STUDY TO DEFINE DEMOGRAPHICS, ECONOMICS, AND ENVIRONMENTAL AWARENESS OF CHARTER ANGLERS IN GALVESTON, TEXAS

A Thesis

by

RHONDA D. CUMMINS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF MARINE RESOURCES MANAGEMENT

May 2008

Major Subject: Marine Resources Management

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Approved by:

Chair of Committee,	W.M. von Zharen
Committee Members,	Ernest Estes
	Thomas L. Linton
	Frederick C. Schlemmer
Head of Department,	Ernest Estes

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ABSTRACT

Study to Define Demographics, Economics, and Environmental Awareness of Charter Anglers in Galveston, Texas. (May 2008)

Rhonda D. Cummins, B.A., East Texas State University

Chair of Advisory Committee: Dr. W.M. von Zharen

A survey questionnaire, following recommendations made by Jenkins and Dillman (1997) and approved by the Institutional Review Board in College Station, was designed to describe demographics of charter anglers in Galveston, Texas and to assess their environmental awareness. The anglers were described by age, gender, place of residence, and species preference to reflect past studies and provide consistency of data. Economic impacts on the local economy were estimated using the number of anglers that spent at least one night in a Galveston hotel, charter fees, and a daily average for food/beverage expenditures made during their stay. Environmental awareness was established by asking whether anglers noticed the presence of marine debris, whether they were aware of the existence of the Flower Garden Banks National Marine Sanctuary (FGBNMS), and whether marine sanctuaries were a valuable management tool.

The questionnaire was administered to anglers that fished from the charter boat *Freedom* during its fifty-four charter trips in the months of June through August 2007. The response rate to the survey was 93.8% (N=213 respondents). The majority (81.7%)

of those surveyed was male, 86.8% were between 20-60 years old, and 86% resided in Texas. The sub-population of charter anglers was defined as infrequent (68.5 %), without species preference (70.8 %), did not own their own boat (75%) and did not belong to a fishing, hunting, or conservation organization (79.8%). The economic impact was approximately $400 per person per day. This first step in assessing environmental awareness resulted in these findings: approximately 14% of the anglers noticed dead fish; 7% noticed dead birds; and 54.5% noticed man-made trash during their charter. Thirty-eight anglers (17.8%) responded that they were familiar with the FGBNMS; yet in general, nearly 81% indicated a perceived value in sanctuaries as a management tool.

Future studies are needed to fully assess environmental awareness of anglers and their knowledge of other management programs. This is particularly important with the expansion of programs such as the Texas Parks and Wildlife Department's artificial reef program.

DEDICATION

My love of fishing came from my maternal grandparents, Mrs. Elvie E. Brunson and Mr. J. S. (Bronc) Brunson. They spent countless hours of my childhood teaching me to fish and enjoy the great outdoors. Because of their passion for this sport, I dedicate this thesis in loving memory of them.

I also dedicate this thesis to a dear colleague who passed away suddenly during the writing of this paper. Mr. Ralph Rayburn, class of ’69, was a tireless advocate for the protection of global marine resources and spent his working years dedicated to the protection and preservation of the waters and wildlife on the Gulf Coast. He carried the Aggie spirit with him, befriending all those whom he met. He was a man of true faith and devotion to doing what was “right.” I was blessed to have known Ralph, as he was a kind, considerate and giving gentleman. He will always be remembered as a friend and mentor.

ACKNOWLEDGEMENTS

This work could not have been done without the participation of Captain Jim Langston, owner and operator of the charter fishing vessel *Freedom.* Capt. Langston's willingness to give me summer employment and his acceptance of my research proposal were mandatory. Without his permission, my survey could not have been conducted. His support of my studies at Texas A&M University, Galveston was without parallel. His patience was endless as I learned his trade and used him as a sounding board for my school work. My gratitude to him exceeds my ability of expression.

A special thank you goes to my committee chair Dr. W.M. von Zharen. No one has more energy, drive, and persistence for excellence than she does. I will always be grateful for her tireless devotion, commitment, encouragement, suggestions and assistance throughout my time at TAMUG.

I would also like to thank the following people for their support and assistance with this project: my committee members Dr. Schlemmer, Dr. Linton, and Dr. Estes; my partner Mr. David Hoggatt; my friends Mr. Vincent Treglia and Ms. Ellen Falone; my colleagues at West Marine; my church family at Grace Episcopal, Galveston; and my port in the storm, the Daniel family of San Angelo.

Most importantly, I want to express my deepest thanks to my father Mr. Herbert Cummins (deceased) and my mother Mrs. Betty Cummins. Their support throughout my life has led to many successful endeavors, including this one. Thanks, Mom! I couldn't have done it without you.

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INTRODUCTION

Executive Order 12866 signed by then-President Clinton directs agencies to "select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach" (President, 1993). Fisheries management during recent decades must consider ecological, political, economic, and sociocultural factors to meet their charge of conservation and optimum use (NAS, 2006). The U. S. Fish and Wildlife Service (FWS) has conducted the National Survey of Fishing, Hunting and Wildlife-Associated Recreation (Survey) every five years since 1955 (FIN, 2001). The purpose of the Survey is to gather information on the number of anglers, hunters, and wildlife-watching participants in the U. S. including how often they participate and how much money they spend on their activities (USDOI, 2001). The Survey is a snapshot for the year it is conducted and the information gained is a valuable tool to gauge trends in Americans' participation in wildlife-related activities and related expenditures (FWS, 2007).

In 2001, more than 82 million U. S. residents fished, hunted, and watched wildlife; they spent over $108 billion pursuing these activities; they contributed to millions of jobs in businesses and industries that support wildlife-related recreation; and they generated funds through licenses and taxes that pay for many of the country's

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This thesis follows the style of the journal *Human Dimensions of Wildlife.*

conservation efforts (USDOI, 2001). Nearly $5.4 billon was spent on wildlife recreation in Texas, with sportfishing accounting for $4.6 billion (USDOI, 2001) and the total economic effect estimated at $10.9 billion (Southwick & Allen, 2003). Forty-five percent of all their fishing expenditures were trip-related including transportation, food and lodging (USDOI, 2001). Fish and wildlife provide numerous recreational opportunities for Texans and provide significant employment, income, and other economic benefits to the state giving the industry immense value to all residents and visitors of Texas whether they are anglers or not (Southwick & Allen, 2003).

Preliminary data for the latest Survey show that Americans spent $120 billion on wildlife-related recreation in 2006 including 30 million Americans age 16 or older who fished and spent $41 billion on their activities (FWS, 2007). The influence of hunters and anglers goes even further by creating an economic ripple effect of $192 billion a year (CSF, 2007). Texas was ranked top in the nation for state hunting and fishing economic impact with 2.6 million hunters and anglers, spending $6.6 billion, supporting 106,000 jobs, and generating $1.3 billion in tax revenue (Gable, 2007).

The economics extend to the state fisheries management agencies that support conservation efforts (Floyd & Lee, 2002). Excise taxes on fishing equipment, motorboat and small engine fuels, import duties, and interest are collected and appropriated from the Sport Fish Restoration and Boating Trust Fund based on a formula which includes land area and number of paid license holders (FWS, 2008). Federal Aid in Sport Fish Restoration (SFR) funding is used to stock fish, acquire and improve sport fish habitat, provide aquatic resource education opportunities, and conduct fisheries research,

including surveys and inventories of sport fish populations, among other related activities (Parramore, 1998). The SFR Program was created to restore and better manage America's declining fishery and is one of the most successful user pay, user benefit programs (FWS, 2008).

Management of sport fisheries has long been concerned with the estimation of fishing mortality and the total harvest removed by anglers (Robson, 1960). Surveys of anglers have been traditionally used by managers of freshwater fisheries, but with the increased competition between saltwater commercial and recreational anglers, surveys have gained importance in saltwater fisheries management (Robson & Jones, 1989). The Magnuson Fishery Conservation and Management Act of 1976 broadened the range of marine fisheries management to include economic and social factors to increase the overall benefit to the United States in terms of recreational opportunities and food production (16 USC 1802). As a result, Federal and state agencies in the United States fund many angler surveys with a variety of objectives and reasons each year (Pollack, Jones & Brown, 1994).

Throughout the United States there are currently several different surveys conducted of marine recreational fishing (NAS, 2006). Implemented by the National Marine Fisheries Service (NMFS) in 1979, the Marine Recreational Fisheries Statistics Survey (MRFSS) was conducted for all recreational fisheries along the Atlantic and Pacific coasts, in the Gulf of Mexico and Caribbean Sea, and off Hawaii (NAS, 2006). The MRFSS is a national survey designed to track trends in angler catch and effort and provide annual regional estimates of harvest and catch for assessment purposes (Brame,

2007). Fishing effort is determined from coastal household telephone surveys, which collect data for each household by recording the number of residents who fished in the last two months (NOAA Staff, 2007). Catch per unit effort (CPUE) is determined from access-point intercept surveys conducted for shore fishing off docks, piers, jetties, breakwaters, bridges, causeways, beaches, and banks; and for private, rental, and for-hire boats (NOAA Staff, 2007).

The supplementary For-Hire Survey (FHS), first implemented in the Gulf of Mexico in 2000, has been extended to all coasts for all fisheries to ascertain fishing effort and CPUE data (NAS, 2006). Effort is determined from telephone surveys using published phone numbers of boat operators, and CPUE is determined from access-point intercept surveys for charter and head boats[1] and from at-sea surveys for head boats (NOAA Staff, 2007). Charter or head boats along California, Alabama, Florida and the Atlantic coast use observers onboard to record at-sea sampling (NAS, 2006). Similar to the FHS, the Party Charter Survey (PCS) is conducted for fishing trips for party and charter boats off California. Fishing effort is determined from boat directory telephone surveys, and CPUE is determined from access-point intercept surveys and at-sea sampling (NAS, 2006).

Various states have surveys as well. For example, to obtain statewide estimates of catch, location, and CPUE for each species in Alaska, the Alaska Sport Fish Statewide Harvest Survey (SWHS) was implemented in 1977 to be used instead of the MRFSS because of the lack of telephones in Alaska (NAS, 2006). The SWHS is a mail survey using the angler license directory to send surveys to about 20% of the households with

licensed anglers, and currently about 40 percent of the sampled households respond (Jennings, Sundet & Bingham, 2007). Table 1 shows an overview of marine recreational surveys that operate in the United States.

Fisheries in the Gulf of Mexico use the regional Southeast Head Boat Survey (SHBS). Effort, CPUE, and catch for head boats are determined from logbook census (NAS, 2006). The logbooks are used to gather boat permit number and identification details, date and time sailed, area sailed (e.g., state waters, federal waters, inshore), length of trip, number of anglers, catch by species, catch location, and discards (Davidson, 2007). Onsite surveys are also done at the end of trips to gather sampling data to compare to the logbooks (NAS, 2006).

Initiated in 1974, the Texas Marine Recreational Fishing Survey (TMRFS) is structured to collect information from private, rental, and charter boats regarding the targeted species, catch composition, catch number, and catch size through stratified proportional random sampling (Osborn, 1996). Data on trip length, angler CPUE, location of fishing, gear and bait used, residence of anglers, and trip satisfaction also were collected (NAS, 2006).

Table 1 Marine Recreational Fishing Survey Overview

Name of survey	Area(s) covered	Survey method for effort	Survey method for CPUE
Alaska Sport Fish State-wide Harvest Survey	Alaska Southeast Alaska	Mail survey of licensed anglers	Mail survey of licensed anglers
California Recreational Fisheries Survey	California	Telephone survey of licensed anglers	Port-based & access-point intercept surveys
Catch Card Survey	Washington North Carolina Maryland		Mandatory catch card reports for catch survey methods
For-Hire Survey	Atlantic coast Gulf of Mexico	Telephone survey of boat directory	Access-point intercept survey; at-sea sampling
Large Pelagic Survey	Atlantic coast from VA to ME	Telephone survey of boat directory	Access-point intercept survey
Marine Recreational Fishery Statistic Survey	Atlantic coast Gulf of Mexico	Telephone survey by random dialing	Access-point intercept survey
Oregon Recreational Boat Survey	Oregon	Port-based boat exit count	Port-based boat-trip intercept survey
Ocean Sampling Program	Washington	Port-based boat entrance count	Port-based boat-trip intercept survey
Party/Fhe Survey	California	Telephone survey of boat directory	Access-point intercept survey; at-sea sampling
Puget Sound Sampling Program	Washington	Telephone survey of licensed anglers	Access-point intercept survey
Shore & Estuarine Boat Survey	Oregon	Telephone survey of licensed anglers	Access-point intercept survey
Southeast Head Boat Survey	Gulf of Mexico	Logbook census	Logbook census
Texas Marine Recreational Fishing Survey	Gulf of Mexico	On-site roving boat counts	Port-based boat-trip intercept survey
Vessel Trip Reports	Atlantic coast	Logbook census	Logbook census

Adapted from *Review of Recreational Fisheries Survey Methods* (NAS, 2006).

Texas has not participated in the MRFSS since 1985, but it does conduct its own survey, the Texas Parks and Wildlife Department's (TPWD) Coastal Sport Fishing Survey, that solicits similar information (GMFMC, 2003). TPWD has commissioned several state-wide angler mail surveys since 1986 that have studied resident freshwater and saltwater anglers as well as non-resident licensed anglers because "fisheries management is increasingly being viewed more as people management than fish management" (Ditton & Hunt, 2001, p. 295). More than catch and effort needs to be known; managers need to know what anglers do and think about fishery resources and why, through using various methods to collect data on-site and off-site (Ditton & Hunt, 2001).

Texas has been a leader in using optimum yield (OY) strategies[2] to manage its fishery resources (Ditton & Hunt, 1996). Social scientists have played a greater role in providing the TPWD with relevant data and information since 1985 by conducting surveys on various angler populations and sub-populations[3] (Anderson & Ditton, 2004). For example, six statewide angler survey data sets (1989, 1990, 1993, 1998, 2002, and 2005) were used in a longitudinal analysis of data on demographics, participation, attitudes and management preferences of Texas anglers from the individuals that purchase resident fishing licenses (Anderson & Ditton, 2004). In fact, some researchers state that human dimensions research may be more important than biological research on fishery and habitat resources (Tseng, Wolber & Ditton, 2006).

Human dimensions of natural resource management has been defined as "an area of investigation which attempts to describe, predict, understand, and affect human

thought and action toward natural environments and to acquire such understanding for the primary purpose of improving stewardship of natural resources" (Delaware Sea Grant, 2008). Human dimensions research builds on several disciplines including economics, geography, psychology, marketing, and education among others (Wilde, Ditton, Grimes & Riechers, 1996). There is still much to learn about the human dimensions of fisheries management including developing a better understanding of various sub-populations of anglers, particularly women, urban dwellers, and tourists (Tseng et al., 2006). One such sub-population is charter anglers. Charter boats are an important component of the marine recreational fishery because they can change the demographics of offshore anglers by allowing those that lack the sufficient discretionary income to own their own boats access to offshore fishing (Ditton, Sutton, Holland, Stoll & Milon, 1999).

Ditton, Mertens and Schwartz (1978) surveyed a sample of "fishermen"[4] who chartered boats along the Texas Gulf Coast. With the relatively large study area, the number of charter operators, and the relatively infrequent rate at which individuals participated in charter fishing, it was deemed too difficult and costly to interview individual charter fishermen on site (Ditton et al., 1978). Consequently, a list of charter boat fishermen obtained from records of various charter boat operators was used to mail out a questionnaire (Ditton et al., 1978). This study was one of the eleven summarized by Ditton, Gill and MacGregor in 1991.

A 1991 report summarized research findings from studies published during 1974-86 on understanding charter anglers. This report focused on charter and partyboat

anglers from Wisconsin, Texas, New York, Florida, Mississippi, California, Delaware, Hawaii, Alaska, and Michigan (Ditton et al., 1991). “More research attention should be focused on identifiable market segments of charter and headboat anglers. The diversity with the overall angler group needs to be explored more fully to respond to specific questions being asked by fishery managers regarding regulatory impacts” (Ditton et al., 1991, p. 25). These market segments include anglers by the species they prefer to catch and local anglers, among others (Ditton et al., 1991). Future studies of charter anglers will need to be issue-oriented and well-grounded on previous descriptive work; such studies will need to focus on questions of concern to resource managers and alternative data collection techniques need to be considered (Ditton et al., 1991).

Surveys are an essential tool in social research (Punch, 2003). It is important to keep in mind that most respondents are inexperienced in completing questionnaires; therefore, the design should allow the respondent to quickly glance at the form, understand where to start, and know what they are supposed to do (Jenkins & Dillman, 1997). Most angler surveys are conducted using relatively large scale (sample sizes of 300 to 20,000) mail and telephone surveys (Wilde et al., 1996). Mail surveys are the least expensive and their response rates range from 32%-80%, with an average of 57% (Wilde et al., 1996). Telephone surveys are slightly more expensive and have lower response rates, ranging from 33%-52% with an average of 42% (Wilde et al., 1996). If alternative methods need to be used, small-scale research projects, specifically those conducted by graduate students, could have important “contribution-to-knowledge benefits” (Punch, 2003, p. 22).

Optimizing response rates is important for reducing the potential for non-response bias (Koloski, N. A., Talley, N. J., Boyce, P. M., Morris-Yates, A. D., 2001) Response rates on small-scale surveys could be maximized by designing questionnaires that combine shortened length and respondent friendliness (Dillman, Sinclair & Clark, 1993). Respondent-friendly refers to forms that are easy to complete and result in positive or neutral, instead of negative, feelings about the questionnaire (Dillman et al., 1993). Difficult or objectionable questions have been shown to reduce response rates (Dillman et al., 1993; Koloski et al., 2001). Rapport with the sponsor of the survey, or surveyor, and the age, personality, and prior knowledge of respondents can also affect response rates (Koloski et al., 2001).

A study has shown that over the past several years, fisheries managers have become more knowledgeable about the social benefits and motivations associated with boating, fishing, and stewardship education (Floyd, 2001). However, the same study identified several knowledge gaps in stewardship education including the need for clearly defined goals and measurable outcomes. These gaps are not surprising since it has been noted that creating an involved and informed public for environmental issues can be challenging (Kightlinger, Sytsma & Heimowitz, 2003). Knowledge by itself does not change behavior (Morrison, Baker & Gillmore, 1994). What is also important is the kind of knowledge: the 2000 Roper Report,[5] an annual report card on environmental attitudes, knowledge, and behavior, discovered a troubling and persistent lack of environmental knowledge among Americans (Kightlinger et al., 2003). This series of

reports is the only longitudinal data[6] available on what Americans know and think about important environmental issues (NEEF, 2007).

The gap between environmental awareness and the possession of environmental knowledge has lead to the development of numerous theoretical frameworks including promising advances in community-based social marketing (Kollmuss & Agyeman, 2002). The development of social marketing approaches such as Weinreich's Stages of Change Theory (1999) arose out of concerns, specifically for sustainability issues, about the ineffectiveness of environmental movements that solely relied on providing information (McKenzie-Mohr & Smith, 1999). The Stages of Change Theory (Weinreich, 1999) describes how an "individual moves from a lack of awareness to consistent action" (Kightlinger et al, 2003, p. 2). The various stages are: 1) *pre-contemplation* where the person lacks awareness of the issue, 2) *contemplation* where the person realizes a problem exists and starts to think about it, 3) *preparation* where the person decides to take action and learn how to change their behavior, 4) *action* where the person performs the new behavior and decides if it is worthwhile, and 5) *maintenance* where the person continues to perform the appropriate behavior (Weinreich, 1999). Messages must be sent throughout the stages to move people along the path of change starting with messages that raise awareness about the problem to be addressed (Weinreich, 1999).

Environmental movements to raise awareness and change behavior among anglers are not well documented in the literature. Little is known about the stewardship orientation of anglers, boaters, or the general public (Fedler, 2001). Studies conducted to

assess the relationship between environmental concern and participating in outdoor research have had mixed results (Bright & Porter, 2001). Previous research has not addressed the general environmental attitudes, knowledge and behavior of anglers.

Recently, however, limited attention has been given to studying anglers' attitudes towards restricted fishing areas (Salz & Loomis, 2005). Currently, the only restricted fishing area near Galveston is the Flower Garden Banks National Marine Sanctuary[7] (FGBNMS) located 70 to 115 miles off the coasts of Texas and Louisiana (Sanctuary Staff, 2007). Originally protected by the Gulf of Mexico Fishery Management Council (GMFMC, 1982) as a Habitat Area of Particular Concern (HAPC), the area is protected from coral harvest and the use of fishing gear such as bottom trawls and longlines, dredges, toxic chemicals, pots, and traps that could damage coral communities (Coleman, Baker & Koenig, 2004). Designated as a Sanctuary in 1992, its goal is much like those of a national park: "enhance public awareness, understanding, appreciation, and wise use of the marine environment" (Browne & Kubasek, 1999, p. 11).

Historically, very little research has been done on tracking the impacts of commercial, as well as recreational, fishing on the FGBNMS (Gittings & Hickerson, 1998). However, there have been reports of illegal fishing by both commercial long-liners and recreational spearfishers (Hickerson & Schmahl, 2005). There are significant concerns about charter and partyboat anglers fishing at, or near, the FGBNMS (G. P. Schmahl, personal communication, May 24, 2007). Closer to shore, the part of the sanctuary called Stetson Bank is often targeted by recreational anglers and targeted fishing efforts could have significant detrimental impacts on grouper and snapper

populations (Hickerson & Schmahl, 2005). A basic measurement of the awareness of the FGBNMS and a perceived value of such programs could be useful (G. P. Schmahl, personal communication, May 24, 2007).

The literature suggests that future angler surveys need to be grounded on previous descriptive work and be issue-oriented. Therefore, my study had two main objectives. The first was in line with previous studies on human dimensions. This human dimensions data to define Galveston charter anglers included demographic characteristics, potential economic impacts of their fishing activity on the local economy, and variables which included level of participation and type of fish species preference.

The second objective was issue-oriented. Environmental awareness for the purpose of this study was defined as the recognition of the presence or absence of marine debris using the natural indicator of dead marine life and the man-made indicator of trash. The perceived value of marine sanctuaries as a management tool was chosen as an exploratory question for this study because of the sanctuaries' management team goal to protect, conserve, and enhance the biodiversity, ecological integrity and cultural legacy of the nation's system of marine protected areas (Sanctuaries Web Team, 2007). The focus on marine sanctuaries was taken one step further to determine if anglers were familiar with the existence of the Flower Garden Banks National Marine Sanctuary (FGBNMS). Although there are other reef programs in the Gulf of Mexico, the FGBNMS was chosen because of its proximity to Galveston and because of concerns voiced by the sanctuary superintendent, Mr. G.P. Schmahl. (While not included in this

study, the Texas Parks and Wildlife Department's artificial reef program[8] is important in creating valuable habitat [as opposed to protecting existing habitat] and should be included in future studies.)

RESEARCH METHODS

My study used information from a survey of charter anglers that was conducted onboard the *Freedom*, a charter boat operated out of the Galveston Yacht Basin. I conducted an on-site survey each day I worked aboard the *Freedom* during the months of June, July, and August 2007. Employment as a deckhand gave me an unparalleled opportunity: I had unlimited time and access to collect data from charter anglers during the three busiest months of the season on a well-established charter boat.

The survey (Appendix A) included questions regarding age, gender, and residence location. Angler responses regarding age were grouped into four categories corresponding to Levinson's model of life development (1978): childhood (0-20) but for the purposes of this survey 18-19 years old, early adulthood between the ages of 20 to 40; middle adulthood between the ages of 41 to 60, and late adulthood over 60 years old (Ornstein, Cron & Slocum, 1989). Anglers were asked their gender to compare the percentages of participation by males and females. Anglers were grouped by their five-digit U.S. Postal Service Zip Code. This demographic information is useful for estimating how population changes might increase pressures on natural resources, assessing the community's need for public services and natural resources, and developing strategies that address the environmental concerns associated with growth others (USEPA, 2002).

Open-ended comments were included to gather information about where and how long the anglers were staying in Galveston, the primary reason for their visit, and

other activities planned during their stay. For example, anglers could only be coming for the day, staying in a hotel, at a rented beach house, with family or friends. This information was collected to represent basic indicators of economic impact on the local community.

Questions were included to learn why, where, and how often the anglers participated in fishing. One question focused on their basic rationale: it gave the angler a choice between fishing for the experience (recreation) and fishing for food to eat (consumptive). They were asked to report on the number of times they had been fishing in the past month given six categories ranging from zero to more than sixteen days. The "sixteen day or more" category was used to accommodate anglers who fish more than half the month.

Anglers were asked whether they were targeting a specific species of fish, and if so which one(s). They were also asked whether they primarily fished in lakes, rivers, bays or offshore. Primary area data were collected to differentiate among freshwater anglers, saltwater anglers, and those who participate in both. This information was collected to help understand fishing frequency and motivations consistent with previous studies. Anglers were also asked whether they were a member of a fishing, hunting, or conservation organization. The anglers were asked whether they owned a fishing boat.

Anglers were asked whether they noticed any marine debris such as dead fish, dead birds, or trash in the water during their charter. They were asked whether they thought marine sanctuaries were a "good idea"[9] to determine their perceived value of

this management tool. Specifically, they were questioned about their awareness of the FGBNMS.

The survey was conducted following each of 54 charter trips and were completed after the charter experience, at the dock, and returned to me prior to the anglers' departure. Minor children were excluded from the survey.[10] The potential survey sample was 227 adult passengers. Two hundred and thirteen[11] were completed and returned, yielding a response rate of 93.8%.

RESULTS

During the survey period, the majority of the *Freedom's* charter boat passengers were males (81.7%), with females representing almost 20%. The majority of the passengers were in middle adulthood at 41-60 years (45%) and early adulthood at 20-40 years (41.8%) (Figure 1). Residence locations were denoted by zip code, representing nine U.S. states with about 86% of anglers residing in Texas. Canada and Africa were also represented (Figure 2).

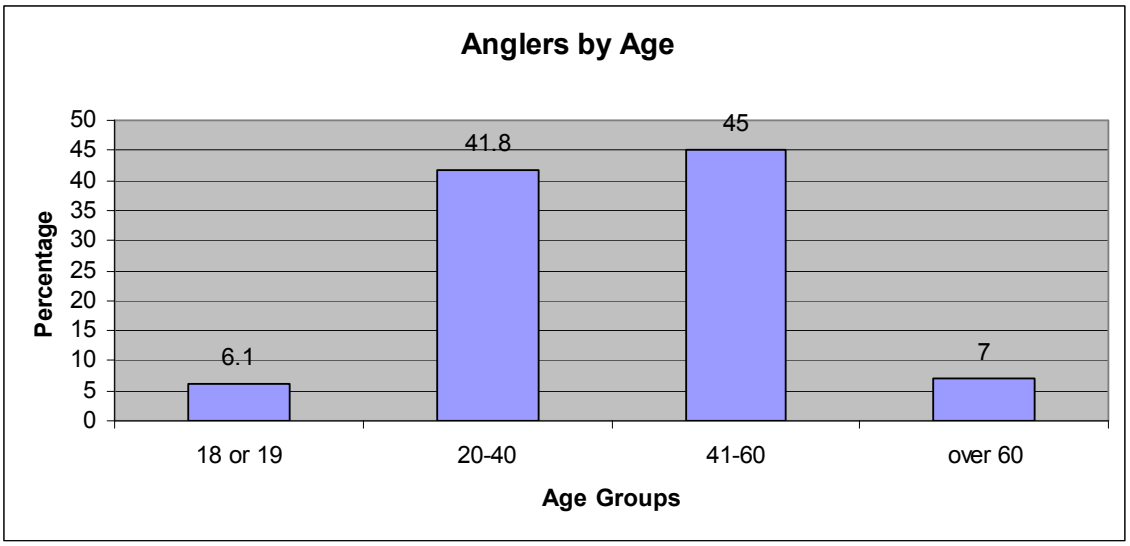

Figure 1 Percentage of Anglers by Age Groups

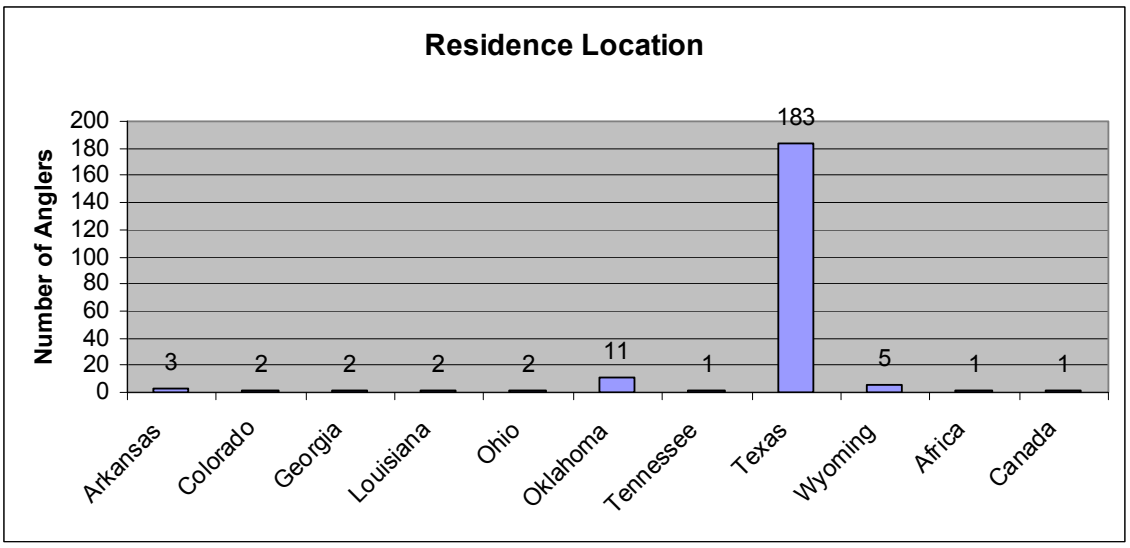

Figure 2 Residence Locations Determined by U.S. Zip Code

Samples of potential economic indicators were included in the survey. This information was not intended to calculate the actual economic impact associated with fishing charters but rather to illustrate the connection between the charter anglers and the local economy. At least one night was spent on the island by 69% of the anglers. Of these anglers, 67.8% stayed in a local hotel, while 15.4% indicated that they rented a condo or beach house. Approximately 11% of the anglers that stayed in Galveston reported staying in a private residence (Figure 3). The primary reasons given for their visit were fishing (30.4%), vacation (20.7%), business (4.7%), fishing and vacation (3.3%), and fishing and business (2.8%). Eight anglers (3.8%) chose "other" as their primary reason to visit Galveston (Figure 4).

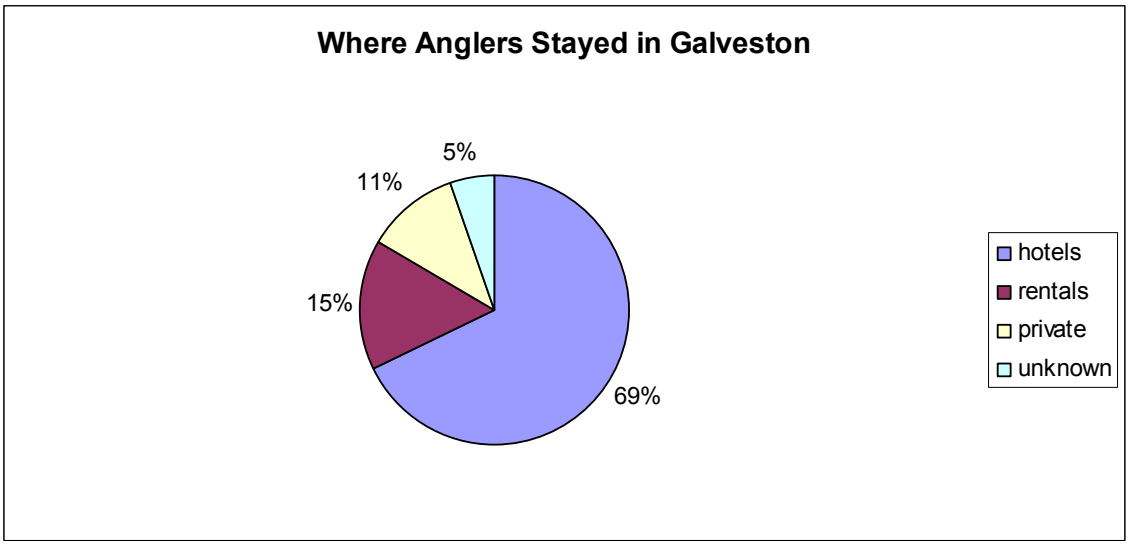

Figure 3 Where Anglers Stayed in Galveston

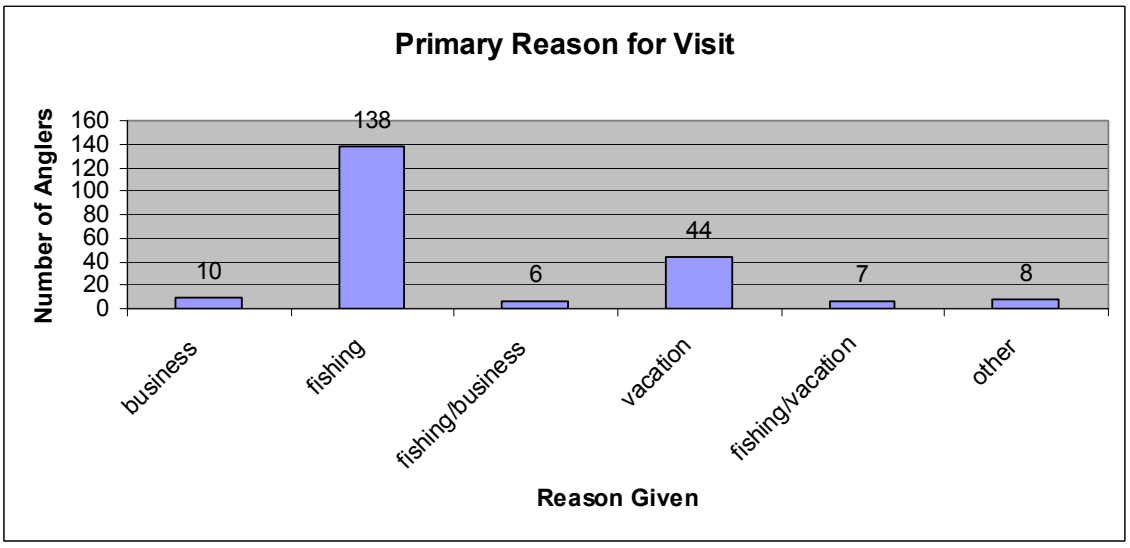

Figure 4 Primary Reasons Given by Anglers for Visiting Galveston

An open comment question asked about other activities in which they would participate during their stay, and, as such, many answers were vague or incomplete. Twenty-one separate activities were listed in various combinations. The most frequent responses included eating out in restaurants, fishing, drinking in bars, going to the beach, and shopping. Specifically of interest to the Galveston business community were the responses that listed local attractions such as Moody Gardens, Schlitterbahn, and the Strand.

Trips chartered during the survey were half-day bay (33.3%), all-day bay (5.6%), 8-hour offshore (20.4%), 10-hour offshore (38.9%), and 15-hour offshore (1.9%). Prices for trips ranged in between $550 to $2000, excluding tips (Table 2). The total charter fees for the 54 trips were $55,800, for an average of $1033.33 per day.

Table 2 Type and Fees for Trips Chartered During Survey

Type of trip	**# of trips**	**Cost of Trip**	**Total**
Half-day Bay	18	$550	$9,900
All-day Bay	3	$800	$2,400
8-hour Offshore	11	$1,100	$12,100
10-hour Offshore	21	$1,400	$29,400
15-hour Offshore	1	$2,000	$2,000

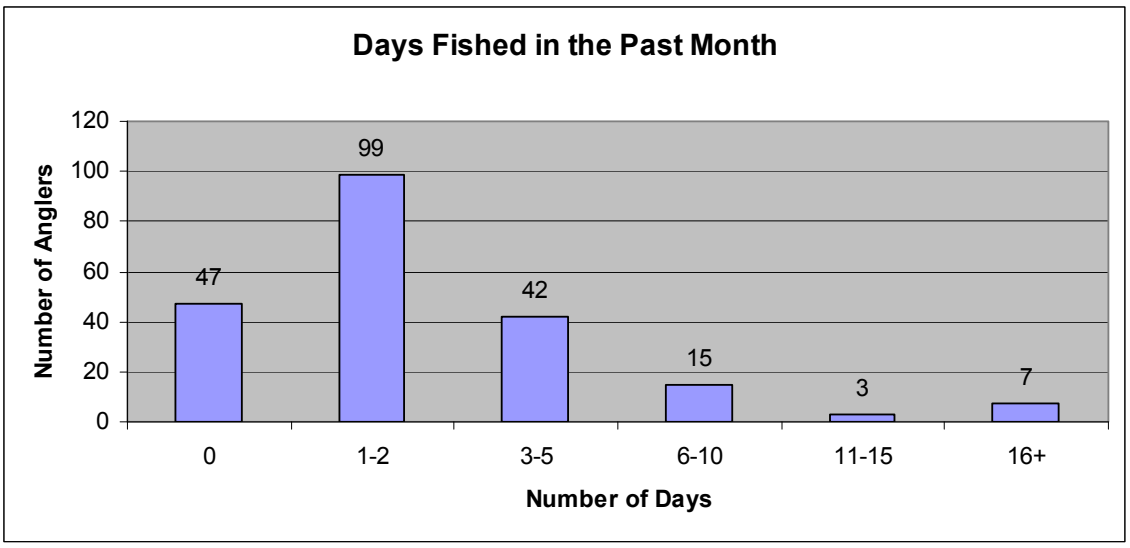

Figure 5 Number of Days Fished in the Past Month

More than two-thirds of the anglers (68.5%) had fished less than three days in the past month, with the majority reporting 1-2 days of fishing. Ten anglers fished for more than eleven days (Figure 5). The primary rationale the anglers gave for fishing was "the experience" (62.9%) and "fish to eat" (24.9%). Twenty-two of the anglers circled both choices (10.3%) and four anglers wrote in the choice of "fun" (1.9%) (Figure 6). Nearly 25% of the anglers own a fishing boat. Forty-three anglers (20.2%) said they were a member of a fishing, hunting, or conservation organization (Figure 7). If anglers were fishing for a specific species of fish, they were asked to list those fish. Forty-four anglers (20.7%) responded to this question. The targeted fish species listed were snapper, shark, redfish, kingfish, and ling (Figure 8).

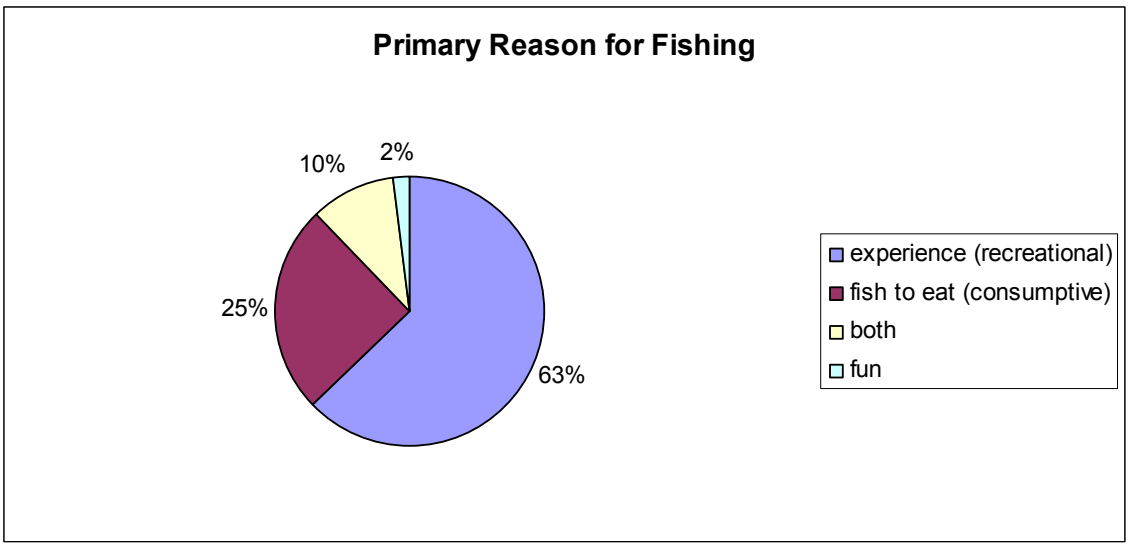

Figure 6 Primary Rationales Given for Fishing

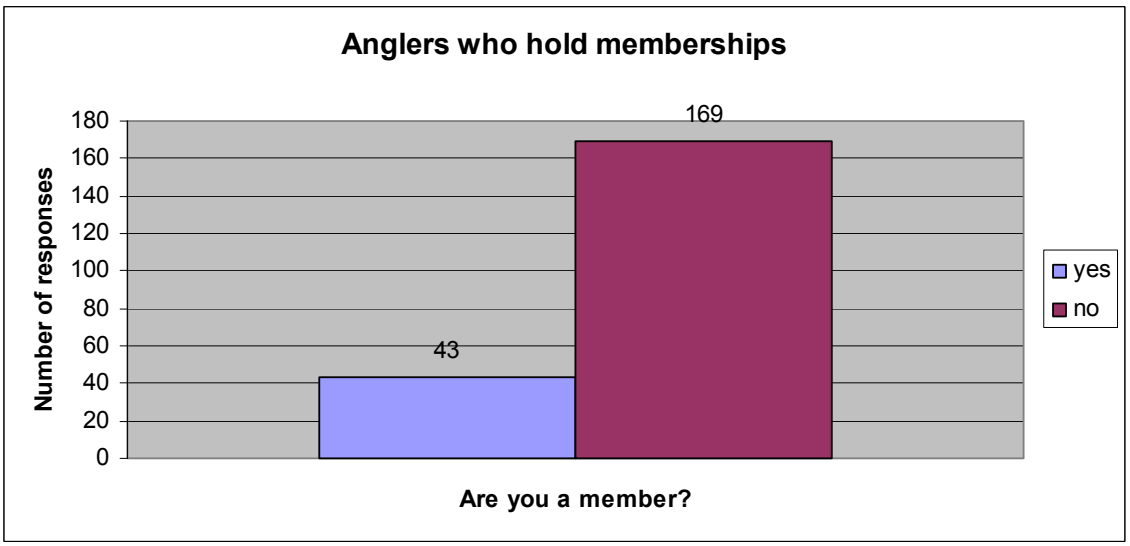

Figure 7 Number of Anglers who are Members of a Fishing, Hunting, or Conservation Organization

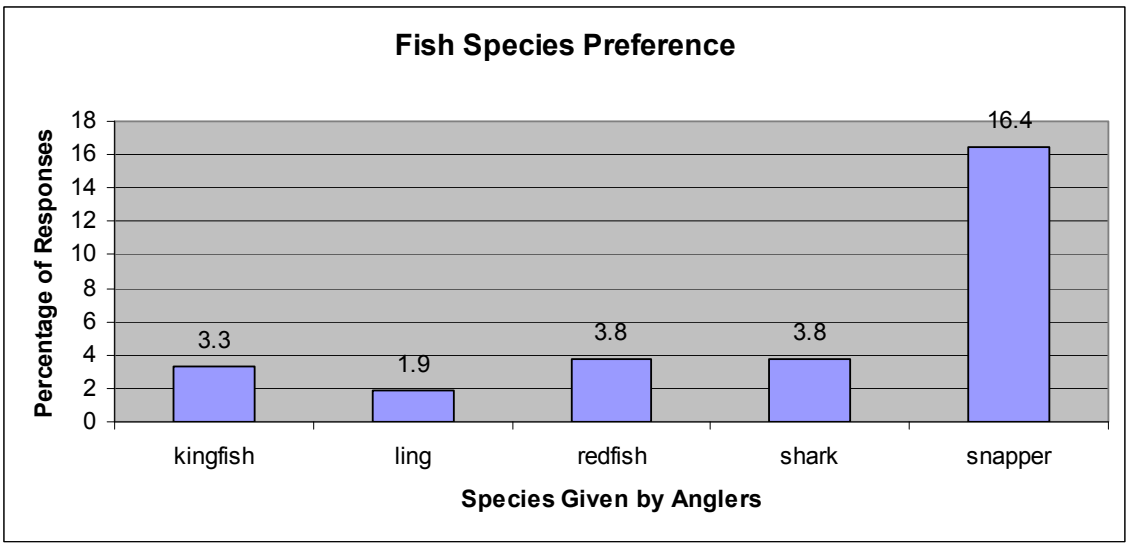

Figure 8 Species of Targeted Fish

Approximately 14% of anglers noticed dead fish. Of the thirty-nine anglers that reported noticing dead fish, seven were female and twenty-two were male. The comparison between gender and noticing dead fish shows 17.9% of females noticed the fish compared to 12.6% of the males. Nearly 7% of the anglers noticed dead birds. Of the fourteen anglers that reported noticing dead birds, three were female and eleven were male. The comparison between gender and noticing dead birds shows 7.7% of females noticed the birds compared to 6.3% of the males. A larger percentage of anglers (52.6%) noticed trash in the water. Of the 112 anglers that reported noticing trash, twenty-one were female and ninety-one were male. The comparison between gender and noticing trash shows 53.8% of females noticed the trash compared to 52.3% of the males.

Anglers were supportive of marine sanctuaries in general. Approximately 81% of the anglers responded that they thought marine sanctuaries were a good idea thus

indicating a perceived value. There were no negative responses. Nearly 18% of the anglers were unsure about such programs. The comparison between gender responses for a good idea shows 79.5% of females said “yes” compared to 81.6% of males.

Thirty-eight anglers (17.8%) reported a familiarity of the Flower Garden Banks National Marine Sanctuary (FGBNMS).The majority of these anglers (47.9%) reside in Texas within 150 miles of Galveston as computed by zip codes (Figure 9). Table 3 gives the breakdown of cities by zip code where the anglers live.

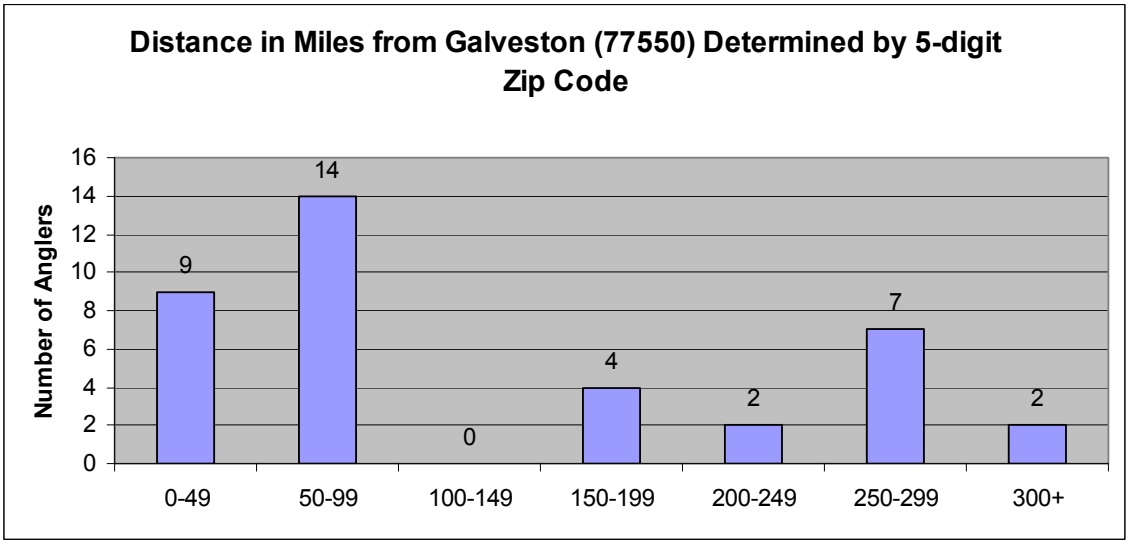

Figure 9 Number of Anglers Familiar with the FGBNMS Shown by Distance of Residence from Galveston in Miles

Table 3 Residence Cities by Distance as Determined by Zip Code

0-99 miles *Includes the Houston/Galveston Metroplex*	**100-199 miles**	**200-299 miles** *Includes the Dallas/Ft. Worth Metroplex*	**300 or more miles**
Galveston (4)	Lafayette, LA	Bruceville	McAlester, OK
Friendswood	Austin	Ennis	Murfreesboro, TN
Galena Park	Mexia	Rainbow	
Missouri City	Henderson	Plano	
Bellaire		Sulphur Springs	
Houston (8)		Arlington	
Sugar Land		Commerce	
Humble		Ft. Worth	
Spring (2)		Lewisville	
Dayton			
Liberty			
Magnolia			

Numbers in parentheses indicates the multiples of location names, i.e., four anglers were from Galveston

DISCUSSION

The objectives of my study were to explore human dimensions data on charter anglers and to establish a measurement of charter anglers' environmental awareness. My survey was designed to collect demographic characteristics, baseline economic impact factors, and variables on participation including species preference. The survey was also one of first impression to set an initial measurement for the environmental awareness of the charter anglers. My exploratory questions dealt with marine debris (both natural and man-made), marine sanctuaries, and knowledge of the Flower Garden Banks National Marine Sanctuary (FGBNMS).

As pointed out by Ditton et al. (1991), alternative data collection techniques to the telephone and mail surveys should be considered. Therefore, instead of these traditional methods, my on-site survey was relatively simple, very cost-effective, and similar to an ethnographic[12] survey (Floyd, 2001) in that it had the advantage of placing the researcher (me) within the community (charter anglers) to be studied; because of this on-site method, all of my respondents actually went fishing.

Jenkins and Dillman (1997) recommended making questionnaires that appear quick and easy to complete and to avoid potentially embarrassing information. I designed a simple and un-intrusive survey to garner the anglers' voluntary cooperation with the goal of obtaining a high rate of participation, and thus, maximizing the amount of data available for analysis. The Review of Recreational Fisheries Survey Methods (NAS, 2006) advises keeping surveys short to avoid interviewer fatigue; therefore, the

survey was limited to one page to encourage participation. Also, if the questions were too personal, people might not participate or may avoid what they perceived as areas that were "none of your business." Thus, these questions were avoided. Respondent-friendliness (Dillman et al., 1993) was addressed in font type and size to make the questions easier to read. For example, participation could be hindered if the anglers needed glasses (and did not bring them to the boat) to read small print. I believe the questionnaire content, design and respondent friendliness as recommended by Dillman et al. (1993) contributed to the exceptionally high response rate of 93.8% to my survey.

This high response rate was unequalled in the relevant literature. Over the last decade, typical angler survey response rates in Texas were 60% (Ditton & Hunt, 1996), 50.2% (Bohnsack & Ditton, 1999), 40% (Anderson & Ditton, 2004) and 40% (Tseng et al., 2006). These surveys utilized an 11-page mail-in questionnaire that was sent to anglers identified through a computer generated random sample selected from fishing license files (Bohnsack & Ditton, 1999). The individuals targeted had simply purchased a fishing license and may or may not have gone fishing during the past year. Such quantitative surveys are typically used for socioeconomic assessments in a relatively simple and cost-effective manner (Pollock et al., 1994).

Population structure is one of several categories of variables that affect fishing demand. My survey was designed to develop a better understanding of the charter angler sub-population. Given that a statewide mail survey of resident fishing license holders found 85% of freshwater anglers and 86% of saltwater anglers were male (Tseng et al., 2006), it is no surprise that the charter anglers aboard the *Freedom* were primarily men

(81.7%). The average age in this last large scale survey was 46 years for freshwater anglers and 48 years for saltwater anglers (Tseng et al., 2006). The 1978 study by Ditton et al. found 74% of charter fishermen were between 30 and 59 years, corresponding with the majority of those in my study (86.8%) being between the ages of 20-60 years.

There are limitations to using on-site surveys to obtain bias-free angler expenditures needed for estimating potential economic impacts since their trips are not usually completed when interviewed at the access point (Pollock et al. 1994). In the study by Tseng et al. (2006), the anglers reported expenditures from purchasing food, drinks, ice, lodging, transportation, charter or guide fees, bait, and tackle. Therefore, basic data are of interest to a general economic impact study; for example, data such as the length and place of stay were collected to illustrate the potential economic impact on the local economy by the charter anglers. Approximately two-thirds of the charter anglers spent at least one night in a Galveston hotel and the most logical additional expenditures were expected to arise from eating in restaurants and drinking in bars. Table 4 lists the hotels visited by the anglers, ranging in average price from $51− $255 (TripAdvisor, 2008a). The price for meals in restaurants in Galveston ranged from $20 to $80 on average per day (Trip Advisor, 2008b). Food/beverage impact for 227 anglers could range from $4,540 to $18,160 for the three month survey period.

Table 4 Hotel Dollars Spent by Charter Anglers of the *Freedom*

Galveston Hotels	**# of Anglers**	**Total # of Nights**	**Avg. Room Rate**
Best Value Inn	5	9	$90
Beachcomber Inn	5	5	$133
Best Western	5	10	$136
Comfort Inn	12	23	$133-164
Commodore	7	25	$99
Econo-lodge	6	12	$71
Flagship	7	28	$89
Galvestonian	2	14	$217
Galvez	5	20	$204
Hampton	7	9	$214
Hawthorne	3	10	$165
Hilton	7	15	$181
Howard Johnson	1	2	$71
La Quinta	6	10	$129
Moody Gardens	2	7	$189
Motel 6	5	6	$51
Quality Inn	2	4	$108
San Luis	3	21	$255
Seaside Inn	5	17	$115
Tremont	3	9	$235
Wyndham	3	6	$204-235

This study found that although Galveston is a destination city for other activities, the primary reasons for visiting the coast included fishing (30.4%), vacation (20.7%), business (4.7%), fishing and vacation (3.3%), and fishing and business (2.8%). This is comparable to Ditton et al. (1991) that found over 60% of charter anglers traveled to the coast to fish and relax. If fisheries management is to succeed in providing "the greatest benefit to society," managers must know much more about the diversity of the angler populations, including their motives, attitudes, and opinions on management alternatives (Ditton et al., 1998, p. 1). While information on the sub-population of charter anglers is sparse, the following results represent a first step: charter anglers fished primarily in freshwater (59%), lakes in particular. Only 33% considered themselves as saltwater anglers. These anglers (68.5%) were infrequent fishing participants, fishing three or less days in the past thirty days. They primarily fished for recreation (62.9%).

On the question of boat ownership, nearly 25% of the charter anglers reported owning a fishing boat. Tseng et al. (2006) reported 56.7% of freshwater anglers and 61% of saltwater anglers indicated that they owned a power boat with an average length of 19 feet. As noted earlier, charter boats are an important component of the marine recreational fishery because they allow anglers that do not own their own boats (or boats of sufficient size and power) access to offshore fishing, which can change the demographics of offshore anglers (Ditton et al., 1999).

Approximately 20% of charter anglers indicated they were a member of a fishing, hunting, or conservation organization compared to 10% of freshwater anglers

and 16% of saltwater anglers. This is slightly higher than the percentage of anglers belonging to clubs and organizations in the previous statewide studies (Ditton & Anderson, 2004), and much higher than the 6.2% club/organization membership found by Fisher (1997).

The question about targeting a particular fish was to show whether anglers had a species preference. Only 20% of the charter anglers had a targeted species preference, the most popular being snapper (16.4%). This was in sharp contrast to previous studies listing 87% of saltwater anglers having a preference for various species, i.e., red drum (40%), speckled trout (20%), flounder (8%) and snapper (4%) (Tseng et al., 2006; Ditton et al., 1998). In my study, there was a significant discrepancy on species preference between the charter anglers and Ditton's saltwater anglers' data. The majority of charter anglers (79.3%) were willing to "catch anything" as compared to less than 1% of the saltwater anglers surveyed by Ditton et al. (1998). This could be a result of the differences in sample size of the two studies, or the non-licensed anglers[13] on the charter boat may have different preferences than the other surveyed licensed anglers.

The Texas Parks and Wildlife Department (TPWD) is responsible for the management and conservation of the state's wildlife and fish resources; conservation education, and outreach; and the regulation of fishing, hunting, and boating activities, among other responsibilities (TSLAC, 2008). Texas anglers support conservation efforts and outdoor recreation opportunities through purchases of licenses, stamps, and equipment registrations (Floyd & Lee, 2002). Almost 60% of the TPWD's operation budget comes from fishing, hunting, and related activities (TPWD, 1997). A 1998

TPWD report lists "increasing public awareness and understanding of its management, conservation, and stewardship roles" as a critical issue (TPWD, 1998, p. 17). Yet little data exists on the public's awareness of such environmental issues.

In response, this study established a measurement of the environmental awareness of the anglers. Environmental awareness describes the knowledge, concerns, and perceptions that people have of their local environment (USEPA, 2002). For the purpose of this study, environmental awareness was defined as the recognition of the presence or absence of marine debris using the natural indicator of dead marine life and the man-made indicator of trash. First impressions can be indicative of the level of pre-contemplation. Are the anglers aware of ocean pollution, i.e., marine debris? This area has not been studied previously. Understanding what anglers know, or do not know, about threats to their environment can help managers design community programs for education and outreach, as well as assist in conflict resolution (USEPA, 2002).

Are charter anglers aware of management schemes designed to protect the marine environment, i.e., sanctuaries? They were asked whether they thought marine sanctuaries were a good idea and specifically whether they were familiar with the Flower Garden Banks National Marine Sanctuary (FGBNMS) located offshore from Galveston in the northern Gulf of Mexico. Although the FGBNMS is a restricted fishing area, it is a possible fishing destination for some of the charter and party boats that practice conventional hook and line fishing, a method which is not restricted within the FGBNMS.

Weinreich's (1998) stages of *pre-contemplation* (where the person lacks awareness of the issue) and *contemplation* (where the person realizes a problem exists and starts to think about it) are addressed in this study. In an attempt to measure first impression of charter anglers, the questions targeted the knowledge and perceptions that the anglers held of the local environment as viewed from the charter boat during their trip. Marine debris such as dead fish, dead birds, and trash are indicative of increasing ocean pollution. Interestingly, the charter boat captain said that large pieces of trash such as refrigerators, ice chests, tree trunks, buckets, etc., were usually noticed as possible hiding places for fish, not as a negative impact on the marine environment (J. Langston, personal communication, July 20, 2007). More anglers noted seeing trash than either dead fish or dead birds, perhaps because of the potential for trash becoming a residence or hiding place for the fish.

A comparison by gender showed that more female anglers reported seeing all three elements of debris than their male counterparts. Previous studies linking environmental concerns with participation in outdoor recreation have been inconsistent on whether women are more likely to be attentive to their environment than men (Witt & Baker, 1998). Stern, Dietz and Kalof (1993) suggested that women might be more attentive than men to links between things they value and the environment. Women appear to be more accepting than men of messages that link environmental conditions to potential harm because they tend to see the world as interconnected (Stern et al., 1993). This could explain why, in this study, women reported a higher awareness of trash, dead fish, and dead birds. Of importance to note, though, is the fact that awareness is the first

step in making changes as a person realizes that a problem exists and starts to think about it (Weinreich, 1998).

Public support is crucial for successful fisheries management and conservation; therefore, managers must identify public attitudes toward new and existing regulatory policies (Fisher, 1997). Due to the proximity of Galveston to the Flower Garden Banks National Marine Sanctuary (FGBNMS), awareness of fisheries management programs such as restricted fishing areas was measured by asking the charter anglers their opinion about whether marine sanctuaries were a good idea. "Good idea" was a respondent-friendly phrase to measure first impression on the perceived positive value of such management programs; in other words, did the anglers think such programs were valuable? The majority of charter anglers (81.2%) responded that they did perceive sanctuaries as valuable. While some anglers were unsure, there were no negative responses to this question.

Although the charter anglers were supportive of the marine sanctuary program in general, few (17.8%) were aware of the FGBNMS. The initial relationship between familiarity and distance of residence is inconclusive. While the majority (60.5%) of anglers lived within 99 miles of Galveston, the next largest group (23.7%) familiar with the FGBNMS lived in between 200-299 miles. So other factors instead of, or in addition to, distance of residence from the FGBNMS must influence anglers' knowledge of the program, factors which can be explored in future research. Measuring awareness of such programs is the first step in garnering support for them and other management plans required to protect natural resources.

SUMMARY AND CONCLUSIONS

The Magnuson Fishery Conservation and Management Act of 1976, Executive order 12866, and other legislation have highlighted the need for fisheries management agencies to study the human dimension aspects of fishing in addition to biological research. Such studies must be aligned with current issues and previous descriptive work. The value of small-scale research should not be overlooked: alternative methods for data collection are essential to building databases on sub-populations of anglers. "Research-based knowledge in any field builds and accumulates as much through the weight of evidence, where the results of numerous smaller studies are accumulated, as through the findings of a single definitive study" (Punch, 2003, p. 22).

This study integrated responder-friendly questions, shortened questionnaire length, and on-site survey access to successfully maximize data collection of charter anglers, leading to an exceptionally high response rate of 93.8%. Data were collected to define Galveston charter anglers by demographic characteristics of age, gender, and place of residence. The majority were males, between 20-60 years, that lived in a metropolitan area. Various fishing related questions were included and whose response defined the sub-population as predominately infrequent, freshwater anglers, without species preference, who did not own their own boat or belong to a fishing, hunting, or conservation organization.

Potential economic impacts of their fishing activity on the local economy were ascertained by determining the number of anglers who spent at least one night in a

Galveston hotel and how much money was spent directly on the charter fees. The average room rate per day ranged from $51-$255. Additional expenditures arose from eating in restaurants and drinking in bars, estimated at $20-$80 per day per angler. Charter fees averaged over $1000 per day which was spent locally by the captain/crew on items which included fuel, bait, ice, tackle, food, beverage, and slip rent.

As for exploring the environmental awareness of charter anglers, more females than males were aware of marine debris such as dead fish, dead birds, and trash. If anglers are unaware of problems such as ocean pollution, they may not be concerned with effective management strategies to reduce pollution in the marine environment. Likewise, if anglers are unfamiliar with management programs such as the Flower Garden Banks National Marine Sanctuary (FGBNMS), their willingness to support such programs are unlikely. Few anglers were familiar with the FGBNMS; yet, in general, they thought marine sanctuaries were a good idea. Perhaps their perceived value arose from the connotation invoked by their understanding of the word "sanctuary." Distance of residence from the location of the FGBNMS was inconclusive as a determining factor of awareness.

While the survey design and implementation proved successful, future questions should be modified to substantiate these findings and elicit further data on demographics, economic impacts, and environmental awareness of anglers in Texas. As part of future surveys, additional questions need to be developed to better understand environmental awareness that in turn, supports programs designed to protect the marine environment. Future questions could address the artificial reef programs of the Texas

Parks and Wildlife Department, as well as other areas of interests to various managers. As a study of first impression, this was a unique project to begin exploring different human dimensions in sub-populations of anglers.

NOTES

[1] Charter boat -- any vessel-for-hire engaged in recreational fishing and hired for a charter fee by an individual or a group of individuals (for the exclusive use of that individual or group of individuals), which results in that vessel being unavailable for hire to any other individual or group of individuals during the period of the charter. Party boat (also called a head boat) -- any vessel-for-hire engaged in recreational fishing and hired (or leased, in whole or part) for a per-capita fee on a first-come, first-served basis. Retrieved 1/25/08 from http://www.nefsc.noaa.gov/nefsc/publications/tm/tm119/tm119gloss.htm

[2] The term "optimum yield" with respect to the yield from a fishery is defined in the FCMA as "the amount of fish: a) which will provide the greatest benefit to the Nation, with particular reference to food production and recreational opportunities; and b) which is prescribed as such on the basis of the maximum sustainable yield from such fishery, as modified by relevant economic, social, or ecological factors" (FCMA, 1976). Therefore, agencies that incorporate findings of biological, social, and economic research into their plans are said to use optimum yield management strategies (Ditton & Hunt, 1996).

[3] A complete listing of publications by personnel from the Human Dimensions of Fisheries Lab at Texas A&M University can be found at http://lutra.tamu.edu/hdlab/publications.htm

[4] Reference to fisher*men* was used in 1978 by Ditton et al. Gender was not addressed as a demographic factor in their survey.

[5] Roper Starch Worldwide was commissioned by the National Environmental Education Foundation to conduct a survey of adult Americans. Their report is the annual National Report Card on Environmental Attitudes, Knowledge and Behavior (NEEF, 2007).

[6] Longitudinal Data is sometimes called "time series data," observations collected over a period of time; the sample (instances or cases) may or may not be the same each time but the population remains constant. Retrieved 1/26/08 from http://www.ojp.usdoj.gov/BJA/evaluation/glossary/glossary_l.htm

[7] Only conventional hook and line fishing is allowed in the Sanctuary (Hickerson & Schmahl, 2005). *Conventional hook and line gear* means any fishing apparatus operated aboard a vessel and composed of a single line terminated by a combination of sinkers and hooks or lures and spooled upon a reel that may be hand or electrically operated, hand-held or mounted. Retrieved 1/24/08 from http://flowergarden.noaa.gov/document_library/management/RegulationsSummary.pdf

[8] Artificial reefs enhance fishery resources, fishing, and diving opportunities off Texas. Texas Parks and Wildlife has three programs: Rigs-to-Reefs, Ships-to-Reefs, and Near-shore/Shallow Reefs. Retrieved March 3, 2008 from http://www.tpwd.state.tx.us/landwater/water/habitats/artificial_reef/overview.phtml

[9] "Good idea" was the broad term used to foster support for the sanctuary program. In other words, they perceived the program as valuable. The connation is one of positive associated value of the resource. In general, people will support "good ideas" but not support "bad ideas".

[10] For the survey to be exempted by the Institutional Review Board (IRB), it was necessary to not include minor children. During the survey period, 32 children under the age of 18 were passengers aboard the *Freedom*. Since they were ineligible to participate, they were not included in the results of the survey.

[11] There were explainable reasons why some did not participate. For instance, one gentleman took four trips over the summer and only completed the survey on his first trip. There was a couple from Africa; the man filled out a survey, but his wife who only spoke French did not. The mother of the Vietnamese family that came did not speak English, and she did not fill out a survey. Considering exceptions like these, my response rate would actually be even higher.

[12] Ethnography is a branch of anthropology concerned with the description of ethnic groups. For more information on ethnographic research see North Carolina State University's web site. Retrieved 1/31/08 from http://www2.chass.ncsu.edu/garson/pA765/ethno.htm

[13] Prior to September 1, 2007 a state fishing license was not required to fish in federal waters off Texas. New in 2007-2008, Recreational anglers must have a Texas fishing license and saltwater endorsement to bring any fish taken in federal waters ashore in Texas. Retrieved 2/8/08 from http://www.tpwd.state.tx.us/regulations/changes08.phtml

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APPENDIX A

RATIONALE FOR SURVEY QUESTION COMPONENTS

Data for estimating economic impact:

2. How many nights are you staying in Galveston? _____

3. Where are you staying? _____

4. What other activities will you do while in town? _____

8. Primary reason for visit: Fishing Business Vacation Other _____

These questions were included to estimate the baseline economic impact of the anglers on the Galveston economy.

Data for demographic comparison:

1. What is your zip code? _____

6. Gender: Male Female

7. Age: 18 or 19 20-40 41-60 over 60

These questions were included to establish the number of anglers by gender, age group, and residence location for comparison with previous angler studies contracted by the Texas Parks and Wildlife Department. Question 1 was also used to determine distances from Galveston in order to ascertain whether distance could be correlated with familiarity of the Flower Garden Banks National Marine Sanctuary.

Data for measuring environmental awareness:

9. Are you familiar with the Flower Garden Bank Marine Sanctuary? Yes No

10. Do you think marine sanctuaries are a good idea? Yes No Unsure

11. Have you noticed any dead fish? Yes No or dead birds? Yes No

12. Have you noticed any trash in the water? Yes No

These questions were designed to illicit information relative to the first two steps in Weinreich's Stages of Change Theory. The first step of *pre-contemplation* is where the person lacks awareness of an issue. The second step, *contemplation*, comes about when the person realizes a problem exists and starts to think about it. By questioning the awareness of marine debris and management tools such as marine sanctuaries, these two steps were addressed.

Data Collected on Previous Surveys:

13. Are you fishing for a particular species of fish? Yes No

    If yes, please list the species: _____

14. Do you primarily fish: lakes rivers bays offshore

15. Do you own a fishing boat? Yes No

16. Your primary goal for fishing: the experience fish to eat

17. How many days did you fish this past month? 0 1-2 3-5 6-10 11-15 16+

18. Are you a member of a fishing, hunting or conservation organization? Yes No

These questions were included to provide consistency with previous studies and in order to determine differences in sub-populations of anglers. Question 18 could also be an indicator of environmental awareness.

General Question:

5. What is the biggest fish you ever caught? _____

This question was designed to be a "responder friendliness" question incorporated within the survey to build rapport with the anglers.

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