

Economic Impact Analysis of Snorkeling and SCUBA Diving on Florida Reefs



NOAA TECHNICAL MEMORANDUM CRCP 42

NOAA Coral Reef Conservation Program
Silver Spring, MD



May 2021

United States
Department of Commerce

Gina Raimondo
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Atmospheric Administration

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K. Wallmo, P. Edwards, S. Steinback, D. Wusinich-Mendez, and M. Allen
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Executive Summary

This report documents the economic impacts to county and state-level Florida economies generated from snorkeling and SCUBA diving on Southeast Florida's reefs. Impacts to the Southeast Florida Counties of Martin, Palm Beach, Broward, Miami-Dade, Monroe and the State of Florida are included in this report. The economic impacts of reef-related diving and snorkeling were estimated from expenditure data collected via an online survey conducted during October 2016 to October 2017. All impacts were estimated using Input-Output models generated from IMPLAN (Impact Analysis for Planning) software (MIG Inc. 2011). The metrics used to assess the impacts to the region's economy include:

- Output: the gross value of sales by regional businesses affected by an activity
- Labor income: personal income (wages and salaries) and proprietors' income (income from self-employment)
- Value-added: the contribution made to the gross domestic product (GDP) in a region
- Employment: full-time and part-time jobs supported by an activity
- State and local tax: the contribution made to state and local taxes

It is important to note that all county-level economic impacts were generated using expenditures made on a respondent's last diving or snorkeling trip, such as trip costs, auto and boat fuel, equipment rental, etc. Hereafter these are referred to as trip-level expenditures. County-level impacts do not include expenses on durable goods. Southeast Florida reef-related diving and snorkeling were calculated using both trip-level and durable good expenditures; thus, additional purchases such as wetsuits, tanks, regulators, masks, etc. were used in the estimation of state-level impacts.

The Executive Summary Table below shows state- and county-level economic impacts from reef-related recreation on Southeast Florida reefs. Results show that expenditures on reef-related diving and snorkeling in Southeast Florida support 8,668 jobs and generate about \$902 million in total economic output over the course of a year in Florida. At the county level, the

total economic impacts were highest for Palm Beach, generating about \$202 million in economic output and supporting 2,015 jobs over the course of a year. The second highest impacts from snorkeling and diving were for Monroe (\$149 million output, 1,756 jobs), followed by Broward (\$155 million output, 1,544 jobs), Miami-Dade (\$65 million output, 656 jobs), and Martin (\$20 million output, 241 jobs).

Executive Summary Table. Total economic Impacts* from Southeast Florida Reef-related Diving and Snorkeling to Counties and the State of Florida.

	<i>Employment (Number of Jobs)</i>	<i>Labor Income (\$)</i>	<i>Value Added (\$)</i>	<i>Output (\$)</i>
<i>Broward</i>	1,544	60,845,493	92,648,855	155,223,207
<i>Martin</i>	241	7,541,305	11,331,353	20,396,651
<i>Miami-Dade</i>	656	25,486,882	38,771,521	64,989,113
<i>Monroe</i>	1,756	49,938,559	79,847,609	149,164,491
<i>Palm Beach</i>	2,015	82,892,100	123,396,545	202,511,112
<i>State of Florida</i>	8,668	339,569,164	529,464,622	902,069,703

*Reported in 2017 USD

The report includes a brief overview of previous research on the economic impacts related to Florida reefs. It is acknowledged that the current study does not replicate any earlier study (Bell et al. 1998; Johns et al. 2001; Johns 2004), and as such, the estimates provided here should not be viewed as updates to previous estimates. Previous studies captured economic impacts of a broad set of beach and coastal recreation that were not necessarily directly associated with coral reefs. This study is, by design, narrowly focused on reef-related diving and snorkeling, and their associated economic impacts to regional economies. Due to these differences, as well as differences in survey design, sampling procedures, and earlier and later standard conventions associated with IMPLAN software, there may be divergences in impact estimates among different studies.

The results presented in this report suggest that reef-related diving and snorkeling contributes a considerable amount to the economies of local counties and the state of Florida. Results can assist agency decision makers and lawmakers when deciding on budget allocations, environmental mitigation policies and regulations, and research priorities.

Section I. Introduction

In 2014 The Florida Department of Environmental Protection (FDEP) Coral Reef Conservation Program (CRCP) launched its largest endeavor to date – the Our Florida Reefs (OFR) community planning process for Southeast Florida’s reefs. This initiative is led by FDEP CRCP and hosted by the Southeast Florida Coral Reef Initiative (SEFCRI), and brings together the community of local residents, reef users, business owners, visitors and the broader public in Miami-Dade, Broward, Palm Beach, and Martin counties to discuss the future of reefs in this region. The need for updated economic impact and value information for Southeast Florida’s reefs was identified as a priority need during early phases of community planning.

This report is a companion to a second report on the economic impacts of Southeast Florida reefs associated with recreational fishing (Wallmo et al. 2021). These two reports are the first of a two-phase study on the economic impacts and non-market economic value of Southeast Florida coral reefs. The primary goal of this report is to provide an estimate of the economic impacts associated with SCUBA diving and snorkeling on Southeast Florida reefs to local county economies of Broward, Martin, Miami-Dade, Monroe, Palm Beach and the Florida state economy (Figure 1). The study has been a top priority for the NOAA Coral Reef Conservation Program (CRCP) Social Science Plan for a number of years, and will support agency managers and lawmakers – local, state and national – as they make decisions on budget allocations, environmental mitigation and other research priorities.

The estimates presented here were derived from data collected through a diving and snorkeling expenditure survey conducted from October 2016 to October 2017 in Southeast Florida. The total economic impacts of reef-related recreation is measured by the contribution that reef-related expenditures make to output (sometimes referred to as sales), income, and employment in a given County or the state of Florida. This study uses an Input-Output (I/O) modeling approach developed by IMPLAN software to estimate impacts of reef-related recreation based on pre-constructed social accounting matrices that account for all dollar flows between different sectors of an economy (MIG Inc. 2011). Using these matrices the I/O model

traces the way dollars spent on activities associated with reef-related recreation on Southeast Florida reefs are re-spent in different sectors of the economy, generating waves of economic activity, referred to as economic multipliers. National industry data and County-level economic data then generate a series of multipliers, which in turn estimate the total economic impacts of reef-related recreation. Further details of the I/O model are provided in the Methods section of the report.



Figure 1. Florida counties (highlighted in yellow) included in the Economic Impact Analysis

Previous Research

Approximately 20 years ago a pilot research project was implemented with the aim of characterizing the economic importance of artificial reefs in the waters adjacent to Escambia, Santa Rosa, Okaloosa, Walton, and Bay counties in Northwest Florida. Results of this project showed that approximately \$414 million in expenditures were associated with artificial reef use, and those expenditures supported 8,136 jobs and \$84 million in labor income.

Building on this initial effort, Johns et al. (2001) expanded the study areas and implemented a modified questionnaire targeting four counties in Florida: Palm Beach, Broward, Miami-Dade and Monroe. The questionnaire collected information that was used to estimate participation rates in reef related activities, expenditures related to reef use, willingness to pay and demographic information. This study utilized four separate surveys approaches; 1) mail survey of local resident reef users, 2) intercept survey of general non-resident visitors, 3) intercept survey of non-resident boating visitors and 4) mail survey of recreational for-hire operators (charter and head boats). Sampling occurred in cities in each County, including West Palm Beach, Fort Lauderdale, Miami, and locations in the Florida Keys. The study estimated the economic impacts and values of artificial and natural reefs over the twelve-month period of June 2000 to May 2001.

Results (in 2000 USD) showed that reef-related expenditures generated \$505 million in sales in Palm Beach County, \$2.1 billion in sales in Broward County, \$1.3 billion in sales in Miami-Dade County and \$490 million in sales in Monroe County from June 2000 to May 2001. These sales resulted in \$194 million in income to Palm Beach County residents, \$1.1 billion in income to Broward County residents, \$614 million in income to Miami-Dade County residents and \$139 million in income to Monroe County residents during the same time period. Reef-related expenditures supported 6,300 jobs in Palm Beach County, 36,000 jobs in Broward County, 19,000 jobs in Miami-Dade County and 10,000 jobs in Monroe County.

Since 2001 Florida natural resource agencies and partners have relied on this economic information to justify allocations for reef conservation. They have also used the information from these studies to raise public awareness about the economic impacts and value of reefs to Florida's economy. Similar studies (e.g. Johns 2004) have been conducted at various spatial scales. For example a 2003 survey of reef users (defined boaters, recreational anglers, divers, snorkelers, and visitors taking reef tours on glass-bottom boats) estimated the economic impacts and values of artificial and natural reefs to the Martin County economy. Results (in 2003 USD) show that during 2003 residents and visitors spent \$20 million on reef-related expenditures in Martin County. These expenditures generated \$13.1 million in sales, \$5.8 million in income, and supported 182 jobs in Martin County during 2003. Artificial reef-related expenditures accounted for 55 percent of the economic contribution of all reefs.

Other work focused specifically on the economic contribution of artificial reefs to the economy of Florida. Leeworthy et al. (2006) examined the role of artificial reefs in reducing user pressure on adjacent natural reefs. By developing recreational user profiles and estimating resident and visitor person-days to artificial and natural reefs before and after the deployment of a shipwreck (used as an artificial reef), the economic and ecological impacts of artificial reefs were estimated. Results¹ showed net increases in total recreational expenditures from the pre- to the post-deployment period of \$2.6 million. This increase generated a combined sales and output impact of \$2.7 million, \$961.8 thousand in local income, and supported 68 jobs.

A study by the University of Florida focused on the economic impact that artificial reef deployments have on six counties in Southwest Florida: Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, and Lee (Swett et al. 2011). The study found that approximately 614,000 boating days and over 2 million person-days were spent annually utilizing the artificial reefs within the six-county region, with 5,600 persons utilizing the reefs on a daily basis. Other

¹ Expenditure increases are in 2002 USD; however, parameters used in the IMPLAN model were from 1997, as the updated parameters were not available at the time of the analysis.

studies (Adams et al. 2015) have found similar results, suggesting that the deployment of artificial reefs are beneficial to the local economies.

A more recent study by Huth et al. (2014) estimated the economic impacts of the Florida system of artificial reefs. Using survey data and applying a regional economic impact model (REMI) the results (in 2005 USD) suggest that fishing and diving activity on Florida artificial reefs supports 39,118 jobs, generates \$3.1 billion in economic output, and generates approximately \$250 million in state revenues. It should be noted that this study was based on the entire state of Florida including artificial reef related activities on the Gulf and Atlantic coasts as well as the Florida Keys.

Study Goals

In 2014 The Florida Department of Environmental Protection (FDEP) Coral Reef Conservation Program (CRCP) launched its largest endeavor to date – the Our Florida Reefs (OFR) community planning process for Southeast Florida’s reefs. This initiative is led by FDEP CRCP and hosted by the Southeast Florida Coral Reef Initiative (SEFCRI), and brings together the community of local residents, reef users, business owners, visitors and the broader public in Miami-Dade, Broward, Palm Beach, and Martin counties to discuss the future of reefs in this region. The need for updated economic impact and value information for Southeast Florida’s reefs was identified as a priority need during early phases of community planning. This study focuses on the economic impact of reef-related diving and snorkeling expenditures in Southeast Florida and thus addresses this priority.

The primary goals of this study are to provide estimates of the economic impacts of reef-related scuba diving and snorkeling activities on local County economies of Martin, Broward, Palm Beach, Miami-Dade, and Monroe, and for the Florida state economy. As previously noted, this study focuses only on diving and snorkeling related to Southeast Florida reefs, and does not include a broad set of recreation activities as some past studies have. In addition, the scope

and budget for this study did not allow for replicating many of the approaches used in previous research.

Section II. Methods

Overview of Economic Impact Analysis

An Input-Output model (I/O) was used to estimate the economic impacts of Florida reef-related recreation on the state of Florida economy and the five counties that are the focus of this research – Martin, Palm Beach, Broward, Miami-Dade, and Monroe. I/O models are a form of economic analysis based on the interdependencies between economic sectors, and are commonly used to estimate the impacts of a shock to an economy by estimating the ripple effects of the shock throughout all affected industries. In this research, the *shocks* to the economy are the expenditures related to reef-related recreation. The *ripple effects* can be classified as direct, indirect, and induced. *Direct effects* occur when money is spent at retail and service oriented businesses. *Indirect effects* occur when retail and service sectors purchase business supplies from wholesale trade businesses and manufacturers, and pay operating expenditures. These secondary industries, in turn, purchase additional supplies and this cycle of industry to industry purchasing continues until all indirect effects are derived from outside the region of interest (Steinback, Gentner, and Castle 2004). *Induced effects* occur when employees in the direct and indirect sectors make purchases from retailers and service establishments in the normal course of household consumption. The summation of the direct, indirect, and induced multiplier effects represent the total economic effects (impacts) generated from expenditures on an activity (Lovell et al. 2020).

The input-output model used in this report generates different metrics for assessing the contributions to a region’s economy from expenditures on reef-related recreation. The different measures are:

- Output: the gross value of sales by regional businesses affected by an activity
- Labor income: personal income (wages and salaries) and proprietors’ income (income from self-employment)

- Value-added: the contribution made to the gross domestic product (GDP) in a region
- Employment: full-time and part-time jobs supported
- State and local tax: the contribution made to state and local tax base

Employment impacts are measured in terms of number of jobs supported; all other metrics are measured in U.S. dollars. In IMPLAN, a job refers to a position in a business and not necessarily an individual. For example, one person could perform two part-time jobs in a business and IMPLAN would identify that as two jobs. Part-time, seasonal, and full-time jobs are all included in IMPLAN. Additionally, the categories of impacts are not independent and it is important to note that adding them together would result in some double counting of impacts. This report presents the summation of direct, indirect, and induced impacts for each of the metrics above. A breakdown by each metric type can be obtained from the report authors.

All I/O modeling was conducted using IMPLAN (Impact Analysis for Planning) software, a widely accepted software used by federal and state government agencies, colleges and universities, non-profit organizations, corporations, and business development and community planning organizations. The economic data for IMPLAN comes from the system of national accounts for the United States based on data collected by the U. S. Department of Commerce, the U.S. Bureau of Labor Statistics, and other federal and state government agencies. Data are collected for 528 distinct producing industry sectors of the national economy, classified on the basis of the primary commodity or service produced. Corresponding data sets are also produced for each County in the United States, allowing analyses at the county level and for geographic aggregations such as clusters of contiguous counties, individual states, or groups of states. IMPLAN organizes the economy into separate industries and estimates the ripple effects, referred to as multipliers or multiplier effects, of shocks by estimating changes in final demand for one industry on all other industries within a local economic area. Modeling is based on Social Accounting Matrices (SAM) that represent flows of all economic transactions that take place within an economy (regional or national).

Survey Design

The Florida Reef Expenditure Survey was designed primarily to collect information that allows for the estimation of economic impacts associated with expenditures on SCUBA diving and snorkeling on reefs in Southeast Florida, including Martin, Palm Beach, Broward, Miami-Dade, and Monroe Counties. The survey instrument was developed during the period of March 2016 to October 2016. Survey instruments included questions under several broad categories:

- Expenses related to snorkeling and/or diving on Southeast Florida reefs during the past twelve months
- Dive/snorkel trip characteristics
- Past and future behavior patterns related to dive/snorkel trips
- Limited demographic information
- Open-ended comments

Draft instruments were tested using a set of two moderated focus groups, conducted in May 2016 in Southeast Florida. These focus groups were conducted with a sample of the diving and/or snorkeling population in Southeast Florida, recruited through screening questionnaires to select respondents who had taken a dive or snorkel trip to a Florida reef during the last twelve months. The focus groups were used to assess question comprehension and overall survey flow. Each focus group consisted of nine individuals. Based on feedback from focus group participants, the survey instrument was revised and re-tested using nine in-person cognitive interviews, also conducted in Southeast Florida. These interviews were conducted in August 2016 using an online survey instrument and a verbal-protocols approach. A verbal-protocols approach involves the respondent reading and responding to the survey out loud; the interviewer follows-up with discussion on each question as needed. Interview respondents were pre-screened for taking a dive or snorkel trip on a Florida reef during the last twelve months. The survey was revised based on feedback from the in-person interviews.

The final survey instrument consisted of four main sections of questions and a short introductory video (Appendix I). The video was shown prior to beginning the survey, to inform

respondents of the importance of their participation and how the survey results can be used. The first section of the survey asked respondents about the number and location of their Florida reef snorkel and dive trips during the past twelve months, and past and expected future trips. This section also asked about dive and snorkel trips taken to artificial reefs in Florida. The second section of the survey asked respondents about expenses they paid during the last twelve months for durable goods related to diving and snorkeling. Durable goods include items such as masks, snorkels, fins, equipment, etc. (durable good categories were refined extensively in the focus groups and cognitive interviews). In the online survey respondents were asked about expenses paid for these goods in a two-step process. First, respondents marked items they bought during the last year. Next, for only the items checked, they received a follow-up question asking for the amount spent on each item and what percent of the expense was in Florida. This prevented respondents from having to skip or insert a "0" for items they did not purchase. For each expense, respondents were asked to estimate the percentage of the expense that was spent in the state of Florida. Figure 2 shows screen shots of the questions related to durable goods.

Florida Reef Diving and Snorkeling Expenses Survey

Q6. The next question asks about items you have purchased during the last 12 months mainly for the purposes of diving or snorkeling in Florida. Include items you bought for yourself or others, but not items someone else bought for you. Do not include items you rented.

- Mask, goggles, fins, snorkel
- Wetsuit, hood, gloves
- Bathing suit, rash guard, towel, water shoes
- Sunscreen, hat, sunglasses, or other sun protection
- Dramamine or other seasickness medication
- Knife/spear, other gear for spearfishing
- Belt, noodle, other flotation device
- Regulator, BC vest, weight belt, tank
- Dive computer, dive watch
- Books, charts, maps, magazines
- Other (please list)
- Check here if you did not purchase any of these items

Q7. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)	What % of this expense was spent in Florida? (0 - 100%)
Mask, goggles, fins, snorkel	\$ <input style="width: 100px;" type="text" value="Amount"/> .00	<input style="width: 100px;" type="text" value="percentage"/> %
Sunscreen, hat, sunglasses, or other sun protection	\$ <input style="width: 100px;" type="text" value="Amount"/> .00	<input style="width: 100px;" type="text" value="percentage"/> %

Figure 2. Screenshot of survey questions on durable goods and expenditures

The third section of the survey asked respondents specifically about the last dive/snorkel trip they took during the last year, and collected information on the County of trip departure, whether the trip was taken from shore, a private or rented boat, or a paid charter trip, and whether the trip was part of a longer work trip or vacation. Trip-level expenses were also collected. Expense categories were specific to the trip mode and whether the trip was part of a longer trip that included lodging and airfare expenses. Similar to the section on durable good expenses, respondents were only asked about actual expenses they paid for items checked on the first screen. Figure 3 shows an example of expense categories for a charter boat trip. The final section of the survey included three demographic questions (age, gender, and County of residence) and asked for open ended comments.

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Airfare
- Lodging
- Charter trip cost
- Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.
- Tips/gratuities paid to staff
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)
- Check here if you did not purchase any of these expenditures

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)		What % of this expense was spent in Florida? (0 - 100%)
Charter trip cost	\$	Amount .00	percentage %
Air for tank	\$	Amount .00	percentage %
Auto, truck, or RV fuel	\$	Amount .00	percentage %
Tolls	\$	Amount .00	percentage %
Souvenirs, t-shirts, gifts	\$	Amount .00	percentage %

Figure 3. Screenshot of survey questions on trip-level goods and expenditures

Sampling Strategy

The sampling strategy used in this data collection was a two-pronged approach and included a random sample drawn from all registered boaters in Martin, Broward, Palm Beach, Miami-Dade, and Monroe counties and an opportunistic sample that was obtained through collaboration with multiple partners and stakeholder entities (see below). A complete list of registered boater mailing addresses was obtained through the Florida Department of Highway Safety and Motor Vehicles and a random sample was drawn from each County using SAS v9.0 software. Sampling rates by County are provided in Table 1. Sampled boaters were contacted by mail using a postcard that contained brief information about the survey, the survey web

address, and a QR code that linked to the survey via mobile devices (Figure 4). Registered boaters received a single postcard mailing and their survey response data is generally indistinct from data obtained from the opportunistic sample. However, all respondents were asked whether they learned about the survey through a postcard received in the mail, a postcard taken from a retail store, an organizational newsletter, word of mouth, or other. As postcards were only mailed to registered boaters, a cross tabulation could provide a rough estimate for response rates and a feasible, though imperfect, method for analyzing only registered boater data.

Table 1. Sample sizes and number of postcard mailings to registered boaters

County	Total Number of Vessels Registered in 2015 *	Sample size needed for 5% margin of error and 95% CI	Sample size needed assuming a 30% response rate	Percent randomly drawn from total	Number of postcards mailed
Broward	41,201	381	1,270	3%	1,300
Miami-Dade	62,645	382	1,273	2%	1,300
Martin	16,079	375	1,250	8%	1,300
Monroe	25,373	378	1,260	5%	1,300
Palm Beach	37,026	380	1,267	3%	1,300
Totals	182,324	1,896	6,320	21%	6,500

* Does not include commercial vessels

An opportunistic sampling approach was used to contact additional respondents. During the late spring, summer and fall of 2016 project investigators engaged with the scuba certification organizations PADI and NAUI, the Divers Alert Network, the Reef Environmental Education Foundation, the Coral Restoration Foundation, and Divers Direct to describe the goals of the survey and enlist their help with survey distribution. Most of the organizations contacted agreed to assist with the distribution efforts. Divers Direct also agreed to distribute survey postcards identical to the postcards mailed to boaters to customers that came into their stores in Southeast Florida (Figure 4). Three Divers Direct stores were provided with 1,000 postcards each for distribution to patrons. With the assistance of these organizations the survey URL was

distributed to potential divers and snorkelers via in-store postcards, electronic listservs, newsletters, and outreach materials.



Figure 4. Postcard mailed to registered boaters and distributed at Divers Direct stores

Survey Implementation

The survey instrument was programmed for online implementation by ECS-Federal, a federal contracting and management company. As noted above, the instrument contained skip patterns to minimize respondent burden. The introductory video was also programmed into the survey instrument, such that respondents who went to the URL or used the QR code were automatically shown the brief 20 second video before the survey began. Survey eligibility relied on the respondent having taken a dive or snorkel trip to a Florida reef during the last twelve months, and this was the first question asked after the video introduction. Respondents who

stated they had not taken a dive or snorkel trip in this time frame were automatically thanked and directed to the end of the survey.

The postcard mailings were sent to the sample of registered boaters in October 2016. Postcards were also delivered to the three Divers Direct stores in Southeast Florida in October 2016 so they could be distributed to store patrons. During the period of October 2016 to October 2017 the stakeholder organizations listed above publicized the survey effort via various communication methods, primarily newsletters and outreach materials. Though organizations were not asked to keep a detailed report on distribution efforts, all organizations reported that they publicized the survey and the URL multiple times throughout the year. The online survey portal was open from October 3rd 2016 to October 18th 2017.

Calculation of Mean Reef-related Diving and Snorkeling Expenditures

Mean expenditures during the past twelve months for each category of durable and trip-level goods were calculated from the survey data and used as the shock for the I/O model. Outliers in the dataset were removed using the SAS trimmed means procedure, which trimmed 0.01% of each tail of the distribution. This procedure provides more robust estimators of the population mean by reducing the effects of extreme values in the sample, and is standard practice in I/O modeling efforts when extrapolating values from a sample to a larger population. As noted above, for each expense respondents were asked to estimate the percentage of the expense that was made in the state of Florida; only dollars spent within the state are used to compute the mean. For most goods, particularly the trip-level goods, this percentage was 100%. To calculate the mean correctly for I/O models, zeros are used for items that the respondent did not purchase, and these observations are included in the mean.

Respondents who stated they took their most recent trip as part of a longer work or vacation trip were asked how many of the trip days were spent diving and/or snorkeling. This allowed for the adjustment of expenses to a per-dive/snorkel day, and mitigates over-estimating expenditures on diving and snorkeling. The following items were adjusted to per-dive/snorkel

days: auto, truck, or RV fuel; auto, truck, or RV rental; cost of dive or snorkel trip if chartered; tips or gratuities paid to staff; boat fuel or oil; boat rental; airfare; lodging.

Section III. Results and Discussion

Respondent Characteristics

The dataset for snorkelers and divers contains 1,148 individual observations. Of these observations, about 9% stated they took the survey after receiving a postcard in the mail. As these observations represent the sample drawn from registered boaters, 9% represents a crude approximation, and lower bound, for a registered boater response rate. Other methods of hearing about the survey included postcard from a retail store (4%), organizational newsletter (17%), and word of mouth (11%). The remaining respondents, about 59%, did not specify how they heard about the survey. To keep the survey brief and maximize survey responses, only a limited amount of demographic information was collected, including age, sex, and Florida residency. The average age of respondents was 48.2 years, and about 35% of respondents were male. About 45% of the respondents stated that they were Florida residents.

Dive and Snorkel Trip Characteristics

Table 2 provides data on respondents' dive and snorkel trips during the last 12 months. On average, respondents took about 15 dive trips and 3 snorkel trips. As the table indicates, there were more dive trips taken than snorkel trips, and about 27% of respondents took both a dive and a snorkel trip. When dive and snorkel trips are combined, respondents took an average of 19 trips (median 6). Most of the dive/snorkel trips during the last 12 months left from Palm Beach County, followed by Monroe, Broward, Miami-Dade, and Martin Counties.

Table 2. Dive and snorkel trip characteristics

Trip Characteristics	Number	Percent
<i>Dive and snorkel trips in the past 12 months</i>		
Total Dive trips	18,928	14.9
Total Snorkel trips	4,409	3.1
Combined dive/snorkel trips	23,337	18.6
Respondents taking both a dive and snorkel trip	310	27
<i>Dive and snorkel trips leaving from:</i>		
Broward County	5,981	24
Martin County	960	4
Miami-Dade County	2,391	10
Monroe County	6,552	27
Palm Beach County	8,715	35
<i>Most recent trip:</i>		
Most recent trip part of a longer work trip or vacation	241	21
Most recent trip was a paid charter trip	363	32
Most recent trip was from a private/rental boat	229	20
Most recent trip was from shore	130	11
Most recent trip was not specified	426	37
<i>Percent of total trips taken to artificial reefs:</i>		
¼ or less of total trips last year	413	36
¼ to ½ of total trips last year	149	13
½ to ¾ of total trips last year	58	5
¾ or more of total trips last year	92	8
Unknown	436	38
<i>Changes in number of trips compared to past years:</i>		
Increased during past 12 months	458	40
Decreased during past 12 months	92	8
Stayed about the same during past 12 months	226	20
Unsure	18	2
Did not answer	354	30

When asked about their most recent dive or snorkel trip, about 21% of respondents said it was part of a longer vacation, and 32%, 20%, and 11% stated their most recent trip was taken from a paid charter, private/rental boat, and shore, respectively. About 37% of respondents did not

specify the mode of their last trip. Respondents were also asked about the percentage of their total trips that were taken to artificial reefs in Florida, defined in the survey as “sunken boats, planes, or other man-made substrates that attract marine life”. Data in Table 2 suggests that fewer trips are taken to artificial reefs than to naturally occurring reefs.

About 40% of respondents stated that the number of dive and/or snorkel trips taken during the past 12 months had increased compared to previous years; 20% stated the number stayed the same, 8% stated the number had decreased, and 2% stated they were unsure (Table 2).

Respondents stating that the number of trips had decreased were asked a follow up question concerning potential reasons for this decrease, including a change in personal financial circumstances (1%), change in amount of available time (4%), deterioration in reef conditions (3%), deterioration in ocean water quality (2%), move or relocation (<1%), other reason/not specified (90%).

Mean Expenditures

On average, divers and snorkelers from the sample spent \$347 during the last 12 months on durable goods and \$202 on trip-level goods (note again that zeros used for items that the respondent did not purchase during the last 12 months are included in calculating the mean). It is important to note that the mean expenditure per trip (\$202) includes all trip modes, and is calculated as a simple rather than a weighted mean (as a large portion of respondents did not specify their most recent trip mode). In total, the sample of divers and snorkelers spent about \$1.17 million on trip-level and durable goods combined. Total and mean expenditures during the past 12 months for all categories of durable and trip-level goods are reported in Tables 3 and 4.

Table 3. Total and mean expenditures on durable goods (last 12 months).

Expenditure Category	Total Expenditures 2017 US \$	Mean Expenditures per respondent 2017 US \$
Mask, fins, snorkel, goggles,	127,018	48.16
Wetsuit, hood, gloves, booties, dry suit	62,194	54.18
Bathing suit, rash guard, towel, water shoes	45,414	34.79
Sunscreen, hat, sunglasses, or other sun protection	44,879	31.02
Dramamine or other medication for sea sickness	5,564	2.44
Knife, spear, or other gear for spearfishing	37,821	32.95
Belt, noodle, or other flotation device	5,500	2.47
Regulator, BC vest, weight belt, tank, third lung	145,739	126.95
Dive computer, dive watch	106,191	68.57
Dive maps, topo maps, or other navigation maps	20,437	10.31
Parts or service for boat, either private or rented	10,350	5.10
Camera or accessories for underwater photography	65,165	10.05
Underwater compass	250	0.00
Fees for diving courses	9,700	5.84
Dive flags, markers, or buoys	1,070	0.02
Diving flashlight	815	0.36
License fees for spearfishing	53	0.03
TOTAL EXPENDITURES	\$688, 160	
MEAN EXPENDITURES PER RESPONDENT		\$347

Table 4. Total and mean expenditures on trip-level goods (last 12 months).

Category	Total Expenditures 2017 US \$	Mean Expenditures per respondent 2017 US \$
Equipment rental not covered as part of charter trip fee	15,573	8.40
Air or nitrox fills for own tanks	11,939	4.97
Auto, truck, or RV fuel	30,813	18.48
Auto, truck, or RV rental	10,910	3.20
Public transportation such as bus, ferry, taxi	840	0.04
Tolls	6,979	4.11
Site access fees such as parking, state or County parks, ramp fees	6,569	2.91
Food and beverages from stores	64,192	37.58
Food and beverages from restaurants	68,681	43.61
Ice	5832	2.54
Souvenirs, t-shirts, or other gifts	15,763	10.37
Cost of dive or snorkel trip if chartered	131,906	59.53
Tips or gratuities paid to staff	16,158	8.15
Boat fuel or oil	69,509	28.16
Boat rental	5,300	2.88
Airfare	7,562	1.81
Lodging	80,310	45.40
TOTAL EXPENDITURES	\$486,277	
MEAN EXPENDITURES PER RESPONDENT		\$202

Economic Impacts of Diving and Snorkeling

To accurately analyze the economic impacts from expenditures, it was necessary to match the type of expenditure with a corresponding industry or retail sector in IMPLAN. Expenditure categories were allocated to IMPLAN sectors based on the sectoring scheme shown in Appendix II; North American Industry Classification System (NAICS) codes are provided for description of the sector. Expenditure categories that included more than one IMPLAN sector were not

aggregated to avoid the biases associated with aggregating. Instead, the expenditure in the category was distributed to individual IMPLAN sectors based on the proportion of final household demand in each sector in each state. Expenditures on boat and vehicle registrations and licenses and property taxes were allocated across sectors using IMPLAN's State/Local Government Non-Education Institution Spending Pattern database.

Generally, economic impact analyses rely on applying the mean expenditures estimated from a sample to a larger population, to estimate the total amount of spending from the target population. In the present study, however, the target population – all individuals who took a snorkel or dive trip to a South Florida reef during the last year – is undefined, as are the total number of trips taken. Therefore, mean expenditures for each durable good category are multiplied by the number of respondents in the sample (1,148 respondents), and mean expenditures for each trip-level category are multiplied by the number of trips in the sample that left from each of the five counties (shown in Table 2). These figures are then input as shocks to the state- and county-level economies. All economic impacts estimates are calculated in 2017 U.S. dollars with the exception of employment, which represents the number of jobs supported by the activity.

Impacts calculated from the sample are referred to as the “Sample-only Economic Impacts”, and it should be recognized that this represents an extreme lower bound of the economic impacts from reef-related diving and snorkeling on reefs in South Florida. Note that the estimate of impacts to the Florida state economy includes expenditures from both durable and trip-level goods and services, but the individual county impacts include only trip-level expenditures. Because of the nature of most trip-level goods, it is assumed that trip-level expenditures are made relatively close to the point of the trip and thus can realistically create a ripple effect through the county economy. The same assumption is not made for durable goods, which could be purchased throughout (or outside of) the state. Note that the survey instrument asked whether the purchase of a durable good item was made specifically for diving and snorkeling on Southeast Florida reefs and whether the expense was made in the State of

Florida. Sample-only Economic Impacts and the Top Ten Employment Impacts (industries that support the largest number of full and part-time equivalent jobs) are presented in Tables 5 - 8.

Table 5. Sample-only economic impacts of reef-related diving and snorkeling expenditures to State of Florida economy.

Impact Type	Trip-level	Durable Good	Combined
Employment (number of jobs)	101.2	6.2	107.4
Labor Income	3,942,322	249,441	4,191,763
Value Added	6,131,753	393,346	6,525,099
Output	10,582,057	630,965	11,213,022
State/local Tax	642,981	960,131	1,603,089

Table 6. Sample-only top ten industries employment impacts of reef-related diving and snorkeling expenditures – State of Florida.

Industry	Employment (number of jobs)
Retail - Sporting goods, hobby, musical instrument and book stores	43.9
Other support services	20.0
Retail - Miscellaneous store retailers	11.8
Full-service restaurants	9.6
Hotels and motels, including casino hotels	9.1
Limited-service restaurants	8.9
Wholesale trade	8.8
Real estate	8.3
Retail - Electronics and appliance stores	6.9
Retail - Food and beverage stores	5.6

Table 7. Sample-only economic impacts of reef-related diving and snorkeling trip-level expenditures to Broward, Martin, Miami Dade, Monroe, and Palm Beach Counties.

Impact Type	Broward	Martin	Miami Dade	Monroe	Palm Beach
Employment (number of jobs)	21.5	3.5	9.5	24.9	28.8
Labor Income	848,234	109,685	369,303	708,174	1,183,222
Value Added	1,291,598	164,810	561,797	1,132,311	1,761,393
Output	2,163,933	296,661	941,689	2,115,286	2,890,694
State/local Tax	130,709	19,727	54,587	133,169	172,818

Table 8. Sample-only top ten industries employment impacts of reef-related diving and snorkeling expenditures – by County.

Industry	Broward	Martin	Miami Dade	Monroe	Palm Beach
Other support services	4.8	1.0	2.4	7.9	7.0
Hotels and motels, including casino hotels	1.8	0.4	0.9	2.6	2.6
Full-service restaurants	1.8	0.3	0.7	2.0	2.6
Limited-service restaurants	1.8	0.3	0.7	2.0	2.6
Retail - Food and beverage stores	1.2	0.2	0.5	1.3	1.7
All other food and drinking places	1.2	0.2	0.4	1.3	1.7
General and consumer goods rental except video tapes and discs	0.6	0.1	0.2	0.7	0.9
Retail - Sporting goods, hobby, musical instrument and book stores	0.6	0.1	0.7	0.7	0.9
Real estate	0.6	0.1	0.3	0.7	0.9
Wholesale trade	0.6	0.1	0.2		
Retail – Gasoline stores				0.7	0.9

A considerable limitation of this study is the lack of a sampling frame for the target population (all snorkelers/divers who took a trip to a Florida reef during the last 12 months). The study therefore has a limited ability to extrapolate from the sample to obtain the total number of dive/snorkel participants and total trips taken during the last twelve months. As stated above, using trip numbers and participation from only the survey respondents' likely results in under-estimating economic impacts. Two imperfect but plausible suggestions to address this limitation are described below.

Assuming that the number of trips and the number of participants from the sample represents a lower bound, we can simply calculate the additional impacts from additional trips and additional participants. This is possible since I/O models are based on linear relationships among multipliers. For example, the state-level economic impacts for each additional 5,000 trips and each additional 1,000 participants can be calculated, and the county-level impacts can be calculated for each additional 5,000 trips (Tables 9 and 10). As part of this report Microsoft Excel macros have been built to allow the impacts and top ten employment industries to be calculated for any number of additional trips and participants.

Table 9. Economic impacts of reef-related diving and snorkeling expenditures to State of Florida economy for additional trips and participants.

Impact Type	Sample-only Impacts	Impacts per additional 5,000 Trips	Impacts per additional 1,000 Participants
Employment (number of jobs)	107.4	21.7	5.5
Labor Income	4,191,763	844,651	221,136
Value Added	6,525,099	1,313,741	348,711
Output	11,213,022	2,267,227	559,366
State/local Tax	1,603,089	137,760	205,710

Table 10. Economic impacts of additional trips to Broward, Martin, Miami Dade, Monroe, and Palm Beach Counties.

Impact Type	Employment	Labor Income	Value Added	Output	State/local Tax
Broward sample-only	21.5	848,234	1,291,598	2,163,933	130,709
Broward additional 5,000 trips	18.0	709,107	1,079,751	1,809,006	109,270
Martin sample-only	3.5	109,685	164,810	296,661	19,727
Martin additional 5,000 trips	18.2	571,276	858,384	1,545,107	102,745
Miami Dade sample-only	9.5	369,303	561,797	941,689	54,587
Miami Dade additional 5,000 trips	19.9	772,278	1,174,816	1,969,236	114,150
Monroe sample-only	24.9	708,174	1,132,311	2,115,286	133,169
Monroe additional 5,000 trips	19.0	540,426	864,096	1,614,230	101,625
Palm Beach sample-only	28.8	1,183,222	1,761,393	2,890,694	172,818
Palm Beach additional 5,000 trips	16.5	678,843	1,010,553	1,658,459	99,150

A second suggestion is to determine an appropriate estimate of the total number of trips and participants using existing data. While there is no defined frame for individuals who took a dive or snorkel trip to a Southeast Florida reef, the Dive Equipment and Marketing Association (DEMA) has data that can be adjusted to approximate such a frame. In 2013 DEMA estimated that the number of snorkelers in the US was about 11 million and number of scuba divers was about 2.7 million²; in 2013 these two numbers combined (13.7 million) represented about 4.3% of the US population³. Assuming the diving and snorkeling participation rate has been relatively

² <https://c.ymcdn.com/sites/www.dema.org/resource/resmgr/imported/Diving%20Fast%20Facts-2013.pdf>

³ <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

stable over the past four years, this participation rate of 4.3% can be applied to the population aggregate of the five-County area (6,395,760 individuals⁴) to estimate the total participation for the five-county region: 275,018 individuals.

Multiplying this participation estimate (275,018) by the median number of dive and snorkel trips from the sample (6) results in a total of 1,650,108 trips for the five county region. Using the distribution for trip departures obtained from the sample (see Table 2), Table 11 shows what the total number of trips from each county would be using the DEMA-based approach. Mean expenditures on durable and trip-level goods obtained from the sample are applied to the trip and participation estimates to calculate state and county-level economic impacts. Economic impact results using these trip and participation estimates are presented in Tables 12 and 13.

Table 11. Mean trip expenditures and DEMA-derived trip numbers for diving and snorkeling.

	Broward	Martin	Miami Dade	Monroe	Palm Beach	State of Florida
Mean Trip Expenditures	202	202	202	202	202	202
Mean Durable Expenditures	--	--	--	--	--	347
Number of Trips Using DEMA-derived participation	429,029	66,004	165,011	462,030	610,540	1,650,108

⁴ <https://www.census.gov/quickfacts/fact/table/fl/PST045217>

Table 12. Economic impacts of reef-related diving and snorkeling expenditures to State of Florida economy using DEMA-derived participation.

Impact Type	Trip-level	Durable Goods	Combined
Employment (number of jobs)	7,155	1,512	8,668
Labor Income	278,752,921	60,816,243	339,569,164
Value Added	433,562,766	95,901,857	529,464,622
Output	748,233,984	153,835,719	902,069,703

Table 13. Economic impacts of reef-related diving and snorkeling trip-level expenditures to Broward, Martin, Miami Dade, Monroe, and Palm Beach Counties using DEMA-derived participation.

Impact Type	Broward	Martin	Miami Dade	Monroe	Palm Beach
Employment (number of jobs)	1,544	241	656	1,756	2,015
Labor Income	60,845,493	7,541,305	25,486,882	49,938,559	82,892,100
Value Added	92,648,855	11,331,353	38,771,521	79,847,609	123,396,545
Output	155,223,207	20,396,651	64,989,113	149,164,491	202,511,112

Caveats and Limitations

There are two changes to the survey that, in hindsight, would improve the precision of the data related to diving and snorkeling. First, the mean and median number of trips taken during the last twelve months is likely high because the survey only included those divers and snorkelers who actually took a trip during the last 12 months. At the beginning of the survey, those respondents who had not taken a dive or snorkel trip to a Southeast Florida reef during the last 12 months were directed to the end of the survey but their responses were not stored in the dataset. However, it is expected that there are divers and snorkelers who participate in the activity but did not take a trip in the last year, and thus should be counted in the participation

estimate but not in the trip number estimate. Ultimately, keeping the respondents who snorkel or dive on Southeast Florida reefs but did not take a trip during the last year would likely improve the participation estimate and reduce the mean and median number of trips. Further, a question that asked respondents for the mode of their last snorkel or dive trip should have been required to allow for more refined expenditure-by-mode estimates. This was not done in order to minimize the respondent's cognitive burden and potential frustration, which can ultimately lead to not completing the questionnaire. However, in retrospect requiring a response to the trip mode question would likely have increased the accuracy of the economic impact estimates.

As previously noted, the largest limitation related to the diving and snorkeling economic impact calculation is the lack of a target population, and consequently, no estimates for total participation and total trips taken. In this report two, approaches were employed to address this limitation; however, both are imperfect. To better address this limitation requires, at minimum, a large-scale survey that targets both visitors and county residents, which was beyond the available resources of this study and would likely suffer from some level of sampling and aggregation issues itself. Given that, we believe that the DEMA report provides reasonable estimates on which to generate trips and participation for each County, and suggest that, in light of all limitations discussed, the economic impacts from diving and snorkeling based on DEMA figures be viewed as an upper bound.

Section IV. Conclusions

This economic impact analysis has estimated that expenditures associated with reef related snorkeling and diving contribute to Florida's local economy. The estimates presented here are based on the diving and snorkeling expenditures of 1,148 respondents over a 12-month period. Based on the data, the expenditures from the respondents generated approximately 107 jobs and contributed \$11 million to the Florida economy over the 12-month period. The economic impacts for each county were also estimated and results show that Martin and Miami-Dade Counties accounted for the lowest levels of direct employment and economic impact over the

time period. Palm Beach County registered the highest economic impact and jobs supported. When aggregated to a larger population level (estimated from DEMA), approximately 8,668 jobs are supported \$902 million is generated in economic output over the course of a year.



This economic impact assessment intentionally focused only on reef-related recreational diving and snorkeling expenditures in five Southeast Florida Counties (Martin, Palm Beach, Broward, and Miami-Dade Monroe). The lower bound estimates of reef-related diving and snorkeling impacts are based on a sample of 1,148 snorkelers and divers; additional estimates presented here are based on aggregation strategies and should represent an upper bound.

Notwithstanding the limitations related to sampling frame and the procedure used to identify reef-related recreational diving and snorkeling expenditures, the results presented here show that reef-related recreational expenditures contribute substantially to local Southeast Florida economies and the State of Florida.


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Appendix I. Florida Reef Expenditure Online Survey Instrument



Florida Reef Diving and Snorkeling Expenses Survey



NOAA is conducting a survey to determine the economic impacts

Questions?

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Start the Survey



Florida Reef Diving and Snorkeling Expenses Survey

This survey is about your expenses associated with snorkeling and diving on reefs in Florida. In the survey the term 'reefs' refers to coral reefs that occur naturally in Florida and artificial reefs (such as sunken boats, planes, or other man-made substrates that attract marine life).

In the survey you can hover over any text in blue for an explanation of the term.

Q1. During the last 12 months did you take a saltwater dive or snorkel trip to a Florida reef?

The term 'trip' simply means the last time you went diving or snorkeling on a Florida reef. A trip could be a paid excursion, diving or snorkeling from a private boat or a rented boat, or diving or snorkeling from shore.

- Yes
- No
- I am unsure

Q2. About how many saltwater dive or snorkel trips did you take to Florida reefs during the last 12 months? (If you don't remember the exact number of trips you took please estimate)

1 Dive trips

1 Snorkel trips

Q3. On average, has the number of saltwater dive or snorkel trips you take per year to Florida reefs:

- Increased during the last 5 years
- Decreased during the last 5 years
- Stayed about the same during the last 5 years
- I am unsure

Q3A. What are the primary reasons the number of saltwater dive or snorkel trips you take per year to Florida reefs has decreased? (Check all that apply)

- Change in personal financial circumstances
- Change in amount of time available to dive or snorkel
- Deterioration in reef conditions
- Deterioration in ocean water quality
- Move or relocation
- Other

Q4. About what percentage of your saltwater dive or snorkel trips taken in Florida during the last 12 months were to artificial reefs?

1 % I am unsure

Q5. About how many of the dive and snorkel trips that you took in Florida during the last 12 months left from each of the following counties: (write a "0" if none of your trips left from that county)

Martin county 1 I am unsure

Palm Beach county 1 I am unsure

Broward county 1 I am unsure

Miami-Dade county 1 I am unsure

Monroe county 1 I am unsure



Next



Florida Reef Diving and Snorkeling Expenses Survey

Q6. The next question asks about items you have purchased during the last 12 months mainly for the purposes of diving or snorkeling in Florida. Include items you bought for yourself or others, but not items someone else bought for you. Do not include items you rented.

- Mask, goggles, fins, snorkel
- Wetsuit, hood, gloves
- Bathing suit, rash guard, towel, water shoes
- Sunscreen, hat, sunglasses, or other sun protection
- Dramamine or other seasickness medication
- Knife/spear, other gear for spearfishing
- Belt, noodle, other flotation device
- Regulator, BC vest, weight belt, tank
- Dive computer, dive watch
- Books, charts, maps, magazines
- Other (please list)
- Check here if you did not purchase any of these items

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Florida Reef Diving and Snorkeling Expenses Survey

Q7. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)	What % of this expense was spent in Florida? (0 - 100%)
Mask, goggles, fins, snorkel	\$ Amount .00	percentage %
Wetsuit, hood, gloves	\$ Amount .00	percentage %
Bathing suit, rash guard, towel, water shoes	\$ Amount .00	percentage %
Sunscreen, hat, sunglasses, or other sun protection	\$ Amount .00	percentage %
Dramamine or other seasickness medication	\$ Amount .00	percentage %
Knife/spear, other gear for spearfishing	\$ Amount .00	percentage %
Belt, noodle, other flotation device	\$ Amount .00	percentage %
Regulator, BC vest, weight belt, tank	\$ Amount .00	percentage %
Dive computer, dive watch	\$ Amount .00	percentage %
Books, charts, maps, magazines	\$ Amount .00	percentage %
Other Item	\$ Amount .00	percentage %

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Florida Reef Diving and Snorkeling Expenses Survey

The next questions are about your MOST RECENT saltwater dive or snorkel trip to a Florida reef.

Q8. From what city in Florida did your dive or snorkel trip leave?

I am unsure

Q9. Was your most recent trip a

- Dive trip
- Snorkel trip

Q10. Was your most recent trip taken from:

- A charter boat
- A private/rented boat
- Shore, no boat was involved in the trip

Q11. Was your most recent trip part of a longer vacation or work trip involving one or more nights away from home?

- Yes
- No

Q11a. How many nights did you spend away from home on your vacation/work trip?

nights



Q11b. How many days did you spend diving or snorkeling on your vacation/work trip?

days

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If Q10 answer is “a charter boat” and Q11 answer is “yes”:



Florida Reef Diving and Snorkeling Expenses Survey

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Airfare
- Lodging
- Charter trip cost
- Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.
- Tips/gratuities paid to staff
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)
- Check here if you did not purchase any of these expenditures

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Florida Reef Diving and Snorkeling Expenses Survey

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)	What % of this expense was spent in Florida? (0 - 100%)
Airfare	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Lodging	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Charter trip cost	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Air for tank	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Auto, truck, or RV fuel	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Auto, truck, or RV rental	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Public transportation (taxi, bus, ferry, etc.)	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Tolls	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Site access fees (parking fees, state or county park fees, ramp fees, etc.)	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Food and beverages from stores	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Food and beverages from restaurants	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Ice	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Souvenirs, t-shirts, gifts	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %
Something else	\$ Amount <input type="text"/> .00	percentage <input type="text"/> %

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If Q10 answer is “a charter boat” and Q11 answer is “no”:



Florida Reef Diving and Snorkeling Expenses Survey

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Charter trip cost
- Equipment rental that was not included in trip cost
- Tips/gratuities paid to staff
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)
- Check here if you did not purchase any of these expenditures

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Florida Reef Diving and Snorkeling Expenses Survey

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)	What % of this expense was spent in Florida? (0 - 100%)
Charter trip cost	\$ Amount .00	percentage %
Equipment rental that was not included in trip cost	\$ Amount .00	percentage %
Tips/gratuities paid to staff	\$ Amount .00	percentage %
Auto, truck, or RV fuel	\$ Amount .00	percentage %
Auto, truck, or RV rental	\$ Amount .00	percentage %
Public transportation (taxi, bus, ferry, etc.)	\$ Amount .00	percentage %
Tolls	\$ Amount .00	percentage %
Site access fees (parking fees, state or county park fees, ramp fees, etc.)	\$ Amount .00	percentage %
Food and beverages from stores	\$ Amount .00	percentage %
Food and beverages from restaurants	\$ Amount .00	percentage %
Ice	\$ Amount .00	percentage %
Souvenirs, t-shirts, gifts	\$ Amount .00	percentage %
Other one	\$ Amount .00	percentage %

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If Q10 answer is “a private/rented boat” and Q11 answer is “yes”:



Florida Reef Diving and Snorkeling Expenses Survey

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Airfare
- Lodging
- Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.
- Air for tank
- Boat fuel/oil
- Boat rental
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)
- Check here if you did not purchase any of these expenditures

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Florida Reef Diving and Snorkeling Expenses Survey

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.



If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)		What % of this expense was spent in Florida? (0 - 100%)	
Airfare	\$	Amount	.00	percentage %
Lodging	\$	Amount	.00	percentage %
Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.	\$	Amount	.00	percentage %
Air for tank	\$	Amount	.00	percentage %
Boat fuel/oil	\$	Amount	.00	percentage %
Boat rental	\$	Amount	.00	percentage %
Auto, truck, or RV fuel	\$	Amount	.00	percentage %
Auto, truck, or RV rental	\$	Amount	.00	percentage %
Public transportation (taxi, bus, ferry, etc.)	\$	Amount	.00	percentage %
Tolls	\$	Amount	.00	percentage %
Site access fees (parking fees, state or county park fees, ramp fees, etc.)	\$	Amount	.00	percentage %
Food and beverages from stores	\$	Amount	.00	percentage %
Food and beverages from restaurants	\$	Amount	.00	percentage %
Ice	\$	Amount	.00	percentage %
Souvenirs, t-shirts, gifts	\$	Amount	.00	percentage %
Other	\$	Amount	.00	percentage %

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If Q10 answer is “a private/rented boat” and Q11 answer is “no”:



Florida Reef Diving and Snorkeling Expenses Survey

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.
- Air for tank
- Boat fuel/oil
- Boat rental
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)
- Check here if you did not purchase any of these expenditures



Florida Reef Diving and Snorkeling Expenses Survey

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.



If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)	What % of this expense was spent in Florida? (0 - 100%)
Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.	\$ Amount .00	percentage %
Air for tank	\$ Amount .00	percentage %
Boat fuel/oil	\$ Amount .00	percentage %
Boat rental	\$ Amount .00	percentage %
Auto, truck, or RV fuel	\$ Amount .00	percentage %
Auto, truck, or RV rental	\$ Amount .00	percentage %
Public transportation (taxi, bus, ferry, etc.)	\$ Amount .00	percentage %
Tolls	\$ Amount .00	percentage %
Site access fees (parking fees, state or county park fees, ramp fees, etc.)	\$ Amount .00	percentage %
Food and beverages from stores	\$ Amount .00	percentage %
Food and beverages from restaurants	\$ Amount .00	percentage %
Ice	\$ Amount .00	percentage %
Souvenirs, t-shirts, gifts	\$ Amount .00	percentage %
Other	\$ Amount .00	percentage %

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If Q10 answer is “shore, no boat was involved in the trip” and Q11 answer is “yes”:



Florida Reef Diving and Snorkeling Expenses Survey

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Airfare
- Lodging
- Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.
- Air for tank
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)

Check here if you did not purchase any of these expenditures

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Florida Reef Diving and Snorkeling Expenses Survey

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)	What % of this expense was spent in Florida? (0 - 100%)
Airfare	\$ Amount .00	percentage %
Lodging	\$ Amount .00	percentage %
Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.	\$ Amount .00	percentage %
Air for tank	\$ Amount .00	percentage %
Auto, truck, or RV fuel	\$ Amount .00	percentage %
Auto, truck, or RV rental	\$ Amount .00	percentage %
Public transportation (taxi, bus, ferry, etc.)	\$ Amount .00	percentage %
Tolls	\$ Amount .00	percentage %
Site access fees (parking fees, state or county park fees, ramp fees, etc.)	\$ Amount .00	percentage %
Food and beverages from stores	\$ Amount .00	percentage %
Food and beverages from restaurants	\$ Amount .00	percentage %
Ice	\$ Amount .00	percentage %
Souvenirs, t-shirts, gifts	\$ Amount .00	percentage %
Other	\$ Amount .00	percentage %

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If Q10 answer is “shore, no boat was involved in the trip” and Q11 answer is “no”:



Florida Reef Diving and Snorkeling Expenses Survey

Q12. The next question asks about expenditures related to your most recent saltwater dive or snorkel trip to Florida reefs. Please check the items below that you bought for yourself or others, but not items someone else bought for you.

- Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.
- Air for tank
- Auto, truck, or RV fuel
- Auto, truck, or RV rental
- Public transportation (taxi, bus, ferry, etc.)
- Tolls
- Site access fees (parking fees, state or county park fees, ramp fees, etc.)
- Food and beverages from stores
- Food and beverages from restaurants
- Ice
- Souvenirs, t-shirts, gifts
- Other (please list)
- Check here if you did not purchase any of these expenditures

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Florida Reef Diving and Snorkeling Expenses Survey

Q13. For the items that you checked, please indicate the amount you spent, and the percentage of the expense that was in Florida.

If you don't remember the exact amount please provide your best estimate.

Item	amount spent (Round to the nearest dollar)		What % of this expense was spent in Florida? (0 - 100%)	
Equipment rental such as mask, fins, snorkel, wetsuit, regulator, tank, BC vest, etc.	\$	Amount	.00	percentage %
Air for tank	\$	Amount	.00	percentage %
Auto, truck, or RV fuel	\$	Amount	.00	percentage %
Auto, truck, or RV rental	\$	Amount	.00	percentage %
Public transportation (taxi, bus, ferry, etc.)	\$	Amount	.00	percentage %
Tolls	\$	Amount	.00	percentage %
Site access fees (parking fees, state or county park fees, ramp fees, etc.)	\$	Amount	.00	percentage %
Food and beverages from stores	\$	Amount	.00	percentage %
Food and beverages from restaurants	\$	Amount	.00	percentage %
Ice	\$	Amount	.00	percentage %
Souvenirs, t-shirts, gifts	\$	Amount	.00	percentage %
Other	\$	Amount	.00	percentage %

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Florida Reef Diving and Snorkeling Expenses Survey

Q14. Are you

- Male
- Female

Q15. In what year were you born?

Q16. Are you a resident of Florida?

- Yes
- No

Q16A. In what county do you reside?

Q17. How did you receive your invitation to complete this survey?

- Received a postcard in the mail with link to survey
- Took a postcard from a dive or snorkel shop that had survey link
- Received the survey link through a listserv, newsletter, or electronic mail
- Heard about the survey from someone else and went to the link on my own
- Other

**Thank you very much for your participation in this survey.
Please use the space below to add any additional comments you have.**

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Appendix II. IMPLAN Scoring Scheme

Expenditure Category	IMPLAN Sector	NAICS Code and Description
Mask, fins, snorkel, goggles	382, 385	goggles 339115, scuba diving equipment manufacturing 339920
Wetsuit, hood, gloves, booties, dry suit	385, 132	booties 316210, scuba diving equipment manufacturing 339920, wet suit manufacturing 339920
Bathing suit, rash guard, towel, etc...	125 – 128, 113,116, 120,132	bathing suits (315190, 315210, 315220, 315240), towels (313210, 313240, 314120), water shoes 316210
Suns protection	182,382,126	sunscreen 325620, sunglasses 339115, hats 315210
Medication	174	medicine manufacturing 325412
Knife, spear, spearfishing gear	235,385	knife manufacturing 332215, scuba diving equipment manufacturing 339920
Belt, noodle, or other flotation device	385	scuba diving equipment manufacturing 339920
Regulator, BC vest, weight belt, etc...	385	scuba diving equipment manufacturing 339920
Dive computer, dive watch	322,315	watches 334519, nautical systems manufacturing 334511
Dive maps, topo maps, etc...	154	maps 323111
Parts or service for boat	508,396	boat repair 811490, boat replacement parts 441222
Camera/accessories	273	cameras 333316
Underwater compass	315	nautical instrument manufacturing 334511
Fees for diving courses	474	scuba instruction 611620
Dive flags, markers, or buoys	239, 123	buoys 332313, flags 314999
Diving flashlight	326	flashlights 335129
License fees for spearfishing	State/local gov't	
Equipment rental (mask, fins, etc...)	443	Recreational Goods Rental 532284
Air/nitrox fills for own tanks	404	Diving Equipment Stores 451110 (Air and Gas Compressor Manufacturing 333912)
Auto, truck, or rv fuel	156	Petroleum Refineries 324110
Auto, truck, or rv rental	442	Car rental 532111
Public transportation	412	Transit 485
Tolls	State/local gov't	
Site access fees	512	Parking garages/lots 812930
Food and beverages from stores		PCE Vector NIPA1111-food purchased for off-premise consumption
Food and beverages from restaurants	501-503	Restaurants 72251
Ice	107	Ice manufacturing 312113
Souvenirs, t-shirts, gifts	404	Diving equipment stores 451110
Cost of dive or snorkel trip if chartered	470	Diving services on a contract or fee basis 561990
Tips or gratuities paid to staff	5001	Labor Income change
Boat fuel or oil	156	Petroleum Refineries 324110
Boat rental	443	Pleasure Boat Rental 532284
Airfare	408	Airfare 481111
Lodging	499	Hotels/motels 721110

Gina Raimondo, Secretary
United States Department of Commerce

Benjamin Friedman, Acting Under Secretary
National Oceanic and Atmospheric Administration

Nicole R. LeBoeuf, Acting Assistant Administrator
National Ocean Service

