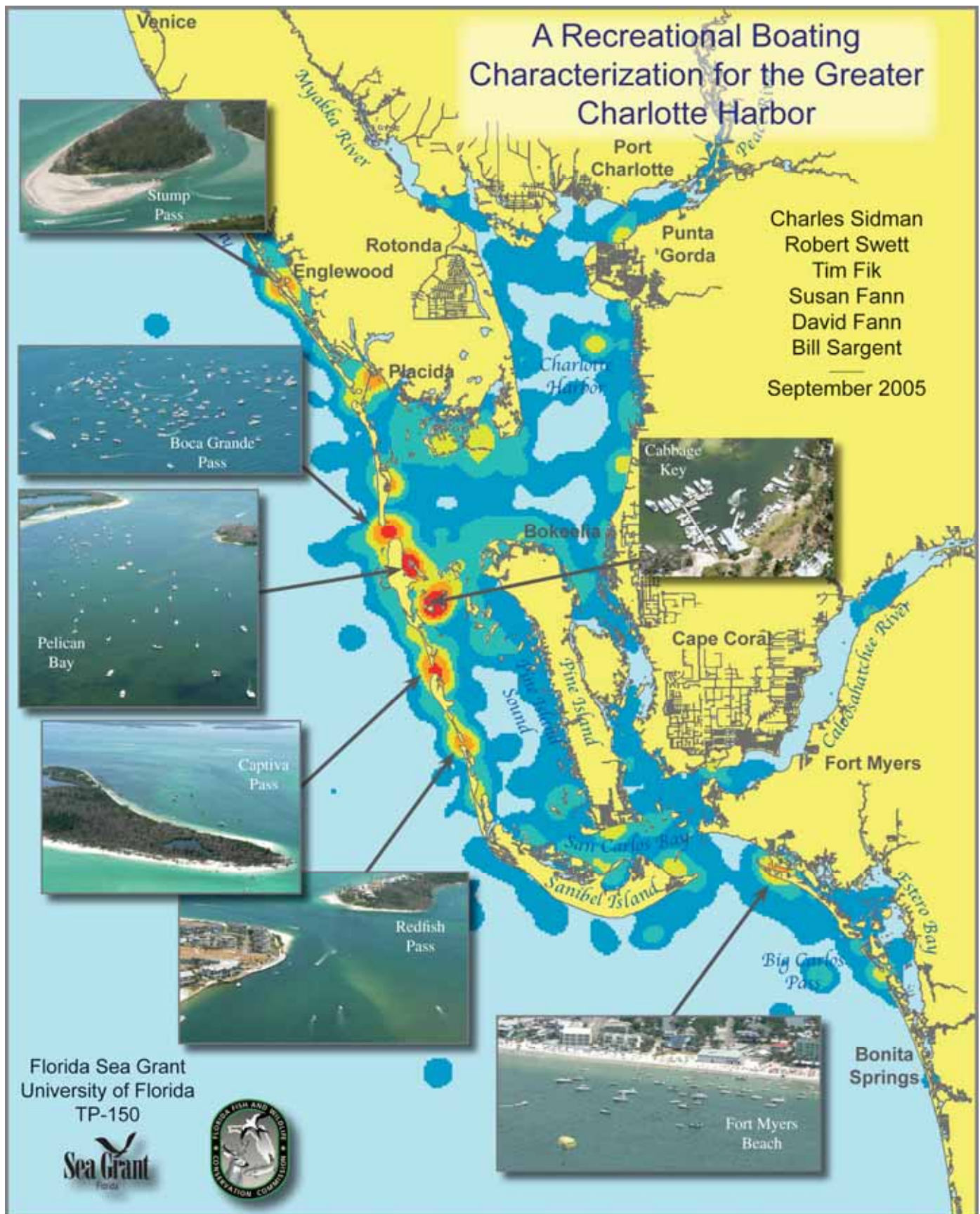


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We especially thank the many boaters who donated their time to complete and return the questionnaire. It is our intention that this effort will be translated into planning strategies and informational products of benefit to the Greater Charlotte Harbor boating communities.

Abstract

This report documents the methods and procedures implemented, during February through September 2005, to survey and characterize boaters who recreate in the Greater Charlotte Harbor region (Charlotte and Lee County waterways), on the basis of trip departure category (marina wet slip, marina dry storage, public ramp, and private dock). Vessel and boat trailer registration numbers collected at area marinas and boat ramps were used to obtain names and mailing addresses from the State's Vessel Title Registration System (VTRS) for marina and ramp samples. Names and mailing addresses for waterfront parcel owners obtained from County tax records were compared to the VTRS to identify the dock sample (those waterfront parcel owners that also own a boat). A map-based questionnaire was mailed to a random sample of 6,944 area boaters. Questionnaire recipients marked the start and end point of their last two recreational boating trips, traced their travel routes, identified their favorite boating destinations, and the primary activities that they engaged in while at a particular destination. In addition, much descriptive data about boaters' trips, including preferences for selecting trip departure sites, destinations, and travel routes, favorite activities, vessel types, and the timing, duration, and frequency of trips, was collected and linked to the mapped data. A content analysis identified important issues and needs from the perspective of the boating community. Lastly, an analysis that compared the responses of early and late responders to the survey was undertaken to evaluate the potential effects of non-response bias; late responders were used as a surrogate for non-responders. This information is intended to be used for resource management and planning applications, and as the basis for developing map based products intended to improve boating experiences and instill resource stewardship.

Chapter 1. Introduction

Background

Boating is a key element in Florida's coastal lifestyle and growth phenomena. Florida currently ranks third in the nation in recreational boat registrations, with almost 900,000 pleasure boats registered or titled, according to the Florida Department of Highway Safety and Motor Vehicles 2005 Vessel Registration 'data sales' database. This represents approximately one boat for every 17 residents. More importantly, with over 22 million estimated participants, Florida is ranked the number one destination for marine recreation - including saltwater boating with an estimated 4.3 million participants - in the United States (Leeworthy & Wiley, 2001). The ever-increasing number of boaters and the diversity of recreational boating activities that now take place within Florida's coastal bays, estuaries, and waterways have had positive economic but negative environmental consequences (Leston, 2002; Antonini, Fann & Roat, 1999). Florida's coastal counties face a major planning dilemma; how to balance growth in boating and associated coastal development with conservation and management of estuarine resources.

As demand for the use of Florida's waterways increases, so does the need for enhanced public access, public safety, and environmental protection. There is, however, little information available to resource managers and planners that describes the preferences and use patterns of the boating community. This study builds upon previous work conducted in the Charlotte Harbor and Tampa and Sarasota Bay boating regions (Sidman & Flamm, 2001; Sidman, Fik, & Sargent, 2004) by refining the questionnaire design, developing a sample selection method to target specific boater groups, and implementing a mail survey to characterize boater preferences, activities, and water-use patterns for the high-use Greater Charlotte Harbor boating region that includes Lemon Bay to Estero Bay. Information obtained from this study is intended to enhance resource management and planning applications, and contribute to educational products that can improve boating experiences and encourage resource stewardship.

This report documents the data collection, compilation, and analysis of a mail survey to characterize recreational boating in the Greater Charlotte Harbor. It presents (1) the questionnaire and related correspondence; (2) the sample design and results of the mailing; (3) a GIS density analysis that depicts the spatial distribution and clustering of trip information reported by survey respondents; (4) a set of descriptive statistics that characterizes boating groups, activities, and perceived problems, and solutions to problems; and (5) a comparative analysis of information reported by early versus late responders to the survey to evaluate survey non-response bias.

Study Goal and Objectives

This project's goal is to characterize the preferences, activities, and water-use patterns of boaters on the basis of trip departure type (i.e., marina wet-slip, dry storage facility, ramp, or private dock). Specific objectives include (1) developing a survey instrument and accompanying correspondence; (2) identifying target boater groups by trip departure type; (3) implementing a mail survey of a random sample of target boater groups; (4) constructing spatial databases that

identify trip departure sites, destinations, travel routes, and congested areas; (5) developing a database structure to link boater activities, preferences, and trip-profiles to the spatial databases; and (6) comparing the responses of early and late responders to the survey to evaluate non-response bias.

Study Region

The Greater Charlotte Harbor study region extends approximately 70 miles from Englewood (Lemon Bay) in the north to Bonita Springs (Estero Bay) in the south, in Charlotte, and Lee counties (Figure 1). An estimated 61,540 pleasure boats are currently registered in the study region according to the Florida Department of Highway Safety and Motor Vehicles, Vessel Title Registration System 2005 ‘data sales’ database. Recreational boaters are attracted to this region by its many barrier islands and protected waters that provide excellent opportunities for small-craft fishing, nature viewing, and picnicking/socializing along barrier island beaches and exposed sand spits (Figure 2). The study region comprises roughly 1,450 square miles of the Gulf of Mexico, and interior bay waters that include Lemon Bay, the Manatee and Peace rivers, Greater Charlotte Harbor, Pine Island Sound, San Carlos Bay, the Caloosahatchee River, and Estero Bay.



Figure 1. The Greater Charlotte Harbor Study Area.



Figure 2. The Charlotte Harbor Boating Region.

Chapter 2. Mail Survey

Survey Instrument

The mail survey is an established method for acquiring spatial and behavioral information from the perspective of the boating community (Antonini, Zobler, Sheftall, Stevely & Sidman, 1994; Antonini, West, Sidman & Swett, 2000; Falk, Graefe, Drogin, Confer, & Chandler, 1992; Sidman, Fik, & Sargent, 2004; West 1982). A mail survey distributed to a randomly selected group is preferred over focus interviews with experts or convenience sampling (e.g., interviews at launch ramps), because it is proven to capture a wider and more representative cross-section of a population (Dillman, 1978; 1991). This is especially true of a boater population that is known to be diverse in terms of activities and/or characteristics (Sidman, Antonini, Saures, Jones & West, 2000). In addition to reducing the potential for sample bias, a mail survey offers greater flexibility to obtain both spatial and behavioral information than methods of strict observation such as aerial surveys (Sidman & Flamm, 2001).

The survey questionnaire developed for this study was patterned after similar, previous studies (Falk et al., 1992; Sidman & Flamm, 2001; Sidman, Fik, & Sargent, 2004; West, 1982;) and was designed to (1) capture spatial information regarding trip departure sites, favorite boating destinations, intervening travel routes, and congested areas; (2) characterize boaters with respect to the types of vessels owned and used, activity preferences, and the timing, frequency and duration of their recreational outings; and; (3) identify problems, and needs from the perspective of the boating community (see Appendix A for the survey instrument and associated correspondence).

The survey instrument was a two-sided 17 X 22 inch questionnaire that folded in quarters to 8.5 X 11 inches. The questionnaire contained a map (1:160,000 scale; 1 inch is about 2.5 miles) of the Greater Charlotte Harbor region on one side; the reverse side consists of 27 questions divided into the following topical areas:

1. Description of primary vessel
2. Description of last two pleasure boating trips
3. Description of favorite boating destinations and activities
4. Description of survey respondent
5. Open questions to identify perceived problems and needs

The following additional items were included with each mailed questionnaire.

1. A cover letter that explained the study
2. A Charlotte Harbor Boater's Guide developed by the FWRI
3. A postage paid return envelope with postal permit indicia
4. A mailing envelope that includes return address and postage permit indicia

In addition, a 4 X 6 card was mailed approximately two weeks after the initial mailing as a reminder to survey recipients to complete and return the questionnaire.

A beta-version of the survey instrument was mailed to six local boating experts who agreed to review and complete the questionnaire. Reviewer comments and suggestions were used to improve the content of the questionnaire.

The questionnaire asked survey recipients to mark, on the map, the location of the trip departure site, travel routes, favorite destinations, and congested areas associated with their last two pleasure boating trips. Complementary questions allowed recipients to characterize their last two trips according to vessel type, the departure date and time, and time spent on the water. In addition, recipients were asked the number of days per month that they take trips and the primary activities that they engaged in while at a particular destination. They were also asked to identify and rank reasons for selecting departure sites, travel routes, and favorite destinations. Finally, a series of open-ended questions addressed problems and needed improvements.

Sample Design

The sample design was developed to acquire group-specific information that can be used to compare and contrast use patterns among four discrete boater populations that actively use the Greater Charlotte Harbor region: Users of (1) marina wet slips, (2) dry storage facilities, (3) public boat ramps, and (4) private docks.

The sample size required for each of the four boater groups is a function of the desired confidence interval and confidence level. Given a total population of finite size, N , a tolerable error amount, e , and a desired confidence level as specified by the normal random variate, z , the required sample size, n , for estimating a population proportion, p , is determined by:

$$n = \frac{N z^2 p(1-p)}{(N-1)e^2 + z^2 p(1-p)}$$

A minimum sample size of 384 was required for each of the four boater groups, based on a tolerable error of $\pm .05$ and a confidence level of 95 percent ($z = 1.96$). This sample size was considered adequate, at the stated error and confidence level, for a population that is finite and does not exceed 2,000,000 (McCall, 1982). A gross sample of 2,000 boaters for each of the four categories was targeted to ensure obtaining 384 returns for each boater group. This ratio assumes a return rate of approximately 20 percent, based on return rates from previous surveys of southwest Florida boaters (Antonini et al., 1994, 2000; Sidman & Flamm, 2001; Sidman, Fik, & Sargent, 2004).

Sample Selection

Vessel and boat trailer registration numbers collected at area marinas and boat ramps were used to obtain names and mailing addresses from the State's Vessel Title Registration System (VTRS), maintained by the Florida Department of Highway Safety and Motor Vehicles (DHSMV) for the marina wet slip, dry storage facility, and public ramp samples. The names and addresses of owners of documented vessels were obtained from the United States Coast Guard Documented Vessel database that is available on-line.

During March – May 2005, Florida Sea Grant personnel visited 25 Charlotte and Lee County ramps (Figure 3) and wrote down 2,135 unique license plate numbers of both the boat trailer and the towing vehicle. This information was compared to the VTRS database maintained by the DHSMV to provide 1,504 VTRS matches for names and mailing addresses of Charlotte and Lee County ramp patrons (Table 1).

Table 1. Breakdown of Unique Tag Numbers Collected and VTRS Matches by Ramp.

County	Ramp Name	Number of Unique Tags	VTRS Matches
Charlotte	Placida	287	195
	Eldred's	8	6
	El Jobean	54	41
	Laishley Park	96	66
	Darst Park	5	3
	Harbour Heights Park	7	4
	Ponce De Leon Park	65	51
	Punta Gorda Park	2	2
	Riverside	2	2
	Spring Lake Park	39	28
	Port Charlotte Beach	40	28
	Ainger Creek Park	18	14
	TOTAL	623	440
Lee	Burnt Store Marina	41	28
	Burnt Store Road Ramp	16	9
	Cape Coral Yacht Club	126	86
	Centennial Park Marina	82	50
	Harbor Hideaway Marina	112	85
	Horton Park	95	60
	Imperial River	44	33
	Lovers Key	249	188
	Matlacha Park	153	111
	Pineland Marina	238	170
	Punta Rassa	232	167
	Sanibel Island	42	27
	D&D Bait and Tackle	82	50
	TOTAL	1,512	1,064

During February – March 2005 Florida Sea Grant contracted personnel visited 50 marinas (Figure 4) located in Charlotte and Lee Counties to record bow numbers from vessels stored in wet slips and in dry stack storage facilities. Florida Sea Grant personnel logged bow numbers from 1,283 vessels moored in wet slips and 3,870 vessels kept in dry storage facilities (Table 2). The name and hailing port of documented vessels were also obtained and used to acquire additional owner names and addresses from the Coast Guard documented vessel database. In addition, one marina provided a list of names and addresses for its patrons, and two marinas stipulated that they generate mailing lists and conduct the mailing. These three marinas did not distinguish between wet-slip or dry-storage type. As such, a total of 1,069 vessels were placed in an ‘unknown’ marina storage type category.



Figure 3. Greater Charlotte Harbor Public Ramps Surveyed.

Table 2. Breakdown of Vessel Bow Numbers Collected from Marinas

County	Ramp Name	Wet Slip*	Dry Storage	Unknown
Charlotte	Ainger Creek Marina	5	0	
	Cape Haze Marina Bay	32	83	
	Chadwick Cove Marina	8	0	
	Fishermen's Village	3	0	
	Gasparilla Marina	88	385	
	Gator Creek Marine	0	21	
	Gulf Coast Marine Center	0	37	
	Marine Max	2	17	
	Palm Island Marina	42	115	
	Punta Gorda Marina	6	22	
	Stump Pass Marina	0	197	
	Weston's Resort	9	0	
	TOTALS	195	877	
Lee	Boca Grande Marina	6	0	
	Bonita Bay Marina Club	41	340	
	Burnt Store Marina	0	0	671
	Caloosa Isle Marina	6	62	
	Cape Coral Yacht Basin	56	0	
	Centennial Harbour Marina	50	0	
	Ft. Myers Yacht Basin	110	0	
	Deep Lagoon	0	248	
	Fish Tale Marina	0	0	298
	Fish Trap Marina	8	0	
	Ft. Myers Beach Marina	22	118	
	Gulf Gateway Marina	8	22	
	Gulf Star/Dumont Marine	9	41	
	Harbor Hideaway	8	0	
	Jack's Marine South	5	12	
	Jensen's Twin Palm Marina	10	0	
	Marinatown Marina	0	0	
	Mc Carthy's Marina	6	0	
	Olde Fish House Marina	0	3	
	Paradise Yacht Club	0	0	
	Peppertree Point Marina	0	0	
	Pineland Marina	3	16	
	Prosperity Pointe Marina	32	0	
	Rialto Harbor Marina	8	0	
	Salty Sam's Marina	41	130	
	Sanibel Marina	32	17	
	Semmer Docks	19	0	
	Snook Bight Marina	41	57	
	St. James Marina	3	0	
	Sweetwater Landing	0	0	100
	Tarpon Point Marina	91	0	
	The Inn Marina	10	88	
	The Marina at Cape Harbour	51	85	
	Tween Waters Inn	8	0	
	Uncle Henry's Marina	6	0	
	Viking Marina	0	0	
	Whidden's Marina	8	0	
	TOTALS	1,088	2,993	1,069



Figure 4. Greater Charlotte Harbor Marinas Surveyed.

Names and mailing addresses for waterfront parcel owners obtained from county tax records were compared to the VTRS to identify the private dock sample (i.e., those waterfront parcel owners who also owned a boat). A sample of private dock owners was selected by means of matching the mailing addresses contained in the VTRS to waterfront parcel addresses obtained from Sarasota, Lee and Charlotte county property tax records. The owner's name, street number, street name, and zip code obtained from county tax records were combined and compressed (i.e., no spaces) into one concatenated field. A similar compression procedure was undertaken for VTRS owner name, address, and zip code fields. Compressed name and address information for all waterfront parcels was then linked to the corresponding compressed VTRS information to identify matches. Matches ensured that only those waterfront parcel owners who also own boats were sampled (Table 3). An ArcGIS program downloaded from the ESRI website was used to select a random spatial sample of 2000 private dock owners from the 9,794 VTRS matches (Figure 5). The size of the dock samples was increased by 15 percent to ensure that minimum sample sizes were retained after implementing address validation procedures.

Table 3. Dock Sample Selection.

Docks County	VTRS Matches	% Total	Sample Needed	# of 2000	15% Add	Total Sub- Sample
Sarasota	218	2%	2000	40	46	44
Charlotte	4,274	44%		880	132	1,012
Lee	5,302	54%		1,080	162	1,242
TOTALS	9,794	100%		2,000	340	2,300

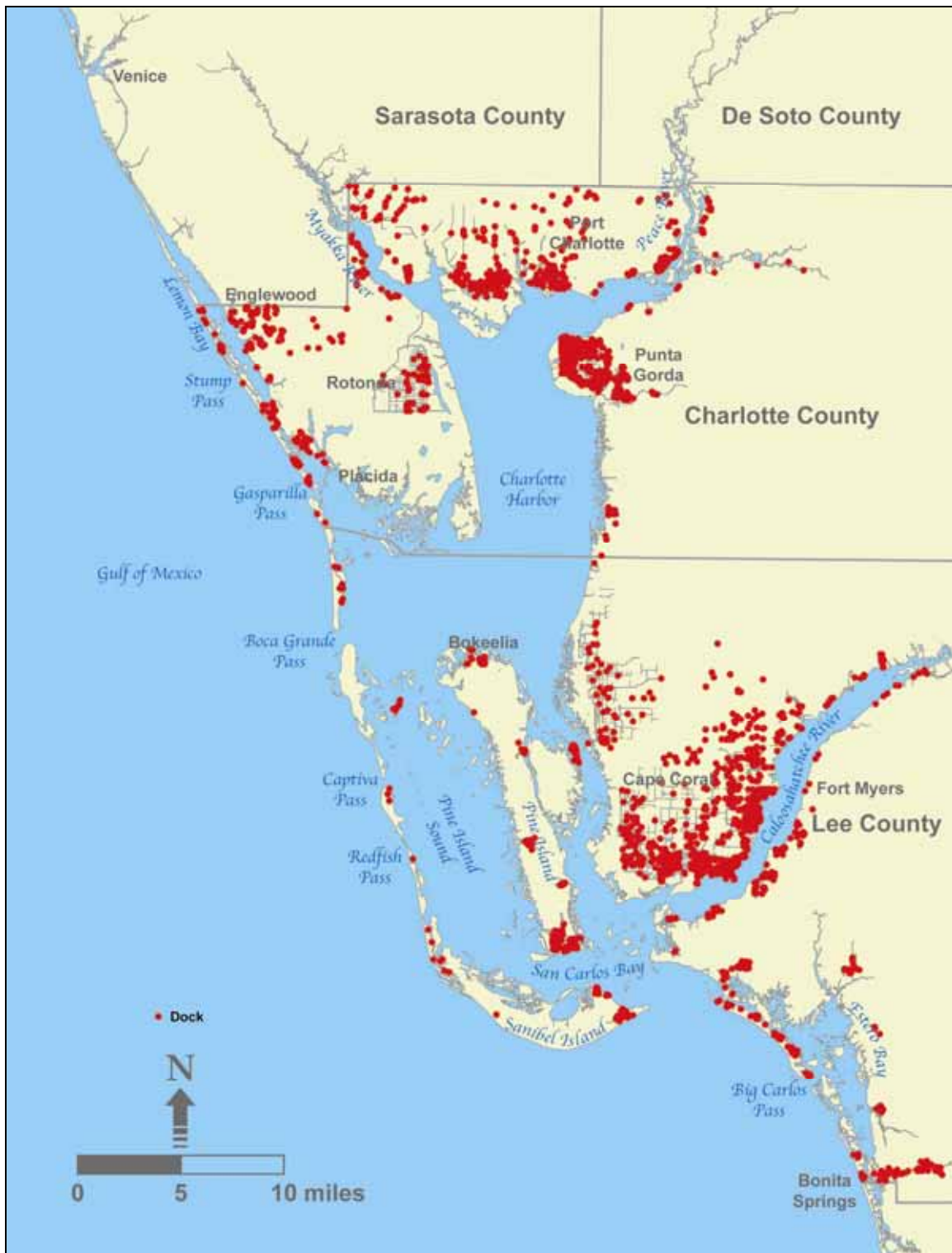


Figure 5. Spatial Distribution of the Greater Charlotte Harbor Private Dock Sample.

Survey Return Breakdown

Questionnaires were mailed in waves from May 27 through June 27, 2005. Smart Mail Services Inc. validated boater addresses and conducted the mailing. A breakdown of survey mailings and returns is presented by boater group (i.e., marina (wet and dry storage), public ramp, and private dock) in Table 4. A total of 1,473, surveys were returned by August 15, 2005, of which, 1,447 could be used for the statistical or spatial analyses (27 surveys could not be used). The number of returned surveys exceeded the target number of 384 for each boater-group (i.e., when marina wet and dry storage groups were combined). This translated to an overall return rate of 20.6%.

Table 4. Survey Return Breakdown.

User Group	Mailed	Returned Useable	% Return
Marina (wet and dry storage)	3,440	594	17.3
Public Ramp	1,504	355	23.6
Private Dock	2,000	488	24.4
Other	na	10	na
TOTALS*	6,944	1,447	20.6 Average

*A total of 1,447 surveys were returned by August 15, 2005. Ten respondents listed 'other' for boater group type.

Chapter 3. GIS Database Development

Spatial Database Design

Questionnaire recipients were asked to mark the start and end point of their last two pleasure boating excursions and trace their entire travel routes on a map, as well as to identify their favorite boating destinations and annotate the map with the primary activities that they engaged in while at a particular destination. Data collected from 1,447 surveys were digitized into the ESRI ArcGIS geographic information system (GIS). This translated to a sample of 2,817 travel routes, 2,817 trip departure sites, 3,909 favorite boating destinations, and 1,825 locations of perceived congestion.

Spatial information was digitized ‘on-screen’ using a 1:24,000 scale shoreline, United States Geological Survey Digital Orthophotograph Quarter Quad imagery, and the positions of marinas, ramps, navigation aids, and artificial reefs, as background themes, to enhance the accuracy of digitized data. Trip departure sites and congested spots were digitized as point features with each record coded with the survey control number and the trip number (i.e., first or second trip). Favorite destinations were digitized as point features and were coded with the survey control number, the trip number (i.e., first or second trip), and the activities that a respondent engaged in at each favorite destination. Travel routes were digitized as line features with the following attribute information coded: Survey control number, trip number (i.e., first or second trip), round trip (or one way); if round trip, then the same route out and back, and whether or not the trip extended beyond the study area.

The database structure allows information from survey questions to be ‘linked’ to digitized spatial information by the use of the survey control number (ID), which uniquely identified spatial and attribute information provided by each survey respondent. The selection and display of favorite destination point data within the GIS is illustrated in Figure 7. A close-up of the southern Charlotte Harbor boating area is displayed in the GIS view. Red dots represent departure sites identified by survey respondents; green dots represent favorite destinations; yellow dots represent a sub-set of favorite destinations where survey respondents reported that they like to “nature view.” The ‘Select by Attributes’ window - upper left corner of Figure 7 - illustrates a GIS database query that selects and displays those favorite destination points that are associated with nature viewing (e.g., NV = “Y”). The ‘Selected Attributes of Destinations’ window - lower left corner of Figure 6 - displays all ‘linked’ database records in yellow. These records share the same survey control number (ID) that meet the query criterion of nature viewing (NV). As can be seen in the resulting GIS view, Pelican Bay is a prime reported destination for nature viewing.

Reported travel routes within the southern Charlotte Harbor boating region are displayed in Figure 7. Pink lines represent travel routes digitized from returned surveys; red and green dots illustrate departure sites and favorite destinations, respectively. The blue lines depicted in the GIS view represent two travel routes that have been selected for display. The corresponding database records that are ‘linked’ to the two travel routes via the survey control number ID are highlighted blue in the ‘Attributes of Routes’ database window - lower left of Figure 7.

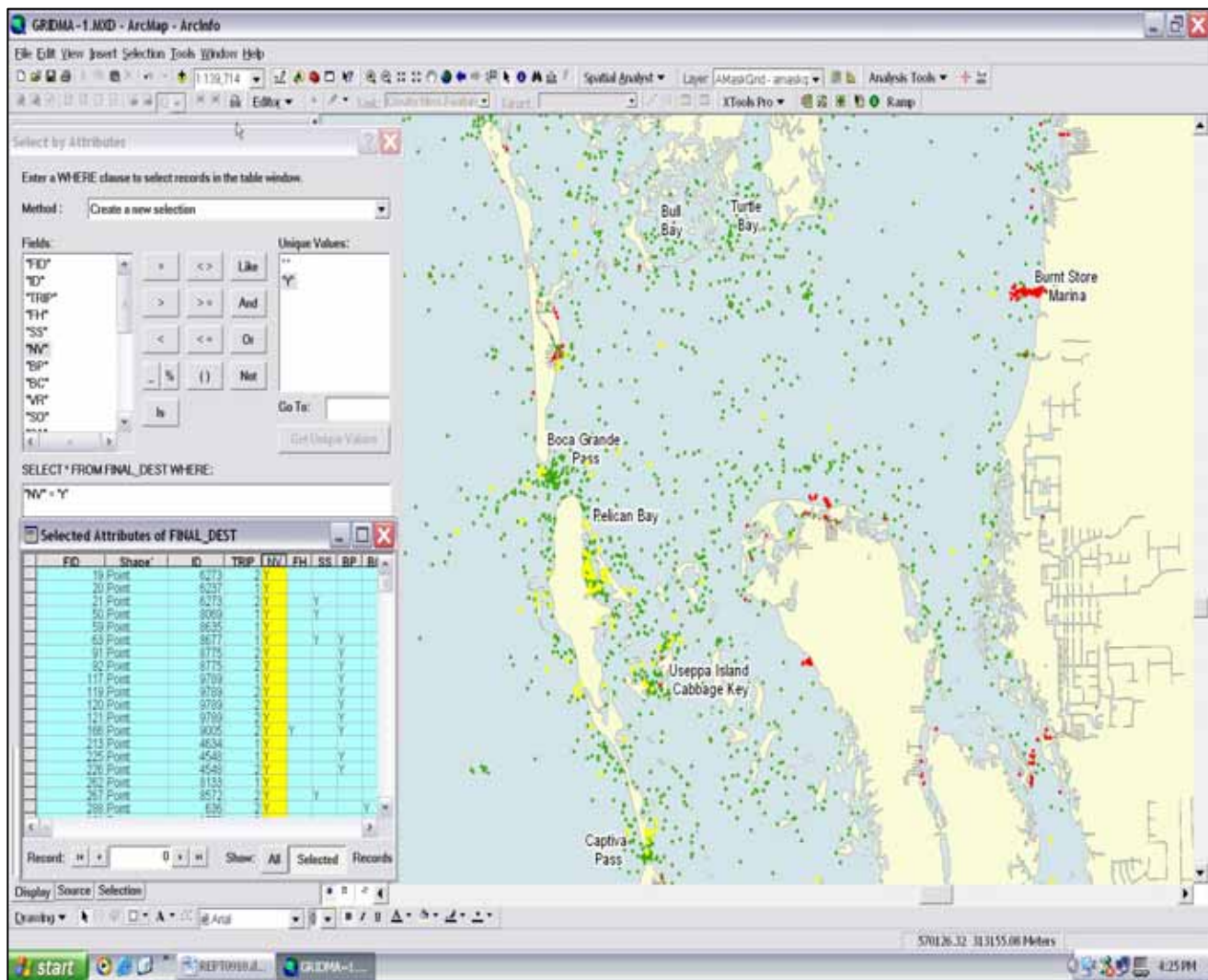


Figure 6. Example of GIS Attribute Query and Display: Nature Viewing Spots.

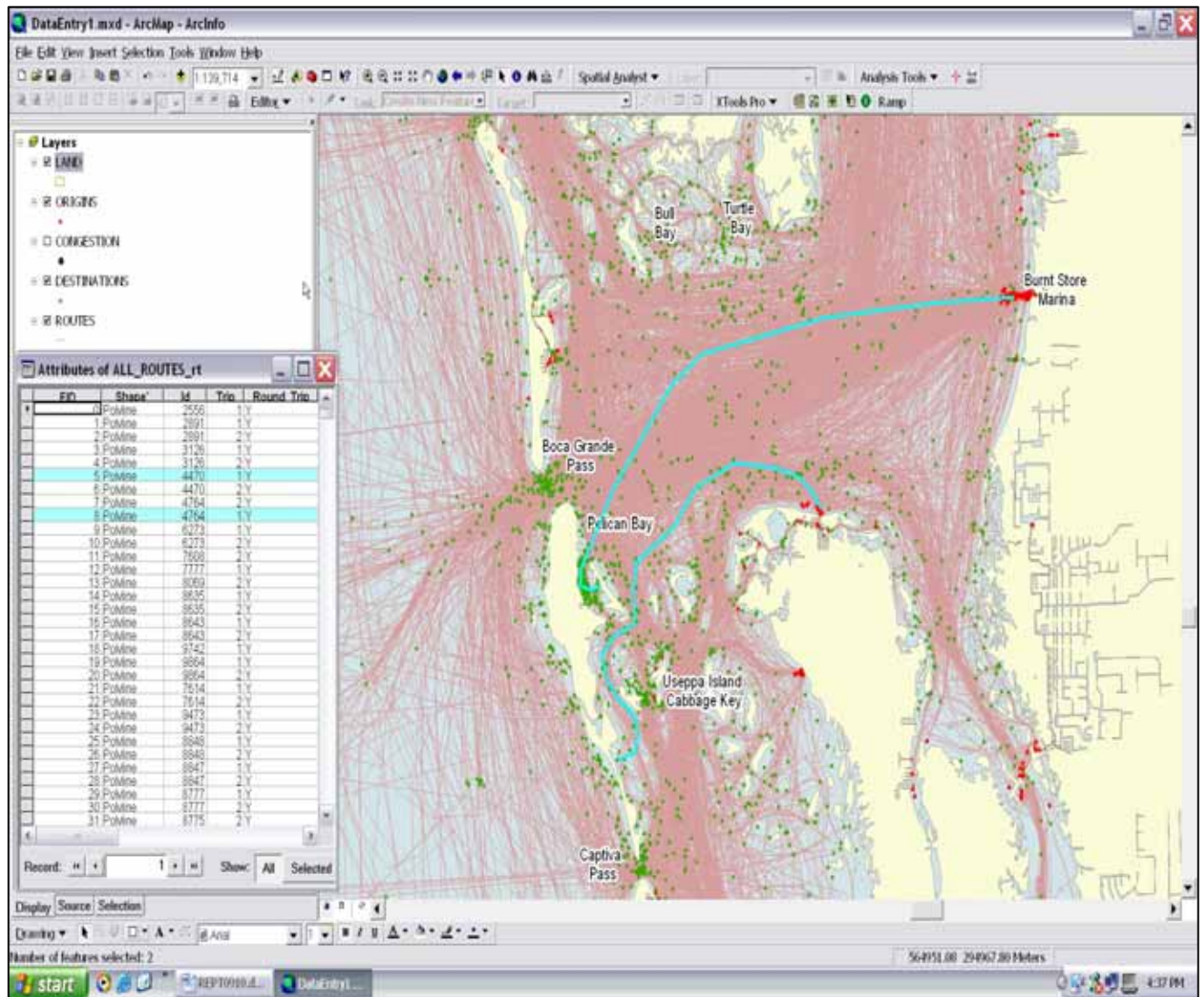


Figure 7. Example of GIS Attribute Query and Display: Reported Travel Routes.

Chapter 4. Mapping Boating Patterns

General Clustering Patterns

This chapter presents the results of a GIS analysis that mapped the distribution or spread of the digitized trip information as ‘density of occurrence.’ Continuous density surfaces generated by the GIS illustrate the degree of concentration or clustering of digitized trip information. General clustering patterns for travel routes, destinations, and congested areas were mapped and described using the following mapping resolution parameters: 200 meter grid cells and a search radius of 805 meters (one-half mile).

Route densities are depicted in Figure 8. The greatest density of vessel traffic is restricted to the Intracoastal Waterway within the lower Caloosahatchee River, San Carlos Bay, and Pine Island Sound. Vessel traffic density is also great between the Burnt Store Marina and Boca Grande Pass. Beyond the barrier islands, the flow of boat traffic is generally dispersed, though evidence of some clustering of routes exists on the Gulf-side near the barrier islands.

Figure 9 displays favorite destinations identifying the locales where respondents most like to visit on a typical recreational boating outing. The density analysis revealed several prime boating destinations: Boca Grande Pass, Pellican Bay, the Useppa Island/Cabbage Key locale, and Captiva Pass. Secondary destination areas include Redfish Pass, Stump Pass, Gasparilla Pass (near Placida), Boca Grande, and Fort Myers Beach. The Fisherman’s Village Marina (near Punta Gorda), Burnt Store Marina, St. James City, Point Ybel, Lover’s Key, and Bull Bay and Turtle Bay areas also represent important boating destinations.

Figure 10 illustrates areas where boaters experience congestion defined in Question 20 as “more boats than you prefer.” The analysis shows that respondents experience the most congestion within segments of the Intracoastal Waterway (e.g., Shell Point, Miserable Mile, Pine Island Sound) and at certain passes (e.g., Boca Grande Pass, Stump Pass, and Gasparilla Pass – near the Placida boat ramp), through which they must navigate en route to open Gulf waters and/or their boating destinations. It should be noted that the prominent passes also represent primary destinations for boaters in the region.



Figure 8. Travel Corridors as Summarized with the GIS.

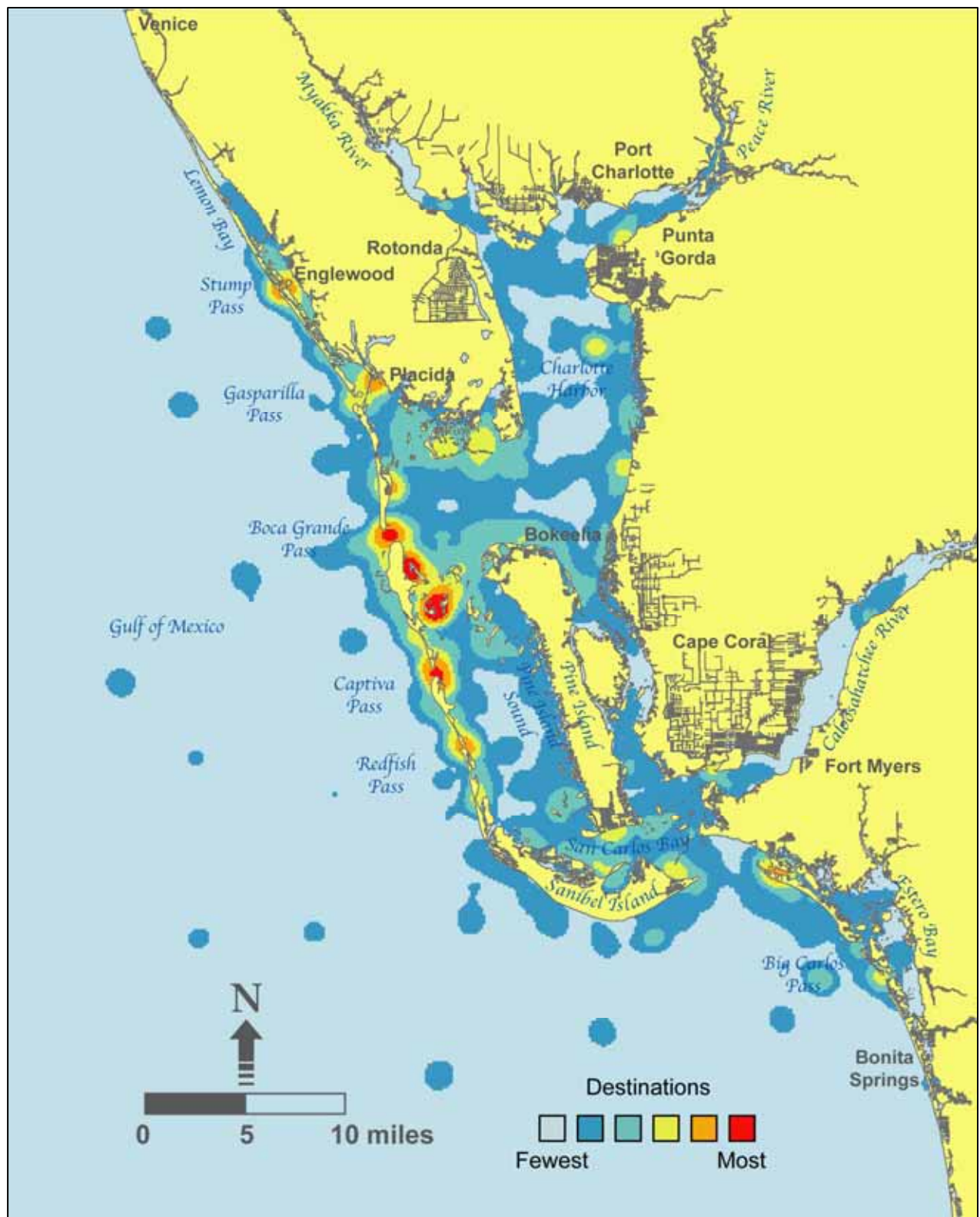


Figure 9. Favorite Destinations as Summarized with the GIS.



Figure 10. Congested Areas as Summarized with the GIS.

Chapter 5. Boater-Group Characteristics

Overview

This chapter presents an evaluation and discussion of responses to specific survey questions. Chapter sections are divided according to themes that describe (1) boater and use profiles; (2) trips and seasonality; (3) choice rationale for selecting departure sites, destinations, and travel routes; (4) activities; and (5) perceived congestion. It should be noted that while questions were arranged to follow a logical progression on the survey instrument the following results and discussion sections are arranged thematically and, therefore, questions do not necessarily follow the order in which they appeared on the survey. The descriptive analysis presented in this chapter is based on information from N=1,437 returned surveys (as of 8/15/05). A copy of the survey instrument is provided in Appendix A.

Boater and Use Profile: Vessel Type, Experience, and Use

- Of the n=1,436 responses to Question 6 (trip 1), 43.6% used boats that fell into the open fisherman category, followed by power cruisers at 19.7%. These two boat types accounted for roughly 63% of all boats used by survey respondents. (Table 5a; Question 6).

Table 5a. Vessel Type for First Trip.

Vessel type	Frequency count	Percentage of total
Jet ski	11	0.76%
Kayak/Row/Canoe	4	0.27%
Sailboat (no cabin)	4	0.27%
Sailboat (with cabin)	130	9.05%
Speed Boat (Runabout)	94	6.54%
Speed Boat (Cigarette)	23	1.60%
Open Fisherman	627	43.66%
Off-shore Fisherman	119	8.28%
Power Cruiser	283	19.70%
Deck Boat	92	6.40%
Pontoon	32	2.22%
Other	17	1.18%
n = 1,436 respondents		

- Of the n=1,408 survey responses to Question 6 (trip 2), 43.5% used boats that fell into the open fisherman category. Power cruisers came in at a distant second-place with 18.96%. (Table 5b; Question 6)

Table 5b. Vessel Type for Second Trip.

Vessel type	Frequency count	Percentage of total
Jet ski	15	1.06%
Kayak/Row/Canoe	5	0.35%
Sailboat (no cabin)	4	0.28%
Sailboat (with cabin)	130	9.23%
Speed Boat (Runabout)	101	7.17%
Speed Boat (Cigarette)	21	1.49%
Open Fisherman	613	43.53%
Off-shore Fisherman	113	8.02%
Power Cruiser	267	18.96%
Deck Boat	90	6.39%
Pontoon	31	2.20%
Other	18	1.27%
n = 1,408 respondents		

- Of the n=1,447 survey respondents, approximately 32% departed from a home dock. Marina dry storage accounted for 24.7% of departures, followed closely by departures from public boat ramps (at 24.5%) and marina wet slips (at 16.3%) - (Table 6; Question 11).

Table 6. Vessel Departure Categories / Departure Sites.

Departure Site	Frequency count	Percentage of total	rank
Boat Ramp	355	24.53%	3
Shore/Causeway	1	< .01%	
Marina Wet Slip	236	16.31%	4
Marina Dry Storage	358	24.74%	2
Home Dock	467	32.27%	1
Condo Dock	21	1.45%	
Other	9	.62%	
n = 1,447 respondents			

- The average number of months per year that respondents reside in Florida is approximately 10.5 based on information gathered from 1,441 of the 1,449 survey respondents (Table 7; Question 21).

Table 7. Average Monthly Residence per year in the State of Florida.

n = 1,441 respondents

Average number of months living in Florida = 10.49 months

Standard Deviation = 3.04 months

95% confidence interval: {10.34 to 10.62 months}

- Survey respondents had, on average, a little over 13.5 years of recreational boating experience in Florida (Table 8; Question 22).

Table 8. Boating Experience in Florida (in years).

Statistic	Years boating
Average	13.59
Standard Deviation	12.72
Minimum	0.25
Maximum	70
Median	9
Mode	5
n = 1,447	

Note: The 95% confidence interval for years boating experience:
{12.9 years < avg. < 14.2 years}.

- Respondents that began their trips from public boat ramps tended to have the greatest amount of boating experience in Florida, as measured in years (with 17.4 years experience, on average). All remaining groups had boating experience that fell well below the mean of 13.59 years. Boaters launching from marinas tended to have a lesser amount of boating experience in Florida in comparison to boaters launching from public access ramps or private docks (Table 9; Question 22).

Table 9. Years of Boating Experience in Florida by Departure Category.

Departure Category	n	(in years)				
		mean	std. dev.	median	min	max
Boat Ramp	355	17.4*	13.7	15	0.50	65
Shore/Causeway**	1	6.0	-	-	-	-
Marina Wet Slip	236	10.6	9.8	7.5	0.50	52
Marina Dry Storage	358	11.8	13.3	6	0.25	70
Home Dock	467	12.2	12.2	10	1	70
Condo Dock	21	12.3	8.1	11	2	27

* Denotes above-average experience-- exceeds the mean (> 13.59yrs)

** Too small of a sample size to evaluate

- Roughly 75% of n=1,432 respondents indicated that they have had a boating safety or seamanship course. Boaters that launched from public ramps tended to be the least likely group to have had a boating safety or seamanship course. Boaters departing from marina wet slips or home docks were more likely to have had a boating safety or seamanship course than those departing from dry storage, public boat ramps or condo docks (Table 10; Question 23).

Table 10. Boaters Having Completed a Boat Safety/Seamanship Course by Departure Category.

Departure Category	n	Yes	percentage	Above Average?
Boat Ramp	354	221	62.4	No
Shoreline/Causeway	1*	1	-	na
Marina Wet Slip	236	202	85.6	Yes
Marina Dry-Storage	357	255	71.4	No
Home Dock	464	380	81.9	Yes
Condo Dock	21	14	66.6	No
Overall	1,432	1,072	74.8 (average)	

* Too small of a sample size to evaluate

- Survey respondents were, on average, 58 years of age (Table 11; Question 24).
- Respondents that departed from marinas and private docks were slightly older than the average survey respondent (Table 11; Question 24).
- Public boat ramp users tended to be markedly younger than respondents associated with other departure categories (Table 11; Question 24).

Table 11. Age of Boaters by Departure Category.

Departure Category	n	(in years)				
		Average	Std. Dev.	Median	Min	Max
Boat Ramp	354	50.0	12.3	51	18	88
Shoreline/Causeway	1	51.0	na	na	na	na
Marina Wet-Slip	235	61.9*	10.2	63	33	89
Marina Dry Storage	356	60.1*	10.3	61	30	87
Home Dock	464	61.5*	10.6	62	20	89
Condo Dock	20	59.2*	12.5	63.5	33	74
Overall	1,441	58.4	11.9	60	16	89

* Denotes above-average value

- Willingness to participate in a future Internet survey was highest for boaters that departed from marina dry storage facilities. All other departure groups fell below the average willingness to participate figure of 66.9%. Respondents that launched from public boat ramps had the lowest willingness to participate percentage with 63.4%. Nevertheless, willingness to participate in a future Internet-based survey was approximately 63% or higher for all departure groups (Table 12a; Question 25a).

Table 12a. Boater Willingness to Participate in a Future Internet Survey.

Departure Category	n	yes	percentage	above avg.?
Boat Ramp	238	151	63.4%	No
Shoreline/Causeway	1	1	-	na
Marina Wet Slip	161	104	64.5%	No
Marina Dry Storage	268	204	76.1%	Yes
Home Dock	337	215	63.7%	No
Condo Dock	14	9	64.2%	No
Overall	n = 1,028	688	66.9% (average)	

- Willingness to participate in a future mail survey was highest for boaters that launched from public boat ramps, followed by marina dry storage facilities (90.9% and 89.0%, respectively). All other departure groups fell below the average willingness to participate figure of 87.8%. Respondents that departed from condo docks had the lowest willingness to participate percentage with 72.2%. Nevertheless, willingness to participate in a future mail survey was very high across the board with an average for all departure groups of almost 88% -- a figure that is significantly higher than the percentage of respondents that were willing to participate in the Internet-based survey (Table 12b; Question 25b).

Table 12b. Boater Willingness to Participate in a Future Mail Survey.

Departure Category	n	yes	percentage	above avg.?
Boat Ramp	319	290	90.9%	Yes
Shoreline/Causeway	1	1	-	na
Marina Wet Slip	202	177	87.6%	No
Marina Dry Storage	282	251	89.0%	Yes
Home Dock	390	335	85.8%	No
Condo Dock	18	13	72.2%	No
Overall	n = 1,222	1,074	87.8% (average)	

- Survey respondents that departed from marinas traveled, on average, 33 minutes from home to the marina from where their trips started (Table 13; Question 13).

Table 13. Drive Time from Home to Marina (in minutes).

Statistic	Drive Time (min.)
Average	33.22
Standard. Deviation	55.11
95% confidence interval	{29.3 to 37.1 min.}
Median	15
n = 771 respondents	

- Survey respondents launching from public ramps or shorelines (including marina ramps) tended to launch approximately 29 times per year from their “first-choice” launch site (Table 14a; Question 14).

Table 14a. Number of Times Per Year that First-choice Ramp/Shoreline is Used to Launch a Boat.

Statistic	number of times/year
Average	29.15
Standard. Deviation	31.9
95% confidence interval	{26.0 to 32.2}
Minimum	1
Maximum	270
Median	20
n = 408 respondents	

- Survey respondents launching from ramps or shorelines (including marina ramps) tended to launch approximately 13 times per year from their “second-choice” launch site (Table 14b; Question 14).

Table 14b. Number of Times Per Year that Second-choice Ramp/Shoreline is Used to Launch a Boat.

Statistic	number of times/year
Average	13.33
Standard. Deviation	18.5
95% confidence interval	{11.2 to 15.4}
Minimum	0
Maximum	200
Median	10
n = 298 respondents	

- The average drive time to boaters first-choice launch location/ramp is approximately 42 minutes based on 432 responses to Question 15, as a follow-up to Question 14 (Table 15a; Question 15).

Table 15a. Drive Time to First-choice Launch Location (in minutes).

Statistic	Drive time (min.)
Average	42.17
Standard. Deviation	55.9
95% confidence interval	{36.8 to 47.5}
Minimum	0
Maximum	480
Median	20
n = 432 respondents	

- The average drive time to boaters second-choice launch location/ramp is approximately 43 minutes based on 329 respondents to Question 15, as a follow-up to Question 14 (Table 15b; Question 15).

Table 15b. Drive Time to Second-choice Launch Location (in minutes).

Statistic	Drive time (min.)
Average	42.94
Standard. Deviation	49.3
95% confidence interval	{37.6 to 48.2}
Minimum	0
Maximum	390
Median	30
n = 329 respondents	

- The average AM start time for the first trip was highly sensitive to departure category, with boaters that depart from public boat ramps launching earliest during the morning hours - at approximately 7:10AM, on average. Boaters departing from home docks were the next earliest to begin their trips (at approximately 8:03AM, on average), followed by boaters departing from marina dry storage facilities (at 8:08AM, on average). (Table 16a; Question 2, AM and PM)

Table 16a. Average Departure Time by Departure Category (first trip).

Departure Category	n	Average value				overall time AM
		AM hour	AM time	PM hour	PM time	
Boat Ramp	345	7.17	7:10*	1.45	1:27	8:37
Shoreline/Causeway	1	9.00	9:00	-	-	-
Marina Wet Storage	233	8.67	8:40	0.95	12:57	9:37
Marina Dry Storage	348	8.13	8:08	2.09	2:05	10:14
Home Dock	452	8.05	8:03	1.84	1:50	9:53
Condo Dock	21	8.23	8:14	1.42	1:25	9:40
All groups	1,411	7.95	7:57	1.67	1:40	9:37

* Denotes a departure time that is well below the average

- The average AM start time for the second trip was also highly sensitive to departure category, with boaters that departed from boat ramps (as observed for the first trip), launching earliest during the morning hours -- at approximately 7:03AM, on average; followed by boaters departing from home docks (at 7:31AM, on average). (Table 16b; Question 2, AM and PM)

Table 16b. Average Departure Time by Departure Category (second trip).

Departure Category	n	Average Value				overall time AM
		AM hour	AM time	PM hour	PM time	
Boat Ramp	334	7.05	7:03*	1.90	1:54	8:57
Shoreline/Causeway	1	9.00	9:00	-	-	-
Marina Wet Storage	228	8.04	8:02	2.24	2:14	10:17
Marina Dry Storage	337	7.93	7:59	2.23	2:14	10:10
Home Dock	443	7.52	7:31*	2.84	2:50	10:22
Condo Dock	21	8.34	8:20	1.40	1:24	9:45
All groups	1,374	7.59	7:35	2.36	2:22	9:57

* Denotes a departure time that is well below the average

- Boaters launching from a public ramp tended to spend more time on the water than those departing from other locations for trips of 24 hours or less in duration (based on survey responses for the first trip). Boaters that departed from public boat ramps and private condo docks were above average in terms of the number of on-water travel hours for the first trip, with 6.9 and 5.5 hours, respectively (Table 17a; Question 3).

Table 17a. Trip Duration: On-Water Travel Time by Group (first trip – day trippers)
(Trip duration $\leq$ 24 hours).

Departure Category	n	(in hours)		
		mean	95% C.I.	median
Boat Ramp	311	6.9*	{6.5 to 7.2}	6
Shoreline/Causeway	0	-	-	-
Marina Wet Slip	143	4.8	{4.3 to 5.3}	4
Marina Dry Storage	323	4.5	{4.2 to 4.8}	5
Home Dock	372	5.2	{4.9 to 5.4}	5
Condo Dock	18	5.5*	{4.1 to 6.9}	5.5
Overall	n = 1,178	5.4	{5.2 to 5.6}	5

* Denotes above-average on-water travel time/trip duration

- Boaters launching from a public ramp tended to spend more time on the water than those departing from other locations, for trips of 24 hours or less in duration (based on survey responses for the second trip); with 6.4 hours per trip, on average. Boaters that departed from public boat ramps and private condo docks were, once again, above average in terms of the number of on-water travel hours for the second trip, with the remaining categories showing less than average on-water trip durations (Table 17b; Question 3).

Table 17b. Trip Duration: On Water Travel Time by Group (second trip – day trippers)
(Trip duration $\leq$ 24 hours).

Departure Category	n	(in hours)		
		mean	95% C.I.	median
Boat Ramp	302	6.4*	{6.1 to 6.8}	6
Shoreline/Causeway	0	-	-	-
Marina Wet Slip	151	4.6	{4.2 to 5.0}	4
Marina Dry Storage	317	4.6	{4.3 to 4.9}	4
Home Dock	374	5.1	{4.7 to 5.4}	5
Condo Dock	17	5.3*	{3.8 to 6.8}	5
Overall	n = 1,171	5.2	{5.0 to 5.4}	5

* Denotes above-average on-water travel time/trip duration

- Boaters departing from marina wet slips tended to spend more time on the water than those departing from other locations, for trips of greater than 24 hours in duration (based on survey responses for the first trip); with trips that averaged approximately 128 hours (5.3 days) in duration (Table 17c; Question 3).

Table 17c. Trip Duration: On-Water Travel Time by Group (first trip - overnights)
(Trip duration > 24 hours).

Departure Category	n	(in hours)		
		mean	95% C.I.	median
Boat Ramp	41	43.7	{35.5 to 51.8}	33
Shoreline/Causeway	1	48.0	-	-
Marina Wet Slip	89	127.9*	{86.3 to 169.6}	72
Marina Dry Storage	32	65.1	{36.0 to 94.2}	48
Home Dock	89	93.4	{62.2 to 124.7}	72
Condo Dock	3	60.0	{34.1 to 85.8}	54
Overall	n = 255	93.4	{74.7 to 112.0}	60

* Denotes above-average on-water travel time/trip duration

- Boaters departing from marina wet slips tended to spend more time on the water than those departing from other types of facilities, for trips of greater than 24 hours in duration (based on survey responses for the second trip); with trips averaging approximately 127 and 274 hours (5.3 and 11.4 days) in duration, respectively (Table 17d; Question 3). [Note: the results for boaters departing from condo docks are suspect due to small sample size; and the estimated value for the mean may be somewhat overstated.]

Table 17d. Trip Duration: On-Water Travel Time by Group (second trip - overnights)
(Trip duration > 24 hours).

Departure Category	n	(in hours)		
		mean	95% C.I.	median
Boat Ramp	39	42.0	{35.0 to 49.0}	32
Shoreline/Causeway	1	48.0	-	-
Marina Wet Slip	78	127.3*	{83.5 to 171.0}	72
Marina Dry Storage	28	50.7	{39.2 to 62.3}	42
Home Dock	73	110.5*	{70.9 to 150.1}	48
Condo Dock**	4	274.2*	{-305.3 to 853.9}	127
Overall	n = 223	99.9	{78.7 to 121.1}	48

* Denotes above-average on-water travel time/trip duration;

** Results based on small sample size (note wide confidence interval)

- Responses suggest a year-round boating season in the study region, with a peak-use period running roughly from March through June and an off-peak period from December through January. The peak use month is April with 5.34 trips per boater, on average (Table 18a; Question 8).

Table 18a. Boat Trips: Monthly Averages and Trip Count Statistics.

<i>Month</i>	<i>n</i>	<i>Monthly average</i>	<i>Top-4 rank</i>	<i>trips</i>	<i>% of Total</i>
January	1,319	3.83		5,064	7.4
February	1,319	4.21		5,558	8.1
March**	1,319	5.02*	3	6,615	9.6
April**	1,319	5.34*	1	7,053	10.2
May**	1,319	5.11*	2	6,743	9.8
June**	1,319	4.66*	4	6,142	8.9
July	1,319	4.22		5,578	8.1
August	1,319	3.90		5,145	7.5
September	1,319	3.85		5,084	7.3
October	1,319	4.21		5,555	8.1
November	1,319	4.22		5,576	8.1
December	1,319	3.58		4,734	6.9

Total = 68,847 trips

Overall Monthly Average = 4.35 trips per boater per month

* Denotes months in which average number of trips exceed the overall monthly average of 3.57 trips/boater/month.

** Denotes peak months (top-4 ranked values, from monthly averages); shown in descending order from high to low.

- Condo dock users generated the greatest number of trips (on average) during the “peak” boating season, with 24.2 trips per boater. Private dock users and boaters departing from marina wet slips tended to generate an above average number of trips during the peak boating season, whereas boaters that depart from public ramps and marina dry storage facilities generated a less than average number of boat trips during the same period (Table 18b; Question 8).

Table 18b. Boat Trips During “Peak” Season by Departure Category.

Departure Category	n	total	Trips/boater (March – June)		
			average	median	rank*
Ramp	332	6,555	19.7	16	4
Marina Wet Slip	216	4,521	20.9**	12	2
Marina Dry Storage	311	6,343	19.1	16	5
Home Dock	410	8,463	20.6**	16	3
Condo Dock	19	460	24.2**	23	1
Overall	n = 1319	26,553	20.1	16	

* Based on average values; ** Denotes at or above the average value of 20.1

- Boaters departing from private docks and marina wet slips generated the greatest number of average boat trips (exceeding the average of 52.2 trips per year. Note that condo dock users generated the greatest number of trips over the course of a year (with an average of 56.9 boat trips per year), followed by boaters departing from home docks and marina wet slips (with 54.8 and 53.8 boat trips per year, respectively). Boaters departing from marina dry storage facilities tended to generate the fewest number of trips with approximately 49.4 trips per year (Table 18c; Question 8).
- The average respondent reported taking about 52 boating trips per year. (Table 18c; Question 8).

Table 18c. Boat Trip Statistics for Year by Departure Category.

Departure Category	n	total	Trips/Boater (Year)		
			average	median	rank*
Ramp	332	16,681	50.2	39	4
Marina Wet Slip	216	11,634	53.8**	40	3
Marina Dry Storage	311	16,358	49.4	43	5
Home Dock	410	22,494	54.8**	43	2
Condo Dock	19	1,081	56.9**	45	1
Overall	n = 1,319	68,847	52.2	41	

* Based on average values; ** Denotes at or above the average value of 52.2

Rationale for Selecting Departure Sites and Travel Routes

This section characterizes the choice rationale for selecting departure sites (i.e., marina, public ramp), and travel routes.

- Based on the ranked average response, survey respondents preferred departure sites that (a) had adequate and safe parking; (b) were proximate to their favorite boating spots/destinations; (c) were close/proximate to their home; and (d) where boat launch and retrieval was easy (Table 19a; Question 16 criteria 1-14).

Table 19. Reasons for Selecting a Favorite Departure/Launch Site.

Reason/Description	Count (n)	Response*	
		average	rank**
1 Deep-water access	951	2.22	8
2 Availability of restrooms	923	2.57	10.5
3 No parking / launch fee	871	2.57	10.5
4 Well-marked access channels	953	1.95	6
5 Proximity to favorite boating spots	943	1.82	3
6 Adequate parking	938	1.73	1
7 Availability of fishing supplies	910	2.86	13
8 Short wait to launch	859	2.20	7
9 Gas, pump-out, maintenance service	947	2.48	9
10 Nearby amenities (e.g. restaurants)	915	2.79	12
11 Proximity to home	967	1.92	5
12 Ease of launching/retrieving boat	876	1.88	4
13 Safe and secure parking	939	1.77	2
14 Other reason: mixed/comments	102	1.76	-
(n = 1, 449 respondents)			

* Average response based on Key below;

** Ranking: from “most important” to “least important” (reasons 1-13 only)

Key:

1 – strongly agree (very important)

2 – agree (important)

3 – neutral

4 – disagree (somewhat unimportant)

5 – strongly disagree (very unimportant)

- Top reasons for selecting a favorite travel route included (a) to enjoy scenic beauty (top ranked response); (b) avoid congested areas; and (c) preference for well-marked channels. Respondents also indicated a preference for areas with calm protected waters and to avoid shallow water. (Table 20a; Question 9 criteria 1-11)

Table 20. Reasons for Selecting a Favorite Travel Route.

Reason/Description	Count (n)	Response*	
		average	rank**
1 Avoid congested areas	1,403	1.69	2
2 Avoid shallow water	1,399	2.22	4.5
3 Good fishing	1,330	2.32	7
4 Prefer well-marked channels	1,388	1.89	3
5 Prefer calm protected waters	1,403	2.22	4.5
6 Avoid speed	1,385	2.58	8
7 None are important – just cruise around	1,266	3.55	10
8 Easy access to supplies or fuel	1,355	2.84	9
9 Quick access to favorite boating spots	1,362	2.23	6
10 Enjoy scenic beauty	1,386	1.53	1
11 Other reason	189	1.74	-

(based on n = 1, 449 respondents)

* Average response based on Key below;

** Ranking: from “most important” to “least important” (reasons 1-13 only)

Key:

1 – strongly agree (very important)

2 – agree (important)

3 – neutral

4 – disagree (somewhat unimportant)

5 – strongly disagree (very unimportant)

Boater Activity Profile

A description of the recreational boating activities reported by respondents is presented in this section. The results are based on answers to Question 18 and reflect a ranking of chosen activities. Respondents were asked to choose, from the activity list, **all** of the activities in which they engage on a typical pleasure boating trip. ‘Count’ is, therefore, equal to the total number of times a given activity was chosen. [Note: Since many respondents selected multiple activities from the list percentages will sum to more than 100%.] The top-five activities (by rank) are highlighted in each table.

- Fishing ranked as the leading activity with approximately two-thirds (66.8%) of survey respondents indicating that they engaged in this activity during a typical boating trip. Cruising was the second-most selected activity with a percentage of 58.6%, followed by restaurant visitation (52.1% of respondents), nature viewing (50.1% of respondents), and sightseeing (45.2% of respondents). Note that socializing and beach picnicking were identified as typical trip activities by well over one-third of the boaters participating in the survey (Table 21; Question 18).

Table 21. Boaters’ Activity Statistics (entire sample).

Activity	Count	n	Percentage of Respondents	rank
Beach Picnicking	481	1,449	33.2%	
Nature Viewing	726	1,449	50.1%	4
Sightseeing	655	1,449	45.2%	5
Cruising	849	1,448*	58.6%	2
Daytime Anchoring	349	1,449	24.0%	
Socializing	553	1,449	38.1%	
Diving	122	1,449	8.4%	
Overnight Anchoring	249	1,449	17.1%	
Visit Restaurants	755	1,449	52.1%	3
Fishing	969	1,449	66.8%	1
Sailing	146	1,449	10.0%	
Swimming	411	1,449	28.3%	
Skiing/Water-sports	100	1,449	6.9%	
Other	57	1,448*	6.8%	

* Note: 1 non-response from sample of n=1,449 respondents

- Fishing ranked as the leading activity among respondents that launched from public boat ramps, with slightly over 90% of respondents acknowledging that they engaged in this activity. Nature viewing, beach picnicking, cruising, and sightseeing rounded out the top-five activities (with percentages ranging from 30.1% to 37.7% of respondents surveyed). Sailing, overnight anchoring, and diving ranked lowest on the list, each with less than 10% of public ramp users indicating that they engage in these activities (Table 22a; Question 18).

Table 22a. Boaters' Activity Statistics: Boat Ramp Group.

Activity	Count	Percentage of Respondents	rank
Beach Picnicking	119	33.5%	3
Nature Viewing	134	37.7%	2
Sightseeing	107	30.1%	5
Cruising	116*	32.6%	4
Daytime Anchoring	48	13.5%	
Socializing	78	21.9%	
Diving	35	9.8%	
Overnight Anchoring	17	4.7%	
Visit Restaurants	104	29.2%	
Fishing	321	90.4%	1
Sailing	9	2.5%	
Swimming	100	28.1%	
Skiing/Water-sports	38	10.7%	
Other	13	3.6%	

Results based on n = 335 respondents; * based on 334 respondents

- Cruising was the number-one activity for boaters that departed from marina wet slips (with 76.6% of respondents indicating that they engage in this activity), followed by nature viewing and visiting restaurants (with 52.9% and 51.6% of respondents). Overnight anchoring and sightseeing came in fourth and fifth place; accounting for 47.8% and 44.9% of respondents in this category, respectively. Socializing was sixth on the list with 42.7%, followed closely by fishing, daytime anchoring and sailing (each with around 35%). Note that less than 10% of respondents departing from marina wet slips indicated that they engage in diving and skiing/water-sports. (Table 22b; Question 18).

Table 22b. Boaters' Activity Statistics: Marina Wet Slip Group.

Activity	Count	Percentage of Respondents	rank
Beach Picnicking	59	25.0%	
Nature Viewing	125	52.9%	2
Sightseeing	106	44.9%	5
Cruising	181	76.6%	1
Daytime Anchoring	83	35.1%	
Socializing	101	42.7%	
Diving	16	6.7%	
Overnight Anchoring	113	47.8%	4
Visit Restaurants	122	51.6%	3
Fishing	87	36.8%	
Sailing	83	35.1%	
Swimming	65	27.5%	
Skiing/Water-sports	4	1.6%	
Other	7	2.9%	

Results based on n = 236 respondents

- Fishing was the top-ranked activity among respondents that departed from marina dry storage facilities, with a 70.6% response rate, followed by restaurant visitation (65.6% response rate), cruising (63.4%), nature viewing (57.2%) and sightseeing (54.4%). Socializing and beach picnicking deserve honorable mention, as they are activities that were identified by over one-third of the survey respondents. Less than 10% of survey respondents departing from marina dry storage facilities identified sailing, skiing/water-sports, diving, and overnight anchoring as typical activities (Table 22c; Question 18).

Table 22c. Boaters' Activity Statistics: Marina Dry Storage Group.

Activity	Count	Percentage of Respondents	rank
Beach Picnicking	135	37.7%	
Nature Viewing	205	57.2%	4
Sightseeing	195	54.4%	5
Cruising	227	63.4%	3
Daytime Anchoring	90	25.1%	
Socializing	141	39.3%	
Diving	24	6.7%	
Overnight Anchoring	26	7.2%	
Visit Restaurants	235	65.6%	2
Fishing	253	70.6%	1
Sailing	5	1.3%	
Swimming	107	29.8%	
Skiing/Water-sports	19	5.3%	
Other	19	5.3%	

Results based on n = 358 respondents

- Cruising and fishing ranked as the top-two activities of respondents departing from home docks, with over 60% of the respondents acknowledging that they engage in these activities in response to Question 18 of the survey. Other activities in which this group identified as prominent included restaurant visitation (at 58.6% response rate), nature viewing, and sightseeing (both at around the 50% mark). Deserving honorable mention were socializing (at 47.5%) and beach picnicking (at 33.4%). The least-likely activities for respondents departing from home docks included diving and skiing/water-sports; each accounting for less than 10% of the activities identified (Table 22d; Question 18).

Table 22d. Boaters' Activity Statistics: Home Dock Group.

Activity	Count	Percentage of Respondents	rank
Beach Picnicking	156	33.4%	
Nature Viewing	244	52.2%	4
Sightseeing	233	49.8%	5
Cruising	305	65.3%	1
Daytime Anchoring	121	25.9%	
Socializing	222	47.5%	
Diving	44	9.4%	
Overnight Anchoring	90	19.2%	
Visit Restaurants	274	58.6%	3
Fishing	287	61.4%	2
Sailing	47	10.0%	
Swimming	129	27.6%	
Skiing/Water-sports	38	8.1%	
Other	16*	3.4%	

Results based on n = 467 respondents; * based on 466 respondents

- Fishing was the leading activity reported by respondents that departed from condo docks, with two-thirds identifying this activity in the survey. Other activities that were shown to be prominent included restaurant visitation (ranked 2nd), nature viewing and cruising (tied at ranks 3 and 4 – yielding a final rank of 3.5), and beach picnicking (5th place in the activity rankings). Least-likely activities for this group included sailing, skiing/water-sports, and diving; each accounting for less than 5% of the activities (Table 22e; Question 18).

Table 22e. Boaters’ Activity Statistics: Condo Dock Group.

Activity	Count	Percentage of Respondents	rank
Beach Picnicking	9	42.8%	5
Nature Viewing	11	52.3%	3.5
Sightseeing	8	38.0%	
Cruising	11	52.3%	3.5
Daytime Anchoring	4	19.0%	
Socializing	7	33.3%	
Diving	1	4.7%	
Overnight Anchoring	2	9.5%	
Visit Restaurants	12	57.1%	2
Fishing	14	66.6%	1
Sailing	0	0.0%	
Swimming	7	33.3%	
Skiing/Water-sports	0	0.0%	
Other	0	0.0%	

Results based on n = 21 respondents (small sample)

Perceived Congestion

The summary of perceived congestion is based on responses to Questions 19 and 20 of the survey questionnaire. Congestion was defined in the questionnaire as the presence of “too many boaters.”

- Approximately 40% of the boaters that participated in the survey answered, “yes” to Question 19, indicating that they had avoided or left congested areas while boating. The condo dock and public boat ramp user categories had the highest percentage of perceived congestion with 60% and 52%, respectively (Table 23a; Questions 19 = yes).

Table 23a. Analysis of Congestion: Proportion of Boaters that Indicated They Had Avoided or Left Their Favorite Spots/Destinations Due to Congestion.

Group/Category	n	Answered “Yes” to Q19	percentage	rank
Boat Ramp	343	180	52.4%	2
Marina Wet Slip	230	67	29.1%	5
Marina Dry Storage	348	147	42.2%	3
Home Dock	446	146	32.7%	4
Condo Dock	20	12	60.0%	1
Overall*	1,397	554	39.6%	

* Includes “other” category (n=10 additional responses)

- Approximately 32% of the boaters that participated in the survey answered “yes” to Questions 19 and 20. In other words, roughly one-third of the survey respondents both identified congested areas on the map and indicated that they had avoided or left congested areas while out on the water. The condo dock and public boat ramp user categories had the highest percentage of perceived congestion with 45% and 44%, respectively. (Table 23b; Questions 19 and 20 = yes).

Table 23b. Analysis of Congestion: Proportion of Boaters that Both Identified Congested Areas on Map and Indicated that They Had Avoided or Left Their Favorite Spots/Destinations Due to Congestion.

Group/Category	n	Answered “Yes” to both Q19 <u>and</u> Q20	percentage	rank
Boat Ramp	343	151	44.0%	2
Marina Wet Slip	230	55	22.9%	5
Marina Dry Storage	348	113	32.4%	3
Home Dock	446	112	25.1%	4
Condo Dock	20	9	45.0%	1
Overall*	1,397	441	31.5%	

* Includes “other” category (n=10 additional responses)

Chapter 6. Perceived Detractors and Needs

Overview

This chapter summarizes the responses to the following survey questions:

Question 26. “What detracts most from your boating experience?”

Question 27. “What is needed most to improve your boating experience?”

A typology of principal detractors (problems) and of principal needs (solutions to problems) was developed through a content analysis of the responses to each of these questions. Responses with similar themes were grouped into primary categories, with more focused sub-categories identified where possible. The content analysis was based on information from N = 1,437 returned surveys (as of 9/1/2005). Note: Some responses were excluded from this analysis (e.g., personal responses to question 26 such as “lack of time” or to question 27 such as “a new boat”); some respondents cited multiple detractors and needs. Total responses, therefore, refers to total analyzed responses.

Detractors

Table 24 lists the primary categories of detractors to the boating experience of survey responders. **Lack of courtesy and/or seamanship** in other boaters (i.e., failure to observe safe, considerate, or regulated boating practices through disregard or ignorance) encompassed by far the most cited negatives, accounting for 43.1% of the N = 1,519 total responses to Question 26. Respondents cited **excessive regulation**, chiefly speed controls, as the second-leading detractor category, with 17.2% of the total responses. **Congestion** and **altered environment** perceptions ranked third and fourth respectively, together encompassing 23% of the total responses. **Lack of access** considerations (8.1% of the total) completed the top-5 ranking of detractors, with **infrastructure** deficiencies accounting for a comparable 6.1%. Less than 2% of the total indicated either that **too little regulation** was a principal detractor or that **no detractors** were perceived. Note: “**No detractors**” was specifically stated, not inferred from a lack of response.

Table 24. Boating Detractors by Primary Category.

Primary Detractor Category	Response Number	Percent of Total	Rank
Lack of Courtesy and/or Seamanship	654	43.1	1
Excessive Regulation	261	17.2	2
Congestion	186	12.2	3
Altered Environment	163	10.7	4
Lack of Water Access	123	8.1	5
Deficient Infrastructure	92	6.1	
Lack of Regulation / Enforcement	22	1.4	
No Detractors	18	1.2	
TOTALS	1,519	100.0	

The summated total ‘response number’ does not equal the number of surveys returned because many survey respondents either chose not to answer this question or, more often, identified multiple detractors in response to this question.

Lack of Courtesy and/or Seamanship in other boaters was the leading detractor category and encompassed all perceptions of bad boating behavior, whether applied to bad boaters in general or to specific operator groups. These sub-categories are itemized in Table 25. Responses ranged from reckless or inconsiderate practices (e.g., speeding too near other vessels or anchoring in a navigation channel) to inexperience (e.g., rentals) to noncompliance with established laws and precedents (e.g., ignoring no wake zones or right-of-way). “**Bad boaters in general**” make up more than half of the responses in this category and is the leading sub-category when all detractor types are considered, with 22.4% of the total response number. Unsafe operators of **PWCs** (13.8% of category), **speeding powerboats** (12.8% of category), and large boats with **large wakes** (11.9% of category) were cited independently in significant numbers. **Ramp user** lack of courtesy and/or ability comprises 3.2% of this detractor category. Nine responses targeted inconsiderate **charter fishing boat operators** as a factor, (1.4% of category), and similar numbers were generated by aspects of **noise** and **alcohol use**.

Table 25. Lack of Courtesy and/or Seamanship Detractors by Sub-Category.

Primary Detractor / Sub-Category	Response Number	Percent of Category	Overall* Percentage
Lack of Courtesy and/or Seamanship	654	100.	43.1
Boaters in General	341	52.1	22.4
PWCs	90	13.8	5.9
Speeding Power Boats	84	12.8	5.5
Large Boat Wakes	78	11.9	5.1
Ramp Users	21	3.2	1.4
Rentals	12	1.8	0.8
Drinking Boaters	12	1.8	0.8
Charter Fishing Boats	9	1.4	0.6
Noisy Power Boats	7	1.1	0.5

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

Issues pertinent to perceived **excessive regulation** make up the second leading detractor designation (Table 26). **Manatee zones**, **speed zones**, and **no wake zones**, all sub-categories having to do with boat speed regulation, together comprise over 90% of this category. Manatee zones were implicated as a primary detractor in 114 responses (7.5% of overall total, or 3rd highest response). Of these, 14% (N = 16) addressed more limited “inappropriate” aspects, such as year round enforcement or certain locations (e.g., Redfish Pass or Lemon Bay). Similarly, some specific locations were associated with speed zone detractions (Estero Bay and Caloosahatchee River) and with perceived excessive no wake zones (e.g., to and from Little Gasparilla Island). Ten responders implicated the speed-limiting zones in causing waterway congestion and an unsafe proximity of large and small vessels. Too frequent stopping or boarding by law enforcement agency **patrols** accounted for 4.2% of this response category, a small 0.7% overall. Lastly, general boating and fishing regulations comprise 0.8% of category responses.

Table 26. Excessive Regulation Detractors by Sub-Category.

Primary Detractor/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Excessive Regulation	261	100.	17.2
Manatee Zones	114	43.7	7.5
Speed Zones	93	35.6	6.1
No Wake Zones	35	13.4	2.3
Patrol Harassment	11	4.2	0.7
Boating Regulations	6	2.3	0.4
Fishing Regulations	2	0.8	0.1

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

“Too many boaters” accounted for 12.2% of all responses to Question 26. Site-specific and time-specific aspects of **congestion** make up sub-categories in Table 27, based on responses. **Waterway** congestion predominated with 70% of the category responses (8.6% overall and the 2nd leading sub-category), with another almost 20% citing **ramp** congestion. **Weekend and holiday** boat traffic was targeted by 19 responses (10.2% of category).

Table 27. Congestion Detractors by Sub-Category.

Primary Detractor / Sub-Category	Response Number	Percent of Category	Overall* Percentage
Congestion	186	100.	12.2
Waterways	131	70.4	8.6
Ramps	36	19.4	2.4
Weekends and Holidays	19	10.2	1.3

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

Table 28. Altered Environment Detractors by Sub-Category.

Primary Detractor/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Altered Environment	163	100.0	10.7
Shoaling	67	41.1	4.4
Red Tide	38	23.3	2.5
Water Trash / Pollution	23	14.1	1.5
Lack of Fish	16	9.8	1.1
Grass Flats Destruction	13	8.0	0.9
Shore Development	6	3.7	0.4

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

Environmental detractors, with sub-categories enumerated in Table 28 above, comprise the fourth largest primary category, with just over 10% of the total responses. (“Bad weather” detractors, though considerable (N = 178), were not factored into the analysis, not being amenable to intervention.) **Shoaling**, or shallow water, was the leading detractor sub-category (41.1% of category). Specific areas were named (e.g., Estero Bay and “The Miserable Mile”) as well as general references to channels and passes. (Note: If lack of dredging was emphasized as the detractor, it was included in the infrastructure category.) **Red Tide** was mentioned as a chief detractor to the boating experience sufficiently often (23.3% of category) that it is listed separately from other causes of altered water quality (e.g., **Trash and Pollution**), but together these sub-categories make up a significant 4% of total responses. Detractors to the fishing experience in the form of **too few fish** and the **loss of grass flats** comprise another 2% of total responses.

Lack of water access, an issue receiving increasing attention in coastal communities, subsumed 123 responses (8.1% of the total responses), with six component aspects broken out in Table 29 below. A lack of **ramp parking** comprised the largest sub-category (47% of category; 3.1% of the total responses). Placida and Punta Rassa ramps were named specifically in multiple responses. Shortages of **ramps** and, independently, **free public ramps** together make up 30% of cited detractors in this category. (If combined with responses of “crowded ramps,” placed under the congestion category, a perceived ramp launch inadequacy entails a significant 4.8% of total responses.) The lack/loss of **marinas and slips** open to the public account for another appreciable number of perceived detractors within the category, but just 1.5% of the total responses to this question.

Table 29. Lack of Water Access Detractors by Sub-Category.

Primary Detractor/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Lack of Water Access	123	100.	8.1
Ramp Parking	47	38.2	3.1
Marinas/Slips Open to Public	23	18.7	1.5
Ramps	22	17.9	1.4
Free Public Ramps	15	12.2	1.0
Dry Storage	6	4.9	0.4
Dockage	6	4.9	0.4

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

Detractors directed at **infrastructure deficiencies** are grouped into the 6th primary category, tabled below. The greatest number (26.1% of category) cited waterway **sign** concerns, with descriptors including “confusing” and “too many.” **Lack of dredging** of canals, channels, and passes accounts for 19.6% of this category, with the same percentage citing inadequate **channel marks**. Independently of the number of marinas available, perceived detractors targeting inadequate **marina facilities**, such as a lack of pumpout stations, fuel docks, or boatyard provisions, make up 21.7% of this grouping. Similarly, existing ramps were faulted for lack of such provisions as restrooms by a small number of responders. Overall, the percentage of responses associated with this sub-category array is small, with each accounting for less than 2% of the total responses.

Table 30. Infrastructure Deficiency Detractors by Sub-Category.

Primary Detractor / Sub-Category	Response Number	Percent of Category	Overall* Percentage
Infrastructure Deficiencies	92	100.	6.1
Waterway Signs	24	26.1	1.6
Marina Facilities	20	21.7	1.3
Dredging of Channels, Passes	18	19.6	1.2
Channel Marks	18	19.6	1.2
Ramp Facilities	7	7.6	0.5
Waterside Restaurants	5	5.4	0.3

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

Finally, a small primary category (1.4% overall) cited the **lack of regulation or enforcement** as a leading detractor. Table 31 shows the sub-category delineation of these 22 responses, led by a concern over **crab trap** proliferation.

Table 31. Lack of Regulation/Enforcement Detractors by Sub-Category.

Primary Detractor/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Lack of Regulation/Enforcement	22	100.	1.4
Crab Trap Proliferation	9	40.9	0.6
Too Few Patrols	4	18.2	0.3
Ramp Parking for Trailers Only	4	18.2	0.3
Fishing Regulations	3	13.6	0.2
Speed Zones	2	9.1	0.1

*Note: Overall percentage refers to the percentage of all responses tallied from Question 26.

The top-ten detractors by sub-category account for 1,083 (or 71.3%) of the N = 1,519 total analyzed responses to Question 26 (Table 32). The overwhelming majority of responses (22.4% of overall responses) cited **lack of courtesy or seamanship** on the part of other boaters in general as the greatest detractor from their boating experience. When PWCs, speeding powerboats, and large boats generating large wakes are included in the “other boater behavior” consideration, the group expands to 38.9% of total responses. In descending order are **waterway congestion** (ranked second), excessive **manatee zone restrictions** (ranked third) and **speed zone restrictions** (ranked fourth). **Shoaling** and **red tide** environmental factors and access inadequacy with respect to **ramp parking** complete the top ten detractors.

Table 32. Top-10 Detractors by Sub-Category.

Detractor Sub-Category	Response Number	Overall Percentage	Rank
Lack of Boater Courtesy/Seamanship	341	22.4	1
Waterway Congestion	131	8.6	2
Manatee Zone Restrictions	114	7.5	3
Speed Zone Restrictions	93	6.1	4
PWC Lack of Courtesy/Seamanship	90	5.9	5
Speeding Power Boats	84	5.5	6
Large Boat Wakes	78	5.1	7
Shoaling	67	4.4	8
Lack of Ramp Parking	47	3.1	9
Red Tide	38	2.5	10

Needs

Boater needs by primary category are summarized in Table 33. It is not unexpected that responses addressing solutions to problems would have themes mirroring those of the problems themselves. However, emphases vary; there were fewer responses overall to question 27 than to question 26; and many responders took advantage of question 27 to address boating concerns other than their previously stated detractors.

Leading the response categories to question 27, with 20.6% and 19.9% respectively of total responses (N = 1,402), are “**infrastructure improvements**” and “**increased access.**” The need for **less regulation** (ranking third) comprised only 43 more responses than the expressed need for **more regulation or enforcement** (ranking fourth). “**Boater education,**” ranging from required courses in safety and etiquette to learning environmental stewardship, completes the top five categories. Responses suggesting a need for **less environmental impact** make up about 10% of total responses. “**Information**” and “**no needs**” categories trail with less than 2.5% each.

Table 33. Boating Needs by Primary Category.

Primary Need Category	Response Number	Percent of Total	Rank
Infrastructure Improvements	289	20.6	1
Increased Access	279	19.9	2
Less Regulation	245	17.5	3
More Regulation/Enforcement	202	14.4	4
Boater Education	197	14.1	5
Environmental Protection	127	9.1	
Information	30	2.1	
No Needs	33	2.4	
TOTALS	1,402	100.1	

Again, the summated total ‘response number’ does not equal the number of surveys returned because many survey respondents either chose not to answer this question or identified multiple needs in response to this question.

Dredging of channels and passes was identified as the leading “Infrastructure Improvement” need (Table 34) with 29.1% of category responses (fifth leading sub-category overall), followed closely by better **channel marks** with 24.9%. The sub-categories comprising **full service marina** needs (i.e., marinas offering fuel docks, pumpout stations, etc.) and better **ramp facilities** (e.g., ramps with restrooms or better security) together account for approximately 28% of category responses and 5.8% of total responses. The need for improved waterway **signs** made up just fewer than 2% of total responses (8.7% of category), followed closely by the need for waterway destination provision, specifically **waterside restaurants**.

Table 34. Infrastructure Improvement Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Infrastructure Improvement	289	100.0	20.6
Dredging of Channels and Passes	84	29.1	6.0
Channel Marks	72	24.9	5.1
Full Service Marinas	50	17.3	3.5
Ramp Facilities	32	11.1	2.3
Signs	25	8.7	1.8
Waterside Restaurants	20	6.9	1.4
Artificial Reefs	6	2.1	0.4

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

“Increased Access,” the second highest primary category under “needs,” is dominated by responses citing the need for **ramps and ramp parking**, in turn the second highest sub-category overall (12.3% of total responses). Whereas ramps and ramp parking were considered separately in the detractor analysis, they were more often linked in the responses to Question 27 and so were made a single sub-category. Water access via **marinas and slips** was a principal need expressed in 14.3% of category responses. More **public and transient dockage** together with more **anchorages and public moorings** were identified as needs in 52 responses, or 3.7% of the total overall. Generating less than 1% of the total responses was the conveyed need for more access to **dry storage** facilities and **public beaches**.

Table 35. Increased Access Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Increased Access	279	100.0	19.9
Ramps and Ramp Parking	173	62.0	12.3
Marinas and Slips	40	14.3	2.9
Public and Transient Dockage	36	12.9	2.6
Anchorage and Public Moorings	16	5.7	1.1
Dry Storage Facilities	11	3.9	0.8
Public Beaches	3	1.1	0.2

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

Regulation issues were fairly split between responses indicating a need for less regulation and those indicating a need for more (Tables 36 and 37). **Manatee zones** figured only in the former category, with 93 responses (third highest sub-category overall) indicating a need for less, more reasonable, or more science-based manatee protection. Less regulation of **speed zones** and **no wake zones** together comprise 7.8% of total response, approximately twice the need expressed for more regulation/enforcement in the same areas in Table 37. By contrast, a need for more boating regulation in general was indicated in 3.4% of all responses, almost twice the incidence of responses comprising “less governmental boating regulation.” Required **boat operator licensure** was cited as a principal need in a significant percentage of responses under “more regulation,” as was a greater presence of **water patrols** (2.4% of the total, as compared to just 0.5% conveying the need for a lesser presence). In addition, **PWCs** were targeted for more regulation in 1.4% of total responses to Question 27. Finally, additional regulations governing **no wake zones**, **crab traps**, and **alcohol consumption** while boating were cited.

Table 36. Less Regulation Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Less Regulation	245	100.0	17.5
Manatee Zones	93	38.0	6.6
Speed Zones	87	35.5	6.2
Governmental Regulation of Boating	25	10.2	1.8
No Wake Zones	23	9.4	1.6
Water Patrols	7	2.9	0.5
Access Permitting	5	2.0	0.4
Fishing Regulation	5	2.0	0.4

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

Table 37. More Regulation/Enforcement Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
More Regulation/Enforcement	202	100.0	14.4
Boating Regulations in General	48	23.8	3.4
Boat Operator Licensure	37	18.3	2.6
Water Patrols	34	16.8	2.4
Power Boat Regulations / Speed Enforcement	30	14.9	2.1
PWC Regulations	20	9.9	1.4
No Wake Zones	20	9.9	1.4
Commercial Fishing, Crab Traps	9	4.5	0.6
Alcohol Consumption	4	2.0	0.3

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

The need for **boater education**, principally in the form of required courses such as offered by the USCG, and independent of the above operator licensure sub-category, is the fifth leading primary category. All aspects of boater education, from matters of etiquette to boat handling to existing law, were considered together in this single largest sub-category under “needs” (13.6% of total responses). The latter ranking conforms to the number one detractor sub-category, the “lack of boater courtesy and seamanship.”

Table 38. Boater Education Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Boater Education	197	100.0	14.1
Etiquette/Safety/Skills/Regulations	190	96.4	13.6
Environmental Stewardship	7	3.6	0.5

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

Improved water quality and **no red tide** account for approximately 40% of all responses tallied under “environmental needs” (Table 39), followed by **more fish**, with 27.6% of category responses. Combining “more fish” with “**less prop scarring**” (comparable to the combined detractor consideration of lack of fish and destruction of grass flats) boosts this aspect of boating experience needs to 34.7% of the category total. The **fewer boaters** sub-category might have been omitted as a response with little recourse, as with “better weather,” but was retained with the sense of less boater *impact*.

Finally, a small group of 30 responses indicated a need for **information** (Table 40), led by the expressed need for **current detailed charts**.

Table 39. Environmental Protection Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Environmental Protection	127	100.0	9.1
Improved Water Quality	36	28.3	2.6
More Fish	35	27.6	2.5
Fewer Boaters	26	20.5	1.9
No Red Tide	14	11.0	1.0
No Prop Scars	9	7.1	0.6
Less Shore Development	7	5.5	0.5

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

Table 40. Information Needs by Sub-Category.

Primary Need/Sub-Category	Response Number	Percent of Category	Overall* Percentage
Information	30	100.0	2.1
Current Detailed Charts	15	50.0	1.1
Fishing Spots and Techniques	8	26.7	0.6
Boat Handling	5	16.7	0.4
GPS Coordinates	2	6.7	0.1

*Note: Overall percentage refers to the percentage of all responses tallied from Question 27.

The top-ten needs by sub-category account for 896 (or 63.9%) of the N = 1,402 total responses to Question 27 (Table 41). The greatest concentration can be further identified with the top two sub-categories, “boater education” and more access via “ramps and ramp parking,” together comprising just over one-fourth of total responses.

Table 41. Top-10 Needs by Sub-Category.

Need Sub-Category	Response Number	Overall Percentage	Rank
Boater Education in Etiquette/Skills	190	13.6	1
More Ramps and Ramp Parking	173	12.3	2
Less Manatee Zone Regulation	93	6.6	3
Less Speed Zone Regulation	87	6.2	4
Channel and Pass Dredging	84	6.0	5
Channel Marks Improvement	72	5.1	6
More Boating Regulation in General	48	3.4	7
More Access to Marinas/Slips	40	2.9	8
Operator Licensure	37	2.6	9
Improved Water Quality	36	2.6	10 tie
More Public, Transient Dockage	36	2.6	10 tie

Chapter 7. Evaluating Mail Survey Non-response Bias

A Comparison of Early versus Late Responders

This chapter employs the method of ‘extrapolation’ to examine mail survey non-response bias. The method compares survey results for a subset of mail survey questions of early versus late responders based on tracking waves of survey returns (i.e., those surveys that were returned prior to and after the mailing of a reminder card). Nonrespondents to earlier waves of surveys are considered as persons initially resistant to investigation who later consent (Fillion 1976). The extrapolation method is based on the assumption that subjects who respond less readily are more like nonrespondents (Armstrong & Overton, 1977; Viviënne, Lahaut, Harrie, Jansen, van de Mheen, Henk, Garretsen, Jacqueline, Verdurmen, & van Dijk, 2002). It should be noted that a follow-up survey of nonrespondents (e.g., mail or telephone interviews) to ‘convert’ original non-responses to responses is preferred over extrapolation. The extrapolation method was used due to budget constraints.

The consequences of mail survey non-response vary. As non-response increases, the potential for a biased sample increases and, therefore, the responses obtained from a survey may not be representative of the larger population. Non-response bias occurs when a reported value (e.g., number of boating trips per month; number of hours spent on the water) deviates from the actual population value due to differences between those individuals that responded to the survey and those that did not. According to Babbie (2001), survey findings should not be generalized to the population unless a “substantial majority of the scientifically selected sample actually participates—the willing respondents and the somewhat unwilling.” An increase in the response rate—by capturing “hard-to-get” respondents—will improve precision and reduce non-response bias (Green, 1991). The standard method to increase responses is to “revisit cases that were unproductive after the first round of surveying with the expectation that some of those cases that were initially non-contacts or refusals can be converted to respondents” (Lynn, Clarke, Martin & Sturgis, 2001).

The analysis presented in this chapter compares: (a) respondents that returned the survey questionnaire “early” – those that returned the survey before they received a reminder card (allowing for a three-day mailing lag; the estimated time it took to receive a reminder card); and (b) respondents that returned the survey questionnaire “late” – those that returned the survey after receiving a reminder card (at least three days after it was estimated that they received a reminder card). The sample of $n=1,458$ total survey respondents (as of 9/02/05) revealed 984 early responders and 474 late responders. Summary response time statistics are presented in Table 42. A statistical analysis of the sub-samples shows a significant difference in the mean and median response times at the 99% confidence level. Note that 21 additional late surveys were added to the database before the statistics in this section were calculated; a factor that accounts for minor incongruities between various summary statistics found this chapter and the previous chapter.

A series of non-parametric statistical procedures were run to test for possible response bias in the survey results as they pertain to selected questions (and the median response). The use of non-parametric tests was required given that the various distributions for the variables

examined were found to be significantly different from a normal distribution (i.e., “non-normal”). For cases involving interval scale data, the Kruskal-Wallis One-Way ANOVA and Rank-Sum test procedures were run to test the null hypothesis that the median values were equal for early and late responder groups. Two-sample proportions test procedures were also run to test for equality of proportions between early and late responders were applicable. All test procedures were carried out at the 95% and 99% confidence levels.

A descriptive analysis was carried out on “response time” – the number of days from the initial mailing of the survey questionnaire to the return of the survey – for the entire sample and for each of the two response groups (Table 42). Completed survey questionnaires from early responders were returned in about 10.9 days, on average, from the mailing date (allowing for a three day mailing lag); whereas completed survey questionnaires from late responders took an average of 29.8 days before they were returned. Late responders tended to return their surveys roughly 9-10 days after the mailing of the reminder card (allowing for a three day mailing lag). The median number of days from the mailing of the survey to the return of the survey was 11 days for the early responder group and 26 days for the late responder group. Note that the overall median response time was 13 days.

Table 42. Response Time Statistics.

Responder* Group	n	Response time (in days)	
		mean	median
Early	984	10.9	11
Late	474	29.8	26
Overall	1,458	17.1	13

*Early refers to “early responders”; Late refers to “late responders.”

- There is statistical evidence to validate a significant difference in the response times of early versus late responders (Table 43). The median number of days (response time) for late responders is shown to be significantly greater than the median number of days (response time) for early responders. This result is expected as the groups were classified on the basis of pre- and post-survey returns in association with the mailing and receipt of the survey remainder cards and the completion of the questionnaire. These results verify the hypothesis that early and late responders constitute two distinct groups on the basis of their median response time (in days).

Table 43. Analysis of Response Times (in days).

Responder Group	n	Response time (in days)		
		mean	std. error	median
Early	984	10.98	10.98	11
Late	474	29.85	29.85	26
Overall	1,458	17.11	17.11	13

ANOVA results:

F-Ratio = 2714.45 (prob. = 0.0000)

Result: Reject H_0 : Equality of means
at 95% and 99% confidence levels

KW One-way ANOVA (H) on Ranks:
(corrected for ties)

Chi-square (H) = 934.97 (prob. = 0.0000)
w/1 degree of freedom

Rank Sum test:

Group 1 – early: mean rank = 496.09

Group 0 – late: mean rank = 1214.05

Z-value (1) = -30.499

Result: Reject H_0 : Equality of medians
at 95% and 99% confidence levels

- An analysis of the A.M. launch time shows consistency in both the mean and median values between early and late responders of the survey questionnaire.
- The median launch time for all groups was 7 (7:00AM) and the mean launch time was approximately 7.8, indicating an estimated A.M. launch time of 7:50A.M.
- There is no statistical evidence to indicate a difference in the A.M. launch times of early versus late responders of the survey questionnaire (Table 44; Question 2).

Table 44. A.M. Launch-Time Statistics.

Responder Group	n	mean	median	Estimated Launch Time (AM)
Early	862	7.841	7	7:50 AM
Late	411	7.842	7	7:50 AM
Overall	1,273	7.842	7	7:50 AM

KW One-way ANOVA (H) on Ranks:
(corrected for ties)

Chi-square (H) = 0.469 (prob. = 0.493)
w/1 degree of freedom

Rank Sum test:

Group 1 – early: mean rank = 740.38

Group 0 – late: mean rank = 724.26

Z-value (1) = -0.685

**Result: Fail to Reject H_0 : Equality of medians
at the 95% and 99% confidence levels**

- An analysis of P.M. launch times reveals a similar consistency in both the mean and median values.
- There is no statistical evidence to indicate a difference in the P.M. launch times of early versus late responders of the survey questionnaire (Table 45; Question 2).

Table 45. P.M. Launch-Time Statistics.

Responder Group	n	mean	median	Estimated Launch Time (PM)
Early	120	2.200	1	2:12 PM
Late	60	2.116	2	2:07 PM
Overall	180	2.144	2	2:08 PM

KW One-way ANOVA (H) on Ranks:
(corrected for ties)

Chi-square (H) = 0.063 (prob. = 0.801)
w/1 degree of freedom

Rank Sum test:

Group 1 – early: mean rank = 89.82

Group 0 – late: mean rank = 91.87

Z-value (1) = -0.248

Result: Fail to Reject H_0 : Equality of medians
at the 95% and 99% confidence levels

- There is no statistical evidence to indicate that the median number of hours spent on the water is different between early and late responders of the survey questionnaire for boaters characterized as “day trippers” – those with trip durations of 24 hours or less (Table 46; Question 3). The median trip duration for day trippers was 5 hours for both early and late responders of the survey. The results of no significant difference held at both the 95% and 99% confidence levels.

Table 46. Trip Duration Statistics (day trippers).

Responder Group	n	(Hours on Water)	
		mean	median
Early	808	5.412	5
Late	393	5.318	5
Overall	1,201	5.381	5

KW One-way ANOVA (H) on Ranks:
(corrected for ties)

Chi-square (H) = 1.777 (prob. = 0.182)
with 1 degree of freedom

Rank Sum test:

Group 1 – early: mean rank = 582.03

Group 0 – late: mean rank = 610.23

Z-value (1) = 1.321

**Result: Fail to Reject H_0 : Equality of medians
at the 95% and 99% confidence levels**

* boaters taking trips of 24 hours or less in duration

- There is no statistical evidence to indicate that the median number of hours spent on the water is different between early and late responders of the survey questionnaire for boaters characterized as “over-nighters” – those with trip durations greater than 24 hours (Table 47; Question 3).
- While the median trip duration for early responders was 72 hours and 51 hours for late responders, the values were not found to be significantly different from one another at the 95% or 99% confidence levels based on the rank sum test. Note that the mean ranks of early and late responders are very close in magnitude (at 123.8 and 130.6 days, respectively). More than likely, the seemingly large (though not statistically significant) difference may be attributable to the median values falling in critical break points in their respective rank distributions.
- The median values of 72 hours and 51 hours (for early and late responders respectively) are not significantly different from the overall median value of 60 hours for the entire sample.

Table 47. Trip duration statistics (over-nighters)

Responder Group	n	(Hours on Water)	
		mean	median
Early	175	96.417	72
Late	81	113.308	51
Overall	256	101.761	60

KW One-way ANOVA (H) on Ranks:
(corrected for ties)

Chi-square (H) = 0.460 (prob. = 0.494)
with 1 degree of freedom

Rank Sum test statistics:

Group 1 – early: mean rank = 123.88

Group 0 – late: mean rank = 130.64

Z-value (1) = 0.678

**Result: Fail to Reject H_0 : Equality of medians
at the 95% and 99% confidence levels**

* boaters with trips that exceed 24 hours in duration

- There is no statistical evidence to indicate a difference in the proportion of boat trips categorized as “weekend trips” (as opposed to “weekday trips”) for early versus late responders of the survey questionnaire (based on their response to Question 4 regarding the day of the week associated with their last boating trip).
- Overall, roughly 39% of respondents’ boat trips are weekend trips (occurring on either a Saturday or Sunday). The difference in proportions, between early and late responders, was estimated at .0136. This proportion is not found to be significantly different from a value of zero at the 95% and 99% confidence levels. In short, the proportions .3987 and .3851 are found not to be significantly different from one another (Table 48; Question 4).

Table 48. Weekend Trip Proportions: Proportion of Trip One Falling on a Weekend.

Responder Group	n	Proportion of trips weekend (P)	%
Early (1)	984	379/984 = .3851	38.5
Late (0)	474	189/474 = .3987	39.8
Overall	1,458	568/1458 = .3895	38.9

$H_0: P(0) = P(1)$; vs. $H_a: P(0) < > P(1)$

Confidence Intervals of Difference $P(0) - P(1)$:

(Estimated value = 0.0136)

Chi-square (Yates): -0.0415 to 0.0687

Chi-Square (Pearson): -.0400 to 0.0671

Tests of zero difference: $H_0: P(0)=P(1)$

Chi-square = 0.194 (prob. = .6596)

Z-value = .498 (prob. = .6186)

**Results: Fail to reject null hypothesis
(for both Chi-square and Z tests)**

**H_0 : Equality of proportions at the
95% and 99% confidence levels**

Note: this test result implies that the weekday trip proportions: $P^*(1) = .6149$ and $P^*(0) = .6013$, are also not statistically different from one another at the 95% or 99% confidence levels.

- There is no statistical evidence to indicate a difference in the median number of boating trips per month for early versus late responders of the survey questionnaire, for the months of January, February, March, April, November, and December.
- There is statistical evidence that early responders take a significantly greater number of boating trips than did late responders for the months of May through October. In each case, the early responders showed a median number of trips that exceeded the median number of trips for late responders by one trip based on the ranked values (Table 49; Question 8). This suggests that the overall median number of trips for early responders over the entire boating year may be slightly higher than the median number of trips for late responders – a result that is consistent with the findings in Table 49.

Table 49. Trip Statistics per Month and Parametric Test Results Comparing Early- versus Late-Responders.

Month	Group	Median # of trips	Chi-square w/(prob)	mean rank	Z-value	test result (99%)*
January	Early (1)	2	0.601 (0.437)	735.3	.7646	Fail to reject
	Late (0)	2		717.3		
February	Early (1)	3	0.678 (0.410)	735.7	.8136	Fail to reject
	Late (0)	2		716.5		
March	Early (1)	4	0.365 (0.545)	734.1	.5996	Fail to reject
	Late (0)	4		719.9		
April	Early (1)	4	3.194 (0.073)	743.1	1.775	Fail to reject
	Late (0)	4		701.3		
May**	Early (1)	4	8.286 (0.003)	751.5	2.878	Reject Ho
	Late (0)	3		683.7		
June**	Early (1)	4	9.227 (0.002)	752.4	2.995	Reject Ho
	Late (0)	3		681.9		
July**	Early (1)	3	15.49 (0.000)	758.9	3.847	Reject Ho
	Late (0)	2		668.3		
August**	Early (1)	3	13.07 (0.000)	756.3	3.514	Reject Ho
	Late (0)	1		673.6		
September**	Early (1)	3	15.11 (0.000)	758.4	3.785	Reject Ho
	Late (0)	2		669.3		
October**	Early (1)	3	10.46 (0.000)	753.8	3.185	Reject Ho
	Late (0)	2		678.8		
November	Early (1)	3	5.415 (0.018)	747.3	2.327	Fail to reject
	Late (0)	2		692.5		
December	Early (1)	2	4.458 (0.034)	745.3	2.068	Fail to reject
	Late (0)	2		696.6		

* Null hypothesis -- H_0 : Equality of medians

** Rank sum test results suggest that the median number of trips for early responders is significantly greater than the median number of trips for late responders during the months highlighted in bold.

- There is statistical evidence to suggest that early responders tend to take a significantly greater number of boating trips over the course of a year than late responders (Table 50; Question 8).
- The median value of 38.6 trips per year (for early responders) was shown to be significantly greater than the median value of 36 trips per year (for late responders). This result suggests that early responders tend to take roughly 2.5 more trips per year than the late responder (rounding to the nearest integer value) based on the equality of medians test results.

Table 50. Trip Statistics for the Year and Parametric Test Results Comparing Total Number of Trips for Early- Versus Late-Responders.

Group	Median # of trips	Chi-square w/(prob)	mean rank	test result Z-value	(99%)*
Early (1)	38.5	7.296 (0.006)	750.1	2.699	Reject Ho
Late (0)	36		686.6		

* Null hypothesis H_0 : Equality of medians

** test results show that the median number of total trips for early responders is significantly greater than the median number of total trips for late responders for the entire year (based on the sum of the total trips per month).

Early responders averaged 48.6 trips per year in comparison to late responders, who only averaged 45.0 trips per year (a difference of approximately 3.6 boating trips per year between the groups).

Note: a standard ANOVA procedure could not be run to test for equality of means as the distribution of total boating trips was “non-normal”.

- There is no statistical evidence to suggest that the percentage of the sub-sample size associated with early versus late responders for individual departure group categories is significantly different from the percentage breakdown of early versus late responders for the entire sample (Table 51; Question 11). In each case, we fail to reject the null hypothesis of equal proportions or percentages at the 95% and 99% confidence levels.

Table 51. Percentage Breakdowns of Sub-Sample Size by Departure Group:
Early- and Late-Responders versus the Entire Sample.

Departure Group	% of Responders		Tests of Zero Difference		Ho:??*
	Early	Late	chi-sq. (prob)	Z (prob)	
Boat Ramp n=356	69.94 (249/356)	30.05 (107/356)	.683 (.408)	.890 (.373)	No
Marina Wet Slip n = 237	64.55 (153/237)	35.44 (84/237)	.667 (.414)	.891 (.372)	No
Marina Dry Storage n = 361	67.86 (245/361)	32.13 (116/361)	.006 (.940)	.137 (.890)	No
Home Dock n = 470	67.65 (318/470)	32.34 (152/470)	.0001 (.990)	.068 (.945)	No
Condo Dock n =21	52.38 (11/21)	47.61 (10/21)	1.515 (.218)	na**	No
Other n= 10	80.00 (8/10)	20.00 (2/10)	.709 (.399)	na**	No
Overall	67.48 (984/1458)	32.51 (474/1458)			

* **Null hypothesis H₀:** Differences in proportions are not significantly different from a value of zero (i.e., equal proportions/percentages);

** not applicable due to sample size restriction (small sample)

- There is no statistical evidence to suggest a difference in the percentage of early versus late responders that fell into each departure group category (Table 52; Question 11). In each case, we fail to reject the null hypothesis of equal proportions or percentages at the 95% and 99% confidence levels. In sum, there is no evidence to support the claim that a late responder is more likely to be associated with a particular departure site category than an early responder.

Table 52. Percentage Breakdowns of Departure Site Association:
Early- versus Late-Responders.

Departure Site	Percentage Breakdown by Site			Test of Zero Difference*	
	Overall	Early	Late	chi-sq (prob)	reject?
Boat Ramp	24.53	22.57 (249/984)	25.30 (107/474)	1.293 (.255)	No
Marina Wet Slip	16.31	17.72 (153/984)	15.54 (84/474)	0.956 (.328)	No
Marina Dry Storage	24.74	24.47 (245/984)	24.89 (116/474)	0.039 (.894)	No
Home Dock	32.27	32.06 (318/984)	32.31 (152/474)	0.009 (.923)	No
Condo Dock	1.14	2.32 (11/984)	1.02 (10/474)	1.573 (.209)	No
Other	< 1%	< 1% (8/984)	< 1% (2/474)	0.259 (.610)	No

Null hypothesis H_0 : Differences in proportions/percentages of Early versus Late responders are not significantly different from a value of zero (i.e., equal proportions/percentages); *at 99% confidence level

- There is no statistical evidence to suggest a difference in the percentage of responses associated with various boating activities for early versus late responders (Table 53; Question 18). In each case, we fail to reject the null hypothesis of equal proportions or percentages at both the 95% and 99% confidence levels.
- There was a significant difference detected in the proportion of early versus late responders engaging in cruising and visiting restaurants at the 95% confidence level. In both cases, early responders tended to select cruising and restaurant visitation with more frequency in the survey (Question 18) as an activity that they engage in than did late responders. Yet this result does not hold at the 99% confidence level.
- There is no evidence to support the claim that a late responder is more likely to be associated with a particular activity than an early responder based on the statistical results at the 99% confidence level.

Table 53. Percentage Breakdowns of Activities: Early- versus Late-Responders.

<i>Percentage Breakdown by Group Test of Zero Difference*</i>					
Activity	overall	Early	Late	chi-sq (prob)	reject?
Beach Picnicking	33.2%	33.84 (333/984)	32.06 (152/474)	0.377 (.539)	No
Nature Viewing	50.1%	50.60 (498/984)	49.36 (234/474)	0.151 (.697)	No
Sightseeing	45.2%	44.81 (441/984)	46.41 (220/474)	0.268 (.604)	No
Cruising	58.6%	60.77 (598/984)	54.21 (257/474)	5.397 (.020)	No**
Day Anchoring	24.0%	24.59 (242/984)	22.99 (109/474)	0.364 (.546)	No
Socializing	38.1%	39.43 (388/984)	35.86 (170/474)	1.574 (.209)	No
Diving	8.4%	8.84 (87/984)	7.80 (37/474)	0.318 (.572)	No
Overnight Anchoring	17.1%	16.86 (166/984)	17.72 (84/474)	0.109 (.741)	No
Visiting Restaurants	52.1%	54.47 (536/984)	47.67 (226/474)	5.646 (.017)	No**
Fishing	66.8%	66.76 (657/984)	66.66 (316/474)	0.0001 (.984)	No
Sailing	10.0%	9.24 (91/984)	11.81 (56/474)	2.050 (.152)	No
Swimming	28.3%	28.25 (278/984)	29.11 (138/474)	0.078 (.779)	No
Skiing/ Water-sports	6.9%	7.01 (69/984)	6.75 (32/474)	0.005 (.941)	No

Null hypothesis H₀: Differences in proportions of Early versus Late Responders are not significantly different from a value of zero (i.e., equal proportions/percentages); *at 99% confidence level (cl); **Yes at 95% cl.

- There is no statistical evidence to suggest a difference in the proportion of early versus late survey responders that indicated they had left their favorite on-water boating destination due to congestion (Table 54; answered yes to Question19); nor are those proportions significantly different from the overall percentage for the entire sample (.3965). In other words, late responders were no more likely or no less likely than early responders to indicate that they had left their favorite on-water destination due to congestion.

Table 54. Perceived Congestion: Left Favorite Destination due to Congestion (yes to Q19).

Responder Group	n	Proportion of trips weekend (P)	%
Early (1)	984	374/984 = .3902	39.02
Late (0)	474	185/474 = .3800	38.00
Overall	1,397	554/1397 = .3965	39.65

H_0 : $P(0) = P(1)$; vs. H_a : $P(0) < > P(1)$

Confidence Intervals of Difference $P(0) - P(1)$:

(Estimated value = 0.0102)

Chi-square (Yates): -0.0447 to 0.0651

Chi-Square (Pearson): -.0432 to 0.0636

Tests of zero difference: H_0 : $P(0)=P(1)$

Chi-square = 0.101 (prob. = .7071)

Z-value = .318 (prob. = .7503)

**Results: Fail to reject null hypothesis
(for both Chi-square and Z tests)**

**H_0 : Equality of proportions at the
95% and 99% confidence levels**

- There is statistical evidence to indicate that the mean and median number of months of the year living in the state of Florida is different between early and late responders (Table 55; Question 21). Note, however, that the results are tenuous given the ANOVA assumptions of normality and equal variance do not hold.
- The statistical results suggest that late responders tend to spend approximately 2 weeks (.539 of a month) less living in Florida than do early responders of the survey.
- The median value for all groups (early, late, and all responders) was 12 months, indicating that the distribution of values is negatively skewed. This suggests that a very large number of survey respondents reside in the state year round of the overall sample. The median values (of 12 months and 12 months), however, were found to be significantly different from one another (a contradiction that is likely related to high degree of “skewness” in the distributions, and for the fact that the distributions for the early and the late responders were found not to be statistically “similar” to one another using the Kolmogorov-Smirnov test).
- It is interesting to note that 1,116 out of 1,458 survey respondents were 12-month residents (approximately 76.5%). Of the 474 late responders, 335 (or 70.6%) were 12-month residents. Of the 984 early respondents, 781 (or 79.3%) were 12-month residents of the state.

- An equality of proportions test revealed that a significantly larger proportion of 12-month residents were found in the early responder sub-sample. In other words, a greater percentage (approximately 8.7%) of 12-month residents were found in the early responder sub-sample than in the late responder sub-sample (Table 55).

Table 55. Number of Months per year Living in Florida (Entire Sample).

Responder Group	n	number of months in Florida		% of group 12-mo. residents
		mean	median	
Early	980	10.675	12	79.3%
Late	470	10.136	12	70.6%
Overall	1,450	10.500	12	76.5%

ANOVA: $F = 10.02$ (prob. = 0.0015)
Comparison value: 0.5394
t-value = 3.165 (prob. = 0.0015)
Note: normality and equal variance assumptions
not validated (reject normality and equal variance)

Mann-Whitney U: rank sums
 $Z = -3.4848$ (prob. = .0004)
Result: Reject H_0 : Equality of means/medians
at the 95% and 99% confidence levels

Difference of proportions based on “proportion”
of year living in the state of Florida (.8446 vs. .8890)
 $Z = -2.952$ (prob. = .0028)
based on “normal approximation”

Kolmogorov-Smirnov (KS) test for different distributions
 $D = .08706$ (reject if greater than 0.0763 at 95% confidence)

Group	D’Agostino Skewness	distribution	skewness
Early	-17.658 (0.0000)	non-normal	severe (negative)
Late	-10.023 (0.0000)	non-normal	severe (negative)
Overall	-20.005 (0.0000)	non-normal	severe (negative)

Differences of proportions test: percentage of 12-month Residents (early vs. late responders)

Chi-square = 12.99 (prob. = 0.0002)
Result: Reject H_0 : Equality of proportions
at the 95% and 99% confidence levels

- Removing the 12-month residents from the analysis, revealed a significant difference in the mean and median values of months of Florida residency (see Table 56). In all cases, the median number of months respondents lived in the state of Florida dropped to six. This suggests the presence of two distinct statistical populations: (a) year-round resident boating population; and (b) boaters that, on average, reside in the state for only six months of the year. Seasonal-resident boaters accounted for roughly 24% of survey participants. Once 12-month (year-long) residents were removed from the sample, there was no statistical evidence that the mean or median number of months associated with early versus late responders was significantly different from one another at the 95% or 99% confidence levels.

Table 56. Number of Months per year Living in Florida
(12-month Residents Removed from Sample/Sub-Samples).

Responder Group	number of months in Florida		
	n	mean	median
Early	199	5.47	6
Late	135	5.51	6
Overall	334	5.49	6

One-way ANOVA results:

Equality of Means test:

Early vs. Late responders

F-Ratio = 0.01 (prob. = 0.9146)

**Result: Fail to Reject H_0 : Equality of Means
at 95% and 99% confidence levels**

Kruskal-Wallis One-way ANOVA results:

Equality of Medians test:

Early vs. Late responders

Chi-square = 0.055 (prob. = 0.8133)

**Result: Fail to Reject H_0 : Equality of Medians
at the 95% and 99% confidence levels**

- There is no statistical evidence to indicate that the median number of years operating a vessel in Florida is different for the early versus late responders of the survey questionnaire (Table 57; Question 22). The mean rank values were very similar for the two groups, and the test results hold at the 95% and 99% confidence levels.
- There is no statistical evidence to indicate that the median number of years operating a vessel in Florida for the individual responder groups differs from the median value for the entire sample (i.e., the values of 8.5 years and 10 years are not significantly different from a value 9 years). Nonparametric test procedures were employed as the distributions of values tested “non-normal.”

Table 57. Number of Years Operating a Vessel in Florida.

Responder Group	n	# of years operating a vessel in FL		
		mean	std. dev.	median
Early	984	13.40	12.55	8.5
Late	474	14.07	13.13	10.0
Overall	1,458	13.62	12.74	9.0

Kruskal-Wallis One-way ANOVA results:

Equality of Medians test:
Early vs. Late responders

Chi-square = 0.368 (prob. = 0.5437)
 (corrected for ties)

Rank Sum test statistics:
 Group 1 – early: mean rank = 724.86
 Group 0 – late: mean rank = 739.13
Z-value (1) = 0.6061

Result: **Fail to Reject H₀: Equality of Medians**
at the 95% and 99% confidence levels

- There is no statistical evidence to indicate that the median age of boaters of late responders is significantly different from the median age of boaters categorized as early responders (i.e., 60 years of age) (Table 58; Question 24). As with the previous analysis concerning number of years operating a vessel in the state of Florida, the “mean rank” values were very similar for the two groups. A non-parametric test procedure was employed given that the distribution of values for the variable “age” was shown to be “non-normal.”

Table 58. Age of Boaters Participating in Survey.

Responder Group	n	# of years operating a vessel in FL		
		mean	std. dev.	median
Early	979	58.57	11.78	60
Late	471	58.07	12.33	59
Overall	1,450	58.41	11.96	60

Kruskal-Wallis One-way ANOVA results:

Equality of Medians test:

Early vs. Late responders

Chi-square = 0.816 (prob. = 0.3661)

(corrected for ties)

Rank Sum test statistics:

Group 1 – early: mean rank = 711.18

Group 0 – late: mean rank = 732.39

Z-value (1) = 0.9033

**Result: Fail to Reject H_0 : Equality of Medians
at the 95% and 99% confidence levels**

- There is statistical evidence to suggest that 12-month resident boaters who participated in the survey tend to take a greater number of trips per year than do non-12-month resident boaters (Table 59). The non-parametric test results indicate that the hypothesis of equality of medians should be rejected at the 95% and 99% confidence levels. In other words, the median number of total trips associated with 12-month resident boaters (39) is found to be significantly greater than the median number of total trips associated with non-12-month residents (34) for boaters who participated in the survey.

Table 59. Total Number of Boating Trips (per year): A Comparison of 12-month Residents versus non-12-month Residents (for Boaters that Participated in the Survey Questionnaire).

Resident/Boater Group	total number of trips per year			median
	n	mean	std. dev.	
12-month resident	1,116	49.70	44.11	39
non-12-month resident	342	40.08	36.22	34
Overall	1,458	47.44	42.57	38

Kruskal-Wallis One-way ANOVA results:

Equality of Medians test:

12-month residents vs. non-12-month residents

Chi-square = 11.816 (prob. = 0.0005)

(corrected for ties)

Rank Sum test statistics:

Group 1 – 12-month: mean rank = 660.72

Group 0 – non-12-month: mean rank = 750.58

Z-value (1) = 3.4532

Result: Reject H_0 : Equality of Medians

at the 95% and 99% confidence levels

- There is statistical evidence to suggest that the median age of 12-month resident boaters is significantly less than the median age of non-12-month resident boaters (Table 60). The non-parametric test results indicate that the hypothesis of equality of medians should be rejected at the 95% and 99% confidence levels. In other words, the median age of non-12-month resident boaters who participated in the survey (64 years) is significantly greater than the median age of 12-month resident boaters who participated in the survey (58 years).

Table 60. Age of Boaters who Participated in the Survey: A Comparison of 12-month Residents versus non-12-month Residents.

Resident/Boater Group	n	age of boaters (in years)	
		mean	median
12-month resident	1,110	56.67	58
non-12-month resident	340	64.07	65
Overall	1,450	58.41	60

Kruskal-Wallis One-way ANOVA results:

Equality of Medians test:

12-month residents vs. non-12-month residents

Chi-square = 110.672 (prob. = 0.00001)
(corrected for ties)

Rank Sum test statistics:

Group 1 – 12-month: mean rank = 661.50

Group 0 – non-12-month: mean rank = 934.44

Z-value (1) = -10.516

Result: Reject H_0 : Equality of Medians
at the 95% and 99% confidence levels

Chapter 8. Summary

This report documents the methods and procedures implemented to survey boaters who recreate in the Greater Charlotte Harbor region (Charlotte and Lee Counties), on the basis of trip departure category (marina wet slip, marina dry storage, public ramp, and private dock). Questionnaire returns confirm that a large and even distribution from each sampled boater departure category was obtained. An analysis of departure origins, destinations, travel routes, and congested areas has identified and mapped general spatial boating patterns. In addition, a descriptive analysis has characterized trip profiles, activity preferences, and identified important issues and needs. Lastly, an analysis that compared the responses of early and late responders to the survey was undertaken to evaluate the potential effects of non-response bias; late-responders were used as a surrogate for non-responders.

Trip-departure specific spatial and temporal information collected in this study provides information on boater use-patterns (i.e., where boaters typically begin their voyages and where they go on the water). This information should be of benefit to resource managers for estimating demand for boating facilities. For example, spatial information collected as part of the ramp survey could be integrated with data collected as part of the previous Tampa and Sarasota Bay study. This would naturally lead to an update of the service area analysis for public ramp facilities. Grid-base market areas would be identified and mapped through a primary service area optimization method (see Sidman, Fik, Swett, Sargent, and Fann, 2005). A complementary analysis would quantify the pressure that boating, originating from access points exerts on bay resources. Geographic overlap in patron attraction and/or resource pressure thresholds among facilities would help to identify appropriate and inappropriate locations for expanding existing or siting future boating infrastructure.

An important goal of this study was to identify, from the boaters' perspective, the kinds of things that detract most from boating experiences, and what is needed most to improve boating experiences. A content analysis of these open-ended questions revealed boating problems, and solutions to problems. For example, most respondents perceived a lack of courtesy and/or seamanship, congestion, and excessive regulations/restrictions, to be the primary detractors, and infrastructure improvements, increased access, and less regulation to be the primary needs. This information can serve as the basis for targeting management efforts to enhance boater education, recreational boating experiences, and instill resource stewardship.

An analysis of early and late responders to the survey found no statistical differences in response for the subset of questions analyzed. The results, for the most part, indicate that early and late responders of the survey come from the same statistical population. However, there were a few notable exceptions. Of particular interest were the results associated with 'total monthly trips' (specifically for the months of May through October) and the 'total number of trips' (yearly). Early responders were shown to have a slightly higher median number of trips per month than late responders during the period in question. Though it can be hypothesized that 'willingness to participate' in the survey questionnaire may be more pronounced among the more active boaters in the Greater Charlotte Harbor boating population, there is still a need to determine if potential differences exist between those boaters who did and did not participate in the survey.

The results indicate that two distinct boating populations exist in the Greater Charlotte Harbor study region, as defined by the number of months survey respondents reside in the state of Florida. Further attention should therefore be given to boating patterns of 12-month resident boaters (i.e., year-round Florida residents) versus non-12-month resident boaters (i.e., that portion of the boating population that tends to reside in the state of Florida for only a portion of the year). A comparison of selected summary statistics of year-round resident boaters versus non-year-round resident boaters shows distinct differences in terms of the total number of trips taken annually (see Table 59). The results show that the 12-month resident boater takes approximately 10 more trips per year, on average (based on a comparison of the means). This, of course, makes sense given that a year-round resident has year-round access to coastal waterways.

Finally, the study findings highlight the need to (1) formally assess the characteristics of non-responders, and examine the extent to which responders versus non-responders to the survey differ in terms of number of trips taken, seasonal use, boating activities, etc, and (2) examine how seasonal versus year-round boating populations impact peak versus off-peak seasons, and if there is any similarity or dissimilarity in (a) their propensity to engage in specific types of boating activities during peak vs. off-peak months, (b) trip duration, (c) departure times, and (d) and on-water destinations.

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Appendices

Appendix A. Questionnaire and Correspondence

Cover Letter



Recreational Boating In the Greater Charlotte Harbor

A survey conducted by the University of Florida Sea Grant Program



Dear Boat Owner / Operator,

We are asking you to participate in a boating study being carried out in southwest Florida by the University of Florida Sea Grant Program. The study seeks to characterize boating in the area. Your responses will be very important to our efforts to help southwest Florida Counties prioritize and improve waterway access and maintenance, and to develop map-based boating products that enhance your recreational boating experience. There are no direct risks to you for participating in this study and we are enclosing a copy of “A Charlotte Harbor Boater’s Guide” to thank you for completing and returning this questionnaire.

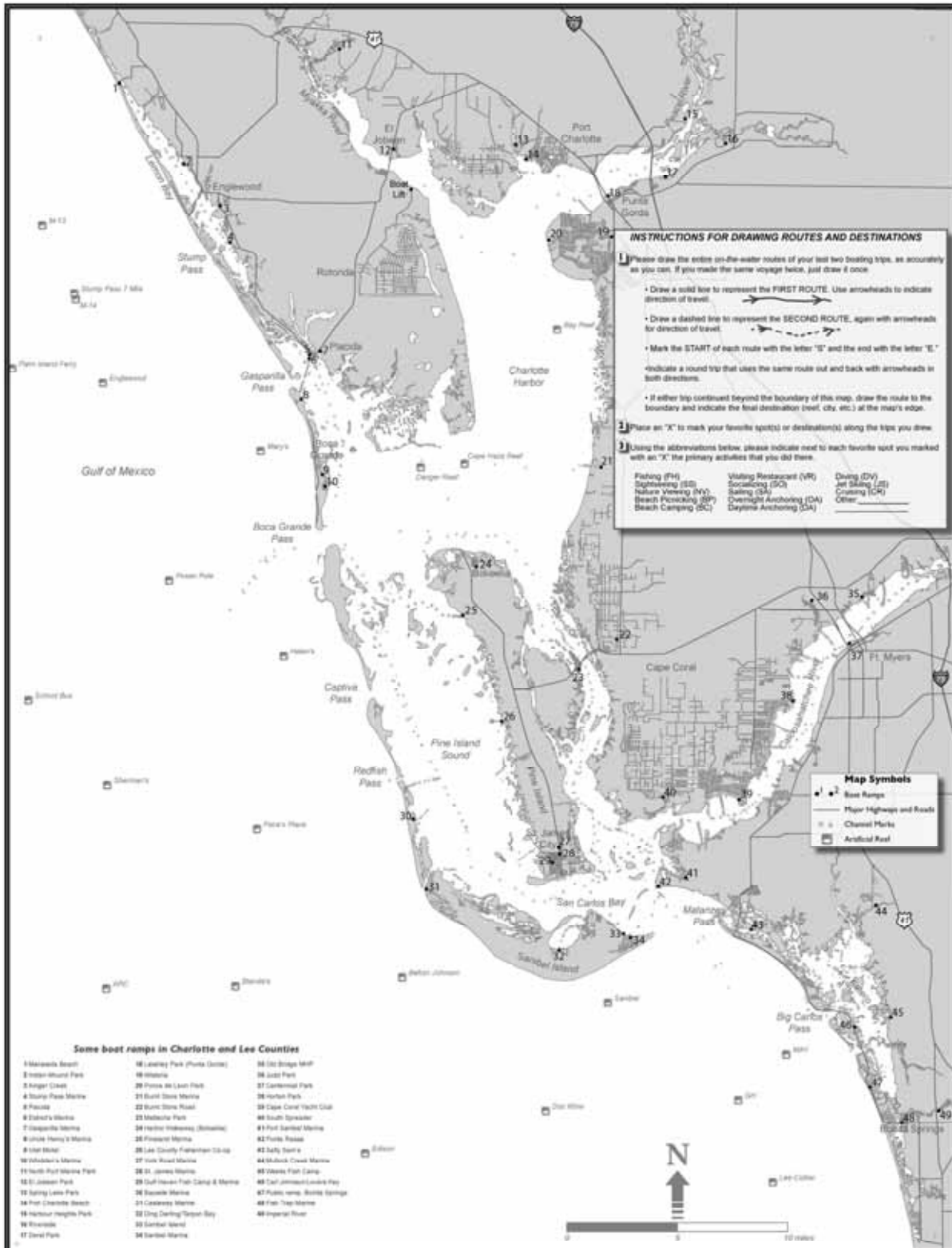
The questionnaire should take about 20 minutes to complete. We would appreciate it if you could complete and return it as soon as possible. We have provided a self-addressed, postage-paid return envelope. **Please be assured that the information you provide will be held in the strictest confidence. Answers will NOT be traced to individuals and your name or address will NOT be made available to anyone else.** Your participation is completely voluntary and you may withdraw your participation at any time without penalty. The questionnaire control number is used only to track survey returns so that we don’t inconvenience you with reminder cards.

Only a small sample of boaters in the Tampa and Sarasota Bay areas has received this survey, so your input is very important. We recently completed a similar boating survey in the Charlotte Harbor area and it was a great success!

For questions about your rights as a research participant, you may contact the University of Florida Institutional Review Board at PO Box 112250, Gainesville, FL 32611 or 352-392-0433. If you have any questions about this survey or our products for boaters, you may contact Charles Sidman at the University of Florida (352) 392-6233, or by email at boatsurvey@ifas.ufl.edu

We are most grateful for your assistance in this important project.

Questionnaire Map



Questionnaire

PART 1. PLEASE DRAW THE ROUTE OF YOUR LAST TWO BOATING TRIPS

On the other side of this questionnaire is a map of the Greater Charlotte Harbor area, from Lemon Bay to Estero Bay. We would like you to provide information regarding your last two boating trips in this area. This will include marking your launch or departure sites, drawing your boating travel routes, and marking your favorite boating spots or destinations along those routes. ***Please refer to the instructions in the upper right portion of the map for completion of this part of the questionnaire. Thank you.***

PART 2. PLEASE DESCRIBE YOUR LAST TWO BOATING TRIPS

Question 1. Were the last two travel routes that you drew on the map typical, or not -- do you travel these routes when boating in the Greater Charlotte Harbor areas depicted on the map more often than not? *(Please check the appropriate box for each travel route that you drew)*

First Trip (solid line)	Typical	☐	Not typical	☐
Second Trip (dashed line)	Typical	☐	Not typical	☐

Question 2. About what time did you get on the water for each of the two trips that you drew on the map? *(For example, 7:30AM)*

First Trip (solid line)	Second Trip (dashed line)
----------------------------------	------------------------------------

Question 3. About how long were you on the water on each of the two trips that you drew on the map? *(Please write in the number of hours or days.)*

First Trip (solid line)	Hours	Days
Second Trip (dashed line)	Hours	Days

Question 4. Please circle the day of the week that you took each of the two trips that you drew on the map.

First Trip (solid line)	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Second Trip (dashed line)	Mon	Tues	Wed	Thurs	Fri	Sat	Sun

Question 5. Please circle the month(s) in which you took each of the two trips that you drew on the map.

First Trip (solid line)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Second Trip (dashed line)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Question 6. From the list below, please check the box beside the vessel type that best describes the boat that you used on each of the two trips that you drew on the map.

Trip 1	Vessel Type	Trip 2
☐	Jet Ski / Personal Watercraft	☐
☐	Kayak / Row / Canoe	☐
☐	Sailboat (no cabin)	☐
☐	Sailboat (with cabin)	☐
☐	Speed: Runabout / Jet Boat (no cabin)	☐
☐	Speed: Scarab / Cigarette (with cabin)	☐
☐	Open Fisherman / Flats / Skiff / John boat	☐
☐	Offshore Sportfisherman (with cabin)	☐
☐	Power Cruiser (with cabin)	☐
☐	Deck Boat	☐
☐	Pontoon Boat	☐
☐	Other (specify) _____	☐

Question 7. Please enter the make/model, length, and draft of the boat(s) that you identified above.
(Draft is how far below the water surface your prop or hull extends.)

First Trip (solid line)	Make / Model	Length (feet)	Draft (feet / inches)
Second Trip (dashed line)	Make / Model	Length (feet)	Draft (feet / inches)

PART 3. PLEASE DESCRIBE YOUR TYPICAL BOATING TRIPS

Question 8. Please indicate, in the boxes below, the number of days per month that you operate your boat in the Greater Charlotte Harbor mapped areas.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Question 9. Which of the following are important to you in selecting your typical boating routes?
(For a-k in the table below, check the box that best describes your opinion.)

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) I try to avoid congested areas / crowds.	☐	☐	☐	☐	☐
b) I try to avoid shallow water.	☐	☐	☐	☐	☐
c) The fishing is good.	☐	☐	☐	☐	☐
d) I prefer well-marked channels.	☐	☐	☐	☐	☐
e) I prefer calm protected waters.	☐	☐	☐	☐	☐
f) I try to avoid speed zones.	☐	☐	☐	☐	☐
g) None are important. I just cruise around.	☐	☐	☐	☐	☐
h) Easy access to supplies or fuel	☐	☐	☐	☐	☐
i) Quick access to my favorite boating spots	☐	☐	☐	☐	☐
j) I enjoy the scenic beauty.	☐	☐	☐	☐	☐
k) Other (specify)	☐	☐	☐	☐	☐

Question 10. From the list (a–k) above, circle the letter associated with the most important reason for selecting your favorite boating routes.

Question 11. Please check the box to the **left** of your typical departure site.

- | | | |
|--|---|---|
| ☐ Boat ramp | ☐ Shoreline / causeway | ☐ Marina wet slip |
| ☐ Home dock | ☐ Condominium dock | ☐ Marina dry storage |
| ☐ Other (specify) | | |

If you normally depart from a marina, the shoreline, or a ramp, please answer the following questions. If you normally depart from a residential or condominium dock, please skip to Question 18.

Question 12. What marina do you depart from most often? (If you launch from a ramp, including a marina ramp, please skip to Question 14.)

Name / Location _____

Question 13. About how long does it take to drive from your home to the marina that you depart from most often?

Hours _____ Minutes _____

Question 14. If you use the shoreline or boat ramps (*including marina ramps*), please identify your two most frequently used shoreline locations or ramps and the approximate number of times per year do you use each. (*A list of some ramps is provided on the other side of this questionnaire.*)

Ramp or Shoreline Name/Location	times per year
First Choice	
Second Choice	

Question 15. About how long does it take to drive from your home to the shoreline locations or two ramps that you identified in Question 14?

Ramp Name/Location	Hours	Minutes
First Choice		
Second Choice		

Question 16. What is important to you in selecting a marina, shoreline, or ramp? (*For a-n in the table below, check the box that best describes how important it is to you, or leave blank if not applicable.*)

Statement	Very Important	Important	Neutral	Unimportant	Very Unimportant
a) Deep-water access	☐	☐	☐	☐	☐
b) Availability of restrooms	☐	☐	☐	☐	☐
c) No parking or launching fee	☐	☐	☐	☐	☐
d) Well-marked access channels	☐	☐	☐	☐	☐
e) Proximity to my favorite boating spots	☐	☐	☐	☐	☐
f) Adequate parking	☐	☐	☐	☐	☐
g) Availability of fishing supplies, bait	☐	☐	☐	☐	☐
h) Short wait to launch.	☐	☐	☐	☐	☐
i) Gas, pump-out, or maintenance service	☐	☐	☐	☐	☐
j) Nearby amenities (e.g., restaurant)	☐	☐	☐	☐	☐
k) Proximity to my home	☐	☐	☐	☐	☐
l) Ease of launching and retrieving boat	☐	☐	☐	☐	☐
m) Safe and secure parking area	☐	☐	☐	☐	☐
n) Other factor (<i>specify</i>)	☐	☐	☐	☐	☐

Question 17. From the list (a–n) above, please circle the letter associated with the most important reason for selecting a marina, shoreline, or ramp.

Question 18. What are your activities on your typical boating trips? (Check all that apply.)

- | | | |
|---|---|--|
| ☐ Beach Picnicking (BP) | ☐ Nature Viewing (NV) | ☐ Sightseeing (SS) |
| ☐ Cruising (CR) | ☐ Daytime Anchoring (DA) | ☐ Socializing (SO) |
| ☐ Diving (DV) | ☐ Overnight Anchoring (OA) | ☐ Visiting Restaurant (VR) |
| ☐ Fishing (FH) | ☐ Sailing (SA) | ☐ Swimming (SW) |
| ☐ Ski / Water Sports (WS) | ☐ Other (O) (specify) _____ | |

Question 19. Based on your boating experiences **over the past year**, have you avoided or left your favorite spots or destinations because of too many other boaters? ☐ Yes ☐ No

Question 20. In which areas, if any, have you experienced the greatest amount of boat congestion?
Please mark congested areas on the map with the letter "C." ("Congestion" refers to the presence of more boats than you would prefer.)

PART 4. PLEASE DESCRIBE YOURSELF

Question 21. How many months per year do you live in Florida? _____(Months)

Question 22. How long have you been operating a vessel in Florida's coastal water? _____(Years)

Question 23. Have you ever taken a boat safety or seamanship course? ☐ Yes ☐ No

Question 24. In what year were you born? _____

Question 25. Would you participate in a future internet and / or mail survey to provide further information on your boating experiences? **Internet** Yes ☐ No ☐ **Mail** Yes ☐ No ☐

Question 26. What detracts most from your boating experience?

Question 27. What is needed most to improve your boating experience?

**PLEASE RETURN THE QUESTIONNAIRE AND MAP IN THE ENCLOSED POSTAGE-PAID ENVELOPE
THANK YOU VERY MUCH FOR YOUR TIME AND PARTICIPATION!**

Questionnaire Control Number
(used only to keep track of survey returns)



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