

The Recreational For-Hire Sector in the U.S. Gulf of Mexico: Structural and Economic Observations from the Third Decadal Survey

El Sector de Alquiler de Barcos para la Pesca Recreativa en el Golfo de México de los Estados Unidos: Observaciones Estructurales y Económicas de la Tercera Encuesta Decadal

Location de Bateaux de Pêche de Loisir dans le Golfe du Mexique aux Etats-Unis: Observations Structurelles et Économiques de la Troisième Enquête Décennale

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ABSTRACT

Cross-sectional surveys of the recreational for-hire (RFH) industry in the U.S. Gulf of Mexico were sponsored by NOAA Fisheries and jointly conducted by Texas A&M and the University of Florida for 1987 and 1997. The third decadal survey, conducted by Louisiana State University in 2010, collected effort, economic, and policy data for the calendar year 2009. Questionnaires were distributed to 2,305 captains in Texas, Louisiana, Mississippi, Alabama, and West Florida with an effective response rate of 33% ($n = 689$) via postal (75%) and internet (25%) participation. Consistent with earlier studies, owner-operators comprised the majority (76%) of respondents, with 94.3% operating uninspected passenger vessels (OUPV), a management unit NOAA refers to as “charter boats”. The remaining 5.7% operated U.S. Coast Guard inspected vessels, or “head boats”, down from 9% and 7% observed in the 1987 and 1997 surveys, respectively. Potential explanations for this apparent decrease include permit moratoria and regulatory reductions of reef species, competition from the expanding charter boat sector, and sampling differences among decadal surveys. While previous survey efforts were limited to the offshore, federal fleet, the advent of state-based licensing frames allowed for improved characterization of the RFH industry. “Guide boats” are a subcategory of uninspected, inshore/coastal charter vessels that represent a sizable, yet previously under-emphasized, management unit. These operations accounted for 70.5% of Gulf vessels in 2009 and more than 51.3% of the region’s estimated \$215.3 million in dockside revenue. Structural and economic profiles for these subsectors are provided by state and region with longitudinal comparisons to earlier Gulf-wide surveys.

KEY WORDS: Recreational for-hire fishing, socioeconomic survey, Gulf of Mexico

INTRODUCTION

Despite its importance to the overall industry, the recreational for-hire (RFH) fishing sector in the U.S. Gulf of Mexico is poorly understood and insufficiently documented from a quantitative perspective. While numerous anecdotal stories are used in discussions about the industry, previous empirical studies have emphasized sociological or biological aspects, neglecting many of the critical operational and economic characteristics that are needed by fisheries managers to understand how their actions affect the industry and the surrounding coastal communities. The two most recent Gulf-wide socioeconomic surveys were conducted in the late 1980s and 1990s (Ditton et al. 1988, Holland et al. 2000, Sutton et al. 1999), but the economic and policy environment in which the RFH industry operates has changed substantially since that time. Given that federal agencies are mandated by the Magnuson-Stevens Fishery Conservation and Management Act to consider social and economic implications of proposed fishing regulations, an updated study of the RFH industry, and one that specifically focuses on operational and economic characteristics, is needed.

This paper summarizes some of the main results of a 2010 survey of the Gulf-wide RFH industry, with a specific emphasis on the operational and economic characteristics of RFH firms for calendar year 2009. Specifically, the latest survey (supported by the National Oceanic and Atmospheric Administration and conducted by Louisiana State University) extends the work of Texas A&M University and University of Florida researchers in the late 1980s and 1990s (Ditton et al. 1988, Holland and Milon 1989, Holland et al. 2000, Sutton et al. 1999). It differs, however, from these previous studies in a number of important ways. First, our study made a focused effort to collect cost and return information on RFH firms that was both detailed and relevant to the current business climate in which they operate. Secondly, we sought to take advantage of recent licensing requirements to survey not only offshore (federal waters) RFH businesses as in the previous two studies, but also the firms that operate primarily inshore (state waters). In doing so, we diverge from traditional industry delineations that are based on customer payment structure, and define *charter* and *head boat* operations through a combination of licensed capacity and operational characteristics. Thirdly, we collected extensive attitudinal information from participants in the RFH fleet, a subject which is not discussed in this paper, but one that will be analyzed in future reports. Taken together, the data obtained in this study constitutes the majority of quantitative information available regarding the economic health and sociological status of the RFH industry, and it provides a baseline for future research and management discussions.

The paper is organized with two overriding objectives in mind. Following a discussion of the methods used, we examine the operational and economic data collected in the current survey. This examination focuses on identifying the most recent economic characteristics of RFH firms, both in terms of how they are structured and their reported costs and returns. Secondly, we make some tentative comparisons of this current data with some of the relevant information collected in the previous studies of the RFH fishing sector. To conclude, we evaluate the finding of this study in light of the exogenous and endogenous factors that have the potential to affect the industry in the near future.

METHODS

Establishing a consistent sampling frame that captures inshore and offshore vessels across the five Gulf states in this study proved to be challenging. There was no standardized (in terms of participant definition) or comprehensive source for the number of charter and head boat operations across the Gulf, making it impossible to exactly identify the survey's target population. Of all the available state and federal sources, state licensing frames were the most comprehensive sources for estimating the RFH fishing population.

Sampling Frame and Population Estimation

The sampling frame was assembled from captain and vessel licensing databases of Texas, Louisiana, Mississippi, and Alabama. This source was not available to previous studies of the RFH sector, as the additional licensing requirements only became effective during the mid- to late-1990s. This newer sampling frame allows surveying of all vessel classes and sectors of the industry without regard to inshore or offshore effort. Unlike the other four states, however, contacts for the Gulf side of Florida were drawn from the National Marine Fisheries Service (NMFS) active for-hire vessel registry due to aggregation-caused ambiguity in Florida's license database (*i.e.*, licenses are available for either vessels and/or captains, and the licenses do not distinguish between operations in the Gulf and Atlantic).

After accounting for duplicate contacts in each state, it was conservatively estimated that 3,315 RFH fishing captains were licensed to operate in the U.S. Gulf of Mexico in 2009. Because of the use of vessel-associated databases in some states, this population estimate does not necessarily capture all freelance captains (*i.e.*, captains that do not own or are not associated with a vessel), though this group is not expected to be a significant proportion of the overall Gulf RFH industry.

This estimate of the number of captains that was used in this study is not directly comparable to population estimates from the other Gulf-wide studies as the previous studies reported the number of vessels. Furthermore, the lack of the current comprehensive state licensing frames in previous studies would have led them to underestimate, or ignore entirely, the vessels operating inshore (*i.e.*, guide

boats). These intrinsic differences in the sampling frames and ability to identify inshore operations suggest caution when comparing data across the three decadal surveys. Additional details are presented at the end of this section.

Survey Administration

In order to gain insight into the typical operational structure of RFH businesses, we collected information on captain, trip, and vessel characteristics. Although some firms reported operating more than one vessel, questions focused on the primary vessel used for operations in 2009. The survey instrument included an expanded economic section, relative to the previous studies, to assess the financial status of the industry.

Following an extensive period of development and evaluation by a number of participants in the RFH industry, a test questionnaire was sent to 100 randomly selected captains in March 2010. Respondents had the option to complete and return the hard copy of the instrument by mail, or complete an identical web-based version via secure transmission online. The trial assessment ran for one month and realized a 34% response rate. The purpose of this test questionnaire was to determine potential response rates in Texas and West Florida (Table 1) and to identify any questions or sections that were difficult for the captains to complete.

Given the lack of problems with the test questionnaire, no changes were made to the instrument and the full survey was administered beginning in April 2010 and lasting for 12 weeks. Surveys were sent to 2,205 captains simultaneously in each Gulf state. Questionnaires were sent to all known captains in Louisiana, Mississippi, and Alabama due to the relatively low captain populations, while a sample was conducted in Texas and West Florida. After adjusting for incorrect addresses or those otherwise unreachable, the survey realized an effective overall

Table 1. Actual sample response and extrapolated population counts of captains by state and operation category

SAMPLE	Head	Charter	Guide	Total
Texas	3	20	142	165
Louisiana	2	31	179	212
Mississippi	1	10	5	16
Alabama	14	16	26	56
West Florida	13	52	86	151
Gulf-wide	33	129	438	600
POPULATION	Head	Charter	Guide	Total
Texas	19	124	882	1,025
Louisiana	6	100	575	681
Mississippi	5	45	22	72
Alabama	41	47	77	165
West Florida	118	473	781	1,372
Gulf-wide	189	789	2,337	3,315

response rate of 33% (n = 689). Even so, the actual number of responses from Alabama and Mississippi were relatively low (56 and 16, respectively), so the two states were combined for analysis purposes. In doing so, we weighted the responses by the total RFH population in each state under the implicit assumption that the responses accurately presented the population in each state, both in terms of the information provided and, specifically, in terms of the distribution of responses across head, charter, and guide vessels. The actual sample response and extrapolated population counts across operation categories are presented by state in Table 1.

Grouping Observations: Head, Charter, and Guide

It is important at this point to note that official, standardized definitions for head, charter, and guide vessels do not exist across the state and federal levels. Instead, previous researchers have used a variety of designations, often focusing on client payment structure rather than the number of passengers a vessel is licensed to carry. Federal for-hire captain licensing requires that vessels carrying more than six passengers at a time to be inspected by the United States Coast Guard (USCG). Vessels carrying six or fewer passengers per trip are not required to be inspected. Instead, captains operating these uninspected boats must, at a minimum, hold an Operator of an Uninspected Passenger Vessel (OUPV), or “six-pack”, license.

RFH firms responding to the survey were categorized using the average number of passengers per trip, effort, and vessel size. For the purposes of this study, a *head boat operation* was defined as a firm whose primary vessel carries more than six passengers on average per trip (*i.e.*, a USCG inspected vessel). A *charter boat operation* was defined as a firm whose primary vessel carries six or fewer passengers on average per trip (*i.e.*, uninspected vessel) and primarily conducts offshore fishing trips. Similar to charter operations, we defined a *guide boat operation* as a firm whose primary vessel carries six or fewer passengers per trip, is approximately 8.53 meters (28 feet) or less in length, and primarily fishes inshore (more than 75% of trips).

The number of survey responses that could be grouped into the head, charter, and guide categories combined using the definitions above totaled 600, as shown in Table 1. Eighty-nine survey responses had missing data for the variables required to separate the observations or had indicated that they did not operate in 2009, and, therefore, could not be used in the analysis.

Usable Sample

To ensure that the same fleet of vessels was considered for all variables examined, only respondents who provided data on all the relevant captain, trip, and vessel characteristics were retained in the analysis. Although it would be valid to also use partial responses to build the analysis

under the assumption that the sample responses reflect the true population parameters, we decided that the amount of data available allowed for this more restrictive interpretation of a usable response. The analysis was further restricted to responses from business owners and operation of the primary vessel. Under these restrictions, the final usable sample for financial and operational analyses totaled 400 responses.

Results are reported using the “rule of three,” with analysis presented only when a variable contained three or more observations. This commonly employed rule promotes the anonymity and confidentiality of responses, but at the cost of either response aggregation across categories or the dropping of variables from the analysis. In this study, for example, variables such as the number of deck hands used or half day trip characteristics are not directly reported in some vessel categories due to insufficient observations.

Comparisons to Previous Gulf-Wide Surveys

The availability of the two previous Gulf-wide surveys and other databases offered the opportunity to examine some RFH industry trends across time. This process, however, must account for the idiosyncratic nature of data collection and reporting if only to provide suitable caveats in interpretation.

State and federal sources for population estimates — State and federal sources were referenced in efforts to estimate the number of operations over time. With state sources, data are available for different spans of time and reflect two units of measurement due to licensing variation between states. Figure 1 shows apparent growth in the number of captains and vessels by state between 1980 and 2009 as new estimates became available from individual states. Estimates are measured as the number of captains in Texas and Louisiana and vessels in Mississippi, Alabama, and West Florida. As new license requirements were established, some growth observed during the first few years after implementation was likely due to an increase in compliance with these new requirements.

Any growth realized after the effect of compliance was likely experienced in the charter and guide sector as a whole. Because state sources do not differentiate between head and charter operations in most cases, federal sources were referenced to gain insight on the head boat sector separately. Examining the number of vessels reporting to the NMFS Southeast Head Boat Logbook Program and For-Hire Survey from 1986 to 2009 provides a general estimate for head boats in the Gulf (K.B., Unpublished data), where head boats were federally defined as vessels carrying 15 or more passengers on average per trip and primarily fishing in federal waters (*i.e.*, Exclusive Economic Zone, or EEZ; Kelly Fitzpatrick, NOAA Beaufort Laboratory, personal communication). It is important to note that estimates from this source are not directly

comparable to those from previous Gulf-wide surveys due to differences in the definition of head boats. Nonetheless, conservative estimates suggest that the growth in head boats numbers averaged 0.73% per year between 1986 and 2009, and 0.68% per year annually since 1997. Based on the NMFS source, there were approximately 85 head boats in 2009. The number of head boats, however, remained relatively stagnant throughout the estimation period and only fluctuated between 69 and 86 head boats.

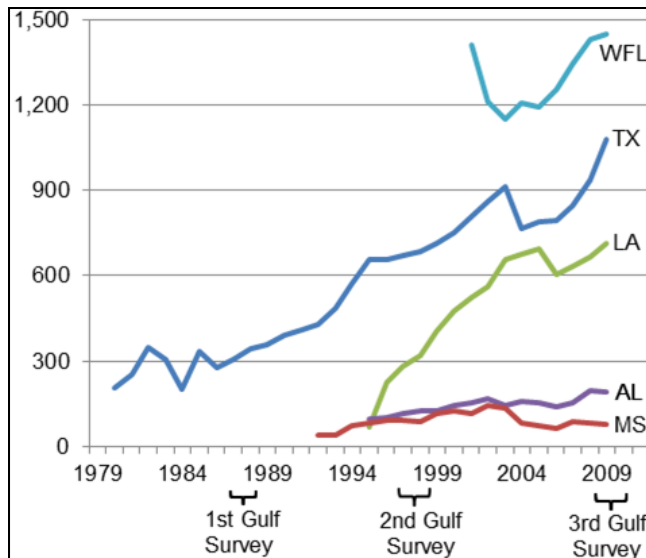


Figure 1. Development of state-based tracking of RFH operations in the U.S. Gulf of Mexico, 1980-2009.

Caveats associated with federal data sources — include the NMFS For-Hire Telephone Survey (FHS) vessel frame for charter boats, Gulf charter and head boat fishing permits for reef fish and coastal migratory pelagic fish, and the U.S. Coast Guard (USCG) federal for-hire captain license database. As with state sources, attempts at estimating the RFH fishing population from these federal databases were problematic. For instance, the NMFS FHS captured trip information on the vessel level for charter and head boat operations. The vessel frame used was not an all-inclusive or standalone source for Gulf-wide vessel estimation as it did not include data from Texas for charter vessels and acted solely as a frequency of vessels included in the NOAA survey sampling frame (Gregg Bray, Gulf States Marine Fisheries Commission, Personal communication). Secondly, the federal reef and pelagic fishing permits only captured operations from the offshore fleet, and thus, could not act as a standalone source. Furthermore, the permits are under a moratorium and would not necessarily show fluctuations in the number of active operations over time. The final population source examined was USCG federal charter captain licenses, which are

not exclusively required for for-hire fishing captains. They are also a requirement for captains that operated diving, sightseeing, and other non-fishing charter trips and did not differentiate between captains operating on the Gulf or Atlantic coasts of Florida. Despite the caveats, these federal databases are referenced in attempts to further investigate RFH fishing population trends.

Approach to time trend comparisons — Results from the three Gulf-wide surveys were compared in order to identify changes in key elements of the RFH fishing industry. These comparisons, however, should be taken as broad generalizations given the differences in surveying and sampling methods. Since previous surveys primarily focused on the offshore fleet, comparisons are reported for the head and charter boat segments and do not include estimates for guide boats. Financial data is reported in constant dollars with a base year of 2009, after adjusting for inflation using Consumer Price Index estimates from the U.S. Bureau of Labor Statistics (2011).

Due to the low number of responses, Florida head boat data was reported as statewide estimates for 1997 and were not limited to Gulf operations. For similar reasons, observations for head boats are combined for the Texas, Louisiana, Mississippi, and Alabama region, as well as for Mississippi and Alabama in analyses of the charter sector for all three surveys. Head boat estimates for the 1987 and 1997 studies are shown as previously reported for the Texas to Alabama region by Ditton et al. (1988) and Sutton et al. (1999). Reported values for the charter segment in these two studies were combined for Mississippi and Alabama using appropriate weights as determined by population estimates relative to state and operation class (e.g., the same weighting algorithm used to combine Mississippi and Alabama responses in the current study). Because charter data for the Gulf side of Florida and the Keys was reported separately in 1997 (in addition to information from the Atlantic coast and statewide estimates), these values were combined and weighted using the proportion of observations between the reported values in order to generate comparable Gulf estimates for Florida.

Estimates presented for the two previous Gulf-wide studies appear as reported by Ditton et al. (1988), Holland and Milon (1989), Sutton et al. (1999), and Holland et al. (2000). A few exceptions include values that were not originally reported but were extrapolated from reported data, or original data obtained from the Texas A&M University Center for Socioeconomic Research and Education (Robert Ditton, Texas A&M University Center for Socioeconomic Research and Education, unpublished data). Variables requiring calculation include the number of passengers per head boat trip and annual head and charter trips for Florida in 1987, the average number of annual charter trips by state in 1997, and effort-related analysis for 1987 and 1997.

RESULTS

The results of the 2009 RFH industry survey are presented below in three major sections. First, we discuss the primary vessel and trip characteristics of respondents in 2009 by operation category and state. Secondly, firm and primary vessel cost and earnings are presented by vessel category and state. Lastly, we make longitudinal comparisons across the various datasets in an effort to identify important time trends in the RFH industry. Although the tables are rather exhaustive, each describes much of the collected data, while the text concentrates on potentially important values and differences in the mean responses. Lack of space precluded the presentation of confidence intervals for the data means presented in the tables. Thus, discussion of variables with relatively similar means across vessel categories and/or states is unwarranted at this time.

Primary Vessel and Trip Characteristics in 2009

Vessel operating conditions are directly reflected in observations of vessel characteristics, business capital structure, and trip attributes. As expected, differences in vessel specifications and trip characteristics emerged between head, charter, and guide operations due to the unique operating environments. For example, because head and charter boats typically operate in offshore (i.e., rig-reef and pelagic trips combined) and federal waters (i.e., exclusive economic zone, or EEZ), these primary vessels are typically larger in length and horsepower than guide boats. Overall, averages resulting from respondent categorization into three operation types provided seemingly reasonable and anticipated observations.

Head boat operations — Head boats are the largest in length and total horsepower (HP) among the Gulf RFH fishing fleet. As shown in Table 2, the average primary vessel was over 16 meters, and inboard engines had almost 900 HP in both the Texas to Alabama and West Florida regions. The majority of annual trips were run on a full day basis, with a smaller portion run as half day and overnight/multiday trips. Partly because of the way the operations were defined, head boat respondents reported carrying more than 13 passengers on average per trip, and all respondents reported using deck hands on trips. Operations in the Texas to Alabama region ran an average of 89 trips annually, while operations in West Florida averaged 115.

Though customer payment structure has historically been a defining factor for head boats, respondents in both regions reported running an unexpectedly low portion of trips on a per person basis. Based on respondent averages, the majority of annual trips were operated using the traditional “charter payment” structure where one group was charged a trip fee.

The percent of part-time operators for business owners in the head boat sector has traditionally been low. In the survey, part-time operators were defined as those grossing less than 50% of earned income from RFH fishing

operations. Both regions showed only an average of 9 to 11% rate of part-time operators.

Head boats typically target offshore species and fish in federal waters, largely due to vessel size and consumer demand. An average of 76 and 87% of trips in the Texas to Alabama and West Florida regions, respectively, were operated targeting rig-reef species, such as grouper (*Serranidae*) and snapper (*Lutjanidae*). Less than a quarter of trips were run targeting inshore or pelagic species in each region.

Charter boat operations — Charter boats are typically smaller in length and HP than head boats, with average primary vessel lengths ranging from 8.7 to 10.8 meters and average HP ranging between 396 and 643. The average number of passengers per charter trip was expected to be smaller than head boats, partly as a function of how the group was defined. Charter operations were defined as those carrying six or less passengers, and thus, the averages reflect this restriction. Relative to head boat operations, charter operators report using deck hands on a smaller portion of trips, with averages ranging between 55 and 85%.

The annual number of trips for the four areas ranged between 48 and 98 trips, and most were run on a full day basis. In line with expectations, a low portion of trips were run on a per person customer payment basis. Only the Mississippi to Alabama and West Florida regions reported any trips being run on a per head payment structure, though the proportion was low at 10 and 8%, respectively.

The percent of part-time charter operators ranged between 21 and 83%. Notably, an unusually higher proportion of respondents from Texas report operating part-time relative to the other three areas.

Charter effort was similar to head boats, where trips were primarily conducted offshore (i.e., rig-reef and pelagic combined). While most charter operators in the Gulf reported targeting rig-reef species, Louisiana operators targeted almost the same proportion of rig-reef and pelagic species, with 92% of trips being conducted in the EEZ.

Guide Boat Operations — Guide boats are the smallest and youngest vessels in the Gulf RFH fishing fleet, though they appear to account for the largest portion of the population. As shown in Table 2, the average primary vessel ranged between 6.4 and 6.9 meters. Total HP is naturally the lowest in the fleet, ranging from 171 to 227 HP for mostly outboard engines (over 90% in each state and region).

The average number of annual trips ranges from 71 to 99. Very few of these trips were run on a per person payment basis, with the highest estimate of 6% in Louisiana. Full day trips were the most operated type of trip in Texas and Louisiana for guide operations; however, half day trips appear to be the primary type in the Mississippi to Alabama region, while full and half day trips were

operated equally in West Florida. Only 1% of trips in Louisiana were run as overnight trips, while operators in other states did not report any of this type.

As anticipated, averages indicate that guide boats carry a fewer number of passengers per average trip than charter boats, though both operations use primary vessels categorized as USCG uninspected (six or less passengers). Very few trips were reported to have a deck hand on board due to the small size of the vessel and operation, as these are primarily one captain, one vessel businesses as indicated by the high percent of owner-operators Gulf-wide for this operation class.

Firm and Primary Vessel Costs and Earnings in 2009

Larger vessels, such as head boats, were expected to have a higher capital expenditure, while generating greater amounts of revenue, costs, and net income to the owner. Revenue includes trip fees and tips and is reported on the trip and annual levels. Operating expenses, such as the cost of labor, fuel, and trip supplies, are reported on the trip level, as well as on the annual level. Other expenses reported on an annual basis include insurance, vessel maintenance, overhead, loan payments, and vessel investments and upgrades. As with the vessel and trip characteristics, financial estimates are restricted to business owners and the primary vessel. Attempts have not yet been made to isolate respondents indicating that their

Table 2. Primary Vessel and Trip Characteristics in 2009

	Head		Charter				Guide			
	TX, LA, MS,	WFL	TX	LA	MS, AL	WFL	TX	LA	MS, AL	WFL
Number of observations	12	9	12	11	22	42	105	100	23	64
Vessel Characteristics										
Length (m)	17.3	16.4	8.7	9.6	10.8	10.2	6.8	6.9	6.8	6.4
Total horsepower	887	892	396	532	572	643	203	227	182	171
Percent outboard	0%	0%	58%	82%	24%	40%	95%	98%	94%	91%
Number of engines	2	2	2	2	2	2	1	1	1	1
Age of vessel in 2009	19	18	19	10	22	19	7	7	8	11
Age of vessel at time of purchase	8	10	11	4	13	10	2	1	2	3
Vessel Operation										
Percent part-time operators	9%	11%	83%	27%	37%	21%	45%	57%	40%	39%
Percent owner-operators	65%	56%	67%	73%	91%	79%	80%	75%	92%	86%
Number of trips	89	115	52	75	48	98	85	71	91	99
Per head payment structure	19%	40%	0%	0%	10%	8%	5%	6%	1%	1%
Percent full day	71%	81%	73%	89%	59%	63%	73%	85%	35%	50%
Percent half day	16%	17%	26%	5%	36%	36%	27%	14%	65%	50%
Percent overnight/multiday	13%	2%	1%	6%	5%	2%	0%	1%	0%	0%
Percent inshore/coastal trips	11%	10%	16%	6%	25%	17%	99%	99%	99%	97%
Percent rig-reef trips	76%	87%	72%	46%	63%	67%	1%	1%	1%	3%
Percent pelagic trips	13%	3%	12%	48%	13%	16%	0%	0%	0%	0%
Percent in EEZ	91%	77%	58%	92%	65%	67%	0%	5%	1%	3%
Full day trip - number of observations	11	9	11	11	21	42	103	93	17	58
Number of full day trips	69	88	34	63	29	49	60	68	39	55
Trip distance (km)	126	95	146	168	99	93	61	72	55	51
Trip duration (hours)	10	10	9	11	9	9	8	8	8	8
Vessel fuel consumed (L)	665	509	306	413	375	268	76	92	84	55
Passengers	13.1	13.1	4.8	5.1	5.1	4.7	3.2	3.2	3.1	2.6
Percent using deck hands	100%	100%	55%	73%	85%	60%	5%	6%	0%	3%
Deck hands	1.5	1.4	1.0	1.0	1.1	1.0	1.0	1.0	0.0	-
Half day trip - number of observations	4	6	5	2	17	32	65	43	20	56
Number of half day trips	37	37	50	-	22	63	42	18	72	56
Trip distance (km)	54	50	35	-	42	42	34	49	31	33
Trip duration (hours)	6	6	5	-	5	5	5	5	5	4
Vessel fuel consumed (L)	243	298	70	-	165	115	47	59	49	37
Passengers	16.0	14.3	4.2	-	5.0	4.5	3.2	2.9	3.3	2.6
Percent using deck hands	100%	100%	20%	-	69%	53%	2%	5%	0%	4%
Deck hands	1.5	1.5	-	-	1.0	1.0	-	-	0.0	-

business operates with positive net returns from those indicating negative net returns. In some instances, these relatively large negative returns may influence means of variables such as net income to the owner per average trip and the number of trips, gross revenue, and net income to the owner on the annual level.

Head boat operations — Largely due to the size and more sturdy design of head boats, these vessels are the most expensive of the RFH fishing fleet. As presented in Table 3, estimates of fair market value for head boats in the Texas to Alabama and West Florida regions average \$308,553 and \$317,778, respectively. Because of this large capital expenditure, most vessels had an outstanding loan valued at over half the value of the vessel.

The majority of boats were insured, and those that were insured were covered for an average of 94% or more of the value of the vessel. The average limit of coverage was 100% in the Texas to Alabama region. Percent coverage was calculated as the ratio between the total limit of coverage for the vessel's hull, engines, and equipment to the vessel's purchase price. Estimates over 100% potentially include coverage for aftermarket investments to the vessel, such as upgrades to engines, electronic equipment, and the hull and deck. Estimates may also include insurance covering the replacement value of the vessel. Limit of coverage for liability was collected separately but is not reported in Table 3.

Revenue and expenditures were examined on the trip level for the primary vessel. The main source of revenue came from trip fees, followed by tips. For those operations offering full day trips, average trip fees were highest in the Texas to Alabama region at \$2,145, while trip fees totaled \$1,772 in West Florida. Fuel and oil constituted the largest operating expenditure, followed by crew labor and trip supplies. Average fuel costs totaled \$535 in the Texas to Alabama region and were apparently higher than for West Florida where they averaged \$394 per trip. The higher expenses in the Texas to Alabama region were likely due to the longer trip distances. Nonetheless, the average net income to owner per trip in the Texas to Alabama region was \$1,662 and \$1,376 in West Florida.

Though trip characteristics and financial data were only collected for full and half day trips, anecdotal evidence from industry leaders suggest that trip fees and expenditures for overnight trips are typically 2.2 times the amount of trip fees and costs for full day trips. As such, trip characteristics and financial data are not reported for overnight trips; however, revenue and costs for these trips are included in the calculations under the annual cash flow section in Table 3.

Net income to owner is determined by subtracting annual outflow from annual inflow. Inflow included fees and tips from full day, half day, and overnight trips. Expenditures accounted for under total annual outflow include labor cost for deck hands and the cost of fuel, supplies, insurance, regular maintenance, overhead, loan

payments, and annualized investments and upgrades since acquirement of the primary vessel.

Total annual revenue from fees and tips averaged \$240,052 in Texas to Alabama, while average annual outflow totaled \$169,542; therefore, the average net income to owner for an average head boat operation in the Texas to Alabama region was \$70,510. Likewise, average annual revenue in West Florida totaled \$225,758, and annual expenditures averaged \$160,030. The average net income to owner in West Florida was \$65,728.

The net income to owner per average trip is a standardized measure calculated as the annual net income to owner divided by the annual number of trips. Because West Florida has a similar annual net income to owner, but a higher average annual number of trips, the estimate for net income to owner per average trip is relatively lower in comparison to the Texas to Alabama region.

Charter boat operations — Since charter vessels are typically smaller in length and power than head boats, it naturally follows that they are less expensive, as reflected in the vessel purchase price and fair market value in Table 3. Unlike the head boat sector, the majority of charter vessels did not have an outstanding loan, except in Louisiana. For those with a loan, the outstanding loan was for more than half the value of the vessel. Similar to head boats, almost all charter boats were insured. Estimates for limits of coverage range between 99% to 115% of the purchase price of the vessel.

Charter trip fees were lower compared to head boats; however, head boat trips remain the cheaper alternative on a per person basis between these two types of operations for full and half day trips. Full day charter trip fees ranged between \$893 and \$1,197. The two largest operating expenses were fuel and crew labor. As with head boats, fuel expenses outweighed labor costs by more than double in each state and region. Net operating income to owner per full day trip ranged between \$634 and \$834. Half day trip fees ranged between \$525 and \$589, with fuel costs being the highest expense ranging from \$58 to \$122. Net operating income per half day trip averaged between \$429 and \$476.

Average annual charter revenue from fees and tips was not even half the estimated values for head boat operations. Louisiana operations appear to have grossed considerably high revenue, calculated at \$107,581. This estimate is likely a function of higher trip fees than in other areas and a relatively high number of full day trips annually. Other states and regions ranged between \$52,086 and \$78,777. Despite Louisiana operations having the highest average cost of labor, fuel, trip supplies, and investments and upgrades to the primary vessel relative to the other states and regions, observations indicate that these charter operations realized the highest net income to owner of \$40,246 and net income to the owner per average trip of \$537.

Table 3. Firm and Primary Vessel Costs and Earnings in 2009

	Head		Charter				Guide			
	TX, LA, MS, AL 12	WFL 9	TX 12	LA 11	MS, AL 22	WFL 42	TX 105	LA 100	MS, AL 23	WFL 64
Number of observations										
Balance Sheet										
Assets - Vessel market value	308,553	317,778	55,875	56,727	77,170	70,679	23,167	24,036	21,810	22,697
Vessel purchase price	367,404	332,778	69,000	76,818	85,438	102,369	30,288	31,840	25,194	29,427
Liabilities - Outstanding loan on vessel	212,656	217,250	60,750	38,000	61,601	53,215	19,811	20,747	17,775	18,926
Percent of vessels with loan	67%	56%	33%	64%	32%	48%	49%	41%	40%	31%
Equity - Equity in vessel	165,123	221,222	35,625	32,545	60,264	54,207	15,620	17,397	15,469	17,374
Percent of vessels with insurance	94%	89%	100%	100%	87%	88%	90%	92%	84%	95%
Percent insurance coverage	100%	94%	114%	99%	115%	97%	104%	108%	108%	125%
Vessel Operation										
Full day trip - number of observations	11	9	11	11	21	42	103	93	17	58
Trip fee	2,145	1,772	1,150	1,197	975	893	514	538	570	501
Tips	274	241	79	116	104	90	63	69	53	53
Crew labor (if used)	116	136	91	115	90	89	50	73	-	-
Fuel and oil	535	394	266	300	278	213	68	76	96	58
Bait	48	54	47	49	33	44	44	31	39	20
Tackle	28	33	15	37	24	20	13	14	15	12
Ice	30	19	16	30	15	19	7	9	11	8
Net operating income to owner per trip	1,662	1,376	834	814	652	634	445	471	461	454
Half day trip - number of observations	4	6	5	2	17	32	65	43	20	56
Trip fee	1,363	1,217	525	-	589	547	377	410	374	349
Tips	155	150	54	-	52	56	52	49	37	35
Crew labor (if used)	53	78	-	-	61	59	-	-	-	-
Fuel and oil	198	229	58	-	122	96	44	54	51	41
Bait	50	33	17	-	16	24	27	20	22	16
Tackle	24	18	7	-	13	13	9	12	10	9
Ice	13	12	6	-	9	9	6	10	7	7
Net operating income to owner per trip	1,181	996	476	-	439	429	342	356	320	310
Annual Cash Flow										
Inflow - Trip revenue (fees, tips)	240,052	225,758	52,086	107,581	58,125	78,777	46,190	42,268	41,098	47,644
Outflow - Total	169,542	160,030	32,561	67,335	43,626	57,826	20,001	18,894	20,077	19,351
Crew labor cost	10,289	14,444	1,818	6,408	3,545	4,351	102	122	0	49
Fuel and oil	51,031	42,338	9,339	24,884	14,885	15,837	5,024	5,010	4,523	5,326
Cost other supplies (bait, ice, tackle)	10,578	11,097	2,517	9,442	3,369	6,650	4,956	3,782	4,481	3,428
Insurance	7,853	7,072	2,134	2,927	2,995	2,921	1,605	1,002	1,012	1,132
Regular maintenance	14,952	6,889	3,246	3,091	3,535	3,099	986	950	810	1,192
Overhead	47,445	54,366	8,350	10,068	11,053	18,428	3,999	4,941	6,744	5,915
Loan payments	22,515	20,748	3,677	4,431	2,458	4,430	2,554	2,065	1,824	1,305
Annualized investments since vessel acquired	4,879	3,077	1,480	6,085	1,786	2,111	775	1,022	682	1,004
Net income to owner (annual)	70,510	65,728	19,524	40,246	14,499	20,951	26,189	23,375	21,021	28,293
Net income to owner (per average trip)	792	572	375	537	302	214	308	329	231	286

Guide boat operations — Primary vessels for guide boat operations are the smallest and least expensive capital expenditure of the three types of RFH fishing operations in the Gulf. Reported fair market value for guide boats averaged between \$21,810 and \$24,036. Responses indicate that less than half of vessels had an outstanding loan. As with the head and charter boat sectors, almost all guide boats were insured. For all states and regions, the limit of coverage exceeded 100% of the purchase price of the vessel. These estimates over 100% can include aftermarket upgrades to the vessel or may include insurance covering the replacement value of capital equipment.

In most cases, full day trip fees were about half the amount of charter fees. Average full day trip fees ranged from \$501 to \$570 in the four states and regions. Because very few guide trips used deck hands, crew labor is not reported in the Mississippi to Alabama and West Florida regions. Though estimates for fuel expenses were low compared to head and charter operations, fuel costs were the highest operating expenditure for guide boats, estimated between \$58 and \$96 per trip. As anticipated, the cost of trip supplies for bait, tackle, and ice were relatively similar between charter and guide boat operations. This result was expected due to the operations running trips with a similar number of passengers on average. Net operating income to owner per trip was similar among states and regions, averaging \$445 to \$471. Costs and earnings for half day trips were also similar between states and regions. Trip fees ranged from \$349 to \$410 per trip, with fuel constituting the highest operating expenses between \$41 and \$54 per trip. Net operating income per trip averaged from \$310 to \$356 per trip.

Estimates of gross revenue from fees and tips ranged between \$41,098 and \$47,644. Guide boat operations from each state or region had little to no crew labor cost. The largest annual expenses were incurred with fuel, trip supplies, and overhead. After accounting for annual inflow and outflow, guide boat operations realized an estimated net income to owner ranging from \$21,021 to \$28,293. Net income to the owner per average trip for guide boat operations appears to be relatively similar to those of charter operations, ranging from \$231 to \$329.

Longitudinal Comparisons

Comparisons across Gulf-wide surveys are attempted despite differences in sampling, question wording in surveys, and other differences between studies. Though these studies represent three cross-sectional snapshots of the industry, estimates do not necessarily accurately depict trends since 1987 and 1997. Longitudinal comparisons are made for head and charter operations only, since previous Gulf-wide studies likely did not include the guide boat sector.

Head boat operations constitute the smallest segment of the RFH population in the U.S. Gulf. Compared to charter operations, head boat businesses typically use a

larger vessel and carry a larger number of passengers. Differences in vessel size between head and charter boats are obvious between states and regions for any given year, as shown in Table 4. Across years, the average vessel size by state and region generally increased between 1987 and 1997, but decreased in all cases from 1997 to 2009.

Gross revenue is reported in 2009 dollars based on reported estimates from the two previous Gulf-wide surveys (Ditton et al. 1988, Holland and Milon 1989, Holland et al. 2000, Sutton et al. 1999). Estimates indicate that there was a general increase in gross revenue for the head boat sector, as shown in Table 5. In the Texas to Alabama region, gross revenue increases between the three study periods. In West Florida, however, a decrease is reported between 1987 and 1997, but then revenue appears to increase to above 1987 levels as demonstrated between 1997 and 2009.

Table 4. Mean Vessel Size (m)

	Head		Charter			
	TX, LA, MS, AL	WFL	TX	LA	MS, AL	WFL
1987	19	20	8	10	12	12
1997	22	20	11	13	12	11
2009	17	16	9	10	11	10

The charter sector presents different trends between study periods in each state or region. Texas operations show an apparent increase in gross revenue between 1987 and 1997, and then a decrease in 2009, which remained above 1987 levels. Louisiana demonstrates apparent steady growth throughout the years, while the Mississippi and Alabama region shows a steady decline. Between 1987 and 1997, West Florida charter operations reportedly experienced a steep decrease in gross revenue, and then a modest increase by 2009, but not dramatically enough to bring these estimates back up to the 1987 level. Similar to head boat operations, the increase in fees outweighed any decreases in the average number of passengers and trips, which allowed for apparent increases in gross revenue. Estimates for gross revenue can be calculated using per person trip fees, average number of passengers per trip, and the annual number of trips. Tables 6, 7, and 8 report estimates for the head and charter sectors for each of these relevant variables from the three study periods.

Gulf-wide, the head boat sector reportedly experienced a decrease in the per person full day trip fees between 1987 and 1997. These fees increased by 2009 to well-above the 1987 estimates. This fluctuation in per person fees was coupled with a reported increase in the average number of passengers per trip between the first two studies, but then decreased in 2009; however, the average passenger estimates seem disjoint between the three surveys. Though the Texas to Alabama region shows a modest increase in annual trips between 1987 and 1997 and West Florida shows a modest decrease, both regions realize a decrease in the number of trips by 2009.

Table 5. Mean Gross Revenue per Vessel (2009 Dollars)

	Head		Charter			
	TX, LA, MS, AL	WFL	TX	LA	MS, AL	WFL
1987	\$170,960	\$210,735	\$48,703	\$86,562	\$71,442	\$117,435
1997	\$188,438	\$188,557	\$84,008	\$94,409	\$64,129	\$76,864
2009	\$240,052	\$225,758	\$52,086	\$107,581	\$58,125	\$78,777

Charter operations reportedly experienced overall increases in per person full day trip fees for most regions over the span of the three Gulf-wide studies. Overall decreases, however, were reported for the number of passengers by state or region, with the exception of Texas which showed a gradual increase over time. Louisiana and the Mississippi and Alabama region showed decreases in the annual number of trips, while Texas and West Florida showed increases between 1987 and 1997; though estimates in 2009 fell below 1987 levels for Texas and remained above 1987 levels for West Florida.

As shown in Table 9, the head and charter sectors experienced an apparent increase in the proportion of part-time operators in all states and regions. This increase in part-time operators likely affected trip fees, average passengers per trip, and the number of annual trips through increased supply and competition.

One explanation for the resiliency of the head boat industry in the Gulf could be the fleet's growing practice of effort diversification. Table 10 shows the percent of operators from each survey who indicated that they target a particular species. Examining the head boat sector across years indicates an increasing frequency of target on a larger number of species. For example, the frequency of target increased for over half of the listed species between 1987 and 2009 for head boat operations. A similar pattern is

demonstrated with charter operations between 1997 and 2009, to a lesser extent. This diversification in effort can be considered a ramification of more restrictive regulations between surveys through bag and length limits, license moratoriums, reductions in total allowable catch, and season reductions, especially in the red snapper fishery.

The frequency of target for each type of operation divides as expected. Namely because of the large size of vessels used, head boats primarily target reef species and coastal pelagics such as Snappers, Groupers, Sharks, Cobia, Jacks, and Mackerels. On the other hand, charter operations tend to target species on a wider range of the inshore to offshore spectrum partly due to the relatively smaller vessel size. Frequency of target for guide boats for the 2009 survey is also shown in Table 10. As expected, these guide boat operations primarily target inshore species, such as Spotted Sea Trout, Red Drum, Flounder, and Tarpon. This result is partly a function of how the groups were defined using trip effort as one of the identifying factors.

Table 9. Mean Percent of Part-Time Operators

	Head		Charter			
	TX, LA, MS, AL	WFL	TX	LA	MS, AL	WFL
1987	6%	5%	27%	16%	11%	15%
1997	0%	0%	22%	17%	25%	11%
2009	9%	11%	83%	27%	37%	21%

Table 6. Mean Number of Passengers

	Head			Charter			
	TX, LA, MS, AL	WFL	TX	LA	MS, AL	WFL	
1987	9	16	4	6	6	6	
1997	38	25	4	4	6	5	
2009	13	13	5	5	5	5	

Table 7. Mean per Person Full Day Trip Fees (2009 Dollars)

	Head			Charter			
	TX, LA, MS, AL	WFL	TX	LA	MS, AL	WFL	
1987	\$90	\$69	\$212	\$119	\$122	\$148	
1997	\$85	\$59	\$235	\$277	\$120	\$150	
2009	\$175	\$163	\$240	\$247	\$190	\$198	

Table 8. Mean Annual Number of Trips

	Head			Charter			
	TX, LA, MS, AL	WFL	TX	LA	MS, AL	WFL	
1987	132	141	100	111	93	86	
1997	135	137	112	99	67	141	
2009	89	115	52	75	48	98	

DISCUSSION

As a result of inconsistencies in state licensing and federal sources in the Gulf, determining the exact size of the RFH fishing industry is impossible. Non-standardized terminology, definitions, and units of measurement in tracking head and charter boat operations, as well as the lack of focus and recognition of guide boat operations as a separate and major segment within the industry, have left many gaps in the ability to identify and confidently draw conclusions on specific trends within the Gulf RFH fishing sector. The third Gulf-wide survey of RFH fishing captains was necessary to establish current baseline data and gauge the health of the industry in attempts to fulfill mandates set forth in the Magnuson-Stevens Fishery Conservation and Management Act. This study parts from previous surveys such that guide and charter operations were examined separately in attempts to provide more meaningful comparisons.

The economic health of the recreational for-hire industry may be evidenced in the percent of vessels with insurance and amount of coverage. The percent of insured vessels ranged between 84% to 100% for all groups across

Table 10. Target species identified in the three decadal surveys

Target Species/Group Number of Observations	1987		1997		2009		
	Head 31	Charter 233	Head 35	Charter 255	Head 21	Charter 87	Guide 292
Spotted Sea Trout (<i>Cynoscion nebulosus</i>)	13%	23%	0%	21%	2%	18%	92%
Red Drum (<i>Sciaenops ocellatus</i>)	15%	27%	1%	24%	9%	17%	88%
Flounder (<i>Paralichthys lethostigma</i>)	21%	16%	0%	8%	2%	6%	46%
Tarpon (<i>Megalops atlanticus</i>)	0%	9%	0%	14%	0%	17%	29%
Jacks (<i>Carangidae</i>)	45%	59%	17%	28%	67%	36%	15%
Mackerels (<i>Scombridae</i>)	37%	64%	22%	69%	53%	64%	21%
Red Snapper (<i>Lutjanus campechanus</i>)	87%	69%	80%	66%	98%	56%	6%
Other Snappers (<i>Lutjanidae</i>)	-	-	-	-	98%	67%	12%
Groupers (<i>Serranidae</i>)	73%	66%	79%	60%	82%	79%	11%
Sharks (<i>Carcharhinidae</i>)	34%	54%	15%	6%	26%	33%	14%
Cobia (<i>Rachycentron canadum</i>)	31%	54%	11%	42%	61%	56%	16%
Dolphin (<i>Coryphaena hippurus</i>)	39%	59%	6%	45%	47%	51%	1%
Wahoo (<i>Acanthocybium solandri</i>)	9%	45%	2%	21%	56%	45%	0%
Tunas (<i>Thunnus spp</i>)	13%	29%	14%	28%	48%	41%	1%
Billfish (<i>Ishtiophoridae</i>)	77%	37%	2%	31%	23%	32%	1%
Other	22%	34%	5%	33%	26%	13%	27%

states and regions. These estimates are in stark contrast to the relatively low proportion of insured vessels in the Gulf commercial shrimp fishery, estimated at 38% (Liese 2011). Furthermore, the average percent of coverage is 94% or more across all groups, states, and regions.

The proportion of part-time operators increased since 1987 and 1997 in all regions and segments of the industry, which potentially affected fluctuations in trip fees and the average number of passengers, and the decrease in annual trips per operation. In 2009, the percent of part-time operators was lowest for head boats and highest for guide boats in each state and region, with the exception of Texas charter operators whose value was unexpectedly high. Owners of head boat businesses were expected to operate mainly full-time due to the larger cost structure of these businesses and high capital investment. Similarly, the percent of owner-operators is lowest for head boats and highest for guide boats, which is expected due to the relatively small business structure of guide boat operations.

In contrast to previous studies, it would appear that head boat operations can no longer be identified primarily by examining trip fee payment structure. Previously, head boats were almost exclusively associated with a per person payment system. Few trips were run on a per head basis in 2009, with the highest showing only 40% of head boat trips in West Florida operating using this method.

According to 2009 estimates, guide boat captains made up 70.5% of the Gulf RFH population, while head and charter boat captains accounted for only 5.7 and 23.8%, respectively. While head boat operations have the ability to generate more revenue per trip than charter and guide

operations due to larger vessel capacities and trip structure, these offshore fishing businesses account for only 20.2% of the industry's \$215.3 million in dockside revenue. The influence of the guide boat sector is more predominant than originally expected as these small inshore operations earned 51.3% of the industry's total dockside revenue. Guide boat operations make up a unique category of inshore fishing businesses, though this group has historically received less attention in research and fisheries resource management and has generally been lumped under the charter boat category.

This finding suggests that previous surveys may have unintentionally missed a large portion of the recreational for-hire industry in focusing primarily on the federal offshore fleet. For the most part, sources for identifying these guide boat operations did not exist as state licensing requirements were not established until a few years prior to the administration of the second Gulf-wide survey. Any changes in the number of guide boats cannot be captured by current or previous estimation sources. This specific group is often lumped into one category with charter captain and vessel estimates, though it is essentially a rather large "subgroup" of charter captains.

In moving forward, standardized terms and definitions should be developed and utilized in research and management by state and federal agencies. Improved methods of tracking different sectors within the RFH fishing population in the Gulf, with a greater focus on guide boat operations, are necessary to systematically examine the growth and health of these different segments on a state and regional basis over time.

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