



Economic Impact of the Florida Keys Flats Fishery



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Addendum

Since the initial draft of this report was released in early May, data from the U.S. Fish and Wildlife Service's National Survey of Fishing, Hunting and Wildlife-Associated Recreation was made available to the public. Use of this data allowed for estimates of the Florida population of saltwater anglers aged 65 and older. This group was a major exclusion from the initial survey report which described saltwater fishing activity and expenditures for Florida resident and non-resident license buyers. In Florida, only resident anglers aged 16 to 64 and all non-resident anglers 16 years and older are required to purchase a saltwater license. The use of the national survey data for resident Florida anglers greatly enhanced the completeness of this project. We are greatly appreciative of the heroic efforts of Richard Aiken, economist with the U.S. Fish and Wildlife Service, to obtain the survey data in a timely manner and usable form for analysis in this study.

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Economic Impact of the Florida Keys Flats Fishery

Executive Summary

The goal of this study was to estimate the economic impact of Flats fishing in the Florida Keys during 2012. Economic impact includes the multiplier effects of angler expenditures, the wages and salaries generated by angler spending, the jobs created, and the federal and state taxes resulting from Flats fishing expenditures. Resident and non-resident licensed saltwater anglers were surveyed by telephone to collect information on their overall saltwater fishing in Florida, their Keys and Flats fishing activity, Florida saltwater fishing expenditures, and Flats species targeted. Additionally, Keys guides were surveyed to estimate the amount of fishing and economic activity their services added to the state's economy. The major findings are highlighted below.

- Number of active Florida saltwater anglers in 2012: 735,485 resident and 124,684 non-resident
- Total saltwater angler expenditures were \$3,086,192,000 and \$5,275,603,000 with multipliers

- Number of licensed and guided non-licensed Florida Keys Flats anglers: 178,705
- Number of days annually fishing in Florida by Keys Flats anglers: 6,370,000
- Number of days fishing the Florida Keys by Keys Flats anglers: 1,840,000
- Number of days fishing Florida Flats by Keys Flats anglers: 1,222,000
- Average annual days saltwater fishing by Keys Flats anglers: 35.6
- Average number of days fishing Florida Keys waters by Keys Flats anglers: 10.3
- Average annual expenditures for all saltwater fishing by Keys Flats anglers: \$6,473
- Average annual expenditures per day for all saltwater fishing by Keys Flats anglers: \$288
- Total direct expenditures for Florida Keys fishing by Keys Flats anglers: \$272,509,000
- Total economic impact (including multipliers) for Keys Flats fishing expenditures: \$465,834,000
- Salary, wages and owner income associated with Keys Flats fishing: \$143,930,000
- Full-time equivalent jobs associated with Keys Flats fishing: 4,734
- Federal tax revenues generated from Keys Flats fishing: \$34,447,000
- State and local tax revenues generated from Keys Flats fishing: \$28,298,000
- Total direct expenditures for Keys Flats fishing by guided Keys Flats fishing: \$62,651,000
- Total economic impact (including multipliers) for guided Keys Flats fishing: \$107,097,000
- Keys Flats fishing expenditures as a percentage of all Florida saltwater fishing expenditures: 9%

- Number of licensed and guided non-licensed Florida Keys anglers: 214,103
- Number of days annually fishing in Florida by Keys anglers: 5,776,000
- Number of days fishing the Florida Keys by Keys anglers: 2,060,000
- Number of days fishing Florida Flats by Keys anglers: 1,165,705
- Average annual days saltwater fishing by Keys anglers: 27.0
- Average number of days fishing Florida Keys waters by Keys anglers: 9.6
- Average annual expenditures for all saltwater fishing by Keys anglers: \$6,241
- Average annual expenditures per day for all saltwater fishing by Keys Flats anglers: \$315
- Total direct expenditures for Florida Keys fishing by Keys anglers: \$473,962,000
- Total economic impact (including multipliers) for Keys fishing expenditures: \$810,201,000
- Salary, wages and owner income associated with Keys fishing: \$229,120,000
- Full-time equivalent jobs associated with Keys fishing: 8,234
- Federal tax revenues generated from Keys fishing: \$59,912,000
- State and local tax revenues generated from Keys fishing: \$49,217,000
- Total direct expenditures for Keys fishing by guided anglers: \$64,988,000
- Total economic impact (including multipliers) for guided , fishing: \$111,093,000
- Keys fishing expenditures as a percentage of all Florida saltwater fishing expenditures: 15%

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Economic Impact of the Florida Keys Flats Fishery

Background

The Florida Keys has long been the focus of Flats fishing in the United States by U.S. anglers and by anglers throughout the world. In spite of this world-wide recognition, very little effort has been directed toward the scientific study of the Keys Flats fishery, their anglers, and the economic effects of their recreational fishing activity. This project examined the economic impact of the Florida Keys Flats fishery. The Flats fishery is defined as angling for species commonly found and caught by anglers in the shallow-water near-shore environment extending from the Atlantic side of the Keys into Florida Bay and the Gulf of Mexico North and West of the Keys.

While no study has focused on the economic impacts of Florida Keys fishing in general or Flats fishing specifically, several relatively recent economic studies have been conducted in Florida and the South Florida region that concentrated on near-shore fisheries for tarpon in the Caloosahatchee River and Charlotte Harbor area on Florida's West coast (Fedler 2010) and St. Lucie River on the East coast of Florida (Fedler 2011). Both of these studies focused on the regional fishery for tarpon because of constraints on funding, the rather isolated nature of the fishery in the Charlotte Harbor and St. Lucie River areas and the interests of the funding organization.

A study that is more directly related to this Florida Keys project involved southern Florida anglers fishing the saltwater reaches of Everglades National Park (Fedler 2009). A good portion of the park's area encompasses Florida Bay and extends into Gulf of Mexico waters on the western edge of the park. Much of the Upper Keys fishing area overlaps with waters inside national park boundaries and included angling down to the North side of the Keys. This study found that about 17% of the anglers fishing Everglades National Park (ENP) saltwater specifically targeted bonefish while 20% targeted tarpon. The economic impact of these two fisheries was \$154 million for bonefish and \$174 million for tarpon fishing in the Florida economy. The study did not differentiate expenditures made by anglers in the region surrounding ENP and elsewhere in the state. Expenditures made by anglers specifically in the Keys was identified in the present study to show the effect of direct angler expenditures made in the Keys as well as the State of Florida.

Justification

Historically, only the most popular, imperiled or widespread near-shore saltwater fish species have received significant management attention in Florida and throughout the nation. Until recently, snook and redfish have been the main focus of scientific research in South Florida. In the past few years, research on tarpon and bonefish has been on the upswing, but these projects have been small in scale and mostly privately funded. Very little is known about the life history of bonefish and permit. One way to increase management attention for these species is to show their value to the local economies where they are pursued by anglers. Understanding the dependence of local communities on specific fisheries in their region helps build an understanding for the need to manage these species sustainably, restore declining species, and protect habitat that is crucial to the spawning, rearing and other important components of a species life history. Determining the economic impact of the Florida Keys Flats fishery will help build the case for the importance of science-based management rather than the anecdotal and politically-based actions Flats species have generally received to this point.

Goal

The goal of this study is to estimate the economic impact of Flats fishing in the Florida Keys. Economic impact includes the multiplier effects of angler expenditures, the wages and salaries generated by angler spending, the jobs created, and the federal and state taxes resulting from Flats fishing activity.

Objectives

- Estimate the number of Flats fishing anglers in the Florida Keys during the 2012 fishing year.
- Identify the number of days anglers spend targeting Flats species within the study area.
- Obtain angler annual saltwater fishing-related expenditures within the study area.
- Estimate annual angler expenditures for principal Flats species within the study area.
- Estimate annual angler value added, wages, jobs and tax revenues generated by Keys Flats fishing.

Study Methods

Nearly all Florida saltwater anglers aged 16 to 64 must possess a valid saltwater fishing license if they fish from a boat or shore. Anglers fishing with guides or from charter boats are not required to possess a saltwater fishing license as they are covered under the boat permit issued for licensed guides and charter operators. Likewise, anglers fishing from a state licensed fishing pier are not required to purchase a saltwater license. Thus, to capture the economic impacts of all Flats anglers, information from licensed saltwater anglers, senior anglers, and non-licensed guided anglers is needed. This project used the Florida Fish and Wildlife Conservation Commission's saltwater fishing license file as the basis for identifying and surveying Keys and Flats anglers and collecting their fishing-related expenditure data. Charter captains and guides identified from the license file were surveyed separately to identify the number of anglers (many not possessing a fishing license) they serve throughout the year so an estimate of guided angler expenditures could be made. Finally, resident senior anglers were estimated from a combination of data from the National Survey of Fishing and Hunting and Wildlife-Associated Recreation (USFWS 2013) and the telephone survey used in this study to estimate fishing by anglers 65 years and older in Florida saltwater and the Keys. Combined, these three methods captured nearly all of the legal fishing activity throughout the Keys. The only omission from this study was 7,116 international anglers, including 5,296 Canadian anglers, fishing in Florida. While these anglers are required to purchase a Florida saltwater fishing license, it was not feasible to contact them as their telephone numbers were generally absent in the FWC license file.

The first phase of this project used data on Florida saltwater fishing license buyers with licenses issued during 2011 and 2012. All saltwater anglers except those fishing on a charter boat, with a guide or on a licensed pier, are required to possess a saltwater fishing license issued by the Florida Fish and Wildlife Conservation Commission (FWC). An electronic file of all saltwater license purchasers during 2011 and 2012 was obtained from the FWC Licensing Division. Initially, anglers whose licenses were valid for fishing during part or all of the 2012 calendar year were selected from the license database. This procedure was used to coincide with survey questioning that focused on fishing activity during 2012 exclusively.

The next step involved eliminating duplicate license holders. License duplication results from anglers receiving a new license because of loss of the original license; upgrading their license from the free shore-based saltwater license to the fee-based license allowing fishing from a boat; and angler

forgetfulness regarding the date of their last license purchase. Further duplication often occurs when anglers purchase combination hunting and fishing licenses, 5-year licenses, or combination freshwater and saltwater fishing licenses.

Once the duplication-free master license file was created, the file was separated into two sub-files – resident and non-resident. Resident license buyers were stratified by distance from the Keys in order to maximize the number of anglers fishing reporting Keys fishing activity during 2012. Resident anglers were classified into three regions based on their residence location. Region 1 anglers consisted of anglers residing in Miami-Dade, Broward, Collier, Palm Beach and Monroe counties. Region 2 included anglers in Lee, Charlotte, Hendry, Glades, Sarasota, Manatee, Desoto, Hardee, Highlands, Okeechobee, Martin and St. Lucie counties. The remaining counties in Florida comprised Region 3. License buyers in the non-resident sub-file from other 49 states were aggregated into Region 4. Anglers residing outside the U.S. Canada were omitted from the study because of the difficulty in contacting them.

License buyers from each region were randomly selected to receive a telephone survey asking them about their Florida and Keys saltwater fishing activity. The target number of completed telephone surveys of anglers was 250 Keys anglers from Region 1, and 500 saltwater anglers from Regions 2, 3 and 4. This sampling procedure required differential weighting of respondents by region to accurately estimate angler numbers and their spending.

Data on each buyer in the FWC saltwater license file included name, address, date of birth, type of license purchased, date of license purchase, gender, ethnicity, telephone number and e-mail address (if voluntarily provided by the buyer). Resident license buyers were classified into a county and corresponding region based upon their residential address. The survey's angling activity and expenditure questions followed those used by Fedler (2010, 2011) and the 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USFWS 2013). Expenditure categories are aligned with economic multipliers (Bureau of Economic Research 2006) for computing multiplier effects, wages and salaries, jobs, and tax revenues.

Telephone Survey Procedures

Telephone surveys were conducted by Responsive Management at their survey center in Harrisonburg, Virginia. Responsive Management maintains its own in-house telephone interviewing facilities. This facility allows for rigorous quality control over the interview process and data collection. The survey center is staffed by professional interviewers with extensive experience conducting computer-assisted telephone interviews on the subjects of outdoor recreation and natural resources.

To ensure the integrity of the telephone survey data, Responsive Management has interviewers who have been trained according to the standards established by the Council of American Survey Research Organizations. Methods of instruction included lecture and role-playing. The survey center managers and other professional staff conducted a project briefing with the interviewers prior to the administration of this survey. Interviewers were instructed on type of study, study goals and objectives, handling of survey questions, interview length, termination points and qualifiers for participation, interviewer instructions within the survey questionnaire, reading of the survey questions, skip patterns, and probing and clarifying techniques necessary for specific questions on the survey questionnaire.

Telephone surveying times were Monday through Friday from 9:00 a.m. to 9:00 p.m., Saturday from noon to 5:00 p.m., and Sunday from 5:00 p.m. to 9:00 p.m., local time. A five-callback design

was used to maintain the representativeness of the sample, to avoid bias toward people easy to reach by telephone and to provide an equal opportunity for all to participate. When a respondent could not be reached on the first call, subsequent calls were placed on different days of the week and at different times of the day.

The software used for data collection was Questionnaire Programming Language (QPL). The survey data were entered into the computer as each interview was being conducted, eliminating manual data entry after the completion of the survey and the concomitant data entry errors that may occur with manual data entry. The survey questionnaire was programmed so that QPL branched, coded, and substituted phrases in the survey based on previous responses to ensure the integrity and consistency of the data collection.

Survey center managers and statisticians monitored the data collection, including monitoring of the actual telephone interviews without the interviewers' knowledge, to evaluate the performance of each interviewer and ensure the integrity of the data. The survey questionnaire itself contained error checkers and computation statements to ensure quality and consistent data. After the surveys were obtained by the interviewers, the survey center managers and/or statisticians checked each completed survey to ensure clarity and completeness. The analysis of data was performed using the Statistical Package for the Social Sciences and proprietary software developed by Dr. Fedler.

Sampling Error

Throughout this report, findings of the telephone survey are reported at a 95% confidence interval. For the entire sample of saltwater anglers, the sampling error for Florida Keys anglers is plus or minus 1.8 percentage points. This means that if the survey were conducted 100 times on different samples that were selected in the same way, the findings of 95 out of the 100 surveys would fall within plus or minus 1.8 percentage points of each other. Sampling error was calculated using the formula described in Dillman (2000). Sampling error for Florida Keys anglers in Region 1 was 3.4%, 3.7% for Region 2, 3.7% for Region 3 and 4.0% for Region 4. Sample error differs for each region because the number of license holders, proportion of Keys anglers, and the sample size in each region.

Telephone Survey Design

The design of the telephone survey allowed for efficiently identifying Florida Keys Flats anglers while collecting essential information on all other Florida saltwater anglers. After a brief introduction about the survey, the initial screening question asked the respondent if they had fished in Florida saltwater areas during 2012. Saltwater anglers active in 2012 were then asked questions about their days fishing. A second screening was then used to identify Florida Keys anglers. Non-Keys anglers were directed to the expenditure questions discussed below while Keys anglers were asked a series of questions about their Keys fishing that included days fished and species targeted. After completing these questions, Keys anglers were then directed to the expenditure questions.

Angler expenditure questions focused on 10 trip-related categories and eight equipment-related categories shown in the box below. Respondents were asked how much they spent for each category

<u>Trip Expenditures</u>	<u>Equipment Expenditures</u>
Food, drink, refreshments & ice	Rods, reels & components
Lodging	Lines and leaders
Public transportation	Hooks, sinkers and swivels
Private transportation	Artificial lures, flies & baits
Charter and guide fees	Tackle boxes, nets & gaffs
Fishing licenses and tags	Minnow traps, cast nets & bait containers
Live and dead bait	Electronic devices
Boat and Equipment rental	Boat payments and insurance
Boat fuel	
Boat moorage & maintenance	

while fishing in Florida during the entire year. Keys anglers were also asked to estimate the percentage of their trip and equipment expenditure that was related to their Keys fishing.

A three-step process was used to estimate expenditures for Flats and Keys fishing and fishing for specific Keys species. First, total annual expenditures for Florida saltwater fishing was divided by the number of days saltwater fishing in Florida to produce a daily fishing expenditure. Next, the daily expenditure was multiplied by the number of days fishing in the Flats, Keys or for a specific species to estimate an angler's expenditures. Finally, individual expenditures were summed to yield total expenditures for Flats, Keys or species fishing activity.

The question on the percentage of trip and equipment expenditures devoted to Keys fishing was used for comparison to the calculation for total expenditures for assessment purposes. The thought here is that if anglers have a relatively accurate grasp of their fishing activity and expenditures, the proportion of expenditures for Keys fishing should be similar to the previous method of multiplying the daily expenditure by days fishing. If they are similar, then greater confidence can be placed on the results of this study.

Guide Survey

A different approach needed be taken to estimate expenditures and economic impacts of anglers using fishing guides because of the constraints encountered when working with this group of anglers. First, many guided anglers do not have to purchase a saltwater fishing license because their fishing activity is covered by their guide's license. These anglers come to the Keys to specifically fish for Flats species such as bonefish, permit and tarpon and may not fish unguided in Florida. Casual conversations with Keys guides suggest that the majority of guided anglers may not purchase a saltwater fishing license as many are from out-of-state.

Second, guides in general are very reluctant to provide information on their businesses (number of trips, revenue, operating costs, etc.). They are very protective of their client lists and having others contact their clients. Third, while approaching guides through professional associations and through opinion leaders amongst their ranks has yielded some positive benefits, survey response rates to detailed surveys are often very low.

One method that has yielded positive results with guides has been to ask for a very few select pieces of information. Using an anonymous mail survey and asking only for information on the number of days guiding and the proportion of resident versus non-resident anglers guided has met with better success. Unfortunately, this procedure precludes the direct estimation of expenditures made by their clients. As a result, the average cost of a day of guided fishing was determined from the angler telephone survey. By asking anglers in the telephone survey to identify the number of days fishing in the Keys with and without a guide, it was possible to calculate the average expenditure for a day of guided fishing and compute total expenditure estimates accordingly for guided fishing. Because of the overlap in guided anglers that bought and did not buy a saltwater fishing license, an adjustment of guided angler numbers to account for this duplication was necessary. This was accomplished computationally based on the number and proportion of resident and non-resident licensed anglers reporting guide use in the telephone survey and the resident and non-resident proportions of anglers reported by fishing guides. As a further point of reference, guides were asked to estimate, if possible, the percentage of their clients that had a Florida saltwater fishing license. This information was also used in estimating the number of days fished by guided anglers.

Estimating Senior Anglers

Since resident Florida anglers aged 65 and older do not need to purchase a saltwater fishing license, it was necessary to estimate their numbers and make a few assumptions about their fishing behavior to represent them in this study. To begin this estimate, the Florida data from the U.S. Fish and Wildlife Service's 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USFWS 2013) was used to determine the number of resident saltwater anglers aged 65 years and over in the Florida population. This database included all types of saltwater anglers, including those fishing from a pier, using guide services, and shellfish harvesters who may or may not have purchased a saltwater license. A ratio of senior anglers to all anglers 16 to 64 years of age was created for use in estimating the number of senior saltwater finfish anglers. The assumption was made that distribution of non-license buying anglers was proportionally distributed across all ages. Thus, the ratio, when applied to the number of licensed resident saltwater anglers in the FWC license database, would yield a fair and comparable approximation of the number of saltwater anglers aged 65 and older.

The number of Keys and Flats anglers cannot be estimated from the USFWS National Survey data. Therefore a second assumption was made regarding the percentage of senior anglers that fish the Florida Keys and Flats. This notion postulates that senior anglers will fish in the Keys and on the Flats at the same rate as anglers aged 55 to 64, their nearest comparison group. This assumption was assessed in this study by examining the consistency of Keys and Flats fishing rates not only for the 55 to 64 age group, but across other age groups as well.

The USFWS National Survey data was also used to calculate the number of Florida saltwater fishing days for the senior group of anglers as will their daily expenditure for saltwater fishing. This allowed for the estimation of total expenditures for senior anglers and commensurate economic impacts.

Economic Impact Analysis

Effective planning for public- and private-sector projects and programs at the state and local levels requires a systematic analysis of the economic impacts of the projects and programs on affected regions. In turn, systematic analysis of economic impacts must account for the inter-industry relationships within regions because these relationships largely determine how regional economies are

likely to respond to project and program changes. Thus, regional input-output (I-O) multipliers, which account for inter-industry relationships within regions, are useful tools for regional economic impact analysis.

The RIMS II methodology is the Regional Input-Output Modeling System (Bureau of Economic Analysis 2006) used in this study. This system was developed and published by the U.S. Department of Commerce and is one of the primary ways in which to conduct a systemic analysis of the economic impacts of projects and programs on affected regions. The conceptual framework of the RIMS II approach is well described by the Community Research Institute at Grand Valley State University, Department of Economics:

Each economic transaction can be compared to the ripples in a pond. When an individual trades money for goods or services the value of that money passes to the recipient like a stone thrown into a pond. That merchant then uses the money to purchase other goods or services adding a ripple to the pond. This (ripple effect) process continues many times and the value of the original money continues to grow.

In economic terms, the use and reuse of funds in the economy produces a multiplying effect. As monetary transactions are conducted over and over again, the value of a dollar has the potential to be multiplied many times as it moves through the economy from transaction to transaction. This multiplying effect is generated both directly by organizations purchasing goods and services and at a degree of separation by the employees of those organizations spending their paychecks. An additional benefit of the multiplier effect is seen in job creation to provide the goods and services being purchased. This multiplier effect applies to all economic activity by all organizations and individuals, whether that activity takes place in the for-profit, nonprofit or governmental sectors. The U.S. Department of Commerce estimates the multiplication effect on both dollars and employment as part of the Regional Input-Output Modeling System (RIMS II).

RIMS II was originally developed in the 1980s by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce, based on the Department of Commerce's input-output table of the national economy. It breaks out almost 500 separate U.S. industries, many directly involved in providing goods and services to anglers. RIMS II is widely used in both the public and private sector. In the public sector, for example, the Department of Defense uses RIMS II to estimate the regional impacts of military base closings, and state departments of transportation use RIMS II to estimate the regional impacts of airport construction and expansion. In the private sector, analysts, consultants, and economic development practitioners use RIMS II to estimate the regional impacts of a variety of projects, such as the development of theme parks and shopping malls. RIMS II measures the economic impact of an industry by accounting for three elements of potential economic impacts:

Direct impacts include employment, payroll, and revenue generated by services and goods purchased by anglers.

Indirect impacts are what users and employees of the fishing-related businesses spend in the local and regional economy as a result of their involvement in the recreational fishing industry.

Induced impacts include the value of goods and services purchased by money generated by direct and indirect impacts throughout the regional economy -- goods and services not associated with fishing and which would otherwise not be available.

The summation of direct, indirect and induced impacts produces **total economic output** and is expressed as a multiplier that is applied to retail sales associated with an activity, program or project.

RIMS II multipliers are intended to show the total regional effects on industrial output, personal earning, and employment for any county or group of contiguous counties in the United States resulting from any industry activity. Industry descriptions are defined according to the BEA's 2005 national input-output tables. Induced impacts for fishing-related businesses can be estimated by applying the RIMS II multipliers to activities within the appropriate industrial sector. RIMS II multipliers are given in three tables.

The **output** multiplier measures the total economic output created by the original retail sale.

The **earnings** multiplier measures the total salaries and wages generated by the original retail sale.

The **employment** multiplier estimates the number of jobs supported by the original retail sale.

Each fishing-related business is assigned a Standard Industrial Classification (SIC) code. The fishing-related business is identified by a corresponding RIMS II code, which identifies the multiplier factor to be applied to that business. Business activities that are most likely encountered in fishing-related economic studies are represented by the categories used to measure angler expenditures. To apply the RIMS II model, angler expenditures are each matched to the appropriate output, earnings and employment multipliers. For example, dollars attributed to gasoline purchases are multiplied separately by the earnings, output and employment multipliers specific to gasoline refinement. The resulting estimates describe the salaries and wages, total economic effects, and jobs supported by the refining industry as a result of fuel purchases made by anglers. This same process is repeated for all reported expenditures. Finally, the total output, income and jobs estimated for each expenditure type are summed to produce the total effect for each impact category.

Federal and state **tax revenues** are also included in this report and represent separate estimates from the RIMS II multipliers for state sales tax and federal income tax revenues. For fishing estimates, sales tax revenues are only associated with original retail sales as it is not possible to track the appropriate tax rates through the subsequent rounds of spending. Sales tax estimates also include fuel tax receipts. Federal income tax receipts are based on the total economic activity created by the original retail sale.

Results

Results are presented for each of the four regions and senior anglers throughout this section. The reason for this disaggregation is to better understand the contribution of each of the four geographic areas to the overall fishing activity and economic impacts of Florida Keys fishing. Information within this section is divided into seven sub-sections. The first provides details on the survey responses and the number of anglers from the telephone survey. The second provides estimates of days fishing in saltwater throughout the state, in the Florida Keys, and for Flats anglers. The third sub-section examines expenditures for each of the trip and equipment categories from annual and daily perspectives. The fourth focus within this section is on guided angler characteristics and expenditures. The total expenditures made by anglers for their overall and Keys fishing and the value added effects from multipliers, personal and business income, and federal and state tax revenues is chronicled in the fifth sub-section. The sixth sub-section includes a discussion and calculations of a secondary method for estimating angler expenditures for Keys fishing and used as a validity check. The final section examines angling activity and expenditures for several Flats species.

Survey Response and Fishing Activity

The telephone survey was based upon buyers of Florida saltwater fishing licenses in 2011 and 2012 that allowed the buyer to fish during any part of the 2012 calendar year. These license buyers were then aggregated into one of four regions based upon distance from the Florida Keys as explained earlier. From within each region, a pool of approximately 5,000 license buyers was randomly selected for use in the telephone survey. The list of buyers in each region provided the basis for random selection of call recipients by the computer-assisted telephone survey program.

Because the proportion of active anglers and the proportion of Keys anglers among the population of license buyers in each region were unknown, survey response targets were set for each region. Thus, a large pool of license buyers was needed for each region. Region 1, encompassing the Keys and South Florida, was expected to have the largest proportion of Keys anglers. Therefore, a minimum target number of completed surveys was set for Region 1 at 250 Florida Keys anglers. This objective was necessary based on the need to achieve a sufficient sample size to achieve sampling errors at or below four percent. Telephone interviews were conducted until the minimum number of Keys anglers was achieved or exceeded.

For Regions 2 through 4 the target was set at a minimum of 500 active saltwater anglers. Again, not knowing the proportion of Keys anglers in each region necessitated an approach that would generate enough Keys anglers in each region to reliably estimate the population.

The telephone numbers used for the survey were provided by the license buyer at the time of purchase and could have been over one year old at the time of the survey. However it was expected that the proportion of disconnected or incorrect numbers would be relatively small given that buyers provided the number. This was not the case as over half of the telephone numbers called were either disconnected or reached someone other than the license buyer (Table 1). Over half of the telephone numbers called in Regions 1 through 3 fell into this category. Telephone numbers for Region 4, non-resident buyers, were somewhat more reliable as 42% reached the wrong person or were disconnected. Surprisingly, few license buyers refused to participate in the survey (4%) or terminated the survey before completion (1%).

Table 1: Type of saltwater fishing license buyer telephone survey response

	Disconnected or Wrong Person	Refusals	Terminated	Completed Calls	Total Calls
Region 1	1,069	71	34	823	1,997
Region 2	993	84	27	683	1,787
Region 3	892	55	14	688	1,649
Region 4	491	56	12	606	1,165
Total	3,445	266	87	2,800	6,598

It is usually assumed that if a person buys a fishing license they will spend a day or more on the water. However, as seen in Table 2, only three-fourths of the buyers actually spent one or more days fishing. The South Florida (Region 1) had the highest non-fishing rate while non-residents (Region 4) had the lowest non-fishing rate. This latter finding is understandable because most non-residents do not purchase a license until they have made a decision to go fishing. Reasons for not fishing were not probed in the survey.

Table 2: Saltwater license angler survey response results by region

	Respondents			Percent Active Anglers
	Inactive Anglers	Active Anglers	Total	
Region 1	242	581	823	70.6%
Region 2	174	509	683	74.5%
Region 3	187	501	688	72.8%
Region 4	100	506	606	83.5%
Total	703	2,097	2,800	74.9%

As would be expected, Region 1 had the highest proportion of Florida Keys anglers (Table 3). Slightly more than half of the active saltwater anglers in this region fished at least one day in the Keys. As distance from the Keys increased, the percentage of anglers traveling to the Keys to fish decreased. It is notable that 21% of the non-resident saltwater license buyers had a Keys fishing destination. The proportion of Flats anglers across the four regions were similar to overall Keys fishing.

Table 3: Number of active saltwater anglers, Keys anglers and Flats anglers sampled by region

	Active Anglers	Keys Anglers		Flats Anglers	
	Number	Number	Percent of Active Anglers	Number	Percent of Active Anglers
Region 1	581	295	50.8%	254	43.7%
Region 2	509	128	25.1%	114	22.4%
Region 3	501	75	15.0%	56	11.2%
Region 4	506	107	21.1%	86	17.0%
Total	2,097	605	28.9%	510	24.3%

Senior and Regional Angler Estimates

As mentioned in the Methods Section, anglers 65 years and older are not required to purchase a saltwater fishing license and, thus, were not represented in the telephone survey. Therefore, it was necessary to estimate the number of senior anglers independently. Estimating the number of senior saltwater anglers (65 years and older) in Florida benefitted from recently released data from the 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation conducted by the U.S. Fish and Wildlife Service (USFWS 2013) at five-year intervals. Florida data from this survey showed that 15% of all saltwater anglers in Florida were aged 65 or older and 18.2% of saltwater anglers aged 16 to 64. Applying the latter percentage to the estimated 646,107 licensed saltwater anglers aged 16 to 64 from the telephone survey (Table 4) results in an estimated 117,378 senior anglers. Using the assumption that the proportion of senior saltwater anglers fish the Keys and Flats is the same as for those in the 55 to 64 age group (18.2% and 11.5%, respectively), results in an estimated 21,324 senior anglers fishing the Keys and 13,545 anglers fishing the Flats (Table 4).

Applying the weights to extrapolate sample numbers in Table 3 to the entire population of licensed anglers, results in about one-fourth of all Florida licensed saltwater anglers fishing in the Keys and nearly 20% fishing the Keys Flats (Table 4). There is a sharp decline in Keys and Flats anglers as the distance north of the Keys increases. Region 2 ranges roughly 50 to 100 miles north of Key Largo. Yet, within this relatively short distance from the Keys only one-fourth of the anglers from this region are attracted to Keys fishing.

Overall, there were an estimated 735,485 saltwater resident and non-resident U.S. anglers fishing in Florida’s coastal margins during 2012. Slightly less than one-fourth of these anglers fished the Florida Keys and 17% were Keys Flats anglers. About three-fourths of the Keys anglers were Flats anglers.

Table 4: Number of active saltwater anglers, Keys anglers and Flats anglers by region

	Active Anglers	Keys Anglers		Keys Flats Anglers	
	Number	Number	Percent	Number	Percent
Licensed Anglers					
Region 1	101,390	51,480	50.8%	36,124	35.6%
Region 2	132,103	33,220	25.1%	25,953	19.6%
Region 3	287,930	43,104	15.0%	32,759	11.4%
Region 4	124,684	26,366	21.1%	20,945	16.8%
Sub-Total	646,107	154,170	23.9%	115,781	17.9%
Senior Anglers	117,378	21,324	18.2%	13,545	11.5%
Total Anglers	735,485	175,494	23.9%	129,326	17.6%

Florida saltwater anglers spent over 19.5 million days and averaged four weeks of fishing along the state’s coastline (Table 5) with nearly two million of these days fishing in the Keys. Using the mean number of days senior anglers fished from the 2011 FWS national survey (12.1) we were able to calculate the total number of saltwater fishing days for senior anglers (Table 5). These anglers accounted for slightly more than 7% of all saltwater fishing days. Again using the percentage of days fishing the Keys and Flats from the 55-64 age group (8.3% and 7.3%, respectively) we were able to estimate the number of days senior anglers fished the Keys and Flats.

The warm southern Florida winters show an obvious effect on the number of saltwater fishing days as anglers in Regions 1 and 2 average 25% more days fishing per year than Region 3 residents. Anglers in Regions 1 and 2 spent two weeks, on average, fishing the Keys. This is twice the number of days the average Region 3 angler spends fishing the Keys. Somewhat surprisingly, non-resident anglers (Region 4) are as active with their Keys fishing as Region 1 and 2 resident anglers.

Table 5: Mean and total fishing days by type of fishing

	Saltwater Fishing Days		Keys Fishing Days		Flats Fishing Days	
	Mean	Total	Mean	Total	Mean	Total
Licensed Anglers						
Region 1	32.1	3,268,223	14.4	757,897	15.2	499,488
Region 2	36.5	4,820,325	13.1	431,605	14.0	246,038
Region 3	26.4	7,589,059	6.4	277,011	6.7	175,287
Region 4	18.9	2,362,589	13.2	345,468	13.7	244,933
Sub Total	27.9	18,040,196	11.7	1,811,981	12.5	1,165,705
Senior Anglers	12.1	1,502,917	8.2	174,858	7.3	98,879
Total Anglers	26.6	19,543,113	11.3	1,986,839	9.8	1,264,584

Angler Expenditures

The telephone survey asked respondents to estimate annual expenditures related to their saltwater fishing in Florida during 2012. Expenditures were broken down into 10 trip-related categories and eight equipment-related categories (Table 6) and are presented for each of the four regions. Region 1 anglers spent the most annually on their saltwater fishing averaging more than \$4,700 per year. Two-thirds of these expenditures were for trip-related costs with food and drink, lodging and boat operation expenses accounting for the majority of trip spending. Rods and reels and boat payments and insurance comprised the majority of equipment-related expenditures for Region 1 anglers. Saltwater fishing expenditures by Region 2 anglers were similar to those from Region 1 (Table 6).

Region 3 anglers spent about \$500 less per year on their saltwater fishing than anglers in Regions 1 and 2. These reduced expenditures were spread over most of the trip-related expenditures but focused

most noticeably in the food and drink, and boat fuel categories. This is most likely related to the fewer number of days fishing compared to their southern counterparts.

Non-resident saltwater anglers differed noticeably from resident anglers in a number of respects (Table 6). First, average expenditures for lodging and public transportation were substantially greater than those of resident anglers. Conversely, their expenditures for boat fuel and associated services were markedly lower than those of resident anglers. Equipment expenditures were consistently less for non-residents. The fact that non-residents only spend \$300 - \$500 less per year on their Florida saltwater angling suggests that they spend long periods of time in Florida fishing. This is consistent with Florida being a winter destination for non-residents who often spend several months temporarily residing in the state.

The calculation of senior angler expenditures was accomplished by using spending data from the FWS National Survey for Florida saltwater anglers aged 65 and older. Expenditure categories used in this study paralleled those in the 2011 National Survey to facilitate representation of senior anglers. As shown in Table 6, senior angler expenditures are for all regions combined. There was no respondent residence information in the USFWS National Survey data that can be used to identify them with a specific county.

Table 6: Annual saltwater fishing expenditures by Florida anglers by region

Trip Expenditures	Average Annual Saltwater Fishing Expenditures					
	Region 1	Region 2	Region 3	Region 4	Senior	Total
Food, drink & refreshments	\$637	\$562	\$486	\$455	\$210	\$519
Lodging	\$308	\$319	\$304	\$664	\$66	\$377
Public transportation	\$20	\$44	\$30	\$223	\$11	\$68
Private transportation	\$350	\$334	\$365	\$370	\$213	\$357
Guide fees	\$144	\$112	\$138	\$155	\$110	\$137
Fishing licenses & tags	\$66	\$72	\$54	\$65	\$23	\$62
Live & dead bait	\$271	\$213	\$173	\$143	\$316	\$191
Boat & equipment rental	\$51	\$125	\$89	\$78	\$55	\$88
Boat fuel	\$816	\$761	\$561	\$395	\$641	\$610
Boat mooring & maintenance	\$536	\$511	\$475	\$268	\$320	\$452
Trip Subtotal	\$3,199	\$3,053	\$2,675	\$2,815	\$1,965	\$2,862
Equipment Expenditures						
Rods & reels	\$507	\$432	\$319	\$276	\$219	\$363
Lines & leaders	\$119	\$110	\$96	\$91	\$58	\$101
Hooks, sinkers & swivels	\$77	\$65	\$60	\$47	\$32	\$61
Artificial lures, baits & flies	\$90	\$103	\$92	\$70	\$88	\$90
Tackle boxes, nets, gaffs	\$58	\$84	\$77	\$43	\$16	\$69
Traps, cast nets, bait containers	\$32	\$43	\$42	\$17	\$85	\$36
Electronics & trolling motors	\$183	\$211	\$208	\$164	\$251	\$196
Boat payments & insurance	\$467	\$389	\$464	\$284	\$227	\$415
Equipment Subtotal	\$1,533	\$1,438	\$1,358	\$990	\$975	\$1,331
Total Annual Expenditure	\$4,732	\$4,491	\$4,033	\$3,805	\$2,941	\$4,192

Senior anglers spent about \$900 or 31% less on their trip expenditures than the average Florida saltwater angler. They also spent 27% less on equipment annually. Overall, senior anglers spent about 70% as much annually on their saltwater fishing in Florida as younger anglers.

There is a very strong difference in the spending patterns of anglers that fish the Florida Keys and Flats and all anglers as seen in Table 7. Keys anglers spend over 50% more per year on trip-related items than the average saltwater angler. Differences are consistent across all expenditure categories with food and drink, lodging and boat expenses being most notable. Differences in equipment expenditures, while not as dramatic as those for trip expenditures, were still consistently greater across all eight categories for Keys anglers who averaged about \$460 more per year. Overall, Keys anglers spent over \$2,000 more per year than the average angler and Flats anglers \$2,200 more per year.

Table 7: Annual saltwater fishing expenditures by type of angler

Trip Expenditures	Average Annual Saltwater Fishing Expenditures		
	All Anglers	Keys Anglers	Flats Anglers
Food, drink & refreshments	\$519	\$821	\$879
Lodging	\$377	\$806	\$812
Public transportation	\$68	\$91	\$90
Private transportation	\$357	\$505	\$514
Guide fees	\$137	\$265	\$293
Fishing licenses & tags	\$62	\$55	\$57
Live & dead bait	\$191	\$300	\$302
Boat & equipment rental	\$88	\$121	\$134
Boat fuel	\$610	\$912	\$903
Boat mooring & maintenance	\$452	\$570	\$615
Trip Subtotal	\$2,862	\$4,446	\$4,598
Equipment Expenditures			
Rods & reels	\$363	\$514	\$554
Lines & leaders	\$101	\$142	\$149
Hooks, sinkers & swivels	\$61	\$89	\$93
Artificial lures, baits & flies	\$90	\$123	\$130
Tackle boxes, nets, gaffs	\$69	\$93	\$99
Minnnow traps, cast net, bait containers	\$36	\$41	\$44
Electronic devices & trolling motors	\$196	\$255	\$247
Boat payments & insurance	\$415	\$538	\$557
Equipment Subtotal	\$1,331	\$1,795	\$1,875
Total Annual Expenditure	\$4,192	\$6,241	\$6,473

Examining expenditures per day of fishing is one way to assess spending differences among anglers by normalizing expenditures. While annual expenditures provides one view of angler spending behavior, the per-day rate of spending refines the analysis by giving angler spending a common reference point (Table 8). That said, Keys anglers spend about 25% and Flats anglers 20% more than the average saltwater angler per day on trip-related expenditures. This is most likely related to the greater number

of fishing days Keys and Flats anglers spend fishing each year. In contrast to trip expenditures, saltwater anglers overall spend 20% more per day of fishing on equipment than Keys anglers and 42% more than Flats anglers. Overall, Keys anglers spend slightly more per day of fishing than the average saltwater angler. Flats anglers spend essentially the same amount as the typical saltwater angler to fish per day.

Table 8: Mean daily saltwater fishing expenditures by type of angler

Trip Expenditures	Mean Daily Saltwater Fishing Expenditures		
	All Anglers	Keys Anglers	Flats Anglers
Food, drink & refreshments	\$31.66	\$37.73	\$39.30
Lodging	\$23.00	\$58.19	\$55.61
Public transportation	\$5.37	\$5.45	\$5.33
Private transportation	\$24.96	\$26.40	\$22.85
Guide fees	\$10.24	\$15.48	\$17.72
Fishing licenses & tags	\$7.53	\$4.40	\$4.14
Live & dead bait	\$12.34	\$11.81	\$11.60
Boat & equipment rental	\$7.01	\$8.61	\$9.05
Boat fuel	\$34.02	\$39.93	\$36.89
Boat mooring & maintenance	\$31.88	\$27.88	\$27.82
Trip Subtotal	\$188.01	\$235.89	\$230.31
Equipment Expenditures			
Rods & reels	\$27.37	\$21.34	\$21.69
Lines & leaders	\$6.70	\$6.44	\$6.90
Hooks, sinkers & swivels	\$4.45	\$3.88	\$4.04
Artificial lures, baits & flies	\$7.69	\$4.87	\$5.20
Tackle boxes, nets, gaffs	\$4.40	\$3.95	\$3.76
Minnnow traps, cast nest, bait containers	\$2.61	\$1.53	\$1.44
Electronic devices & trolling motors	\$12.74	\$9.50	\$8.03
Boat payments & insurance	\$32.97	\$28.18	\$28.57
Equipment Subtotal	\$98.92	\$79.69	\$57.93
Total Annual Expenditure	\$286.92	\$315.57	\$288.24

The total amount of angler expenditures for trip- and equipment-related item is shown in Table 9. The estimates for Keys and Flats angling activity are based on the number of Keys and Flats fishing days by anglers. The number of Keys fishing days and Flats fishing days for each angler were multiplied by the total daily fishing expenditure for each angler and summed to produce a total Keys or Flats expenditure. Overall, saltwater anglers in Florida spend \$3.053 billion on their fishing activity. About 14% or \$441 million of these expenditures are made by anglers fishing the Florida Keys, with 8% or \$241 million attributable to Flats anglers. Nearly 70% of the expenditures made by all anglers are for trip-related expenses.

The proportion expenditures across each of the ten trip-related categories were very similar as boat fuel, food and drink, and boat services (mooring and maintenance) were the top expenditure categories.

Table 9 Annual saltwater fishing expenditures by type of angler

Trip Expenditures	Total Saltwater Angler Expenditures		
	All Anglers	Keys Anglers	Flats Anglers
Food, drink & refreshments	\$359,918,258	\$51,488,818	\$29,440,382
Lodging	\$251,503,566	\$63,043,796	\$35,240,169
Public transportation	\$45,424,327	\$6,294,491	\$3,584,334
Private transportation	\$255,984,042	\$37,540,682	\$22,487,265
Guide fees	\$101,413,532	\$19,203,505	\$8,895,629
Fishing licenses & tags	\$42,616,662	\$4,366,410	\$2,773,419
Live & dead bait	\$160,386,335	\$19,960,612	\$10,362,781
Boat & equipment rental	\$63,370,802	\$8,904,103	\$5,422,281
Boat fuel	\$469,461,330	\$66,610,601	\$35,955,355
Boat mooring & maintenance	\$329,538,898	\$41,996,980	\$22,212,844
Trip Subtotal	\$2,079,617,753	\$319,409,998	\$176,374,460
Equipment Expenditures			
Rods & reels	\$260,361,166	\$34,117,898	\$19,140,760
Lines & leaders	\$72,281,573	\$10,118,586	\$4,929,455
Hooks, sinkers & swivels	\$43,345,279	\$5,819,559	\$2,611,806
Artificial lures, baits & flies	\$68,280,157	\$8,298,125	\$3,734,083
Tackle boxes, nets, gaffs	\$46,346,741	\$5,671,873	\$3,256,267
Minnnow traps, cast nest, bait containers	\$32,924,088	\$3,344,109	\$1,888,689
Electronic devices & trolling motors	\$156,151,020	\$18,031,113	\$9,518,856
Boat payments & insurance	\$294,471,025	\$36,737,961	\$19,261,068
Equipment Subtotal	\$974,161,049	\$122,139,223	\$64,340,984
Total Annual Expenditure	\$3,053,778,802	\$441,549,221	\$240,715,444

For equipment-related expenditures, boat payments and insurance, rods and reels, and electronic devices was the focus of over 70% of angler spending.

When looking at the regional distribution of saltwater fishing expenditures by licensed anglers for Keys and Flats fishing, it is not surprising that Region 1 dominates the total for both types of Keys anglers (Table 10). Over \$140 million was spent by Region 1 anglers in 2012 on their Keys fishing with nearly \$70 million spent for Flats fishing. Expenditures by non-residents (Region 4) for both Keys and Flats fishing exceeded expenditures for both Region 2 and Region 3 anglers.

The difference between Keys and Flats angling was about \$70 million in Region 1, whereas the difference for Region 2 was \$22 million, and \$24 million and \$45 million for Regions 2 and 4, respectively. Senior anglers accounted for \$345 million in overall saltwater fishing expenditures. However, only 11% of this was attributable to Keys fishing and 7% to Flats fishing. Overall, Florida anglers spent \$3 billion on their saltwater fishing during 2012. They spent slightly more than \$441 million on Keys fishing and \$240 million for Flats fishing.

Table 10: Total expenditures by type of angler and region

	Total Expenditures		
	All Anglers	Keys Anglers	Flats Anglers
Region 1	\$479,741,951	\$140,003,788	\$69,760,195
Region 2	\$593,232,176	\$68,346,672	\$44,022,485
Region 3	\$1,161,184,035	\$85,790,951	\$41,615,947
Region 4	\$474,457,727	\$107,249,654	\$62,608,066
Senior	\$345,162,912	\$40,158,157	\$22,708,752
Total	\$3,053,778,802	\$441,549,221	\$240,715,444

Guided Angler Characteristics and Expenditures

A particular interest of this study was to estimate guided fishing activity and the resulting economic impact in the Keys and for Flats fishing. As mentioned in the methods section, obtaining information on this component of the fishing industry is very difficult. Further, many guided anglers in the Keys do not purchase Florida saltwater fishing licenses as the guide's license fee covers non-licensed clients. It was anticipated that a relatively large proportion of guided anglers would not have individual licenses as many guides reported that they had a large number of non-resident clients that only fished in Florida with them. Based on previous experience working with this group of service providers and consultation with Keys guides, a two-pronged approach to data collection was taken. First, Florida guides were surveyed by mail, internet and by personally handing surveys to guides at meetings. The focus of these surveys was to collect information in four essential areas: 1) number days guided in the Florida Keys during 2012; 2) average number of customers during a typical day of guided fishing; 3) an estimate of the percentage of guided customers that possessed a Florida saltwater fishing license; and 4) the percentage of days targeting a variety of Flats species.

The second component of estimating guided fishing activity and expenditures was to identify licensed anglers using guides from the telephone survey data and analyze their responses separately. The telephone survey included a question asking how many days they fished the Keys with a guide. This information, along with trip expenditure information for guide fees, provided the basis for estimating this component of guided fishing activity.

Guides with FWC issued licenses in the South Florida Region 1 were contacted by postal mail with a paper survey and return envelope, or by e-mail with a link to an online survey due to the difficulty in obtaining responses to any one type of survey. Additionally, known licensed Keys guides were handed surveys with return envelopes at meetings to achieve additional responses. A total of 523 licensed guides were identified in the region. From these guides 151 (29%) survey responses were obtained. Among the respondents, 65% indicated that they guided customers in the Florida Keys (Table 11). Guides fished an average of 155 days in the Keys. Guided fishing days ranged from eight to 290 days.

Table 11: Guided fishing day calculations for non-licensed Keys guided anglers

Variable	Non-Licensed Keys Anglers	
	Value	Total
Region 1 Guides		523
Percent Guiding in Keys	65.3%	342
Mean Days Guided in Keys	155	53,010
Anglers Guided per Day	1.9	100,719
Percent Customers Not Licensed	73.2%	73,726

Guides typically serviced one to three anglers each day with the mean being 1.9 anglers. When asked to estimate the proportion of their customers that had a Florida saltwater fishing license, 27% of the guides reported they did not know and could not provide an estimate. The remaining guides provided estimates ranging from zero to 40 percent. The mean percentage of licensed customers was 26.8 percent.

By following the calculations in Table 11, an estimated 73,726 non-licensed anglers fished the Keys with guides during 2012. Analysis of the telephone survey data resulted in the identification of 27,823 licensed anglers that spent 73,726 days fishing with guides in the Florida Keys (Table 12). The number of licensed versus non-licensed fishing days was within 1,400 days of each other. There was a larger disparity of about 3,900 days in Flats fishing days. This difference in Flats fishing days was accounted for by the greater number of days licensed anglers spent targeting offshore species.

Table 12: Guided days fishing by licensed and non-licensed anglers

	Guided Days Fishing	
	Keys Fishing	Flats Fishing
Non-Licensed Guided Anglers	73,357	71,957
Licensed Guided Anglers	73,726	69,836
Total	147,083	141,793

In order to estimate guided angler expenditures it was first necessary to identify the trip and equipment categories appropriate for guided anglers and calculate a daily expenditure for guided fishing. From previous similar surveys involving guides (Fedler 2010, 2011) and through analysis of expenditure telephone survey data for guided anglers, four trip-related and four equipment-related expenditure categories were identified (Table 13). Mean angler expenditures were calculated for guided anglers and multiplied by the number of guided fishing days to estimate total expenditures for guided Keys and Flats fishing activity.

Table 13: Mean daily expenditures for guided anglers

Trip Expenditures	Mean Daily Expenditure
Food, drink & refreshments	\$54.10
Lodging	\$83.86
Private transportation	\$29.25
Guide fees	\$226.66
Trip Subtotal	\$393.87
Equipment Expenditures	
Rods & reels	\$32.13
Lines & leaders	\$6.52
Hooks, sinkers & swivels	\$3.34
Artificial lures, baits & flies	\$5.98
Equipment Subtotal	\$47.98
Total Daily Expenditure	\$441.85

The largest expenditure for guided anglers were guide fees (Table 13) which comprised over half of the daily expenditure total. Lodging and food and drink were the next largest expenditure categories. Anglers averaged \$441.85 per day of guided fishing.

As would be expected from very similar guided fishing days, the estimated total expenditures for non-licensed and licensed anglers for Keys guided fishing was very similar (Table 14). Each accounted for over \$32 million in direct expenditures for their fishing activity. Similarly, guided Flats fishing activity differed by less than one million dollars between the two groups. Combined, the two groups of guided anglers spent over \$64 million for their overall guided Keys fishing and \$62 million for Flats fishing. It needs to be pointed out that the licensed angler guide expenditures are included in the total fishing expenditures reported in the expenditure tables above. When calculating total economic impacts in the next section, only the non-licensed guided angler total was added to the licensed angler total for impact calculations.

Table 14: Fishing expenditures by guided and non-guided anglers

Type of Guided Angler	Guided Days Fishing	
	Keys Fishing	Flats Fishing
Non-Licensed Guided Anglers	\$32,412,790	\$31,794,013
Licensed Guided Anglers	\$32,575,833	\$30,857,037
Total	\$64,988,624	\$62,651,050

Total Economic Impacts

Economic impact not only represents the direct expenditures made by anglers, it also includes the value added or multiplier effects of these expenditures. Other benefits from angler spending include the

salaries, wages and business owner income. In Florida, federal and state fuel taxes, payroll taxes, and sales taxes also are associated with angler spending and are components to document in any impact assessment. To begin the impact assessment process, the first step in this study was to combine licensed and guided non-licensed angler expenditures to identify total angler expenditures. These totals are shown in Table 15.

Florida saltwater anglers spent over \$3 billion on their fishing in 2012 (Table 15). Further, \$474 million dollars was spent for fishing in the Florida Keys with \$272 million for Flats fishing.

Table 15: Total, Keys and Flats saltwater fishing expenditures

	All Florida Fishing	Keys Fishing	Flats Fishing
Non-Licensed Guided Anglers	\$32,412,790	\$32,412,790	\$31,794,013
Licensed and Senior Anglers	\$3,053,778,802	\$441,549,221	\$240,715,444
Total All Anglers	\$3,086,191,592	\$473,962,011	\$272,509,457

The next step was to apply the value added multipliers to the direct expenditures to estimate the additional dollars generated by angler spending. As shown in Table 16, angler expenditures created an additional \$2.1 billion in secondary impacts for all saltwater fishing. Further, spending for Keys fishing resulted in \$336 million in value added and \$193 million for Flats fishing. The total impact of Florida saltwater angler statewide was \$5.2 billion. Keys fishing accounted for 15% of the total saltwater fishing impact or \$810 million while Keys Flats fishing generated \$466 million in angler spending impacts.

The benefits of angler spending are the important related components of jobs and personal income. As shown in Table 16, over \$1.6 billion in wages, salaries and business owner income is generated by saltwater angler spending in Florida and accounts for 53,615 full-time equivalent (FTE) jobs. Fishing in the Keys brings \$250 million in wages to local economies in Florida and an estimated 8,234 jobs. Flats fishing accounted for nearly 58% of the salaries and wages generated by all Keys fishing and 4,734 of the jobs. It is important to note that these wage and job benefits accrue throughout the state where angler's purchases are initially made. Equipment, boats and other items are usually purchased locally. Many trip-related items are purchased en-route to the Keys or in the Keys themselves. The point here is to emphasize that not all Keys or Flats fishing expenditures are made in the Keys and that the benefits are spread throughout the state.

Table 16: Total economic impact of Florida saltwater fishing and Keys and Flats fishing

Angler Type	Direct Expenditures	Multiplier Effects	Total Economic Impact	Salaries, Wages & Owner Income	FTE Jobs	Federal Tax Revenues	State and Local Tax Revenues
All Anglers	\$3,086,191,592	\$2,189,411,434	\$5,275,603,026	\$1,630,019,401	53,615	\$390,113,948	\$320,475,144
Keys Anglers	\$473,962,011	\$336,238,959	\$810,200,970	\$250,330,302	8,234	\$59,911,767	\$49,216,985
Flats Anglers	\$272,509,457	\$193,324,135	\$465,833,592	\$143,930,047	4,734	\$34,446,902	\$28,297,824
Guided Keys Fishing	\$64,988,624	\$46,104,343	\$111,092,966	\$34,324,738	1,129	\$8,214,969	\$6,748,524
Guided Flats Fishing	\$62,651,050	\$44,446,017	\$107,097,067	\$33,090,112	1,088	\$7,919,485	\$6,505,787

Both federal and state tax revenues generated by saltwater fishing are sizable as seen in Table 16. While all saltwater fishing in Florida accounts for over \$390 million in federal taxes and \$320 million in state taxes, Keys fishing (\$109 million) and Flats fishing (\$63 million) also generate significant revenues to local, state and federal governments.

Guided fishing is an important component of the recreational fishery in the Keys. Guided fishing has an overall economic impact of \$111 million with Flats fishing accounting for \$107 million or 96% of the total (Table 16). In addition to angler spending for Keys fishing, over \$33 million in salaries and wages and nearly 1,100 FTE jobs are supported.

Secondary Expenditure Calculation

A second method for calculating Keys-related fishing expenditures was devised to provide an internal validity check for estimating Keys fishing expenditures. Instead of multiplying Keys fishing days by the average daily fishing expenditure (as noted above), licensed anglers were asked to estimate the percentage of their trip expenditures and equipment expenditures that were for fishing in the Keys. These percentages were multiplied by the angler’s total trip expenditures and total equipment expenditures, respectively, and summed to produce an estimate of Keys-related fishing expenditures.

The trip and equipment expenditure percentages for the license angler segment of Keys fishing are shown in Table 17. Somewhat surprisingly, the largest percentages were for the Region 4 non-resident anglers. Their percentages exceeded Region 1 percentages by 10 points for trip expenditures and five points for equipment expenditures. Region 2 and 3 anglers averaged 12 percentage points lower than Region 1 anglers for trip expenditures and 14 percentage points lower for equipment expenditures.

Table 17: Keys trip and equipment expenditure percentages

	Percentage Keys Expenditures	
	Trip	Equipment
Region 1	58.7%	55.9%
Region 2	45.3%	41.2%
Region 3	46.6%	39.2%
Region 4	69.0%	61.2%
Total	54.2%	49.0%

Keys-related expenditures can be calculated by multiplying the percentages by annual trip and equipment expenditures which results in the alternative estimate of Keys expenditures. The estimates for each region are seen in Table 18. The overall total in Table 18 of \$413 million is within three percent of the \$401 million for Keys expenditures by licensed anglers in Table 10. This second less-refined method of estimating Keys expenditures lends additional confidence in the results of the analysis above.

Table 18: Keys trip and equipment expenditures

	Keys Expenditures		
	Trip	Equipment	Total
Region 1	\$96,811,709	\$45,870,067	\$142,681,776
Region 2	\$54,060,909	\$19,298,403	\$73,359,312
Region 3	\$77,471,629	\$21,110,514	\$98,582,143
Region 4	\$75,781,658	\$23,082,637	\$98,864,295
Total	\$304,125,904	\$109,361,621	\$413,487,525

Flats Species Angling and Expenditures

Flats anglers in the license angler survey were asked to estimate the number of days they spent fishing for several species shown in Table 19. Species data were not included for senior anglers in these results because the USFWS National Survey does not collect data specifically for Florida saltwater species. When the species days were summed for each angler their total exceeded the number of Flats fishing days by as much as 250%. Clearly, anglers reported fishing for multiple species days for a single day when several species were targeted. For example, bonefish anglers often encounter and catch permit, tarpon or other species when their original focus of the trip may have been on bonefish. Likewise, some anglers fish for different species during different periods of the day and on different tides to optimize their fishing time. This double or triple counting of a fishing day causes problems with estimating expenditures associated with any single species.

To overcome this problem, Flats fishing days were annualized across all species listed based on the number of days a particular species was targeted. For example, if an angler reported fishing 10 days for bonefish, five days for permit, 15 days for tarpon and 10 days for snapper and grouper for a total of 40 days but only reported 30 days of Keys Flats fishing, the days reported for each species would be multiplied by 0.75 (30/40) to scale the species days to total days. The annualized values would be: bonefish 7.5, permit 3.75, Tarpon 11.25 and snapper/grouper 7.5 which equals 30 days. Failure to use such a procedure results in a gross over-estimation of fishing days for each species and resulting expenditures as well.

Non-licensed guided angler and licensed angler fishing days for each species were annualized separately and added together to produce the annualized days in Table 19. Annualized days were then multiplied by expenditures for a day of Flats fishing to produce total expenditures for each species.

Table 19: Annualized fishing days and expenditures for Keys Flats species

	Days	Expenditures
Bonefish	43,742	\$9,159,545
Permit	44,420	\$9,301,514
Tarpon	119,492	\$25,021,475
Snapper/Grouper	443,348	\$92,836,739
Other Inshore	541,939	\$113,481,432
Total	1,192,941	\$249,800,705

As seen in Table 19, bonefish and permit generated relatively small expenditure impacts compared to tarpon and only 10% of the impact of snapper/grouper fishing. The pursuit of other inshore species such as snook, redfish, sharks, and barracuda accounted for 45% of all Flats fishing expenditures.

Discussion and Conclusions

The Flats fishery in the Florida Keys is a highly visible and important component of the state's fishing economy. Anglers from throughout the state, country and world travel to the Keys with thoughts of hooking a world record tarpon, permit, bonefish or other species. Flats fishing is responsible for generating over \$465 million to the Florida economy, much of it locally. Flats fishing in the Keys is a very unique fishery that is accessible year-round for winter visitors as well as summer visitors to enjoy. Thus, the benefits are spread throughout the year as compared to other parts of Florida where the benefits are more seasonal.

The larger Keys fishery that includes offshore fishing is also important to the overall Florida saltwater fishing economy. The long string of islands provides access to a wide variety of inshore and offshore species throughout the year. The \$810 million in economic impacts comprises 15% of the saltwater fishing impacts throughout the state of Florida.

Fishing guides play a very important role in the Keys economy. Anglers fishing with guides accounts for about 14% of all economic impacts in the Keys and 23% of the Flats fishing impacts. This industry sector is important beyond the economic aspects of their activity. They provide successful fishing experiences for many anglers each year which helps build both the image of Keys recreational fishing and satisfied anglers that will return to the Keys in future months and years.

The economic importance of Florida Keys sport fishing and Flats fishing in particular were highlighted in this report within the context the overall saltwater fishing in Florida during 2012. This context was necessary to assess the validity of this study's findings. As noted in the introduction of this report, the National Survey of Fishing, Hunting and Wildlife Associated Recreation (USFWS 2013) conducted at five-year intervals provides a solid benchmark to gauge the accuracy of this study. This study goes beyond the limited focus and detail of the national survey data for Florida by yielding much greater detail and the ability to focus on a specific region.

The American Sportfishing Association (ASA 2013) used the 2011 National Survey data to develop sport fishing economic impact models for each state. These models are very similar to the one used in this study. The ASA study estimated that resident and non-resident anglers made \$3.119 billion in direct expenditures for saltwater fishing in Florida. The multiplier effect brought the total economic impacts to \$6.882 billion. The report also noted that wages and salaries totaled \$2.128 billion, jobs 65,212, federal taxes \$544 million and state taxes \$416 million. These numbers are very close to those of this study (Table 16) when consideration is given to the fact that the ASA report included many unlicensed anglers omitted from this study. In Florida, saltwater fishing licenses are not required to fish on charter boats,

fishing piers, and for shellfish. The addition of these anglers to our study would likely have closed the gap in expenditures considerably. Thus, the economic impacts in this report are highly consistent with other studies for the overall impacts of saltwater sport fishing in Florida.

Because of this overall consistency, estimates of Florida Keys and Flats fishing activity and their economic impacts should also be considered reliable. The large sample sizes, and low sampling error, also lend support to the validity of the results.

Flats anglers spend nearly \$2,000 more per year on their saltwater fishing than other saltwater anglers in Florida. Yet, because of the larger number of days they fish each year their average expenditure for a day of fishing is essentially the same as other anglers.

Fishing guides in the Florida Keys play an important role in the regions fishing industry. The small number of guides average over 155 days of fishing per year with some guides spending nearly 300 days fishing annually. Their activity accounts for over 140,000 angler days of fishing and results in angler expenditures totaling \$62 million. The overall economic impact of guided Keys Flats fishing is \$107 million.

Finally, while fishing for high profile species like bonefish, tarpon and permit receive extensive media attention, these Flats fisheries attract a relatively small number of anglers compared to other species such as snapper, grouper and other inshore species. The resulting economic benefits are comparatively small as well. Collectively, however, Flats fishing in the Florida Keys generates \$465 million annually for Florida's economy. Much of this economic activity benefits the Keys.

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