speed:			1.9 3.0 0.5 0.4			Total:		Dredge (Cubic Yards)		Even Clearance:	
Total:			1.9 5.0 0.5 0.8			Total:		Dredge (Cubic Yards)		One Foot Clearance:	
Total:			350 100.0%			Total:		Total:		Total:	

TRAFFICSHED NUMBER: 6 TRAFFICSHED NAME: Compass Rose

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:										
Open Utility:	17	11.0%	1.3	2.0	0.5	0.4	Anchorage:		Restricted Boats with Variable	1.37%
Other:	2	1.3%	3.0	3.0	3.0	0.0	Beached/Blocked:	16	Draft Capability:	3
Personal Water Craft:										
Power Cabin/Trawler:	7	4.5%	3.6	5.0	2.0	1.1	Holst/Drystack:	139	Total Channel Length (ft.):	1,172
Recreational Fishing:	24	15.6%	2.1	3.5	1.5	0.6	Moorings:		Restricted Channel Length (ft.):	1,159
Sail:	38	24.7%	4.3	7.0	1.0	1.3	Ramp:		Restricted Channels	0.57%
Speed:	66	42.9%	1.8	3.0	0.5	0.4	Seawall:	14	(Percent of Study Area):	
Total:	154	100.0%	2.5	7.0	0.5	1.4	Trailer:	6	Dredge (Cubic Yards)	1,354
							Wet Slip:	39	Even Clearance:	
							Total:	214	Dredge (Cubic Yards)	2,213
									One Foot Clearance:	

TRAFFICSHED NUMBER: 7 TRAFFICSHED NAME: Mobile Home Park

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:										
Open Utility:	7	5.1%	0.6	1.0	0.5	0.2	Anchorage:		Restricted Boats with Variable	0.89%
Other:	43	31.2%	1.1	2.0	0.5	0.4	Beached/Blocked:	25	Draft Capability:	13
Personal Water Craft:										
Power Cabin/Trawler:	6	4.3%	3.0	3.0	3.0	0.0	Holst/Drystack:	34	Total Channel Length (ft.):	5,638
Recreational Fishing:	29	21.0%	1.7	3.0	0.5	0.6	Moorings:		Restricted Channel Length (ft.):	726
Sail:	25	18.1%	2.9	5.5	1.0	1.5	Ramp:	3	Restricted Channels	0.35%
Speed:	26	18.8%	1.4	2.5	0.5	0.4	Seawall:	7	(Percent of Study Area):	
Total:	138	100.0%	1.7	5.5	0.5	1.1	Trailer:	13	Dredge (Cubic Yards)	76
							Wet Slip:	129	Even Clearance:	
							Total:	211	Dredge (Cubic Yards)	614
									One Foot Clearance:	

TRAFFICSHED NUMBER: 8 TRAFFICSHED NAME: Port Carlos Cove

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
	Number	Percent	Avg.	Max	Min	Std. Dev.			Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:										
Open Utility:	18	43.9%	1.1	1.5	0.5	0.3	Anchorage:		Restricted Boats with Variable	1.33%
Other:	1	2.4%	2.0	2.0	2.0		Beached/Blocked:	2	Draft Capability:	38
Personal Water Craft:										
Power Cabin/Trawler:	2	4.9%	2.5	3.0	2.0	0.7	Holst/Drystack:	12	Total Channel Length (ft.):	5,134
Recreational Fishing:	7	17.1%	1.5	2.0	1.0	0.4	Moorings:		Restricted Channel Length (ft.):	2,163
Sail:							Ramp:	1	Restricted Channels	1.06%
Speed:	12	29.3%	1.5	2.5	1.0	0.4	Seawall:		(Percent of Study Area):	
Total:	41	100.0%	1.4	3.0	0.5	0.5	Trailer:		Dredge (Cubic Yards)	1,626
							Wet Slip:	55	Even Clearance:	
							Total:	70	Dredge (Cubic Yards)	3,229
									One Foot Clearance:	

TRAFFICSHED NUMBER: 9 TRAFFICSHED NAME: Island Shores 1

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats: Restricted Boats (Percent of Study Area):	10
			Avg.	Max	Min Std. Dev.				
Kayak/Row/Canoe:						Anchorage:	Anchorage:		
Open Utility:	2	13.3%	1.0	1.5	0.5	Beached/Blocked:	Government:	Restricted Boats with Variable Draft Capability:	5
Other:						Holst/Drystack:	Industrial:	Total Channel Length (ft.):	1,169
Personal Water Craft:	2	13.3%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club:	Restricted Channel Length (ft.):	887
Power Cabin/Trawler:						Ramp:	Motel/Hotel/Restaurant/Shop:	Restricted Channels (Percent of Study Area):	0.43%
Recreational Fishing:	2	13.3%	2.8	4.0	1.5	Seawall:	Multi-Family Residential	Dredge (Cubic Yards)	1,332
Sail:	4	26.7%	4.0	5.0	3.0	Trailer:	Other	Even Clearance:	
Speed:	5	33.3%	1.6	2.0	1.5	Wet Slip:	Single Family Residential	Dredge (Cubic Yards)	1,989
Total:	15	100.0%	2.2	5.0	0.5	Total:	Total:	One Foot Clearance:	

TRAFFICSHED NUMBER: 10 TRAFFICSHED NAME: Island Shores 2

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats: Restricted Boats (Percent of Study Area):	11
			Avg.	Max	Min Std. Dev.				
Kayak/Row/Canoe:	4	14.8%	0.5	0.5	0.5	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:	0.38%
Open Utility:	3	11.1%	1.2	1.5	1.0	Beached/Blocked:	Government:	Total Channel Length (ft.):	2,698
Other:						Holst/Drystack:	Industrial:	Restricted Channels (Percent of Study Area):	0.83%
Personal Water Craft:	1	3.7%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club:	Dredge (Cubic Yards)	1,431
Power Cabin/Trawler:	1	3.7%	4.0	4.0	4.0	Ramp:	Motel/Hotel/Restaurant/Shop:	Even Clearance:	
Recreational Fishing:	6	22.2%	1.6	2.0	1.0	Seawall:	Multi-Family Residential	Dredge (Cubic Yards)	2,692
Sail:	1	3.7%	4.0	4.0	4.0	Trailer:	Other	One Foot Clearance:	
Speed:	11	40.7%	1.8	2.5	1.0	Wet Slip:	Single Family Residential		
Total:	27	100.0%	1.6	4.0	0.5	Total:	Total:		

TRAFFICSHED NUMBER: 11 TRAFFICSHED NAME: Primo Drive 1

Boats	Number Percent		Draft (ft.)			Moorings	Facilities	Restricted Boats: Restricted Boats (Percent of Study Area):	12
			Avg.	Max	Min Std. Dev.				
Kayak/Row/Canoe:	2	5.0%	0.5	0.5	0.5	Anchorage:	Anchorage:	Restricted Boats with Variable Draft Capability:	0.41%
Open Utility:	9	22.5%	1.1	1.5	0.5	Beached/Blocked:	Government:	Total Channel Length (ft.):	1,697
Other:	1	2.5%	3.0	3.0	3.0	Holst/Drystack:	Industrial:	Restricted Channels (Percent of Study Area):	0.65%
Personal Water Craft:	3	7.5%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club:	Dredge (Cubic Yards)	2,709
Power Cabin/Trawler:	6	15.0%	3.2	4.0	3.0	Ramp:	Motel/Hotel/Restaurant/Shop:	Even Clearance:	
Recreational Fishing:	10	25.0%	1.9	3.0	0.5	Seawall:	Multi-Family Residential	Dredge (Cubic Yards)	3,695
Sail:	3	7.5%	3.3	6.0	2.0	Trailer:	Other	One Foot Clearance:	
Speed:	6	15.0%	1.6	2.5	0.5	Wet Slip:	Single Family Residential		
Total:	40	100.0%	1.8	6.0	0.5	Total:	Total:		

Boats	Number Percent		Draft (ft.)			Moorings		Facilities		Restricted Boats	
			Avg.	Max	Min						
Kayak/Row/Canoe:	3	8.6%	0.5	0.5	0.5	0.0	Anchorage:	Anchorage:		Restricted Boats	7
Open Utility:	9	25.7%	1.1	1.5	0.5	0.5	Beached/Blocked:	Government:		(Percent of Study Area):	0.24%
Other:	1	2.9%	4.5	4.5	4.5		Holst/Drystack:	Industrial:		Restricted Boats with Variable	3
Personal Water Craft:	1	2.9%	1.0	1.0	1.0		Moorings:	Marina/Yard/Club:		Draft Capability:	
Power Cabin/Trawler:										Total Channel Length (ft.):	1,459
Recreational Fishing:	4	11.4%	2.1	2.5	2.0	0.3	Ramp:	Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.):	1,103
Sail:	6	17.1%	2.2	4.0	1.0	1.5	Seawall:	Multi-Family Residential:		Restricted Channels	
Speed:	11	31.4%	2.0	3.5	0.5	0.7	Trailer:	Other		(Percent of Study Area):	0.54%
Total:	35	100.0%	1.7	4.5	0.5	1.0	Wet Slip:	Single Family Residential		Dredge (Cubic Yards)	1,127
							Total:	Total:		Even Clearance:	
										Dredge (Cubic Yards)	1,944
										One Foot Clearance:	

Boats	Number Percent		Draft (ft.)			Moorings		Facilities		Restricted Boats	
			Avg.	Max	Min						
Kayak/Row/Canoe:	3	6.1%	0.5	0.5	0.5	0.0	Anchorage:	Anchorage:		Restricted Boats	17
Open Utility:	16	32.7%	0.7	1.5	0.5	0.4	Beached/Blocked:	Government:		(Percent of Study Area):	0.58%
Other:	1	2.0%	2.0	2.0	2.0		Holst/Drystack:	Industrial:		Restricted Boats with Variable	6
Personal Water Craft:							Moorings:	Marina/Yard/Club:		Draft Capability:	
Power Cabin/Trawler:	7	14.3%	3.3	4.0	2.0	1.0	Ramp:	Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	1,739
Recreational Fishing:	7	14.3%	1.9	3.5	1.5	0.7	Seawall:	Multi-Family Residential		Restricted Channels	
Sail:	10	20.4%	2.8	4.5	1.0	1.2	Trailer:	Other		(Percent of Study Area):	0.68%
Speed:	5	10.2%	1.4	2.0	0.5	0.7	Wet Slip:	Single Family Residential		Dredge (Cubic Yards)	1,335
Total:	49	100.0%	1.7	4.5	0.5	1.3	Total:	Total:		Even Clearance:	
										Dredge (Cubic Yards)	2,371
										One Foot Clearance:	

Boats	Number Percent		Draft (ft.)			Moorings		Facilities		Restricted Boats	
			Avg.	Max	Min						
Kayak/Row/Canoe:	1	3.2%	0.5	0.5	0.5		Anchorage:	Anchorage:		Restricted Boats	6
Open Utility:	7	22.6%	1.2	1.5	0.5	0.4	Beached/Blocked:	Government:		(Percent of Study Area):	0.21%
Other:	3	9.7%	2.3	3.0	1.0	1.2	Holst/Drystack:	Industrial:		Restricted Boats with Variable	3
Personal Water Craft:							Moorings:	Marina/Yard/Club:		Draft Capability:	
Power Cabin/Trawler:										Total Channel Length (ft.):	1,368
Recreational Fishing:	6	19.4%	2.0	2.5	1.5	0.4	Ramp:	Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.):	1,024
Sail:	4	12.9%	2.5	4.0	2.0	1.0	Seawall:	Multi-Family Residential		Restricted Channels	
Speed:	10	32.3%	1.6	2.5	0.5	0.6	Trailer:	Other		(Percent of Study Area):	0.50%
Total:	31	100.0%	1.7	4.0	0.5	0.8	Wet Slip:	Single Family Residential		Dredge (Cubic Yards)	697
							Total:	Total:		Even Clearance:	
										Dredge (Cubic Yards)	1,455
										One Foot Clearance:	

TRAFFICSHED NUMBER: 15 TRAFFICSHED NAME: Tropical Shores

Boats			Draft (ft.)					Moorings		Facilities		Restricted Boats:		9
Number Percent			Avg.	Max	Min	Std. Dev.			Anchorage:	Anchorage:		Restricted Boats		0.31%
Kayak/Row/Canoe:	4	11.8%	0.8	1.5	0.5	0.5	Beached/Blocked:		9	Government:		Restricted Boats with Variable		7
Open Utility:	20	58.8%	0.9	2.0	0.5	0.5	Holst/Drystack:		18	Industrial:		Draft Capability:		
Other:							Mooring:			Marina/Yard/Club:		Total Channel Length (ft.):		3,283
Personal Water Craft:							Ramp:			Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.)		2,302
Power Cabin/Trawler:	1	2.9%	3.0	3.0	3.0		Seawall:			Multi-Family Residential		Restricted Channels		1.12%
Recreational Fishing:	4	11.8%	2.1	3.0	1.0	0.9	Trailer:		1	Other		(Percent of Study Area):		
Sail:	2	5.9%	2.0	3.0	1.0	1.4	Wet Slip:		28	Single Family Residential		Dredge (Cubic Yards)		928
Speed:	3	8.8%	2.0	2.5	1.5	0.5	Total:		56	Total:		Even Clearance:		
Total:	34	100.0%	1.3	3.0	0.5	0.8						Dredge (Cubic Yards)		2,632
												One Foot Clearance:		

TRAFFICSHED NUMBER: 16 TRAFFICSHED NAME: Salty Sam's Marina

Boats		Draft (ft.)					Moorings		Facilities		Restricted Boats:		
Number Percent		Avg.	Max	Min	Std. Dev.	Anchorage:		Anchorage:		Restricted Boats			
Kayak/Row/Canoe:	5	3.4%	0.7	1.0	0.5	0.3	Beached/Blocked: 44		Government:		(Percent of Study Area):		
Open Utility:	29	19.7%	1.3	2.0	0.5	0.3	Holst/Drystack: 16		Industrial:		Restricted Boats with Variable		
Other:							Mooring:		Marina/Yard/Club: 2		Draft Capability:		
Personal Water Craft:	1	0.7%	1.0	1.0	1.0		Ramp: 1		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):		
Power Cabin/Trawler:	10	6.8%	2.8	4.0	2.0	0.6	Seawall: 1		Multi-Family Residential		Restricted Channels		
Recreational Fishing:	15	10.2%	1.9	3.0	1.0	0.7	Trailer: 58		Other		(Percent of Study Area):		
Sail:	60	40.8%	3.4	6.5	1.0	1.3	Wet Slip: 88		Single Family Residential		Dredge (Cubic Yards)		
Speed:	27	18.4%	1.7	3.0	0.5	0.6	Total: 208		Total: 2		Even Clearance:		
Total:	147	100.0%	2.3	6.5	0.5	1.3					Dredge (Cubic Yards)		
											One Foot Clearance:		747

TRAFFICSHED NUMBER: 17 TRAFFICSHED NAME: Donara Blvd/Madison Ct

<u>Boats</u>		Draft (ft.)					<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:		6
Number Percent		Avg.	Max	Min	Std. Dev.	Anchorage:		Anchorage:		Restricted Boats		0.21%	
Kayak/Row/Canoe:	3	8.1%	0.5	0.5	0.5	0.0	Beached/Blocked:		Government:		Restricted Boats with Variable		1
Open Utility:	9	24.3%	1.1	1.5	0.5	0.5	Holst/Drystack:		Industrial:		Draft Capability:		
Other:											Total Channel Length (ft.):		2,323
Personal Water Craft:	2	5.4%	1.0	1.0	1.0	0.0	Moorings:		Marina/Yard/Club:		Restricted Channel Length (ft.)		1,684
Power Cabin/Trawler:	1	2.7%	3.0	3.0	3.0		Ramp:		Motel/Hotel/Restaurant/Shop:		Restricted Channels		
Recreational Fishing:	6	16.2%	2.1	3.0	1.5	0.7	Seawall:		Multi-Family Residential		(Percent of Study Area):		0.82%
Sail:	5	13.5%	4.2	5.0	3.0	0.8	Trailer:		Other		Dredge (Cubic Yards)		1,034
Speed:	11	29.7%	1.8	3.0	1.0	0.6	Wet Slip:		Single Family Residential		Even Clearance:		
Total:	37	100.0%	1.9	5.0	0.5	1.2	Total:		Total:		Dredge (Cubic Yards)		2,282
											One Foot Clearance:		

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.		Anchorage:		Anchorage:		Restricted Boats	
Kayak/Row/Canoe:		1	6.3%	0.5	0.5	0.5	Beached/Blocked:		Government:		(Percent of Study Area):	
Open Utility:		2	12.5%	1.5	1.5	1.5	Holst/Drystack:		Industrial:		Restricted Boats with Variable	
Other:							Mooring:		Marina/Yard/Club:		Draft Capability:	
Personal Water Craft:		2	12.5%	1.0	1.0	1.0	Ramp:		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	
Power Cabin/Trawler:		3	18.8%	3.0	3.0	3.0	Seawall:		Multi-Family Residential		Restricted Channel Length (ft.):	
Recreational Fishing:		3	18.8%	2.0	2.5	1.5	Trailer:		Single Family Residential		Restricted Channels	
Sail:		1	6.3%	2.0	2.0	2.0	Wet Slip:		Other		(Percent of Study Area):	
Speed:		4	25.0%	2.0	2.5	1.0	Total:		Total:		Dredge (Cubic Yards)	
Total:		16	100.0%	1.9	3.0	0.5					Even Clearance:	
											Dredge (Cubic Yards)	
											One Foot Clearance:	

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.		Anchorage:		Anchorage:		Restricted Boats	
Kayak/Row/Canoe:		1	4.0%	0.5	0.5	0.5	Beached/Blocked:		Government:		(Percent of Study Area):	
Open Utility:		5	20.0%	1.1	1.5	0.5	Holst/Drystack:		Industrial:		Restricted Boats with Variable	
Other:							Mooring:		Marina/Yard/Club:		Draft Capability:	
Personal Water Craft:		3	12.0%	1.0	1.0	1.0	Ramp:		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	
Power Cabin/Trawler:		3	12.0%	3.0	3.0	3.0	Seawall:		Multi-Family Residential		Restricted Channel Length (ft.):	
Recreational Fishing:		5	20.0%	1.9	3.0	1.5	Trailer:		Other		Restricted Channels	
Sail:		3	12.0%	3.0	3.0	3.0	Wet Slip:		Single Family Residential		(Percent of Study Area):	
Speed:		5	20.0%	1.5	1.5	1.5	Total:		Total:		Dredge (Cubic Yards)	
Total:		25	100.0%	1.8	3.0	0.5					Even Clearance:	
											Dredge (Cubic Yards)	
											One Foot Clearance:	

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.		Anchorage:		Anchorage:		Restricted Boats	
Kayak/Row/Canoe:		1	12.5%	0.5	0.5	0.5	Beached/Blocked:		Government:		(Percent of Study Area):	
Open Utility:		3	37.5%	0.5	0.5	0.5	Holst/Drystack:		Industrial:		Restricted Boats with Variable	
Other:							Mooring:		Marina/Yard/Club:		Draft Capability:	
Personal Water Craft:							Ramp:		Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	
Power Cabin/Trawler:		3	37.5%	1.8	2.5	1.5	Seawall:		Multi-Family Residential		Restricted Channel Length (ft.):	
Recreational Fishing:		3	37.5%	2.0	2.0	2.0	Trailer:		Single Family Residential		Restricted Channels	
Sail:		1	12.5%	2.0	2.0	2.0	Wet Slip:		Other		(Percent of Study Area):	
Speed:		8	100.0%	1.2	2.5	0.5	Total:		Total:		Dredge (Cubic Yards)	
Total:		8	100.0%	1.2	2.5	0.5					Even Clearance:	
											Dredge (Cubic Yards)	
											One Foot Clearance:	

TRAFFICSHED NUMBER: 21 TRAFFICSHED NAME: Mid-Island Marina

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
Number	Percent	Avg.	Max	Min	Std. Dev.				(Percent of Study Area):	
Kayak/Row/Canoe: 7		0.5	0.5	0.5	0.0	Anchorage:	Anchorage:		Restricted Boats	41
Open Utility: 15		6.3%	1.4	1.5	1.0	Beached/Blocked: 59	Government:		(Percent of Study Area):	1.40%
Other: 9		3.8%	2.3	4.0	2.0	Holst/Drystack: 151	Industrial:		Restricted Boats with Variable	14
Personal Water Craft: 1		0.4%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club: 1		Draft Capability:	
Power Cabin/Trawler: 24		10.1%	3.0	4.0	2.0	Ramp: 1	Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	1,014
Recreational Fishing: 45		19.0%	1.9	4.0	1.0	Seawall: 1	Multi-Family Residential		Restricted Channel Length (ft.):	317
Sail: 23		9.7%	3.5	5.5	1.0	Trailer: 34	Other		Restricted Channels	
Speed: 113		47.7%	1.7	3.0	1.0	Wet Slip: 93	Single Family Residential		(Percent of Study Area):	0.15%
Total: 237		100.0%	2.0	5.5	0.5	Total: 338			Dredge (Cubic Yards)	175
									Even Clearance:	
									Dredge (Cubic Yards)	410
									One Foot Clearance:	

TRAFFICSHED NUMBER: 22 TRAFFICSHED NAME: Bayview Heights

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
Number	Percent	Avg.	Max	Min	Std. Dev.				(Percent of Study Area):	
Kayak/Row/Canoe: 1		5.9%	0.5	0.5	0.5	Anchorage:	Anchorage:		Restricted Boats	1
Open Utility: 1		5.9%	1.5	1.5	1.5	Beached/Blocked: 1	Government:		(Percent of Study Area):	0.03%
Other: 1		5.9%	2.0	2.0	2.0	Holst/Drystack: 17	Industrial:		Restricted Boats with Variable	
Personal Water Craft: 1		5.9%	3.0	3.0	3.0	Moorings:	Marina/Yard/Club:		Draft Capability:	
Power Cabin/Trawler: 3		17.6%	1.7	2.0	1.5	Ramp:	Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	1,190
Recreational Fishing: 3		17.6%	1.7	2.0	1.5	Seawall:	Multi-Family Residential		Restricted Channel Length (ft.):	217
Sail: 2		11.8%	2.0	2.0	2.0	Trailer:	Other		Restricted Channels	
Speed: 8		47.1%	1.8	2.0	1.5	Wet Slip: 11	Single Family Residential		(Percent of Study Area):	0.11%
Total: 17		100.0%	1.8	3.0	0.5	Total: 29			Dredge (Cubic Yards)	0
									Even Clearance:	
									Dredge (Cubic Yards)	161
									One Foot Clearance:	

TRAFFICSHED NUMBER: 23 TRAFFICSHED NAME: Yachtsman's Cove

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats	
Number	Percent	Avg.	Max	Min	Std. Dev.				(Percent of Study Area):	
Kayak/Row/Canoe: 1		6.7%	0.5	0.5	0.5	Anchorage:	Anchorage:		Restricted Boats	13
Open Utility: 2		13.3%	1.0	1.5	0.5	Beached/Blocked: 2	Government:		(Percent of Study Area):	0.44%
Other: 1		6.7%	1.0	1.5	0.5	Holst/Drystack: 11	Industrial:		Restricted Boats with Variable	8
Personal Water Craft: 1		6.7%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club:		Draft Capability:	
Power Cabin/Trawler: 1		6.7%	3.0	3.0	3.0	Ramp:	Motel/Hotel/Restaurant/Shop:		Total Channel Length (ft.):	1,434
Recreational Fishing: 2		13.3%	1.5	2.0	1.0	Seawall:	Multi-Family Residential		Restricted Channel Length (ft.):	1,352
Sail: 3		20.0%	3.3	4.0	2.0	Trailer:	Other		Restricted Channels	
Speed: 5		33.3%	1.5	1.5	1.5	Wet Slip: 5	Single Family Residential		(Percent of Study Area):	0.66%
Total: 15		100.0%	1.8	4.0	0.5	Total: 18			Dredge (Cubic Yards)	1,162
									Even Clearance:	
									Dredge (Cubic Yards)	2,164
									One Foot Clearance:	

<u>Boats</u>		<u>Draft (ft.)</u>			<u>Moorings</u>		<u>Facilities</u>		<u>Restricted Boats:</u>	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	1	4.2%	0.5	0.5	0.5	Anchorage:	Anchorage:		Restricted Boats	0.07%
Open Utility:	8	33.3%	1.1	1.5	0.5	Beached/Blocked:	Government:		Restricted Boats with Variable	
Other:						Holst/Drystack:	Industrial:		Draft Capability:	
Personal Water Craft:						Moorings:	Marina/Yard/Club:		Total Channel Length (ft.):	1,749
Power Cabin/Trawler:	1	4.2%	4.0	4.0	4.0	Ramp:	Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.):	646
Recreational Fishing:	2	8.3%	1.5	1.5	0.0	Seawall:	Multi-Family Residential		Restricted Channels	
Sail:	1	4.2%	4.5	4.5	4.5	Trailer:	Other		(Percent of Study Area):	0.32%
Speed:	11	45.8%	1.6	2.0	0.5	Wet Slip:	Single Family Residential	24	Dredge (Cubic Yards)	411
Total:	24	100.0%	1.6	4.5	0.5	Total:	Total:	24	Even Clearance:	
									Dredge (Cubic Yards)	890
									One Foot Clearance:	

TRAFFICSHED NUMBER: 25 TRAFFICSHED NAME: Williams Drive

<u>Boats</u>		<u>Draft (ft.)</u>			<u>Moorings</u>		<u>Facilities</u>		<u>Restricted Boats:</u>	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:						Anchorage:	Anchorage:		Restricted Boats	0.10%
Open Utility:	2	11.8%	1.8	2.0	1.5	Beached/Blocked:	Government:		Restricted Boats with Variable	
Other:						Holst/Drystack:	Industrial:		Draft Capability:	
Personal Water Craft:	1	5.9%	1.0	1.0	1.0	Moorings:	Marina/Yard/Club:		Total Channel Length (ft.):	1,725
Power Cabin/Trawler:	1	5.9%	4.0	4.0	4.0	Ramp:	Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.):	150
Recreational Fishing:	6	35.3%	2.1	3.0	1.5	Seawall:	Multi-Family Residential		Restricted Channels	
Sail:	2	11.8%	3.0	4.0	2.0	Trailer:	Other		(Percent of Study Area):	0.07%
Speed:	5	29.4%	1.8	2.5	1.0	Wet Slip:	Single Family Residential	20	Dredge (Cubic Yards)	0
Total:	17	100.0%	2.1	4.0	1.0	Total:	Total:	20	Even Clearance:	
									Dredge (Cubic Yards)	111
									One Foot Clearance:	

TRAFFICSHED NUMBER: 26 TRAFFICSHED NAME: Holiday Heights

<u>Boats</u>		<u>Draft (ft.)</u>			<u>Moorings</u>		<u>Facilities</u>		<u>Restricted Boats:</u>	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	4	9.8%	0.5	0.5	0.0	Anchorage:	Anchorage:		Restricted Boats	0.17%
Open Utility:	14	34.1%	1.2	2.0	0.5	Beached/Blocked:	Government:		Restricted Boats with Variable	2
Other:						Holst/Drystack:	Industrial:		Draft Capability:	
Personal Water Craft:	4	9.8%	1.0	1.0	0.0	Moorings:	Marina/Yard/Club:		Total Channel Length (ft.):	2,583
Power Cabin/Trawler:	2	4.9%	2.5	3.0	2.0	Ramp:	Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.):	1,642
Recreational Fishing:	8	19.5%	1.9	2.5	1.5	Seawall:	Multi-Family Residential		Restricted Channels	
Sail:	2	4.9%	3.5	4.0	3.0	Trailer:	Other		(Percent of Study Area):	0.80%
Speed:	7	17.1%	1.6	2.0	1.0	Wet Slip:	Single Family Residential	51	Dredge (Cubic Yards)	471
Total:	41	100.0%	1.5	4.0	0.5	Total:	Total:	51	Even Clearance:	
									Dredge (Cubic Yards)	1,687
									One Foot Clearance:	

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	5	5.8%	0.5	0.5	0.0	Anchorage:	Anchorage:		0.51%
Open Utility:	27	31.4%	1.1	2.0	0.5	Beached/Blocked:	Government:		Restricted Boats with Variable Draft Capability:
Other:						Holst/Drystack:	Industrial:		Total Channel Length (ft.):
Personal Water Craft:	16	18.6%	1.0	1.0	0.0	Moorings:	Marina/Yard/Club:		3,139
Power Cabin/Trawler:	3	3.5%	3.3	4.0	0.6	Ramp:	Motel/Hotel/Restaurant/Shop:		877
Recreational Fishing:	13	15.1%	2.3	4.0	1.5	Seawall:	Multi-Family Residential		0.43%
Sail:	5	5.8%	4.2	5.0	0.9	Trailer:	Other		Dredge (Cubic Yards)
Speed:	17	19.8%	1.9	3.0	1.0	Wet Slip:	Single Family Residential		347
Total:	86	100.0%	1.7	5.0	1.1	Total:	Total:		Dredge (Cubic Yards)
									One Foot Clearance:

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	1	4.8%	0.5	0.5	0.5	Anchorage:	Anchorage:		0.34%
Open Utility:	8	38.1%	0.6	1.5	0.5	Beached/Blocked:	Government:		Restricted Boats with Variable Draft Capability:
Other:						Holst/Drystack:	Industrial:		Total Channel Length (ft.):
Personal Water Craft:	2	9.5%	1.0	1.0	0.0	Moorings:	Marina/Yard/Club:		2,455
Power Cabin/Trawler:						Ramp:	Motel/Hotel/Restaurant/Shop:		1,954
Recreational Fishing:	1	4.8%	1.5	1.5	1.5	Seawall:	Multi-Family Residential		0.95%
Sail:	3	14.3%	1.3	2.0	1.0	Trailer:	Other		Dredge (Cubic Yards)
Speed:	6	28.6%	1.8	2.5	1.0	Wet Slip:	Single Family Residential		406
Total:	21	100.0%	1.1	2.5	0.5	Total:	Total:		Dredge (Cubic Yards)
									One Foot Clearance:

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	3	100.0%	0.8	1.0	0.5	Anchorage:	Anchorage:		0.10%
Open Utility:						Beached/Blocked:	Government:		Restricted Boats with Variable Draft Capability:
Other:						Holst/Drystack:	Industrial:		Total Channel Length (ft.):
Personal Water Craft:						Moorings:	Marina/Yard/Club:		1,529
Power Cabin/Trawler:						Ramp:	Motel/Hotel/Restaurant/Shop:		517
Recreational Fishing:						Seawall:	Multi-Family Residential		0.25%
Sail:						Trailer:	Other		Dredge (Cubic Yards)
Speed:						Wet Slip:	Single Family Residential		Even Clearance:
Total:	3	100.0%	0.8	1.0	0.5	Total:	Total:		Dredge (Cubic Yards)
									One Foot Clearance:

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.		Anchorage:		Anchorage:		Restricted Boats	187
Kayak/Row/Canoe:		10	3.8%	0.6	1.0	0.5	0.2				Restricted Boats (Percent of Study Area):	6.40%
Open Utility:		84	32.1%	1.1	2.0	0.5	0.5	Beached/Blocked:	24	Government:		
Other:		2	0.8%	1.5	2.0	1.0	0.7	Holst/Drystack:	274	Industrial:		155
Personal Water Craft:		8	3.1%	1.0	1.0	1.0	0.0			Marina/Yard/Club:		
Power Cabin/Trawler:		9	3.4%	2.9	4.0	2.0	0.6	Mooring:		Motel/Hotel/Restaurant/Shop:		20,350
Recreational Fishing:		51	19.5%	1.9	3.0	0.5	0.5	Ramp:	3	Multi-Family Residential:		9,935
Sail:		17	6.5%	2.7	4.5	1.0	1.2	Seawall:		Other:		4.85%
Speed:		81	30.9%	1.8	3.0	0.5	0.5	Trailer:	8	Single Family Residential:		9,073
Total:		262	100.0%	1.6	4.5	0.5	0.8	Wet Slip:	120	Total:		16,432
								Total:	429			

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.		Anchorage:		Anchorage:		Restricted Boats	5
Kayak/Row/Canoe:		3	50.0%	0.8	1.0	0.5	0.3	Beached/Blocked:	1	Government:		0.17%
Other:								Holst/Drystack:	6	Industrial:		
Personal Water Craft:								Mooring:		Marina/Yard/Club:		
Power Cabin/Trawler:								Ramp:		Motel/Hotel/Restaurant/Shop:		5
Recreational Fishing:		1	16.7%	1.0	1.0	1.0		Seawall:	1	Multi-Family Residential:		2,187
Sail:								Trailer:		Other:		1,769
Speed:		2	33.3%	2.0	2.5	1.5	0.7	Wet Slip:	4	Single Family Residential:		0.86%
Total:		6	100.0%	1.3	2.5	0.5	0.7	Total:	12	Total:		1,423
												2,734

Boats				Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number Percent		Avg.	Max	Min	Std. Dev.		Anchorage:		Anchorage:		Restricted Boats	15
Kayak/Row/Canoe:		1	0.2%	0.5	0.5	0.5		Beached/Blocked:	7	Government:		0.51%
Open Utility:		50	10.7%	1.5	2.5	0.5	0.4	Holst/Drystack:	491	Industrial:		7
Other:		3	0.6%	2.7	3.0	2.0	0.6	Mooring:		Marina/Yard/Club:		7,391
Personal Water Craft:		37	7.9%	1.0	1.0	1.0	0.0	Ramp:		Motel/Hotel/Restaurant/Shop:		330
Power Cabin/Trawler:		44	9.4%	3.0	4.0	2.0	0.5	Seawall:		Multi-Family Residential:		0.16%
Recreational Fishing:		134	28.8%	2.2	4.0	1.5	0.5	Trailer:	32	Single Family Residential:		17
Sail:		8	1.7%	2.9	4.0	2.0	0.9	Wet Slip:	258	Total:		262
Speed:		189	40.6%	2.0	3.5	1.0	0.5	Total:	788			
Total:		466	100.0%	2.0	4.0	0.5	0.7					

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	9	10.2%	0.5	0.5	0.0		Anchorage:			
Open Utility:	19	21.6%	1.1	2.0	0.5	0.5	Beached/Blocked:	11		
Other:							Holst/Drystack:	84		
Personal Water Craft:	6	6.8%	1.0	1.0	1.0	0.0	Moorings:			
Power Cabin/Trawler:	2	2.3%	3.0	3.0	3.0	0.0	Ramp:	3		
Recreational Fishing:	17	19.3%	1.9	3.0	1.0	0.5	Seawall:			
Sail:	5	5.7%	2.2	3.5	1.5	0.8	Trailer:			
Speed:	30	34.1%	1.8	3.0	1.0	0.5	Wet Slip:	40		
Total:	88	100.0%	1.5	3.5	0.5	0.7	Total:	138		
									Dredge (Cubic Yards)	364
									Even Clearance:	
									Dredge (Cubic Yards)	1,317
									One Foot Clearance:	

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	5	9.3%	0.5	0.5	0.0		Anchorage:			
Open Utility:	35	64.8%	1.9	3.0	1.0	0.6	Beached/Blocked:	9		
Other:							Holst/Drystack:	6		
Personal Water Craft:	2	3.7%	1.0	1.0	1.0	0.0	Moorings:			
Power Cabin/Trawler:	1	1.9%	2.0	2.0	2.0	0.0	Ramp:	8		
Recreational Fishing:	11	20.4%	2.1	2.5	2.0	0.2	Seawall:			
Sail:							Trailer:	4		
Speed:							Wet Slip:	50		
Total:	54	100.0%	1.8	3.0	0.5	0.7	Total:	77		
									Dredge (Cubic Yards)	7,151
									Even Clearance:	
									Dredge (Cubic Yards)	16,910
									One Foot Clearance:	

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	Restricted Boats (Percent of Study Area):
Kayak/Row/Canoe:	27	8.4%	0.5	0.5	0.0		Anchorage:			
Open Utility:	164	51.1%	1.9	3.0	0.5	0.6	Beached/Blocked:	46		
Other:	10	3.1%	2.1	3.0	0.5	0.8	Holst/Drystack:	141		
Personal Water Craft:	8	2.5%	1.0	1.0	1.0	0.0	Moorings:			
Power Cabin/Trawler:	1	0.3%	3.0	3.0	3.0	0.0	Ramp:	18		
Recreational Fishing:	101	31.5%	2.3	3.0	0.5	0.4	Seawall:	5		
Sail:							Trailer:	57		
Speed:	10	3.1%	2.1	2.5	1.0	0.5	Wet Slip:	194		
Total:	321	100.0%	1.9	3.0	0.5	0.7	Total:	461		
									Dredge (Cubic Yards)	23,532
									Even Clearance:	
									Dredge (Cubic Yards)	8,046
									One Foot Clearance:	

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	25	15.2%	0.6	1.5	0.5	0.3	Anchorage:		Restricted Boats	4.82%
Open Utility:	110	66.7%	2.1	3.0	0.5	0.5	Beached/Blocked:	17	Restricted Boats with Variable	
Other:							Holst/Drystack:	128	Draft Capability:	124
Personal Water Craft:	3	1.8%	1.0	1.0	1.0	0.0	Mooring:		Total Channel Length (ft.):	40,770
Power Cabin/Trawler:							Ramp:	6	Restricted Channel Length (ft.):	21,897
Recreational Fishing:	25	15.2%	2.2	2.5	2.0	0.3	Seawall:	1	Restricted Channels	
Sail:	1	0.6%	2.0	2.0	2.0		Trailer:	5	(Percent of Study Area):	10.70%
Speed:	1	0.6%	2.0	2.0	2.0		Wet Slip:	101	Dredge (Cubic Yards)	12,355
Total:	165	100.0%	1.8	3.0	0.5	0.7	Total:	258	Even Clearance:	
									Dredge (Cubic Yards)	28,575
									One Foot Clearance:	

<u>Boats</u>		Draft (ft.)			<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:							Anchorage:		Restricted Boats	
Open Utility:							Beached/Blocked:		Restricted Boats with Variable	
Other:							Holst/Drystack:		Draft Capability:	
Personal Water Craft:							Mooring:		Total Channel Length (ft.):	755
Power Cabin/Trawler:							Ramp:	2	Restricted Channel Length (ft.):	
Recreational Fishing:							Seawall:		Restricted Channels	
Sail:							Trailer:		(Percent of Study Area):	
Speed:							Wet Slip:	6	Dredge (Cubic Yards)	0
Total:							Total:	8	Even Clearance:	
									Dredge (Cubic Yards)	0
									One Foot Clearance:	

<u>Boats</u>		Draft (ft.)				<u>Moorings</u>		<u>Facilities</u>		Restricted Boats:		
Number Percent		Avg.	Max	Min	Std. Dev.	Anchorage:		Anchorage:		Restricted Boats	0.65%	
Kayak/Row/Canoe:						Beached/Blocked:		Government:		Restricted Boats with Variable	14	
Open Utility:	6	27.3%	1.3	1.5	1.0	0.3	Hoist/Drystack:		Industrial:		Draft Capability:	
Other:	11	50.0%	1.9	2.0	1.0	0.3	Mooring:		Marina/Yard/Club:		Total Channel Length (ft.):	3,992
Personal Water Craft:							Ramp:		Motel/Hotel/Restaurant/Shop:		Restricted Channel Length (ft.):	3,818
Power Cabin/Trawler:							Seawall:		Multi-Family Residential		Restricted Channels	
Recreational Fishing:	2	9.1%	2.3	3.0	1.5	1.1	Trailer:		Other		(Percent of Study Area):	1.87%
Sail:							Wet Slip:		Single Family Residential		Dredge (Cubic Yards)	1,329
Speed:	3	13.6%	1.7	2.0	1.5	0.3	Total:		Total:		Even Clearance:	
Total:	22	100.0%	1.8	3.0	1.0	0.5					Dredge (Cubic Yards)	4,157
											One Foot Clearance:	

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	116	38.4%	0.5	1.0	0.5	0.0	Anchorage:		258	8.82%
Open Utility:	88	29.1%	1.1	2.0	0.5	0.4	Beached/Blocked:	135	Restricted Boats with Variable Draft Capability:	143
Other:							Holst/Drystack:	143	Total Channel Length (ft.):	40,368
Personal Water Craft:	8	2.6%	1.0	1.0	1.0	0.0	Moorings:		Restricted Channel Length (ft.):	15,580
Power Cabin/Trawler:							Ramp:	11	Restricted Channels	
Recreational Fishing:	53	17.5%	1.4	2.0	0.5	0.4	Seawall:	4	(Percent of Study Area):	7.61%
Sail:	6	2.0%	1.7	3.0	1.0	0.8	Trailer:	15	Dredge (Cubic Yards)	6,939
Speed:	31	10.3%	1.4	2.0	0.5	0.3	Wet Slip:	161	Even Clearance:	
Total:	302	100.0%	1.0	3.0	0.5	0.5	Total:	469	Dredge (Cubic Yards)	18,480
									One Foot Clearance:	

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:							Anchorage:		3	0.10%
Open Utility:	1	33.3%	1.5	1.5	1.5		Beached/Blocked:		Restricted Boats with Variable Draft Capability:	3
Other:							Holst/Drystack:		Total Channel Length (ft.):	300
Personal Water Craft:							Moorings:		Restricted Channel Length (ft.):	135
Power Cabin/Trawler:							Ramp:		Restricted Channels	
Recreational Fishing:	1	33.3%	2.5	2.5	2.5		Seawall:		(Percent of Study Area):	0.07%
Sail:							Trailer:		Dredge (Cubic Yards)	128
Speed:	1	33.3%	1.5	1.5	1.5		Wet Slip:	17	Even Clearance:	
Total:	3	100.0%	1.8	2.5	1.5	0.6	Total:	17	Dredge (Cubic Yards)	228
									One Foot Clearance:	

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number	Percent	Avg.	Max	Min	Std. Dev.				Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	1	20.0%	0.5	0.5	0.5		Anchorage:		1	0.03%
Open Utility:	1	20.0%	1.5	1.5	1.5		Beached/Blocked:	2	Restricted Boats with Variable Draft Capability:	
Other:							Holst/Drystack:	2	Total Channel Length (ft.):	315
Personal Water Craft:							Moorings:		Restricted Channel Length (ft.):	198
Power Cabin/Trawler:							Ramp:	1	Restricted Channels	
Recreational Fishing:	1	20.0%	2.5	2.5	2.5		Seawall:		(Percent of Study Area):	0.10%
Sail:	1	20.0%	1.0	1.0	1.0		Trailer:		Dredge (Cubic Yards)	17
Speed:	1	20.0%	1.5	1.5	1.5		Wet Slip:	4	Even Clearance:	
Total:	5	100.0%	1.4	2.5	0.5	0.7	Total:	9	Dredge (Cubic Yards)	164
									One Foot Clearance:	

TRAFFICSHED NUMBER: 42 TRAFFICSHED NAME: Bonita Beach

Boats		Draft (ft.)			Moorings		Facilities		Restricted Boats:	
Number	Percent	Avg.	Max	Min Std. Dev.					Restricted Boats	(Percent of Study Area):
Kayak/Row/Canoe:	7	12.3%	0.5	0.5 0.5 0.0	Anchorage:		Anchorage:		Restricted Boats	(Percent of Study Area):
Open Utility:	16	28.1%	1.2	1.5 0.5 0.4	Beached/Blocked:		Government:		Restricted Boats with Variable Draft Capability:	21
Other:					Holt/Drystack:		Industrial:		Total Channel Length (ft.):	7,696
Personal Water Craft:	1	1.8%	1.0	1.0 1.0 1.0	Mooring:		Marina/Yard/Club:		Restricted Channel Length (ft.):	1,463
Power Cabin/Trawler:	5	8.8%	2.8	3.0 2.0 0.4	Ramp:		Motel/Hotel/Restaurant/Shop:		Restricted Channels	
Recreational Fishing:	14	24.6%	2.2	3.0 0.5 0.7	Seawall:		Multi-Family Residential		(Percent of Study Area):	0.71%
Sail:	2	3.5%	2.8	3.5 2.0 1.1	Trailer:		Other		Dredge (Cubic Yards)	314
Speed:	12	21.1%	1.8	2.5 1.0 0.5	Wet Slip:		Single Family Residential		Even Clearance:	
Total:	57	100.0%	1.6	3.5 0.5 0.8	Total:		Total:		Dredge (Cubic Yards)	1,398
					Total:		Total:		One Foot Clearance:	

TRAFFICSHED NUMBER: 43 TRAFFICSHED NAME: McLaughlin Blvd

Boats		Draft (ft.)				Moorings		Facilities		Restricted Boats:	15	
Number Percent		Avg.	Max	Min	Std. Dev.	Anchorage:		Anchorage:		Restricted Boats	0.51%	
Kayak/Row/Canoe:	6	24.0%	0.5	0.5	0.5	0.0	Beached/Blocked: 4		Government:		Restricted Boats with Variable Draft Capability:	11
Other:						Holst/Drystack: 22		Industrial:		Total Channel Length (ft.):		2,896
Personal Water Craft:	3	12.0%	1.0	1.0	1.0	0.0	Mooring:		Marina/Yard/Club:		Restricted Channel Length (ft.):	1,255
Power Cabin/Trawler:							Ramp:		Motel/Hotel/Restaurant/Shop:		Restricted Channels	0.61%
Recreational Fishing:	4	16.0%	1.6	2.5	0.5	0.9	Seawall:		Multi-Family Residential		(Percent of Study Area):	509
Sail:	2	8.0%	2.0	3.0	1.0	1.4	Trailer:		Other		Dredge (Cubic Yards)	509
Speed:	5	20.0%	1.7	2.5	1.0	0.6	Wet Slip:		Single Family Residential		Even Clearance:	
Total:	25	100.0%	1.3	3.0	0.5	0.7	Total:		Total:		Dredge (Cubic Yards)	1,439
										One Foot Clearance:		

TRAFFICSHED NUMBER: 44 TRAFFICSHED NAME: Fish Trap Bay 1

<u>Boats</u>		Number Percent		Draft (ft.)			<u>Moorings</u>	<u>Facilities</u>	Restricted Boats:	5
Kayak/Row/Canoe:	2	25.0%	0.5	0.5	0.5	0.0	Anchorage:	Anchorage:	Restricted Boats	0.17%
Open Utility:	3	37.5%	1.2	1.5	0.5	0.6	Beached/Blocked:	3	Restricted Boats with Variable Draft Capability:	5
Other:							Holst/Drystack:	4	Total Channel Length (ft.):	2,409
Personal Water Craft:							Mooring:		Restricted Channel Length (ft.):	1,439
Power Cabin/Trawler:							Ramp:	1	Restricted Channels	
Recreational Fishing:	3	37.5%	1.8	2.5	1.5	0.6	Seawall:		(Percent of Study Area):	0.70%
Sail:							Trailer:	3	Dredge (Cubic Yards)	273
Speed:							Wet Slip:	3	Even Clearance:	
Total:	8	100.0%	1.3	2.5	0.5	0.7	Total:	14	Dredge (Cubic Yards)	1,338
								5	One Foot Clearance:	

Boats	Draft (ft.)			Moorings			Facilities		
	Number	Percent	Avg.	Max	Min	Std. Dev.	Number	Percent	Avg.
Kayak/Row/Canoe:	9	12.9%	0.5	0.5	0.5	0.0	Anchorage:		
Open Utility:	27	38.6%	1.3	1.5	0.5	0.3	Beached/Blocked:	9	
Other:	2	2.9%	2.0	2.0	2.0	0.0	Holst/Drystack:	29	
Personal Water Craft:	2	2.9%	1.0	1.0	1.0	0.0	Moorings:		
Power Cabin/Trawler:	1	1.4%	3.0	3.0	3.0	0.0	Ramp:		
Recreational Fishing:	13	18.6%	1.6	2.0	0.5	0.5	Seawall:	3	
Sail:	3	4.3%	2.2	4.5	1.0	2.0	Trailer:	9	
Speed:	13	18.6%	1.8	3.0	1.0	0.5	Wet Slip:	47	
Total:	70	100.0%	1.4	4.5	0.5	0.7	Total:	97	
							Marina/Yard/Club:		
							Motel/Hotel/Restaurant/Shop:	1	
							Multi-Family Residential:	1	
							Other:		
							Single Family Residential:	64	
							Total:	66	
							Restricted Boats:		
							Restricted Boats (Percent of Study Area):		47
							Restricted Boats with Variable Draft Capability:		1.61%
							Total Channel Length (ft.):		8,767
							Restricted Channel Length (ft.):		2,690
							Restricted Channels (Percent of Study Area):		1.31%
							Dredge (Cubic Yards) Even Clearance:		2,440
							Dredge (Cubic Yards) One Foot Clearance:		4,433

Boats	Draft (ft.)			Moorings			Facilities		
	Number	Percent	Avg.	Max	Min	Std. Dev.	Number	Percent	Avg.
Kayak/Row/Canoe:	15	9.2%	0.5	0.5	0.5	0.0	Anchorage:		
Open Utility:	62	38.0%	1.3	2.0	0.5	0.4	Beached/Blocked:	21	
Other:	7	4.3%	1.9	2.0	1.0	0.4	Holst/Drystacks:	55	
Personal Water Craft:	1	0.6%	1.0	1.0	1.0	0.0	Moorings:		
Power Cabin/Trawler:	3	1.8%	3.0	3.0	3.0	0.0	Ramp:	5	
Recreational Fishing:	37	22.7%	1.7	2.5	0.5	0.4	Seawall:	3	
Sail:	8	4.9%	2.0	3.5	1.0	0.8	Trailer:	13	
Speed:	30	18.4%	1.8	3.0	1.0	0.4	Wet Slip:	162	
Total:	163	100.0%	1.5	3.5	0.5	0.6	Total:	259	
							Marina/Yard/Club:	4	
							Motel/Hotel/Restaurant/Shop:	2	
							Multi-Family Residential:	8	
							Other:		
							Single Family Residential:	77	
							Total:	91	
							Restricted Boats:		
							Restricted Boats (Percent of Study Area):		121
							Restricted Boats with Variable Draft Capability:		4.14%
							Total Channel Length (ft.):		106
							Restricted Channel Length (ft.):		15,526
							Restricted Channels (Percent of Study Area):		5.123
							Dredge (Cubic Yards) Even Clearance:		2,508
							Dredge (Cubic Yards) One Foot Clearance:		3,509
							Total:		7,304

Boats	Draft (ft.)			Moorings			Facilities		
	Number	Percent	Avg.	Max	Min	Std. Dev.	Number	Percent	Avg.
Kayak/Row/Canoe:	68	7.3%	0.5	1.5	0.5	0.2	Anchorage:		
Open Utility:	249	26.7%	1.2	2.0	0.5	0.4	Beached/Blocked:	103	
Other:	13	1.4%	2.2	4.0	1.0	0.8	Holst/Drystack:	577	
Personal Water Craft:	18	1.9%	1.0	1.0	1.0	0.0	Moorings:		
Power Cabin/Trawler:	9	1.0%	2.6	3.0	2.0	0.5	Ramp:	64	
Recreational Fishing:	278	29.8%	1.9	3.0	0.5	0.4	Seawall:	4	
Sail:	6	0.6%	2.5	4.0	2.0	0.8	Trailer:	46	
Speed:	293	31.4%	1.7	3.5	0.5	0.4	Wet Slip:	702	
Total:	934	100.0%	1.6	4.0	0.5	0.6	Total:	1496	
							Marina/Yard/Club:	1	
							Motel/Hotel/Restaurant/Shop:	1	
							Multi-Family Residential:	8	
							Other:		
							Single Family Residential:	567	
							Total:	578	
							Restricted Boats:		
							Restricted Boats (Percent of Study Area):		798
							Restricted Boats with Variable Draft Capability:		27.29%
							Total Channel Length (ft.):		743
							Restricted Channel Length (ft.):		68,422
							Restricted Channels (Percent of Study Area):		24,701
							Dredge (Cubic Yards) Even Clearance:		12.07%
							Dredge (Cubic Yards) One Foot Clearance:		16,398
							Total:		34,695

