

# **The Economics of Atlantic Highly Migratory Species For-Hire Fishing Trips, July-November 2013**

Clifford P. Hutt and George Silva



U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service.

NOAA Technical Memorandum NMFS-OSF-4  
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## **ABSTRACT**

The for-hire sector plays a significant role in providing recreational fishing opportunities for Atlantic highly migratory species (HMS) such as tuna, billfish, swordfish, and sharks. Because of the high cost of equipment needed to pursue HMS, many saltwater anglers find chartering a for-hire vessel to be the only affordable alternative. In 2013, there were 3,968 licensed Atlantic HMS Charter/Headboat (CHB) permit holders from Maine to Texas that took an estimated 9,449 for-hire vessel trips in the Atlantic and Gulf of Mexico (not including Texas) to pursue HMS from July to November of 2013. During this time period, NOAA Fisheries conducted a log-book study of randomly selected Atlantic HMS Charter/Headboat (CHB) permit holders to collect trip cost and earnings data. Data were collected on 596 for-hire trips targeting Atlantic HMS. Approximately 68 percent of HMS for-hire trips targeted a combination of pelagic species (most commonly yellowfin tuna, swordfish, or marlin) while 32 percent targeted coastal sharks. Average charter fares for HMS charter boat (6 anglers or fewer) trips ranged from \$1,223 in the Southeast (NC - FL) to \$2,450 in the Northeast (ME - VA). Net returns per trip ranged from a low of \$528 in the Southeast to a high of \$1,028 in the Gulf of Mexico (FL -TX). Overall, the \$19 million spent on HMS for-hire charter operations generated approximately \$51 million in economic output along the Atlantic and Gulf of Mexico coasts.

## **INTRODUCTION**

The for-hire sector plays a significant role in providing recreational fishing opportunities for Atlantic highly migratory species (HMS) such as tuna, billfish, swordfish, and sharks. HMS are large pelagic species that are costly to pursue, and prohibitively so for many private anglers. The pursuit of most HMS generally requires the use of comparatively large fishing vessels that have a substantial range, and the expenditures of HMS private anglers are significantly higher than those of the average saltwater angler in the United States (Hutt et al., 2014). Based on estimates from the Large Pelagics Survey (LPS) and Marine Recreational Information Project (MRIP), 9,449 for-hire vessel trips were taken in the Atlantic and Gulf of Mexico (not including Texas) to pursue HMS from July through November of 2013. While this represents a relatively small portion (1.9%) of the 501,607 total for-hire vessel trips taken over the same area and time period, as estimated by Marine Recreational Information Program (MRIP), the unique nature and management of HMS for-hire fisheries dictate a need for a targeted assessment.

While NOAA Fisheries collects annual catch and effort data on Atlantic HMS for-hire fisheries through the Large Pelagic Survey (LPS) and MRIP, no previous effort has been made to collect data on the costs and earnings of Atlantic HMS for-hire trip operators. While recent studies conducted or funded by NOAA Fisheries have assessed the operations and economic contribution of the for-hire sector in the Northeast and Southeast Atlantic, these studies have either excluded vessels that primarily target HMS (as was the case in the Northeast study), or

lumped vessels targeting Atlantic HMS in with all other vessels reducing its usefulness for HMS management purposes (Holland et al., 2012; Steinback and Brinson, 2013). In addition to these studies, we know of two studies that collected data on angler expenditures for HMS for-hire trips (Bohnsack et al., 2002; Ditton and Stoll, 2003). However, both of these studies focused exclusively on the angler expenditures associated with for-hire trips, and not on the costs and earnings of the for-hire vessel operators. Furthermore, both studies are 10 or more years old, and one of the studies only focused on a single fishery in a single state. For these reasons, the results of neither study can be assumed to be representative of the current economic condition of the entire Atlantic HMS for-hire fleet. Therefore, the purpose of this study was to collect cost and earnings data on Atlantic HMS for-hire fishing trips to facilitate the assessment of potential economic impacts on the Atlantic HMS for-hire fleet from proposed regulatory actions. Such assessments are required by several legislative mandates and executive orders governing federal fisheries management (e.g., Magnuson-Stevens Act, Regulatory Flexibility Act, and Executive Order 12866).

## **METHODS**

A logbook was designed to collect data on Atlantic HMS for-hire trip costs and earnings, and descriptive trip data. QuanTech Inc., a survey research firm with extensive experience in collecting data from both private anglers and the for-hire sector, was contracted to execute the logbook study from July 2013 through November 2013. Two logbook forms were developed for the study: 1) a Trip Summary form that collected data on individual for-hire trips targeting Atlantic HMS, and 2) a No-Fishing form that was to be returned any week that a selected vessel did not take any for-hire trips for Atlantic HMS. Selected vessels were only asked to report on trips that targeted species managed by the Atlantic HMS Management Division (i.e., bluefin, yellowfin, bigeye, albacore, and skipjack tuna; blue and white marlin; roundscale spearfish; sailfish; swordfish; and all Atlantic sharks excluding smooth and spiny dogfish). The logbooks were developed in collaboration with QuanTech, and five HMS charter boat captains from across the Atlantic HMS region (Atlantic coast and Gulf of Mexico) that pre-tested and provided feedback on the logbooks. That feedback enabled us to clarify the instructions and intent of several questions while eliminating some minor redundancies.

### **Sampling Frame and Sample Draw**

For-hire vessels fishing for tunas, sharks, swordfish or billfish in the Atlantic Ocean must obtain an Atlantic HMS Charter/Headboat category permit. As of October 2013, there were 3,968 licensed Atlantic HMS Charter/Headboat permit holders (NMFS, 2014b). Given the later starting time of the fishing season in the Northeast, there was concern that using 2013 permit holders only could result in missing vessels that purchased their permits later in the year. To address this concern, vessels from Maine to Delaware were included if they had purchased a

permit in either 2012 or 2013, while only 2013 permit holders were used from Maryland to Texas. Additionally, QuanTech removed vessels from the sampling frame if they had already been identified as inactive for 2013 or as never taking anglers out for a fee by the NMFS For-Hire Telephone Survey (FHTS). The final sampling frame for this study consisted of the 3,733 for-hire vessels that possessed HMS Charter/Headboat permits and had principal ports in coastal states from Maine to Texas (ME, NH, MA, RI, CT, NY, NJ, DE, MD, VA, NC, SC, GA, FL, AL, MS, LA, or TX). A random sample of 1,200 vessels, proportionally stratified by the number of permitted vessels per port state, was selected for reporting. As in the FHTS, this report distinguishes between charter boats and head boats based on their passenger carrying capacity. Vessels licensed by the Coast Guard to take 6 or fewer passengers are classified as charter boats, while vessels licensed to carry more than six passengers are classified as head boats.

### **Logbook Implementation**

Notification packages were mailed to each of the 1,200 vessels selected for logbook reporting on June 14, 2013. Each package included a cover letter describing the study, and a postage-paid return postcard for the permit holders to return to QuanTech to indicate whether they intended to take out for-hire trips for Atlantic HMS for the rest of 2013. The purpose of the postcard was to estimate what percentage of the sampling frame was composed of vessels that did not take out for-hire trips for Atlantic HMS, and were thus ineligible for the study. A total of 218 permit holders returned postcards indicating that the selected vessel would not be used to take for-hire trips for Atlantic HMS in 2013. These vessels were classified as ineligible for the study, and no additional materials were mailed to the permit holder. Those permit holders that did not return the postcard were assumed to be taking for-hire trips in 2013, and were retained within the study sample unless later communications indicated otherwise.

In early July, QuanTech mailed cost and earnings logbook packages to the remaining 982 vessels for reporting. Each logbook package included a cover letter, several Trip Summary forms (Appendix 2), several No Fishing forms (Appendix 2), and a matching supply of pre-paid return envelopes. Additional logbook forms were mailed to permit holders upon request, or when they had returned all the Trip Summary forms included in the initial packet. Permit holders were instructed to return a Trip Summary form within seven days of a for-hire trip targeting Atlantic HMS, or a No Fishing form for each week that the selected vessel did not take an HMS for-hire trip. Vessel owners were instructed to not report on for-hire trips that targeted species that are not under the management authority of the Atlantic HMS Management Division. Permit holders that knew in advance that they would not be taking HMS for-hire trips for an extended period of time were given the option to indicate so on the No Fishing forms to reduce reporting burden on both the selected permit holder and the contractor. Up to three reminder calls were made as needed to any permit holder that failed to report on a timely basis.

## **Vessel and Trip Characterization**

Throughout this report, vessel and trip data is summarized and reported across two categories: region and trip type. Data is summarized across three management regions: the North Atlantic (ME, NH, MA, RI, CT, NY, NJ, DE, MD, and VA), the South Atlantic (NC, SC, GA, and east FL), and the Gulf of Mexico (west FL, AL, MS, LA, and TX). Within each of these regions, trip and vessel data is further summarized across two categories defined by the number of anglers taken out, or the vessel's party size. Vessel trips taking out 6 or fewer anglers per trip are defined as charter boats trips, while vessels taking out 7 or more anglers per trip are defined as head boats trips. Additional descriptive data on the characteristics of reporting vessels was obtained from the Atlantic HMS Charter/Head Boat permit database.

## **Economic Analysis**

A cash flow analysis was conducted by estimating average costs and earnings at the trip level by region and trip type for the period of July to November, 2013. Cash flow represents the movement of money into and out of a business via its operating activities (Steinback and Brinson, 2013). In the case of a charter boat operation, this represents the revenue and expenses generated by boat trips. In the case of Atlantic HMS charter and head boat trips, inflows represent the revenues generated by charter fees paid by anglers. Captains and vessel owners were not asked to report tips for crew members as the captains that pre-tested the logbooks indicated they are generally unaware of how much their crew members are tipped each trip. As such, tips could not be included in the cash flow analysis. Cash outflows included the various costs of conducting an individual trip. For-hire operators were asked to report on trip costs for fuel and oil, bait, ice, tackle, captain and crew pay, and other expenses. The difference in inflows and outflows represented the net revenue per trip.

Next, total expenditures and net revenue associated with HMS charter boat trips were estimated for each region. This was accomplished by extrapolating the average trip expenses and net returns for HMS charter boat trips by the number of charter boat trips taken in each region from July through November, 2013, for which HMS were the either the primary or secondary target species. A boat trip was defined as one day of fishing for HMS by a single vessel regardless of the number of anglers that were on board. So whether there are three or five anglers aboard a given vessel, it still only counts as one day of fishing. LPS data was used to provide an estimate of 4,936 HMS charter boat trips in the Northeast, while MRIP data was used to estimate the number of HMS charter trips taken in the Southeast (3,008 trips) and Gulf of Mexico (1,505 trips). Because MRIP estimates trip effort on a per angler basis (i.e., 3 anglers fishing on the same boat equals 3 trips), trip estimates generated from MRIP data were adjusted to vessel trip estimates by dividing the number of angler trips by the average number of anglers per trip reported for the Southeast and Gulf of Mexico region. Total expenditures of HMS headboat trips

were not estimated due to limited sample sizes, and the inability to identify target species on headboat trips in all regions.

Finally, the economic contribution of HMS charter boat for-hire operations was estimated for the Northeast, Southeast, and Gulf of Mexico regions using input-output models estimated in IMPLAN (Minnesota IMPLAN Group, Inc., 2010). Input-output models estimate the economic contributions, or impacts, of monetary expenditures by consumers and businesses by tracking a regional economy's ability to absorb and circulate their expenses using economic multipliers (Miller and Blair, 1985). The input-output models used in this report generated three different metrics, referred to as impacts, for assessing the contributions to a region's economy from expenditures associated with Atlantic HMS for-hire charter boat trips. The different measures of impacts are:

- **Output** is the gross value of sales by businesses within the economic region affected by an activity. In the rest of the document, the terms "sales impacts" and "output impacts" are used interchangeably.
- **Labor income** includes personal income (wages and salaries) and proprietors' income (income from self-employment).
- **Employment** is specified on the basis of full-time and part-time jobs. There is significant part-time and seasonal employment in commercial and recreational fishing and many other industries.

The first two types of impacts are measured in terms of dollars, whereas employment impacts are measured in terms of number of jobs. Additionally, the three categories of impacts are not independent and it is important to note that adding them together would result in some double counting of impacts.

Input-output analyses were conducted with the same sum-of-parts approach used by Steinback and Brinson (2013). In this approach, the "direct" economic impacts (sales, income, and employment) of HMS angler for-hire trip expenditures to for-hire operators are directly estimated using survey data. Direct sales impacts are represented by the gross revenues taken in by for-hire operators for HMS for-hire trips. Direct income impacts are represented by the total expenditures of HMS for-hire operators for captain and crew pay. Finally, direct employment impacts were estimated by multiplying the average number of crew, including captains, per HMS for-hire trip by the estimated number of active HMS for-hire vessels during the study period. Input-output models in IMPLAN were then used to estimate the "indirect" impacts of for-hire operating expenditures and the "induced" impacts of household expenditures by crew members employed by HMS for-hire operators.

IMPLAN models were assembled for each aggregated region using state level data models provided in the software package, and assigning charter boat expenditures to the appropriate industrial sectors (Table 1). Expenditure categories that included more than one IMPLAN sector

were not aggregated to avoid the biases associated with aggregating. Costs listed under the “other costs” category were divided among five sectors including grocery store purchases and four IMPLAN sectors that manufacture brooms, clothes, mops, plastic bags, and soaps. A previous for-hire study in the Northeast Atlantic found these items to be the “other” supplies most commonly purchased by for-hire operators (Steinback and Brinson, 2013). Because the typical grocery or convenience store purchase includes a wide range of products, expenditures at grocery and convenience stores were allocated across sectors based on IMPLAN’s Personal Consumption Expenditure (PCE) activity database for grocery store purchases. PCE activity databases are created by the Bureau of Economic Analysis and represent national average expenditure patterns. Captain and crew pay were assigned to the employee compensation sector which uses a PCE activity database that contains data on average household expenditures of disposable income. Throughout this report, the results of the input-output analysis are referred to as either “economic contributions” or “economic impacts” with no implied distinction in the terms.

## **RESULTS**

### **Response Rate and Non-response Bias Analysis**

Of the 1,200 permit holders that were selected for reporting, 428 were determined to be ineligible for the study as they indicated they had no plans to take anglers on for-hire trips for HMS (Table 2). This includes both the 218 that returned the postcard sent out in the initial mailing, and 210 additional permit holders that either sent the postcard back late or indicated they did not plan to take for-hire trips for HMS over the phone. An additional 14 permit holders were classified as ineligible due to bad addresses that resulted in returned notification letters or logbook packets. Of the remaining sampled permit holders, 396 (52% of eligible permit holders) only returned No Fishing forms or indicated no HMS fishing over the phone, 212 (28%) returned no forms and could not be reached by phone, 67 (9%) refused to participate in the study, and 83 (11%) returned a total of 596 Trip Summary forms (Table 2).

To test for possible sources of non-response bias, statistical comparisons were made between respondents (those returning Trip Summary or No Fishing forms), and non-respondents (refusals and those that made no attempt to report and could not be reached) across four vessel characteristic variables (vessel length, year built, number of crew, and propulsion type) that were recorded in the HMS Charter/Headboat permit database, and were thus known for the entire sampling frame (Table 3). For a trip cost and earnings study, significant difference in vessel characteristics would be a potential indicator of non-response bias as differences in the size of a vessel or its crew could logically lead to significant differences in the operating costs of the vessel or the number of anglers a vessel could take out which would affect potential earnings. Continuous variables such as vessel length were compared using t-tests while categorical

variables were compared using chi-square tests. No significant differences were found between the vessels of respondents and non-respondents for the variable vessel length ( $t = 1.14$ ;  $p = 0.253$ ), year built ( $t = -0.86$ ;  $p = 0.388$ ), or number of crew ( $t = -0.26$ ;  $p = 0.798$ ). On average, vessels with HMS Charter/Headboat permits were approximately 37 feet in length, were built in the mid-1990's, and reported carrying an average of 2.7 crew members.

### **Vessel Characteristics**

The average charter boat vessel that reported taking for-hire trips for HMS was 41 feet in length, weighed 25 tons, and had 843 horsepower (Table 4). Average charter boat vessel length ranged from 39 (North Atlantic) to 44 (South Atlantic) feet across the three regions with average tons ranging from 21 to 30, and average horsepower ranging from 720 to 983 (Table 4). The average HMS charter boat was built in 1993 with average year of construction ranging from 1989 (South Atlantic) to 1995 (North Atlantic) across the regions. Charter boats reported 2.4 crew members on average (regionally ranged from 2.0 to 3.3). Finally, 77% of HMS charter boats reported having inboard motors (Table 4). Inboard motors were most common in the South Atlantic where they made up 92% of all vessels, and were least common in the Gulf of Mexico where they only made up 62% of vessels (Table 4).

The average head boat vessel that reported taking for-hire trips for HMS was 55 feet in length, weighed 46 tons, had 978 horsepower, were built in 1990, and had a crew capacity of 2.4 individuals (Table 4). In the North Atlantic, head boats averaged 50 feet long, 36 tons, had an average of 1,148 horsepower, were built in 1992, and had a crew capacity of 2.3 individuals. In the Gulf of Mexico, head boats averaged 58 feet long, 52 tons, had an average of 876 horsepower, were built in 1988, and had a crew capacity of 2.4 individuals (Table 4). Finally, 88% of HMS head boats reported having inboard motors with 67% having inboard motors in the North Atlantic, and 100% having inboard motors in the Gulf of Mexico (Table 4). No head boats reported taking HMS fishing trips in the South Atlantic.

### **Trip Characteristics**

Of the 596 Trip Summary forms returned, 536 reported on trips that targeted HMS managed by the Atlantic HMS Management Division. The other 60 trips that vessel captains reported on targeted a variety of species including dolphin (mahi), wahoo, king mackerel, blackfin tuna, snapper, sea bass, and tilefish. All statistics presented in the remainder of this report pertain solely to the 536 trips that targeted HMS. Over half ( $n = 297$ ) of the returned Trip forms returned came from the South Atlantic region (North Carolina through Atlantic coast of Florida), and all of these were for charter boat trips (Table 5). Of the remaining 239 trips providing Trip forms, 113 (95 charter, 18 headboat) were from the North Atlantic (Maine to Virginia), and 126 (86 charter, 40 headboat) were from the Gulf of Mexico (Table 5).

The species groups most commonly targeted by HMS for-hire vessels varied by region and between charter and headboats (Table 6). Overall, the HMS most commonly targeted by charter boats were yellowfin tuna (45%), sailfish (37%), marlin (32%), and coastal sharks (32%). The reported percentages add to greater than 100% as most HMS for-hire trips targeted multiple species (Table 6). This was especially true of trips targeting tuna or billfish species as the majority of these trips reported targeting at least two other species. The exception was HMS trips targeting coastal sharks with only 5% or fewer reporting targeting other species (Table 6). Of the 19 headboat trips that reported targeting coastal sharks, none reported targeting any other species (Table 6). The HMS most commonly targeted by headboats were yellowfin tuna (37%), bigeye tuna (45%), swordfish (34%), and coastal sharks (33%). In the North Atlantic region, the two HMS most commonly targeted by both charter and head boats were yellowfin tuna (57%, 100%) and bigeye tuna (48%, 100%) (Table 6). The third HMS most commonly targeted in the North Atlantic by charter boats were bluefin tuna (35%) which were not targeted on any reported headboat trips. HMS charters in the South Atlantic were most likely to report targeting sailfish (56%), yellowfin tuna (44%), and marlin (40%). In the Gulf of Mexico, HMS charter and head boats were most likely to report targeting coastal sharks (64%, 48%), yellowfin tuna (35%, 53%), and marlin (23%, 30%).

Overall, 84% of HMS for-hire trips were day trips that were completed the same day they started while 12% were over-night trips. Four percent ( $n = 20$ ) of HMS for-hire trips involved spending at least two night on the water with two trips spending three nights on the water. Over-night trips were most common among headboats with 60% spending at least one night on the water compared to only 10% of charter boats (Table 7). Over-night trips were most common in the North Atlantic region where 89% of headboat trips, and 36% of charter boat trips spent at least one night away from port (Table 7). In comparison, only one over-night trip was reported in the South Atlantic despite that region having the most reported trips. Among day trips, average trip length was 9 hours for both charter and headboats, and ranged from 7 to 11 hours across regions (Table 7). Across all regions, the average number of anglers per trip was approximately 5 anglers for charter boat trips, and 16 for headboat trips with the number of lines fished largely matching the number of anglers (Table 7). Crew size, excluding captains, averaged 2 on charter boats and 4 on headboats, and was largely consistent across regions (Table 7).

Among charter boat trips, the most commonly reported fishing technique varied across the regions (Table 8). Trolling was most popular in the two Atlantic regions, while 99% of Gulf of Mexico charter boats reported anchoring or drifting. However, almost all (98%) headboat trips reported fishing by anchoring or drifting across regions with only 29% reported trolling at some point during a trip (Table 8). Dead bait was consistently the most popular across regions and trip types with 90% of charter and 88% of headboat trips using it (Table 8). Conversely, the use of live bait and artificial lures was much more varied across regions and trip types.



## **HMS Trip Cost and Earnings**

In the Northeast, the average net return per HMS charter boat trip was \$969 (Table 9). Inflows from charter fees averaged \$2,450 per trip. Northeast charter boat trips averaged \$1,229 in material costs with their greatest material expenditures being for fuel (\$966) and bait (\$129). Charter boat trips also had average costs of \$61 for tackle, \$56 for ice, and \$15 in other costs. Average payouts to charter boat captains and crews totaled \$253 in the Northeast. HMS headboat trips in the Northeast had an average net return per trip of \$2,305 (Table 9). Inflows from headboat fees averaged \$6,973 per trip. Northeast headboat trips averaged \$3,979 in material costs with their greatest material expenditures being for fuel (\$2,824) and bait (\$446). Head boat trips also had average costs of \$186 for tackle, \$183 for ice, and \$342 in other costs. Average payouts to headboat captains and crews totaled \$689 in the Northeast of which only \$27 went to captains. It should be noted that payouts to captains were only reported if the captain was not the vessel owner which was rarely the case among headboats reporting in the Northeast. It should be noted that the costs reported here do not include annualized expenses such as overhead, loan payments, or vessel repair and maintenance. Estimation of these annualized expenses would require a separate survey that has not been conducted at this time.

In the Southeast, the average net return per HMS charter boat trip was \$534 (Table 10). Inflows from charter fees averaged \$1,223 per trip. Southeast charter boat trips averaged \$496 in material costs with their greatest material expenditures being for fuel (\$376) and bait (\$46). Charter boat trips also had average costs of \$38 for tackle, \$14 for ice, and \$22 in other costs. Average payouts to charter boat captains and crews totaled \$199 in the Southeast. The lower costs and revenues reported for this region were likely due to the fact that only one over-night trip was reported in the Southeast. No HMS headboat trips were reported in the Southeast during the study period.

In the Gulf of Mexico, the average net return per HMS charter boat trip was \$1,028 (Table 11). Inflows from charter fees averaged \$2,111 per trip. Gulf of Mexico charter boat trips averaged \$858 in material costs with their greatest material expenditures being for fuel (\$631) and bait costs (\$70). Charter boat trips also had average costs of \$58 for tackle, \$43 for ice, and \$55 for other costs. Average payouts to charter boat captains and crews totaled \$225 in the Gulf of Mexico. HMS head-boat trips in the Gulf of Mexico had an average net return per trip of \$2,595 (Table 11). Inflows from headboat fees averaged \$5,048 per trip. Gulf of Mexico headboat trips averaged \$1,970 in material costs with their greatest material expenditures being for fuel (\$1,704) and bait (\$84). Head boat trips also had average costs of \$69 for tackle, \$62 for ice, and \$51 in other costs. Average payouts to charter boat captains and crews totaled \$483 in the Gulf of Mexico.

## **Economic Contribution of HMS Charter Boat Trips**

In the Northeast, the LPS estimated that there were 4,936 charter trips from July to November, 2013, that targeted HMS. Extrapolating the average gross revenue per HMS trip in the Northeast resulted in an estimate of \$12.1 million in gross revenue from July through November, 2013. Of that gross revenue, \$7.3 million went towards covering trip expenditures (fuel, bait, ice, crew, etc.), and \$4.8 million went to owner net return and other annual operation costs (Table 12). Analysis in IMPLAN estimated that these expenditures generated \$31.9 million in total economic output, \$8.0 million in labor income, and 460 full and part-time jobs (Table 13).

In the Southeast, the MRIP estimated that there were 3,008 charter trips from July to November, 2013, that targeted HMS. Extrapolating the average gross revenue per HMS trip in the Southeast resulted in an estimate of \$3.7 million in gross revenue from July through November, 2013. Of that gross revenue, \$2.1 million went towards covering trip expenditures (fuel, bait, ice, crew, etc.), and \$1.6 million went to owner net return and other annual operation costs (Table 12). Analysis in IMPLAN estimated that these expenditures generated \$10.6 million in total economic output, \$2.9 million in labor income, and 243 full and part-time jobs (Table 13).

In the Gulf of Mexico, excluding Texas, the MRIP estimated that there were 1,505 charter trips from July to November, 2013, that targeted HMS. Extrapolating the average gross revenue per HMS trip in the Gulf of Mexico resulted in an estimate of \$3.2 million in gross revenue from July through November, 2013. Of that gross revenue, \$1.6 million went towards covering trip expenditures (fuel, bait, ice, crew, etc.), and \$1.5 million went to owner net return and other annual operation costs (Table 12). Analysis in IMPLAN estimated that these expenditures generated \$8.8 million in total economic output, \$2.2 million in labor income, and 428 full and part-time jobs (Table 13).

Table 14 lists economic output generated by Atlantic HMS charter boat trips in the top ten industry sectors for each region. Naturally, in all regions the sector experiencing the greatest economic output is the for-hire fleet itself with the petroleum refinery sector coming in at number two across all regions (Table 14). Beyond the top two industries, there was considerable variation across regions in the order of which industries were most supported by Atlantic HMS charter trips. In the Northeast, the top five industries were rounded out by dwelling rental activity, wholesale trade businesses, and oil and gas extraction. In the Southeast, the remaining top five were oil and gas extraction, nonresidential building maintenance and repair, and dwelling rental activity. In the Gulf of Mexico, the remaining top five industries by output were oil and gas extraction, dwelling rental activity, and wholesale trade businesses.

## DISCUSSION

This study used a logbook survey of vessels holding Atlantic HMS Charter/Headboat permits to estimate the costs and earnings and regional economic contribution of Atlantic HMS for-hire angling trips. Previous cost and earnings studies of recreational for-hire fleets by NOAA Fisheries have typically used one-time surveys conducted by mail, telephone, or in-person to collect data on annual operational expenditures and average trip costs and earnings (Holland et al., 2012; Hospital and Beavers, 2012; Steinback and Brinson, 2013). By utilizing a trip logbook, this study was able to collect data from Atlantic HMS for-hire captains for multiple trips that often targeted different species, thus allowing this study to better characterize the variety of trips offered by Atlantic HMS for-hire operators.

While logbooks do provide trip data with a greater level of detail, they have the disadvantage of placing a greater reporting burden on study participants which typically results in lower study participation. Only 11% of eligible individuals selected for the study returned Trip Forms while an additional 52% either returned weekly No HMS Fishing forms, or indicated they did not fish for HMS within a given time period during contractor follow-up calls. A little over a third ( $n = 428$ ) of the 1,200 permit holders selected for participation in the study reported they had no plans to take for-hire trips for Atlantic HMS during the July to November study period; however, data was not collected on whether these individuals took for-hire trips targeting HMS at any time during the rest of the year, or if they only purchased the permit to allow their clients to retain HMS caught incidentally while targeting other fish species.

Unlike other NOAA Fisheries studies of recreational for-hire fleets, this study focused exclusively on the economics of for-hire trips that targeted HMS. This study did not collect data on the annual operation costs of for-hire vessels (e.g., boat payments, repairs, insurance, etc.), for-hire trips that did not target HMS, and non-for-hire trips taken with the vessel. In their study of for-hire vessels in the Northeast United States, Steinback and Brinson (2013) collected data on other categories of trips taken by for-hire vessels. They found that many for-hire fishing vessels in the Northeast also took out whale watching trips in addition to non-for-hire fishing trips to collect bait or scout out new fishing locations, and non-financial trips for personal use. Furthermore, Atlantic HMS Charter/Headboat permit holders are also authorized to fish commercially for sharks, tunas, and swordfish under commercial regulations assuming they are not conducting a for-hire trip, and the appropriate commercial seasons are still open (NMFS, 2014c). Future study efforts on the annual expenditures and expenditures associated with non-for-hire trips will be needed to obtain a more complete picture of the economics and overall profitability of vessels holding HMS Charter/Headboat permits.

Analysis of Atlantic HMS for-hire trip data was analyzed by region and whether the vessel was classified as either a charter or headboat. Separate regional analyses were conducted in order to account for differences in regional fisheries. In the Northeast, Atlantic HMS for-hire trips

primarily target tuna species (i.e., bluefin, yellowfin, and bigeye tuna) while Southeast trips were dominantly by billfish trips (i.e., marlin and sailfish), and Gulf of Mexico trips were overwhelmingly dominated by trips targeting coastal sharks (64%). Looked at in aggregate these fisheries were targeted in nearly equal proportions (32%-45%). Trips were further categorized as either charter boat or headboat trips to account for expected significant variations in costs and earnings given the large differences in vessel size and passenger capacity.

This study was originally intended to begin data collection in June 2013 to match up with the data collection period for the Large Pelagic Survey, but due to delays in testing the logbook forms data collection on the Atlantic HMS For-Hire Cost and Earnings Study did not commence until July 2013. While this still allowed for capturing the majority of HMS for-hire trips taken in the Northeast, missing the winter and spring months resulted in a majority of HMS for-hire trips in both the Southeast and Gulf of Mexico. According to the MRIP survey, 64% of 2013 HMS for-hire trips in the Southeast and 52% in the Gulf of Mexico were taken before data collection began in July 2013. As a result, the economic impact estimates presented in this report for the Southeast and Gulf of Mexico should be considered highly conservative estimates, and only reflective of the summer and fall seasons. One significant HMS recreational fishery that was missed as a result of the timing of this study was the winter bluefin tuna fishery off of North Carolina. An economic impact assessment of the winter bluefin tuna fishery off of Hatteras, North Carolina, in 1997 estimated that anglers spent \$3.8 million dollars in trip-related expenditures during a three month period, generating over \$5 million dollars in economic impact (Bohnsack et al., 2002). This is comparable to the entire amount of expenditures and impacts estimated for the entire southeast region during the period of the current logbook study. However, it is important to note that the North Carolina study included all angler trip expenditures, including those for private boat trips, and not just the expenditures associated directly with the operation of for-hire vessels. Additionally, the North Carolina study (Bohnsack et al. 2002) utilized a different methodology as it surveyed anglers directly as opposed to surveying charter headboat captains. As such, the North Carolina bluefin tuna study included data on bluefin tuna angler travel expenditures outside of what they paid for charter trips. Even so, the winter fishery for trophy-sized bluefin tuna off of the North Carolina coast likely represents the most significant HMS fishery that was not assessed by the for-hire logbook study.

Furthermore, because the state of Texas does not participate in the MRIP survey, no estimate of HMS Charter/Headboat trips taken by vessels originating in Texas was available for this study. The Texas Department of Parks and Wildlife (TPWD) Division of Marine Fisheries was contacted to determine if they had data available on HMS trips taken in 2013, but they reported that they had only intercepted 14 vessels that had taken trips in federal waters during 2013 which was not enough to reliably estimate the number of trips taken. Of these vessels, the only HMS reported caught were blacktip sharks, Atlantic sharpnose sharks, and spinner sharks. However, this study collected 84 trips reports (60 charter boat, 24 headboat) for HMS for-hire trips originating in Texas, and while the majority (n = 69) targeted coastal sharks, these trips also

targeted yellowfin tuna (n=13), skipjack tuna (n = 2), marlin (n = 6), sailfish (n = 9), and pelagic sharks (n = 3). Despite the lack of an estimate of HMS for-hire trips taken from Texas ports, data was collected on the expenditures of HMS for-hire trips by Texas captains, and incorporated in the cost and earnings estimates for the Gulf of Mexico. Given all this, the estimates of total expenditures and economic impacts associated with HMS for-hire trips in the Gulf of Mexico should be considered an under-estimate even for the study period of July through November. A previous study of Texas HMS Charter/Headboat Permit holders conducted by NOAA Fisheries found that permit holders in Texas took an average of 8.8 for-hire trips targeting HMS between July and December of 2008 (Salz et al., 2009). Extrapolating that number of trips by the number of HMS Charter/Headboat Permit holders in the state of Texas in 2013, would result in an addition 915 HMS for-hire trips, and increase estimated expenditures and economic impacts for the Gulf of Mexico region by approximately 60 percent.

Because this study did not collect data on HMS charter/headboat annualized costs (i.e., overhead, vessel repairs and maintenance, insurance, loan payments, etc.), it is not possible to currently come to a definitive conclusion about the economic status of the HMS for-hire fleet. The study did find that trip expenses added up to about 50 to 60 percent of the average trip fare per region. On average, this leaves 40 to 50 percent of for-hire vessel earnings to cover vessel owner annual expenses, and hopefully leave a profit. However, two previous studies of for-hire vessels in the Northeast and Southeast did collect data on for-hire vessel annual expenditures (Brinson and Steinback, 2013; Holland et al., 2012). Data collected by Brinson and Steinback (2013) indicate that annualized expenditures accounted for approximately 40 percent of total charter vessel costs on average. If this percentage is assumed to be the same for HMS charter vessels in the Northeast, it would indicate that they would have approximately \$1.8 million in net returns over the study period on average, representing approximately 15 percent of their total revenue. Similarly, Holland et al. (2012) found that annualized costs for charter vessels in the Southeast accounted for 61 percent of their total costs. Again, if this percentage was applied to HMS charter vessels in the Southeast, they would average approximately \$315 thousand in net returns over the study period, representing 8.5 percent of their total revenues. If we assume a middle point of 50 percent for HMS charter vessels in the Gulf of Mexico, where no estimate is available, they would experience \$733 thousand in net returns, representing 23 percent of their total revenues. It should be noted that both the Brinson and Steinback (2013) and Holland et al. (2012) studies found significant variation in the annualized costs of charter vessels with many having annual costs in excess of their total annual revenue. Future consideration should be given to collecting annualized cost data on Atlantic HMS for-hire operators to provide a more complete picture of their profitability and operational expenses.

Finally, this study estimated 1,131 jobs were generated as a result of HMS charter vessel operations during the study period. This number is a conservative estimate, and does not include jobs created by additional travel expenditures generated by the HMS anglers that charter HMS for-hire vessels. Furthermore, most HMS for-hire vessels also take out trips targeting other

species, and these trips were not included in this study's analysis, and are not reflected in the estimated employment figures. The results of this study indicate that one job was supported by HMS charter vessel operations for approximately every 12 HMS trips taken.

There are several ways the data collected for this study could potentially be used to assess management actions concerning the Atlantic HMS for-hire sector. The fact that data was collected on costs per trip makes the data particularly useful. In addition to simply informing managers of the economic impact of HMS for-hire operations relative to other fishing sectors, the data could be used to assess the potential economic impacts of a temporary regional closure of the Atlantic HMS for-hire fishery. For example, during the Deep Water Horizon oil spill significant portions of the Gulf of Mexico were closed to all fishing. In this or a similar situation elsewhere, historic MRIP effort data could be used to estimate the average number of HMS for-hire trips taken during the time and area of the proposed closure in the 3-5 previous years. This estimate of average trips could then be used to extrapolate the potential loss of expenditures based on the average trip cost and earnings profiles generated by this study which could in turn be used to estimate the potential proportional change in economic impacts in IMPLAN. A similar analysis could be conducted to assess the potential impacts of other proposed fisheries closures; however, in the event of single fisheries closures there would always be the potential for for-hire captains to take out trips targeting other fisheries. In such cases, managers would need to consider potential demand for charter trips targeting the substitute fisheries. Similar analyses could be conducted on species specific closures related to quota over-ages as data was provided in the logbook forms on species targeted. Cost-earnings profile data can be found on trips that pursued the most commonly targeted HMS can be found in Appendix 1. The limiting factor when dealing with cost-earnings data by species targeted is that, with the exception of trips targeting coastal sharks, most HMS for-hire trips targeted multiple pelagic species. If the fishery for one pelagic HMS was closed, there is no guarantee trips that targeted it wouldn't continue to target the other species.

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Table 1. Regional HMS for-hire trip expenditures IMPLAN sector scheme.

<b>Expenditure/Income Category</b>	<b>IMPLAN Sector(s)</b>	<b>Description</b>
<b>Trip operation costs</b>		
Fuel and oil	3115	Refined petroleum products
Bait	3017	Fish (smackerel, ballywoo, butterfish)
Ice	3070	Soft drinks and manufactured ice
Tackle	3311	Sporting and athletic goods
Other supplies	3138	Soaps
	3086	Brooms and mops
	3318	Knit apparel
	3142	Plastics
	PCE	IMPLAN PCE vector for grocery store purchases
<b>Employee pay and benefits</b>		
Hired captain	5001	Employee compensation
Crew / mates	5001	Employee compensation
<b>Annualized Expenses + Net Returns</b>	338*	Scenic and sightseeing transportation and support activities

\* Due to lack of data on the annualized expenses of HMS for-hire operations, it was chosen to model the balance of revenues after trip expenses under the IMPLAN industry sector that most closely approximated the operations of a for-hire operator.



Table 2. Final response status of each vessel selected for trip cost-earnings reporting by port state. To avoid double counting, vessels that returned Trip Forms some weeks, and No Trip forms other weeks, are only included in the Returned Trip Form column. Vessels in the “Did not target HMS” column are those that returned postcards indicating they did not plan to target HMS during for-hire trips at any point during the report period, or indicated such to the contractor during a follow-up call.

Port State	Status per vessel							All
	Unable to Contact	Form - No Trips	Non-deliverable	Did Not Target HMS	Refusal	Phone - No Trips	Returned Trip Forms	
AL	3	2	0	5	1	3	6	20
CT	4	3	0	12	1	3	2	25
DE	6	1	0	8	2	6	2	25
FL	24	27	5	67	5	28	16	172
GA	0	0	0	4	1	0	1	6
LA	5	6	1	6	0	5	3	26
MA	54	36	3	102	19	54	8	276
MD	6	12	0	5	4	7	1	35
ME	4	4	0	15	0	9	1	33
MS	2	0	0	2	0	1	0	5
NC	14	15	0	40	5	19	11	104
NH	10	5	0	10	0	6	1	32
NJ	28	17	2	63	10	50	11	181
NY	26	10	1	36	8	13	6	100
RI	8	5	1	20	3	12	2	51
SC	8	1	0	14	4	7	2	36
TX	3	4	1	5	1	10	10	34
VA	7	9	0	14	3	6	0	39
All	212	157	14	428	67	239	83	1,200
Percent of eligible	28%	21%	---	---	9%	31%	11%	---

Table 3. Statistical comparisons of known vessel characteristics between logbook respondents (those returning either Trip Summary or No HMS Fishing forms), and non-respondents (including refusals) to assess the potential for non-response bias. Continuous variables were assessed with t-tests while categorical variables were assessed with chi-square tests.

Variable	Respondents	Non-respondents	Test statistic	p-value
Vessel length (ft)	36.2	37.3	1.14	0.253
Year built	1995	1994	-0.86	0.388
Number crew	2.7	2.6	-0.26	0.798

Table 4. Characteristics of charter (CH) and head boat (HB) vessels returning Trip Summary forms by region and overall.

Party Size	N. Atlantic		S. Atlantic		Gulf of Mexico		Overall	
	CH	HB	CH	HB	CH	HB	CH	HB
Length (ft)	38.6	50.3	44.3	--	40.3	57.8	40.9	55.0
Tons	20.6	36.3	30.3	--	25.0	51.6	24.9	45.9
Horsepower	787	1,148	983	--	720	876	843	978
Year built	1995	1992	1989	--	1994	1988	1993	1990
Number crew	2.3	2.3	2.0	--	3.3	2.4	2.4	2.4
Propulsion type								
Outboard	29.0	33.3	8.3	--	38.5	0.0	23.5	12.5
Inboard	71.0	66.7	91.7	--	61.5	100.0	76.5	87.5

Table 5. Number of trip summary forms returned overall and per region by vessel category as determined by reported party size (vessels carrying more than 6 anglers are classified as head boats). A total of 581 trip summary forms were returned during the reporting period, of which 536 were for trips targeting HMS species. Trips targeting other species were generally for other species covered in the LPS survey, and some reef fishing trips.

Region	Vessel Category		
	Charter	Head Boat	Combined
Northeast Atlantic (ME – VA)	95	18	113
South Atlantic (NC – FL*)	297	0	297
Gulf of Mexico (FL* – TX)	86	40	126
Overall	478	58	536

\* Florida based trips were assigned to the Southeast Atlantic or Gulf of Mexico region depending on whether the primary fishing location was located either east or west of 82 degrees longitude, respectively.

Table 6. Percent\* of HMS charter/head boat trips by region and target species (2013).

Party Size	N. Atlantic		S. Atlantic		Gulf of Mexico		Overall	
	CH	HB	CH	HB	CH	HB	CH	HB
Bluefin tuna	35.0	0.0	3.0	-	0.0	3.0	9.0	2.0
Yellowfin tuna	57.0	100.0	44.0	-	35.0	53.0	45.0	67.0
Albacore tuna	14.0	89.0	6.0	-	0.0	0.0	7.0	28.0
Bigeye tuna	48.0	100.0	2.0	-	5.0	20.0	12.0	45.0
Skipjack tuna	3.0	0.0	10.0	-	2.0	0.0	7.0	0.0
Marlin	14.0	17.0	40.0	-	23.0	30.0	32.0	26.0
Swordfish	13.0	89.0	3.0	-	10.0	10.0	6.0	34.0
Sailfish	0.0	0.0	56.0	-	15.0	10.0	37.0	7.0
Pelagic sharks	27.0	6.0	0.0	-	0.0	8.0	5.0	7.0
Coastal sharks	7.0	0.0	30.0	-	64.0	48.0	32.0	33.0
Other species	11.0	83.0	40.0	-	14.0	13.0	30.0	34.0

\*Percentages exceed 100 percent as most trips targeted multiple species.

Table 7. Measures of average HMS charter/head boat trip effort by region and overall.

Party Size	N. Atlantic		S. Atlantic		Gulf of Mexico		Overall	
	CH	HB	CH	HB	CH	HB	CH	HB
Trip length (d)	1.4	1.9	1.0	-	1.3	1.7	1.1	1.7
% over-night	35.8	88.9	0.3	-	17.3	47.5	10.4	60.3
Trip length (h) (1 day trips)	11	10	8	-	7	9	9	9
Anglers per trip	4.6	18.5	5.2	-	4.6	14.2	5.0	15.5
Crew per trip	2.1	5.3	1.8	-	2.2	3.4	1.9	4.0
Lines fished per trip	8.5	18.8	5.6	-	4.6	13.1	6.0	14.9

Table 8. Percent of HMS charter/head boat trips by fishing method, bait, and hook-type (2013).

Party Size	N. Atlantic		S. Atlantic		Gulf of Mexico		Overall	
	CH	HB	CH	HB	CH	HB	CH	HB
Fishing method								
Anchored or								
Drifting	69.0	94.0	43.0	-	99.0	100.0	58.0	98.0
Trolling	77.0	17.0	92.0	-	30.0	35.0	78.0	29.0
Greenstick	0.0	11.0	8.0	-	0.0	0.0	5.0	3.0
Other	0.0	0.0	1.0	-	0.0	0.0	0.0	0.0
Bait type								
Artificial	78.0	83.0	29.0	-	29.0	40.0	39.0	53.0
Live bait	28.0	83.0	11.0	-	35.0	28.0	19.0	45.0
Dead bait	88.0	94.0	93.0	-	84.0	85.0	90.0	88.0
Macherel	28.0	6.0	36.0	-	22.0	33.0	32.0	24.0
Squid	38.0	89.0	20.0	-	9.0	13.0	22.0	36.0
Herring	7.0	11.0	5.0	-	7.0	5.0	6.0	7.0
Menhaden	13.0	0.0	27.0	-	8.0	8.0	21.0	5.0
Ballyhoo	58.0	17.0	61.0	-	19.0	33.0	53.0	28.0
Butterfish	35.0	100.0	0.0	-	2.0	0.0	7.0	31.0
Other	25.0	83.0	8.0	-	86.0	63.0	26.0	69.0
Hook type								
Circle hooks	56.0	6.0	47.0	-	97.0	100.0	58.0	71.0
J hooks	74.0	94.0	84.0	-	17.0	20.0	70.0	43.0

Table 9. Average costs and revenues for HMS charter/head boat trips in the Northeast region (Maine to Virginia) in 2013.

Party Size	Charter Boat (n = 95)				Head Boat (n = 18)			
	Mean	SE	LB	UB	Mean	SE	LB	UB
<b>Outflow</b>								
Material costs	1,228.62	71.52	1,091.69	1,375.76	3,979.33	215.76	3,524.11	4,434.55
Fuel costs	966.79	63.66	843.75	1,096.56	2,823.78	138.28	2,532.04	3,115.52
Fuel price	3.96	0.05	3.86	4.07	3.47	0.05	3.37	3.57
Gallons used	244.14	15.65	213.05	275.22	823.89	45.02	728.90	918.87
Bait costs	129.05	11.21	106.79	151.31	445.56	30.01	382.23	508.88
Tackle costs	61.01	6.26	48.58	73.44	185.56	9.94	164.58	206.53
Ice costs	56.28	5.03	46.30	66.27	182.78	10.09	161.49	204.07
Other costs	15.49	5.01	5.54	25.45	341.67	31.38	275.47	407.87
<b>Payouts</b>								
Captain	109.16	17.74	73.94	144.38	27.78	27.78	-30.83	86.38
Crew	144.11	18.30	107.77	180.44	660.56	57.66	538.91	782.20
<b>Inflow</b>								
Total fare	2,450.40	159.97	2,132.77	2,768.03	6,972.50	497.77	5,922.30	8,022.70
Daily fare	1,791.67	111.04	1,571.21	2,012.13	3,536.25	173.48	3,170.23	3,902.27
<b>Net return</b>	968.51	99.30	778.95	1,173.35	2,304.83	332.10	1,604.16	3,005.51

\* SE = standard error; LB = lower bound of 95% confidence interval; UB = upper bound of 95% confidence interval

Table 10. Average costs and revenues for HMS charter/head boat trips in the Southeast region (North Carolina to east Florida) in 2013.

Party Size	Charter (n = 297)				Head Boat (n = 0)			
	Mean	SE	LB	UB	Mean	SE	LB	UB
<b>Outflow</b>								
Material costs	495.66	32.49	426.04	553.91	--	--	--	--
Fuel costs	376.32	25.17	321.11	420.14	--	--	--	--
Fuel price	3.74	0.02	3.69	3.79	--	--	--	--
Gallons used	100.62	7.11	86.62	114.61	--	--	--	--
Bait costs	45.76	3.97	37.94	53.58	--	--	--	--
Tackle costs	37.74	4.03	29.81	45.66	--	--	--	--
Ice costs	13.52	0.91	11.72	15.32	--	--	--	--
Other costs	22.32	4.12	14.22	30.42	--	--	--	--
<b>Payouts</b>								
Captain	101.56	7.90	86.01	117.12	--	--	--	--
Crew	97.42	5.33	86.94	107.91	--	--	--	--
<b>Inflow</b>								
Total fare	1,223.02	43.24	1,137.93	1,308.11	--	--	--	--
Daily fare	1,201.55	35.70	1,131.29	1,271.82	--	--	--	--
<b>Net return</b>	528.38	29.77	475.47	592.65	--	--	--	--

\* SE = standard error; LB = lower bound of 95% confidence interval; UB = upper bound of 95% confidence interval

Table 11. Average costs and revenues for HMS charter/head boat trips in the Gulf of Mexico region (west Florida to Texas) in 2013.

Party Size	Charter (n = 86)				Head Boat (n = 40)			
	Mean	SE	LB	UB	Mean	SE	LB	UB
<b>Outflow</b>								
Material costs	857.56	140.77	584.72	1,144.49	1,969.97	237.34	1,489.90	2,450.04
Fuel cost	631.03	109.12	421.11	855.02	1,704.25	195.42	1,308.97	2,099.52
Fuel price	3.64	0.03	3.57	3.70	3.74	0.05	3.64	3.85
Gallons used	173.36	31.26	111.20	235.52	450.95	53.78	342.16	559.74
Bait costs	69.99	10.44	49.23	90.76	83.60	14.84	53.58	113.62
Tackle costs	58.22	11.08	36.20	80.24	68.63	15.39	37.50	99.75
Ice costs	42.95	6.50	30.03	55.88	62.25	19.66	22.49	102.01
Other costs	55.37	11.81	31.89	78.85	51.25	17.31	16.24	86.26
<b>Payouts</b>								
Captain	111.34	24.78	62.08	160.60	137.50	64.19	7.65	267.35
Crew	114.13	19.51	75.33	152.92	345.88	73.28	197.65	494.10
<b>Inflow</b>								
Total fare	2,111.44	249.35	1,615.66	2,607.21	5,048.10	558.99	3,917.43	6,178.77
Daily fare	1,422.19	111.13	1,201.24	1,643.14	2,890.70	240.11	2,405.02	3,376.38
<b>Net return</b>	1,028.41	157.78	707.65	1,335.08	2,594.75	296.73	1,994.56	3,194.94

\* SE = standard error; LB = lower bound of 95% confidence interval; UB = upper bound of 95% confidence interval

Table 12. Total 2013 (July-November) costs and earnings for HMS charter boats by region.

	Northeast	Southeast	Gulf of Mexico <sup>2</sup>
Total HMS charter trips <sup>1</sup>	4,936	3,008	1,505
Inflow (gross revenue)	12,095,174	3,678,938	3,176,799
Outflow (expenses)			
Fuel	4,772,097	1,131,996	949,426
Bait	636,991	137,996	105,305
Tackle	301,145	113,525	87,596
Ice	277,798	40,669	64,621
Other	76,459	67,140	83,308
Hired captain	538,814	305,500	167,518
Crew / mates	711,327	293,047	171,716
Owner net return plus fixed costs	4,780,544	1,589,411	1,547,309

<sup>1</sup> Charter boat trips that indicated HMS were their primary or secondary target species. Excludes head boat trips.

<sup>2</sup> The estimate of HMS for-fire trips in the Gulf of Mexico does not include trips originating from Texas, as the state does not participate in the MRIP survey.

Table 13. Estimated total expenditures and economic impacts generated by Atlantic HMS charter boat trip operations by region, July-November 2013.

Region	Total Expenses (\$1,000)	Economic Impacts		
		Employment	Labor Income (\$1,000)	Total Output (\$1,000)
Northeast	\$12,095	460	\$8,011	\$31,929
Southeast	\$3,679	243	\$2,848	\$10,587
Gulf of Mexico	\$3,177	428	\$2,226	\$8,847



Table 14. Economic output supported by Atlantic HMS charter boat trip operations by region, July-  
November 2013, in the top ten industries.

Industry	Economic Output (\$1,000)		
	Northeast	Southeast	Gulf of Mexico
For-hire fleet	\$12,095	\$3,679	\$3,177
Petroleum refineries	\$4,637	\$612	\$1,002
Imputed rental activity for owner-occupied dwellings	\$592	\$222	\$167
Wholesale trade businesses	\$431	\$176	\$123
Extraction of oil and natural gas	\$405	\$424	\$324
Commercial Fishing	\$404		
Real estate establishments	\$392	\$167	\$111
Monetary authorities	\$303	\$153	\$90
Private hospitals	\$297		
Sporting and athletic goods manufacturing	\$291		\$84
Maintenance and repair of nonresidential structures		\$248	
Petrochemical manufacturing		\$135	
Lessors of nonfinancial intangible assets		\$121	
Couriers and messengers			\$105
Food services and drinking places			\$87

**Appendix 1: Data tables by HMS targeted**

Table A1. Number of trip summary forms returned for trips targeting the four most commonly targeted HMS by reported party size (vessels carrying more than 6 anglers are classified as head boats). Totals exceed the 536 reported trips targeting HMS as many trips targeted multiple species.

Region	Vessel Party Size		
	Charter	Head Boat	Combined
Yellowfin tuna	215	39	254
Sailfish	178	4	182
Coastal Sharks	151	19	170
Marlin	152	15	167

Table A2. Measures of average HMS charter/head boat trip effort by target species.

Species	Yellowfin Tuna		Sailfish		Coastal Sharks		Marlin	
	CH	HB	CH	HB	CH	HB	CH	HB
Trip length (d)	1.3	1.1	1.1	2.5	1.0	1.0	1.2	2.0
Trip length (h), 1 day trips	11	10	10	--	5	9	11	10
Anglers per trip	5.4	14.0	5.5	7.5	4.8	18.6	5.7	8.2
Crew per trip	2.2	4.7	2.1	4	1.4	2.6	2.2	3.7
Lines fished per trip	8.1	13.0	7.2	6	3.2	18.6	7.7	6.7

Table A3. Species targeted by HMS charter/head boat trips by trips targeting the four most commonly targeted HMS species groups (2013).

Species	Yellowfin Tuna		Sailfish		Coastal Sharks		Marlin	
	CH	HB	CH	HB	CH	HB	CH	HB
Bluefin tuna	9.0	3.0	5.0	25.0	2.0	0.0	2.0	7.0
Yellowfin tuna	100.0	100.0	67.0	100.0	3.0	0.0	88.0	100.0
Albacore tuna	15.0	41.0	10.0	0.0	1.0	0.0	16.0	7.0
Bigeye tuna	23.0	67.0	4.0	100.0	1.0	0.0	14.0	60.0
Skipjack tuna	12.0	0.0	12.0	0.0	1.0	0.0	14.0	0.0
Marlin	62.0	38.0	64.0	100.0	2.0	0.0	100.0	100.0
Swordfish	10.0	51.0	1.0	75.0	1.0	0.0	9.0	33.0
Sailfish	56.0	10.0	100.0	100.0	3.0	0.0	75.0	27.0
Pelagic sharks	3.0	10.0	0.0	0.0	5.0	0.0	1.0	7.0
Coastal sharks	2.0	0.0	2.0	0.0	100.0	100.0	2.0	0.0
Other species	42.0	51.0	59.0	0.0	5.0	0.0	47.0	7.0

\*Percentages exceed 100 percent as most trips targeted multiple species.

Table A4. Percent of HMS charter/headboat trips by fishing method, bait, and hook-type (2013).

Species	Yellowfin Tuna		Sailfish		Coastal Sharks		Marlin	
	CH	HB	CH	HB	CH	HB	CH	HB
Fishing method								
Anchored or Drifting	39.0	97.0	26.0	100.0	100.0	100.0	23.0	100.0
Trolling	93.0	44.0	94.0	100.0	56.0	0.0	100.0	73.0
Greenstick	11.0	5.0	12.0	0.0	0.0	0.0	15.0	13.0
Other	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Bait type								
Artificial	64.0	79.0	46.0	100.0	5.0	0.0	59.0	80.0
Live bait	26.0	67.0	20.0	75.0	5.0	0.0	18.0	60.0
Dead bait	89.0	82.0	90.0	75.0	99.0	100.0	92.0	73.0
Mackerel	22.0	36.0	21.0	100.0	58.0	0.0	22.0	73.0
Squid	39.0	54.0	30.0	75.0	3.0	0.0	35.0	33.0
Herring	5.0	10.0	9.0	0.0	0.0	0.0	6.0	13.0
Menhaden	3.0	8.0	3.0	0.0	56.0	0.0	3.0	13.0
Ballyhoo	86.0	41.0	88.0	100.0	2.0	0.0	93.0	93.0
Butterfish	15.0	46.0	1.0	0.0	1.0	0.0	4.0	20.0
Other	16.0	54.0	12.0	0.0	46.0	100.0	14.0	7.0
Hook type								
Circle hooks	66.0	56.0	74.0	100.0	42.0	100.0	75.0	87.0
J hooks	80.0	64.0	80.0	75.0	62.0	0.0	79.0	60.0

Table A5. Average costs and revenues for HMS charter/headboat trips by species targeted.

Species	Yellowfin Tuna		Sailfish		Coastal Sharks		Marlin	
	CH	HB	CH	HB	CH	HB	CH	HB
<b>Outflow</b>								
Material costs	1,050.16	3,473.91	828.73	2,255.63	189.57	786.55	997.20	2,395.67
Fuel price	3.76	3.73	3.73	3.84	3.63	3.50	3.71	4.03
Gallons used	221.44	741.49	170.78	472.50	35.15	207.89	211.98	488.00
Bait costs	91.18	276.12	77.26	107.50	27.12	31.34	79.09	125.00
Tackle costs	52.47	156.03	61.09	148.75	15.54	0.00	59.49	154.00
Ice costs	46.55	134.77	26.03	41.25	7.99	27.58	41.63	37.00
Other costs	29.86	210.26	44.21	125.00	11.47	0.00	40.14	103.33
<b>Payouts</b>								
Captain	123.47	153.85	156.60	75.00	41.03	0.00	106.91	126.67
Crew	163.56	600.00	158.90	410.00	29.30	122.37	176.94	369.33
<b>Inflow</b>								
Total fare	2,335.05	7,459.59	1,802.95	6,900.00	685.54	1,921.32	2,208.32	6,646.67
Daily fare	1,748.40	3,475.01	1,577.95	2,612.50	673.13	1,921.32	1,757.94	3,160.00
<b>Net return</b>	997.87	3,231.83	658.72	4,159.38	425.64	1,012.39	927.27	3,755.00

**Appendix 2: HMS For-Hire Cost-Earnings Logbook Forms**

ATLANTIC HMS CHARTER HEADBOAT TRIP SUMMARY FORM

HMS Permit Number: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Vessel Number: (Coast Guard or State) \_\_\_\_\_

Contact Phone Number: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Contact Name: (Please Print) \_\_\_\_\_

Port of Departure: \_\_\_\_\_ State [ ] [ ]

Departure

Date (MM/DD/YY) [ ] [ ] [ ] [ ] [ ] [ ] Time (military) [ ] [ ] [ ] [ ]

Landing

Date (MM/DD/YY) [ ] [ ] [ ] [ ] [ ] [ ] Time (military) [ ] [ ] [ ] [ ]

Number of Anglers on Trip: [ ] [ ]

Number of Crew Members: (including captain) [ ] [ ]

Number of Lines Fished: [ ] [ ]

Target(s): [ ] Bluefin [ ] Yellowfin [ ] Albacore [ ] Bigeye [ ] Skipjack [ ] Marlin [ ] Swordfish [ ] Sailfish [ ] Pelagic Sharks [ ] Coastal Sharks [ ] Other (List) \_\_\_\_\_

Gear Type: [ ] Rod & Reel (Anchored/Drifting) [ ] Rod & Reel (Trolling) [ ] Greenstick [ ] Other (List) \_\_\_\_\_

Coordinates of where the majority of fishing was conducted: LAT [ ] [ ] deg LONG [ ] [ ] deg

Fished with: [ ] Artificial Lure [ ] Live Bait [ ] Dead Bait If using bait, hook type: [ ] Circle Hooks [ ] J Hooks If using bait, type used: [ ] Mackerel [ ] Squid [ ] Menhaden [ ] Herring [ ] Ballyhoo [ ] Butterfish [ ] Other (List) \_\_\_\_\_

TRIP EXPENSES

Unit Cost Quantities Used Fuel: Price per Gallon \$ [ ] [ ] [ ] [ ] [ ] [ ] Gallons Used: [ ] [ ] [ ] [ ] [ ] [ ] Bait: Trip Cost \$ [ ] [ ] [ ] [ ] [ ] [ ] Pounds: [ ] [ ] [ ] [ ] [ ] [ ] and/or Count: [ ] [ ] [ ] [ ] [ ] [ ] Tackle: Trip Cost \$ [ ] [ ] [ ] [ ] [ ] [ ] Ice: Trip Cost \$ [ ] [ ] [ ] [ ] [ ] [ ] Used Own Ice Maker: [ ] Yes [ ] No

Other Trip Costs: (Specifically for this trip) \$ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Trip Payout: (See instructions) Owner \$ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Captain \$ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Crew/Mate \$ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

REVENUE Total Trip Fare: (Not including tips) [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

I certify the information contained on this form is accurate and complete to the best of my knowledge:

Captain Name (Please Print): \_\_\_\_\_ Captain Signature: \_\_\_\_\_



## Instructions for the Trip Summary Form

**NOTE: We appreciate your participation in the Atlantic Highly Migratory Species (HMS) Charter Headboat Economic Study. All data provided are CONFIDENTIAL and will be used to determine the effects of existing and proposed management policies on fishery participants. Please note that consistent and accurate reporting is extremely helpful for achieving the benefits of conservation and management of Atlantic HMS fisheries.**

Please use a ballpoint pen and print clearly to record the following:

- HMS Permit Number and Vessel Number: U.S. Coast Guard documentation number or state registration number as recorded on HMS permit.
- Contact Name and Contact Phone Number: Name and telephone number of the person completing the form.
- Port & State of Departure: location of port from which the trip commenced.
- Date of Departure: calendar date (month/day/year) on which the trip was started.
- Time of Departure: military time (24 hour clock) at which the boat left port.
- Date of Landing: calendar date (month/day/year) the vessel arrived back at port if an overnight trip.
- Time of Landing: military time (24 hour clock) at which the boat returned to port.
- Number of Anglers on Trip: number of paying individuals taken fishing on the trip.
- Number of Crew Members: number of persons paid as crew (including captain).
- Number of Lines Fished: maximum number of fishing lines in the water at one time.
- Target: group of fish species targeted on the trip (check all that apply).
  - Pelagic Sharks: Blue, Oceanic Whitetip, Shortfin Mako, Thresher, and Porbeagle
  - Coastal Sharks: Tiger, Nurse, Lemon, Blacktip, Spinner, Bull, Finetooth, Blacknose, Hammerheads, Bonnethead, Atlantic Sharpnose
- Gear Type: Type of fishing gear and fishing method used on the trip. If other, please indicate the type of gear used. Check all that apply.
- Latitude and Longitude: Coordinates in degrees of the spot where the majority of fishing occurred.
- Fished with: Type of bait/lure used – artificial, live bait, or dead bait – on the trip (check all that apply).
- Hook Type: If bait was used on the trip did the boat use circle or J-hooks.
- Type of Bait Used: If live or dead bait was used on the trip, what species of bait was used.
- Fuel: price per gallon paid for fuel used during trip. If you did not refuel for the trip, record price paid when fuel was last purchased; indicate gallons actually used during the trip. Exclude fuel purchased but not used.
- Bait: record amount of bait used during trip by count or pounds and total cost of bait purchased.
- Tackle: total cost of tackle (hooks, line, sinkers, lures) purchased for the trip.
- Ice: Total cost of ice purchased for the trip. Leave blank if you used your own ice machine to produce ice for the trip.
- Used Own Ice Maker: Check yes if you used your own ice machine to produce ice for this trip.
- Other Trip Costs: Other costs incurred *specifically* for this trip excluding items listed elsewhere on this trip summary form.
- Trip Payout: Payout (\$) to different members of the crew. If the captain and owner are the same person, put the individual's share of the fare under owner and place X's in the captain boxes.
  - Owner: Portion of trip fare paid to the owner.
  - Captain: Portion of trip fare paid to the captain.
  - Crew/Mate: Portion of trip fare paid to the crew/mate.
- Total Trip Fare: The total fare charged for the trip, not including tips.
- Captain Signature and Name: signature of the person completing the form (normally, this should be the captain for the trip although the vessel owner may complete the second portion of the form).

**Remove this page and keep yellow copy for your records. Please mail white page(s) for each week (Monday through Sunday) on Mondays. NOTE: if the vessel made no for-hire HMS trips, please complete and mail a No Fishing for Highly Migratory Species Reporting Form.**

PAPERWORK REDUCTION ACT STATEMENT: Atlantic highly migratory species charter headboat vessel logbooks provide information on fishing effort and catch and bycatch in the charter headboat fisheries for tunas, sharks, billfish, and swordfish. This information is the basis for quota monitoring and stock assessment and is used to meet international obligations to report fishery statistics to the International Commission for the Conservation of Atlantic Tunas. Collection of economic information through vessel logbooks provides current data on the costs and earnings for vessels participating in the Atlantic highly migratory species fisheries and aids NMFS in the assessment of impacts of fishery regulations. Public reporting burden for this information collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining data needed, and completed and reviewing the collection of information, is estimated to average: 12 minutes per response for the catch form (daily report); and 30 minutes per response for the trip expense and earnings summary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: National Marine Fisheries Service, F/SF1, 1315 East West Highway, Silver Spring MD 20910. In accordance with NOAA Administrative Order 216-100, it is agency policy not to release confidential information, other than in aggregate form. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number. This is an approved information collection under OMB #0648-0371 that expires July 31, 2015

**NO FISHING FOR HIGHLY MIGRATORY SPECIES (HMS) REPORTING FORM**

HMS Permit #  Vessel Name: \_\_\_\_\_

During the entire week of  <sup>M M</sup> /  <sup>D D</sup> to  <sup>M M</sup> /  <sup>D D</sup>, year  this vessel DID NOT FOR-HIRE FISH for Atlantic HMS (tuna, billfish, shark, or swordfish).

Please check the box below and provide the date the vessel will resume for-hire HMS fishing activity, if the vessel is currently inactive (e.g. due to repair, out-of-season, etc.)

This vessel WILL NOT FOR-HIRE FISH for HMS until  <sup>M M</sup> /  <sup>D D</sup>, year

Signature: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_ - \_\_\_\_\_

Please keep the yellow copy for your records and mail the white copy to: QuanTech, Inc., 2020 14th Street North, Suite 560, Arlington, VA 22201

**NO FISHING FOR HIGHLY MIGRATORY SPECIES (HMS) REPORTING FORM**

HMS Permit #  Vessel Name: \_\_\_\_\_

During the entire week of  <sup>M M</sup> /  <sup>D D</sup> to  <sup>M M</sup> /  <sup>D D</sup>, year  this vessel DID NOT FOR-HIRE FISH for Atlantic HMS (tuna, billfish, shark, or swordfish).

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Signature: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_ - \_\_\_\_\_

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This vessel WILL NOT FOR-HIRE FISH for HMS until  <sup>M M</sup> /  <sup>D D</sup>, year

Signature: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_ - \_\_\_\_\_

Please keep the yellow copy for your records and mail the white copy to: QuanTech, Inc., 2020 14th Street North, Suite 560, Arlington, VA 22201