

2016



# **Indian River Lagoon Economic Valuation Update**

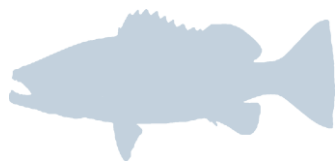
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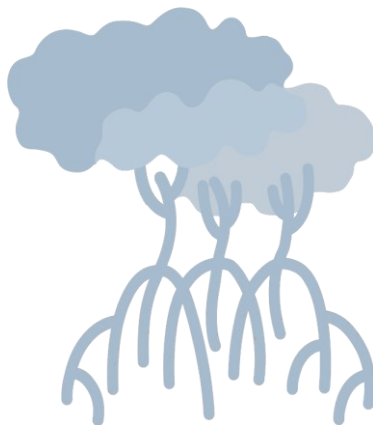
## Preface

Florida's regional planning councils (RPCs) are dedicated to increasing awareness and education of their member local governments statewide to foster better decision-making and bring together necessary public and private sector constituencies to solve regional problems. Their members include a wide range of local elected officials, governor appointees from the private business sector and academia, and ex-officios from economic development, transportation, environmental and water management organizations.

The East Central Florida Regional Planning Council (ECFRPC) was formed by its local governments in 1962. The Treasure Coast Regional Planning Council (TCRPC) was established in the same manner in 1976. Together the two regions include 11 counties and 126 municipalities, occupying a territory of over 9,729 square miles with a combined population of 5,467,614. These regions also include the six counties that contain the 156-mile long Indian River Lagoon – a national ecologic and economic treasure.

These regional planning councils have been long-focused on regional ecosystem restoration efforts and serve as clearinghouses for information, education, legislation, and policy related to critical coastal and environmental resource issues facing the region. The RPCs stand with their congressional and state legislative delegations, responsible governmental jurisdictions, and the dozens of local, regional, and statewide grass-roots organizations focused on restoration of the Everglades, Indian River and Lake Worth lagoons and St. Lucie and Caloosahatchee river ecosystems.

In 2015, the Florida Department of Economic Opportunity (FDEO) funded the ECFRPC to produce an updated economic contributions analysis for the Indian River Lagoon (IRL). ECFRPC worked closely with TCRPC to accomplish the update. The effort represents a tremendous opportunity for the region to quantify, not only the annualized economic contribution of this nationally significant estuary, but more importantly, what is at stake economically if the ecosystem collapses. The authors and contributors of the study recognize the vital role of a healthy IRL, not just to the region's economic vitality, but as the foundation of its extraordinary quality of life. Copies of this report are available for viewing and download on the RPC's websites: [www.ecfrpc.org](http://www.ecfrpc.org) and [www.tcrpc.org](http://www.tcrpc.org).





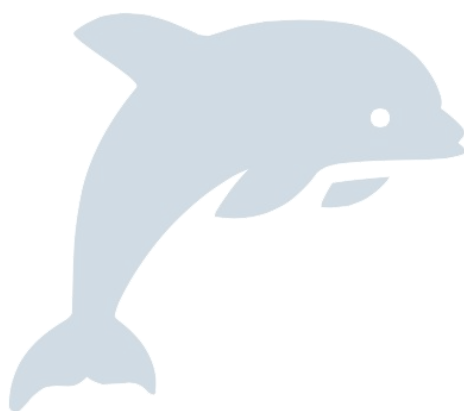
## Foreword

In May of 2015, the ECFRPC and TCRPC entered into discussions with FDEO and subject matter experts regarding a methodology to update and refine economic contributions data and analyses related to the IRL. Previous studies were evaluated, which included the 1996 IRL National Estuary Program's Economic Assessment and Analysis, Hazen and Sawyer's 2008 update of the Indian River Lagoon Economic Assessment and Analysis, and Florida Ocean Alliance's 2013 Florida's Oceans and Coasts Report. Additional discussions to further refine the scope were held among the group, including staff members from the IRL National Estuary Program, Florida Inland Navigation District, Water Management District, Tampa Bay Regional Planning Council, and Florida Fish and Wildlife Conservation Commission, along with private sector economic consultants. The budget was limited and the goal was to find a relatively inexpensive, reliable, and repeatable method for valuing the regional economic contributions of the IRL.

Ultimately, the group decided on a methodology similar to what was used to produce the statewide economic contributions analysis published in the 2013 Florida's Oceans and Coasts report by the Florida Ocean Alliance. This report used a reliable and repeatable set of employment and market data for quantifying the value of economic activity attributable to productive estuarine and nearshore coastal systems in Florida. Unlike the Florida's Oceans and Coasts report, the IRL Economic Valuation Update focuses only on the IRL's economic contributions to the IRL region, which includes all of coastal Brevard, Indian River, St. Lucie, and Martin counties and portions of Volusia and Palm Beach counties.

The team of twelve subject matter experts from various environmental and economic disciplines were also assembled to review the drafts of the report (Appendix 2). This report is the result of that collaborative effort.

The intent of this report is to establish a repeatable and cost-efficient method for estimating the direct, indirect, and induced economic values attributable to the IRL. Quantifying these values and the IRL's total annual economic contributions, serves to emphasize the region's economic interdependence with the IRL and the importance of restoration efforts to sustain its health and productivity.



## Acknowledgments

The ECFRPC and TCRPC gratefully acknowledge the support of FDEO for funding this important effort documenting the value of annual economic contributions of the IRL. Special thanks to Beth Frost, FDEO contract administrator, and her reminders about deadlines. Also, special thanks to Barbara Lenczewski, James Stansbury and George Foster for their expertise, constant words of encouragement, and their assistance in obtaining the release of proprietary North American Industry Classification System (NAICS) code data. A personal thank you to Kathie Hughes, Program Manager for the Bureau of Labor Statistics at FDEO, for preventing the authors from breaking state laws related to the public release of confidential NAICS code data. Special thanks to Tara McCue of ECFRPC, contract manager, for her timely administration of all the contract modifications necessary to complete the project on time and within budget. The RPCs would like to extend special appreciation to the subject matter experts for volunteering their time and for their constructive suggestions to improve the scope, methodology, and final report. They include:

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A special thanks to our economic consulting team of Tom Lavash, Tom Moriarity, and James Stover of the firm WTL+a for their assistance in refining the scope, their professionalism, and their personal commitment to a successful project. Finally, thank you to the authors of the Florida's Oceans and Coasts report whose finished work inspired the methodology for this report. The project managers and primary authors of this report are Michael J. Busha and Peter G. Merritt of TCRPC.



## **Acronyms**

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BMAP	Basin Management Action Plan
ECFRPC	East Central Florida Regional Planning Council
FDEO	Florida Department of Economic Opportunity
FFWCC	Florida Fish & Wildlife Conservation Commission
IMPLAN	IMpact Analysis for PLANing Model
IRL	Indian River Lagoon
LMS	Bureau of Labor Market Statistics
NAICS	North American Industry Classification System
NOAA	National Oceanographic and Atmospheric Administration
QCEW	Quarterly Census of Employment and Wages Program
RIMS II	Regional Input/Output Modeling System
ROI	Return on Investment
RPC	Regional Planning Council
TCRPC	Treasure Coast Regional Planning Council
TDT	Tourism Development Tax
TMDL	Total Maximum Daily Load
VFR	Visiting Friend and Relatives



## Executive Summary

This report illustrates the link between the IRL region's economy and the IRL. Completing this economic analysis expands and updates various sections of three earlier economic studies: Economic Assessment and Analysis of the Indian River Lagoon, January 1996; Indian River Lagoon Economic Assessment and Analysis Update, August 2008; and Florida's Oceans and Coasts: An Economic and Cluster Analysis, May 2013. Other key objectives of the update are to: 1) estimate Total Annual Economic Output attributable to the five main IRL-related coastal industry groups (Living Resources; Marine Industry; Recreation and Visitor-related; Resource Management; and Defense & Aerospace); and 2) establish a repeatable and valid process for analyzing and reporting the economic value of these five main coastal industry groups for the IRL region.

This economic analysis was accomplished primarily by using the latest 2014, six-digit NAICS code data and measuring economic impacts through the IMPLAN Regional Economic Input/Output Model. The IMPLAN model estimates direct impacts (employment and spending), indirect impacts (secondary effects of spending through incomes generated by relevant industries), and induced impacts (indirect spending by employees). For example, a boat dealer would be compensated (direct impact), might own a house (indirect impact) and may spend money dining out, which would generate economic activity through income for cooks and servers in restaurants (induced impacts). IMPLAN incorporates a series of algorithms to calculate direct, indirect, and induced impacts that ripple through the economy.

### *Study Area*

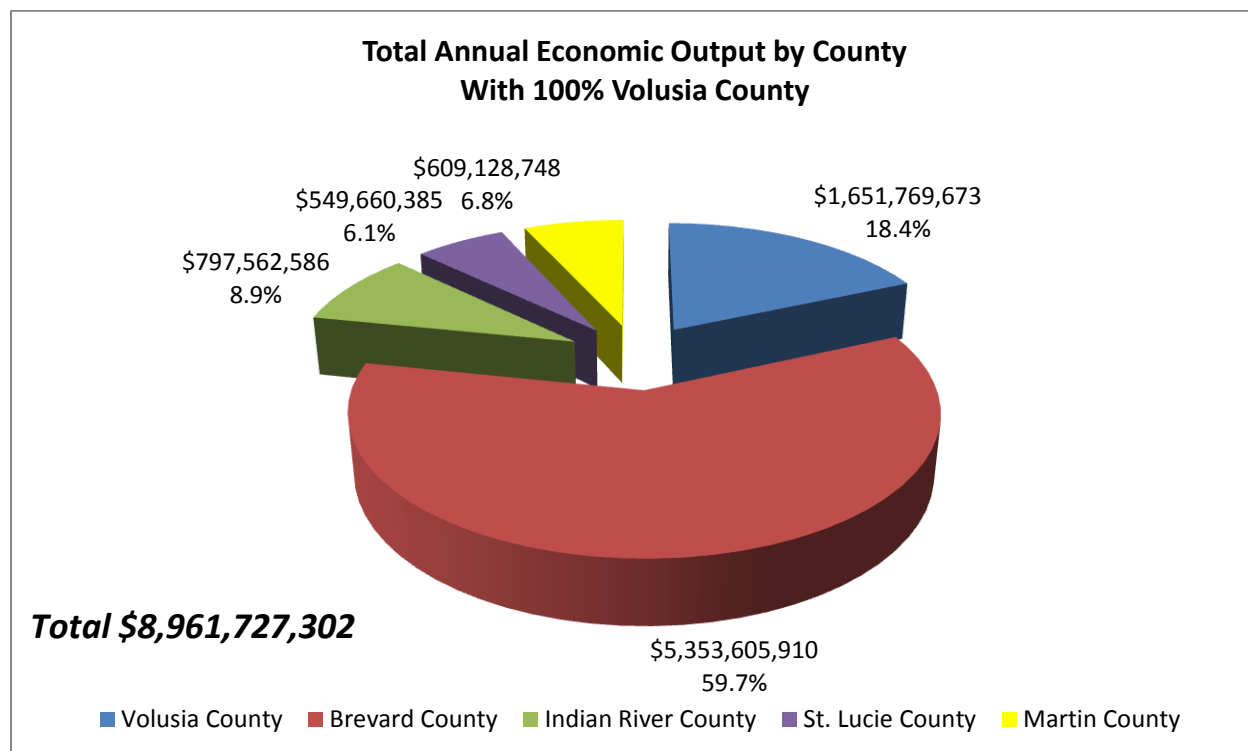
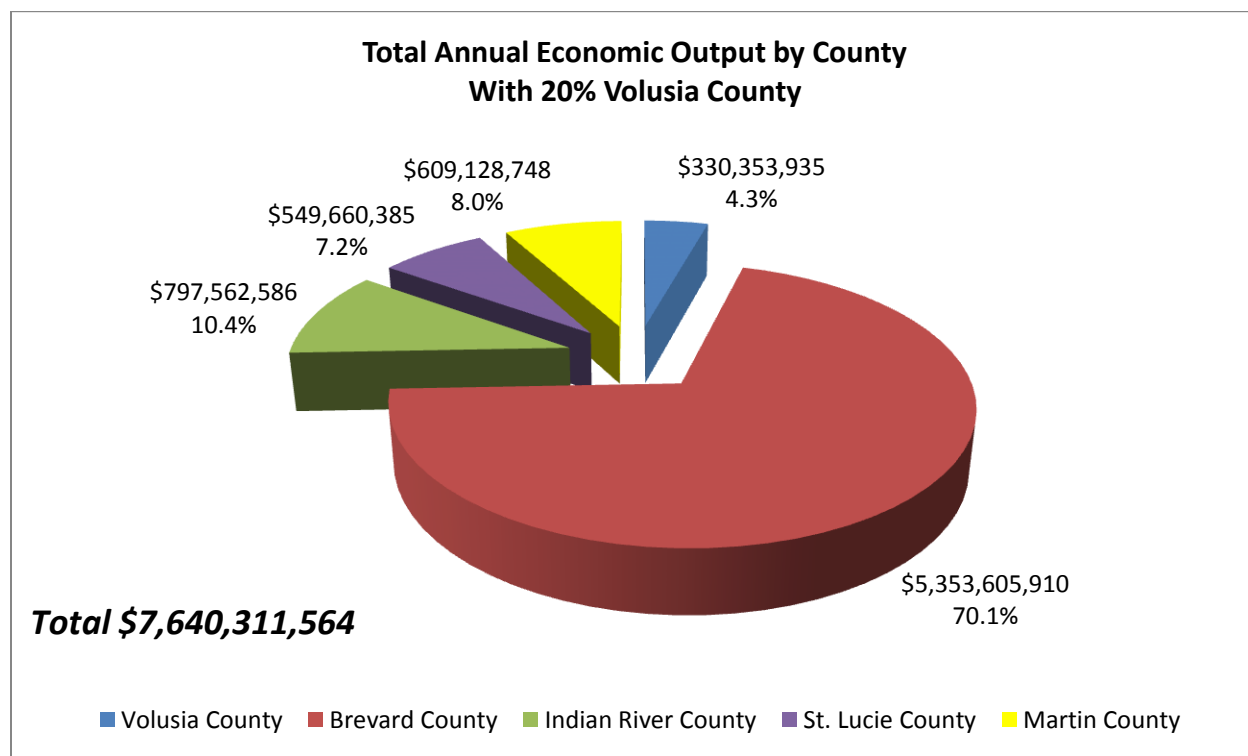
The study area for this report extends from the Ponce de Leon Inlet in Volusia County to the Jupiter Inlet in northern Palm Beach County, completely traversing Brevard, Indian River, St. Lucie, and Martin counties. Economic data sets used in this analysis represent the year 2014. These include countywide information on IRL-related economic drivers for Brevard, Indian River, St. Lucie and Martin counties. Even though the Ponce de Leon Inlet divides the north-south distance of Volusia County in approximately half, only about 20 percent of Volusia County's coastal population is adjacent to the IRL system. Approximately 80 percent of Volusia County's coastal population is adjacent to the Halifax River Lagoon, which extends north from the Ponce de Leon Inlet. Therefore, this report relies on the assumption that only 20 percent of the total economic output of Volusia County are attributable to the IRL. Also, the IRL's economic contribution to Palm Beach County was not included in this report. This was because broad countywide data could not be disaggregated, and only a small fraction of countywide economic output totals are attributed this portion of the study area.

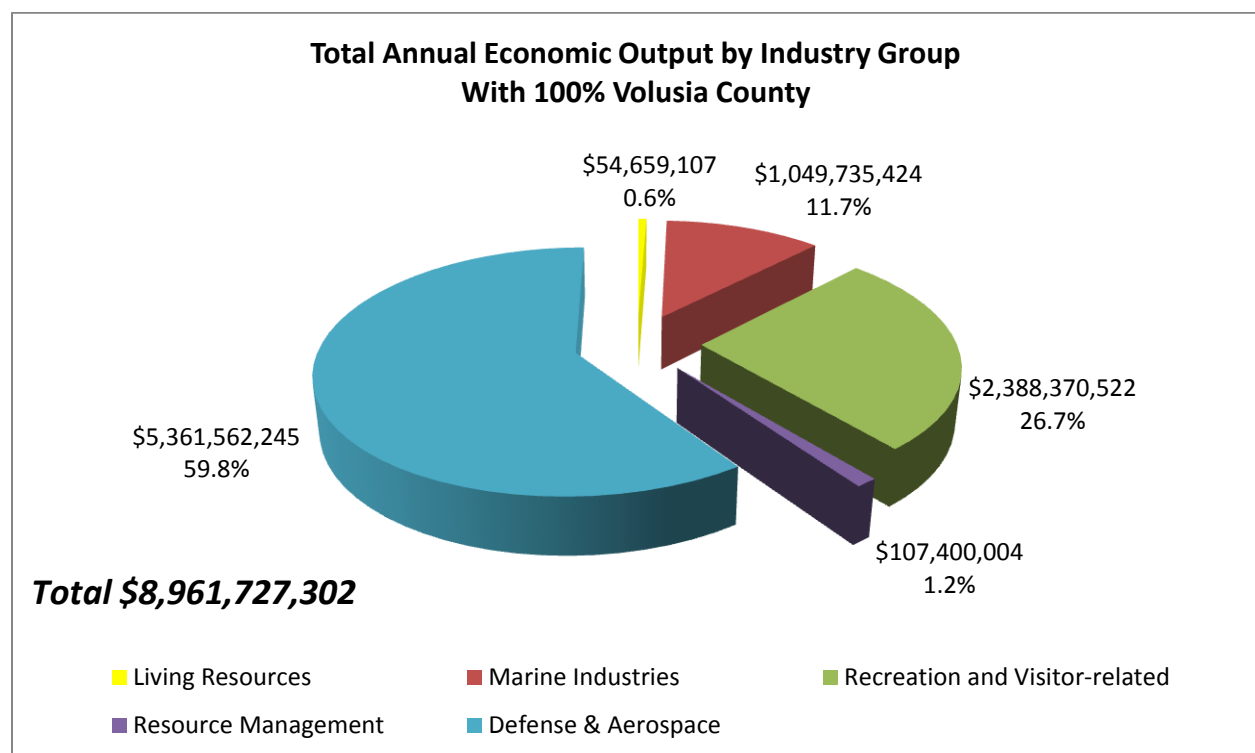
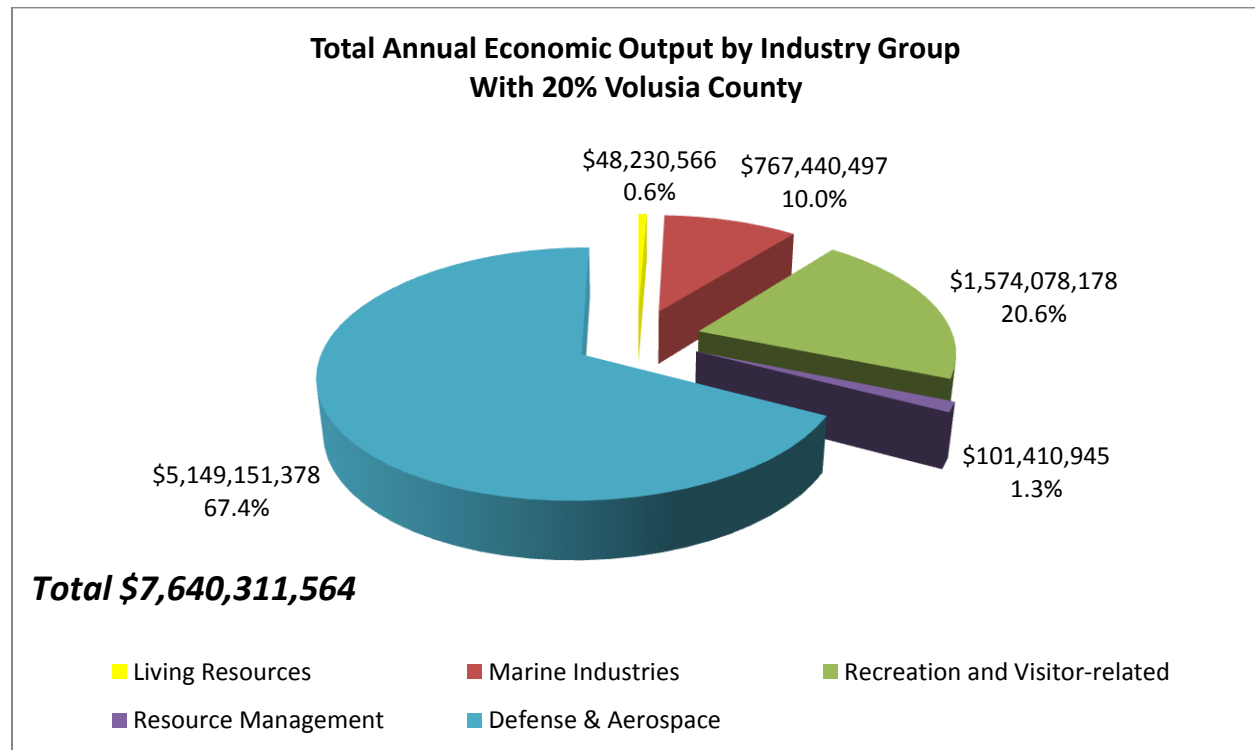
### *Just How Valuable is the Indian River Lagoon?*

Overall the total annual economic output or value received from the IRL in 2014 is about **\$7.6 billion**. This does not include the estimated **\$934 million** in annualized real estate value added for property located on or near the IRL (Hazen and Sawyer 2008). Also not included are the economic contributions from estuarine-related resources in Volusia County north of the Ponce de

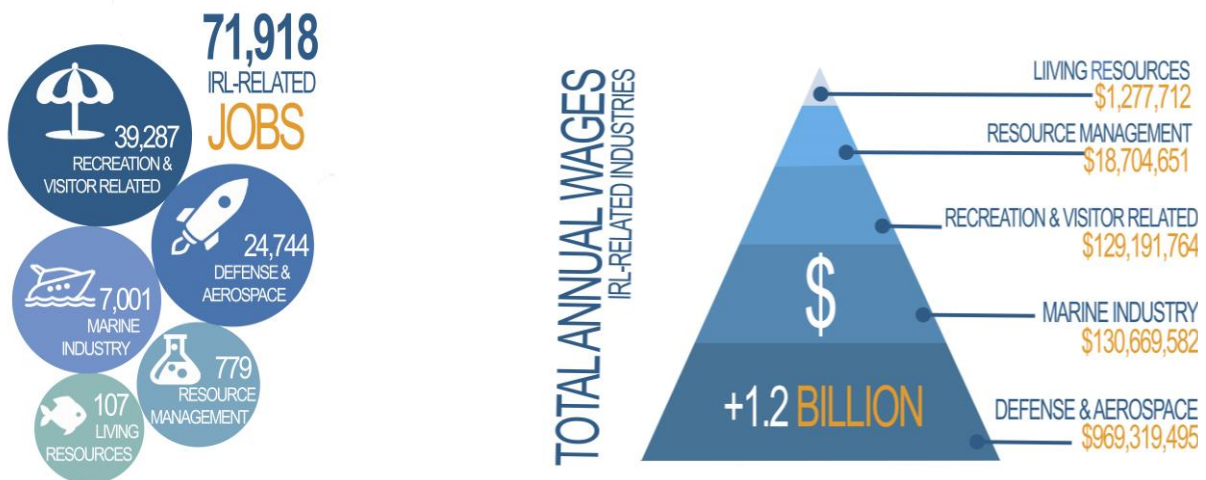


Leon Inlet. If both of these economic contributions are considered, the total annual economic output is valued at about **\$9.9 billion**.

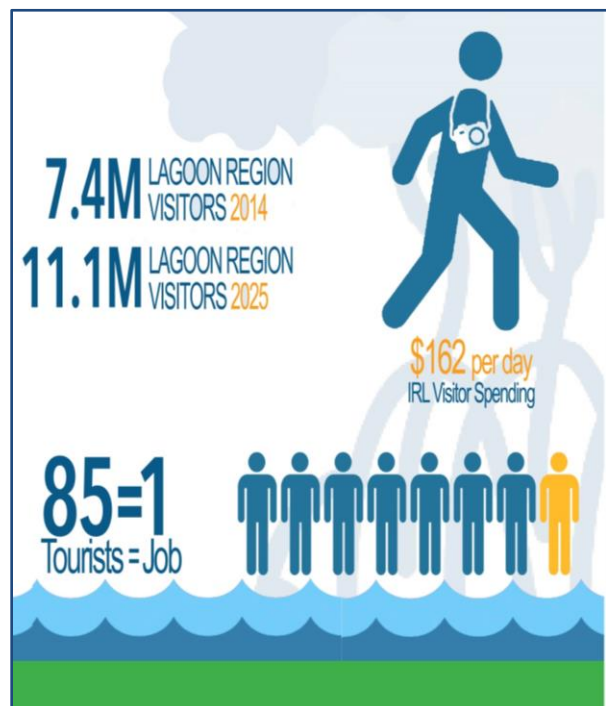




The five main IRL-related industry groups are categorized as Living Resources, Marine Industries, Recreation and Visitor-related, Resource Management and Defense & Aerospace. These industry groups, which are directly influenced by the IRL, support nearly **72,000 jobs** annually with annual wages of more than **\$1.2 billion**. Total annual income (labor and proprietor's) for IRL-related industry groups is around **\$2.6 billion**.



Recreation and visitor-related activity related to the IRL contributes around **\$1.57 billion** annually to the IRL region's economy. In 2014, the IRL region attracted over **7.4 million** visitors. Previous studies have estimated that annually, between 31 to 46 percent or 2.3 - 3.5 million of the region's visitors participate in IRL-related recreation. By 2025, the IRL region is expected to receive over **11 million** visitors annually. All things being equal, this would equate to between 3.4 - 5.1 million visitors annually looking to participate in IRL-related recreation. Today, each visitor to the IRL region spends about **\$162** a day. For every **85** visitors to the IRL-region, one job can be expected to be created.



### ***Cost of a Sustainable Indian River Lagoon-Based Economy and the Region's Return on Investment***

Enhancing water quality, increasing habitat, providing additional points of access, and implementing other best management practices to improve the IRL can generate thousands of new jobs and increase the value and output of the IRL-based economy. This presumes state and local plans to improve the IRL's health and productivity are implemented and continue to be successful in the future. Implementing these plans will require a long-term commitment of time and funding.

One way to estimate how much it will cost annually and cumulatively over time to achieve a sustainable IRL, is to estimate the cost of implementing the adopted Basin Management Action Plans (BMAPs) for the IRL region. There are four BMAPs covering the IRL region. Each contains nutrient load reduction goals intended to establish a sustainable IRL in the future.

TCRPC and ECFRPC (2015) estimated it would cost **\$4.6 billion** to accomplish the required nutrient load reductions in all four of the BMAPs. By this measure, and with efforts extended over a 20 year period, it would require an annual investment of **\$230 million** to sustain an IRL-based economy. When comparing this average annual cost to the IRL's total average annual economic output of **\$7.6 billion**, the Return on Investment (ROI) from a sustainable IRL is **33 to 1**. Or, for every dollar spent on achieving a sustainable IRL, the lagoon returns **\$33** in total economic value. Over the years, as the IRL improves in health and productivity, annual ROI in the future can be expected to increase.



Based on the estimated 2015 population of the IRL counties, the annual cost per person to accomplish the nutrient load reduction goals in the four IRL-related BMAPs equates to about **\$140**. If this is divided equally among IRL-county households, each would pay around **\$334** a year, or about **\$28** a month. The 1996 Economic Assessment and Analysis of the IRL found that 1000 IRL households polled said they would be willing to pay an additional \$60 a year to support IRL improvement programs. The 2008 update of this study found that 50 percent of the 985 IRL households polled would be willing to pay a one-time tax of \$20 to improve the lagoon, with about 27 percent of the respondents willing to pay a one-time tax of \$400.

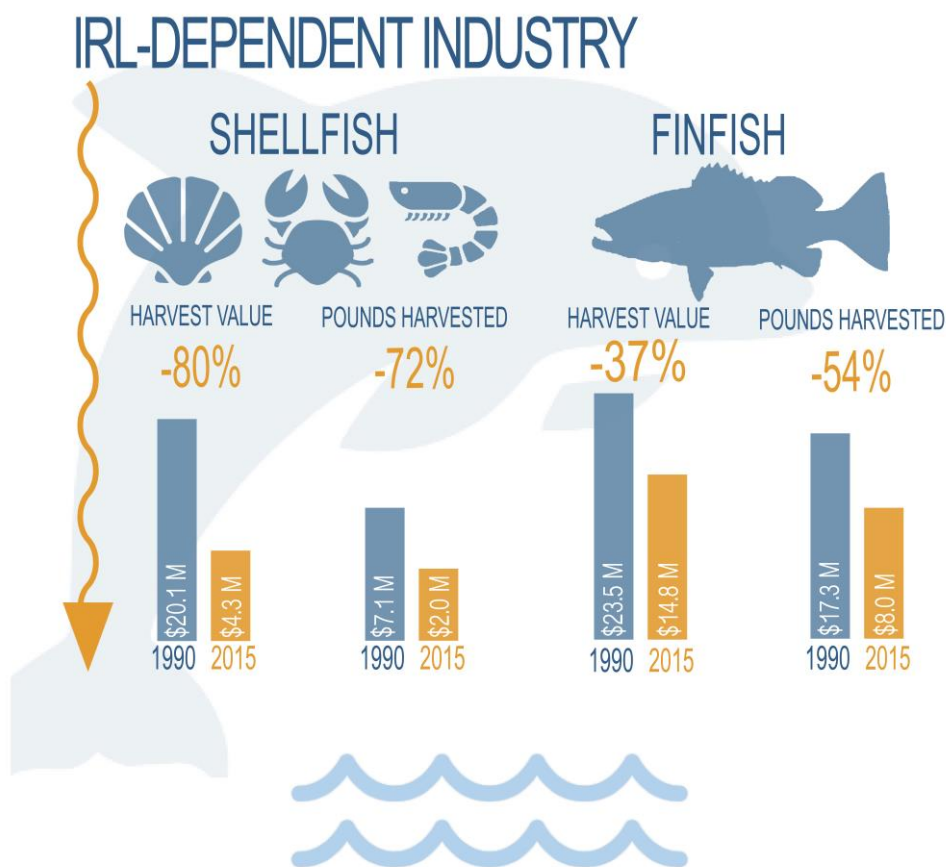
The cost calculations outlined above assume that IRL residents will bear the full cost of BMAP implementation. This is not likely to be the case. Floridians outside the IRL region will contribute to state water quality improvement programs and water management district projects through state sales taxes and federal income taxes redistributed to the IRL region in the form of state and federal assistance. American and foreign tourists will also offset some local implementation costs through sales and other special taxes levied on local goods and services

that may flow to state water quality improvement programs. In addition, use of Land Acquisition Trust Fund monies may also offset the cost of BMAP-related water quality improvement projects for the lagoon.

### ***An Indian River Lagoon-Dependent Industry in Decline***

Commercially harvested clams, oysters, crabs and shrimp were worth \$12.6 million at the docks in 1994. Adjusted for inflation, this 1994 amount is \$20.1 million in 2015 dollars. The overall value of the commercial clam, oyster, crab, and shrimp harvest for 2015 is \$4.3 million – a decline of nearly 80 percent. Pounds of shellfish harvested have also declined during about that same period, from 7.1 million pounds to 2 million pounds, or almost 72 percent. IRL counties showing the sharpest decline in value and pounds harvested were Volusia, Brevard and Martin.

The commercial fin fishery fared a little better, but still showed significant declines in value and pounds landed. In 1990, the estimated value of commercial fin fish landed was worth \$13 million. Adjusted for inflation, this 1990 amount is \$23.5 million in 2015 dollars. The overall value of the commercial fin fish harvest for 2015 is estimated at \$14.8 million – a decline of 37 percent. Pounds of fin fish landed also declined during that same period, from 17.3 million pounds to 8 million pounds or almost 54 percent. IRL counties showing the sharpest declines in value and pounds harvested are Brevard, Indian River, and Martin counties.

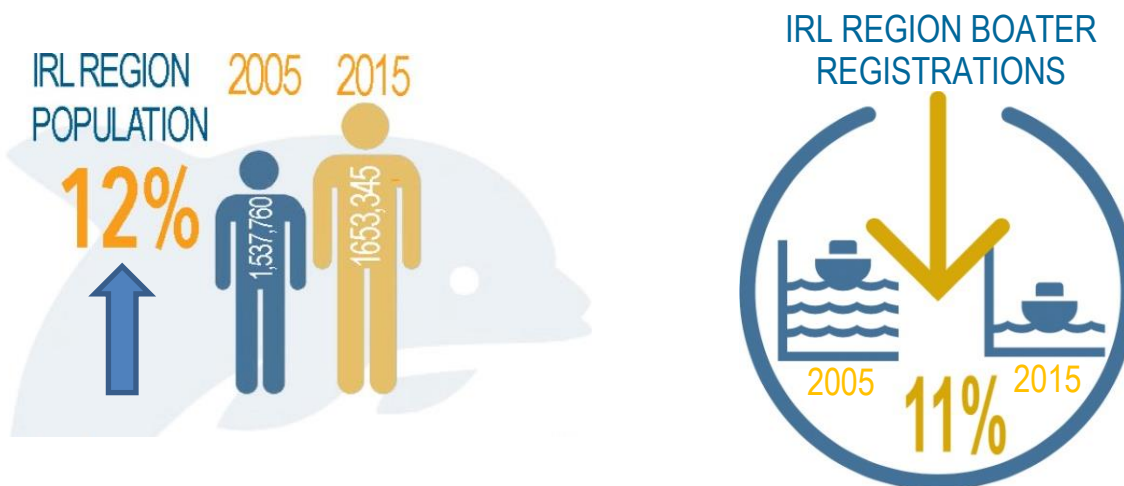




### ***Indian River Lagoon Region Boat Registrations Declining***

One indicator of the environmental health and economic productivity of the IRL is the increase or decrease in boat registrations over time. Increased access and use of the lagoon by boats for fishing and other outdoor lagoon-based activities has an economic impact on retail, lodging, marine industry and food and beverage sectors, and also on sales tax, fuel tax, boat registration fees and fishing license revenues.

A declining trend in boat registrations for the IRL region has been observed in the last decade. While the IRL region's population has increased by 12 percent, boat registration has decreased by 13,045 or by 11 percent since 2005. Much of the decline has been for boats in the 12-39-foot range with boat registrations in the 40 foot and larger class remaining relatively flat. The sharpest declines in boat registrations have occurred in Brevard, Volusia and St. Lucie counties.



### ***Conclusion***

This economic valuation update is not a status report on the IRL's environmental health or how to address human-related impacts affecting its long-term sustainability. The report simply serves to measure the economic values the IRL region stands to lose if it does not eliminate regional and local environmental inputs that are degrading the health and productivity of this estuary of national significance.

The IRL and nearshore coastal resources are significant contributors to the region's strong economy and extraordinary quality of life. Sustaining the IRL is important to the region's economic recovery, expanding opportunities within the five main industry groups, recruiting new industry sectors and talent, and sustainable growth. The health and sustainability of the IRL will be a key determinant in the future of the region's economy, public health and other natural, cultural, and societal values that are collectively worth far more than what has been quantified in this report.

## IRL-RELATED INDUSTRY GROUPS



## Introduction

The IRL is a shallow, navigable estuary where saltwater from the Atlantic Ocean mixes with freshwater from surrounding lands, canals, and natural tributaries. The IRL is contained within six counties along Florida's east coast between a chain of barrier islands and the mainland. It extends over 156 miles from the Ponce de Leon Inlet in Volusia County, to the Jupiter Inlet in Palm Beach County. This seagrass-based ecosystem supports an abundant collection of plants and animals and is considered to be the most biologically diverse estuary in North America.

The importance of sustaining the biologic and economic productivity of the lagoon is nationally recognized. In setting national priorities, which advocate balancing economic contributions of the nation's estuaries with the protection of these environments, Congress established the National Estuaries Program in 1987 and designated the IRL an estuary of national significance in 1990. For the counties that make up the IRL region, the regional connection and balance between a healthy lagoon and a strong economy is equally important.

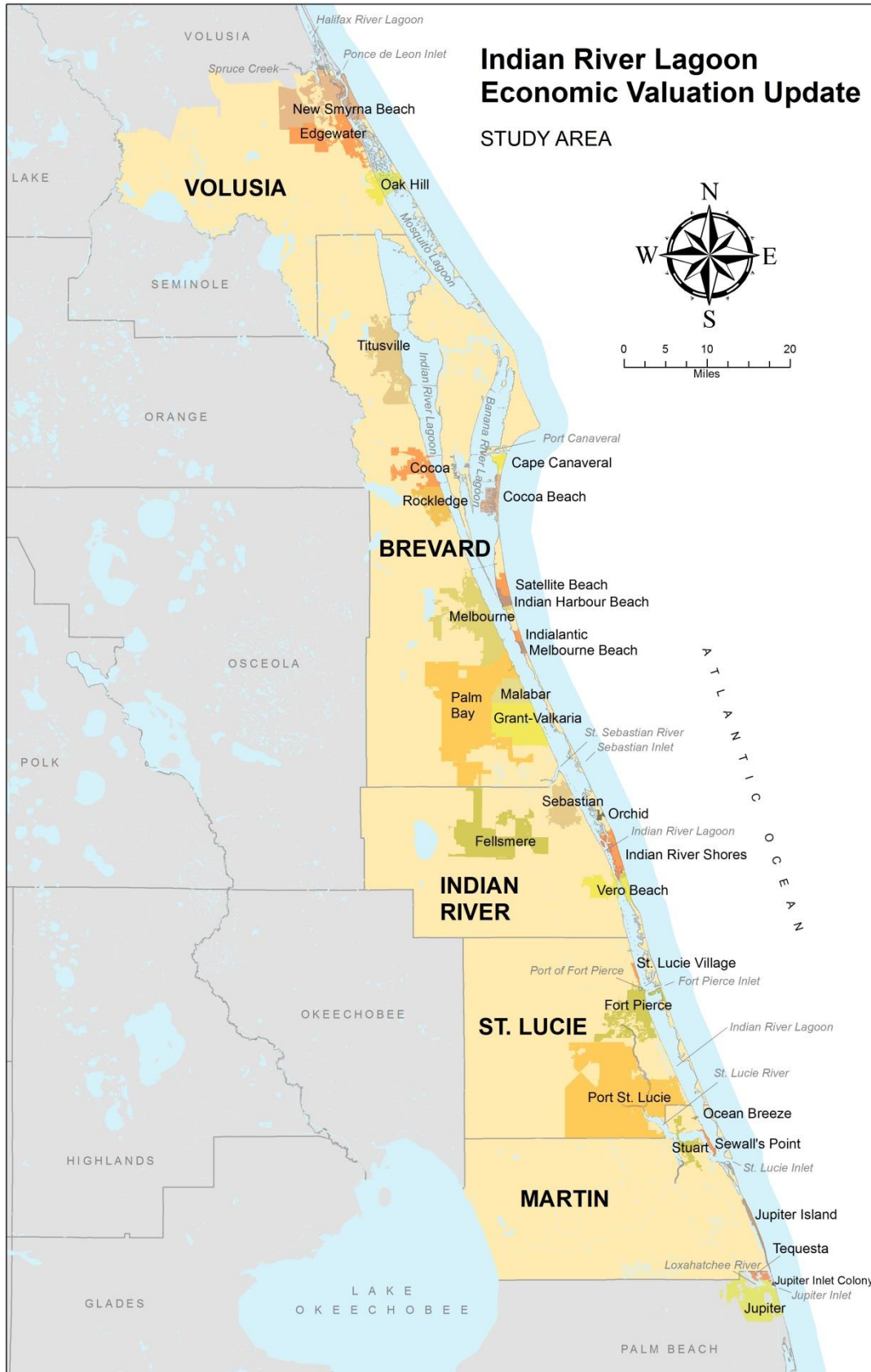
Over 7.4 million tourists were attracted to visit the IRL region last year. This number is expected to grow to 11 million by 2025. The IRL region's resident population in 2015 is estimated to be around 1.5 million. By 2025, that population is expected to grow to nearly 1.9 million. In 2015, more than 1.1 million residents or just over 76 percent of the IRL region's population lived within a few miles of the lagoon. This estuarine environment not only fuels a coastal industry-based economy worth an estimated **\$7.6 billion** annually, but contributes directly to the region's appeal and extraordinary quality of life.

### *Purpose of the Study*

The purpose of the study is to: 1) establish the economic value and contribution of the IRL to the economies of the coastal counties that comprise the IRL region; 2) highlight the connection between a healthy IRL ecosystem and the region's economy; and 3) identify missing or incomplete data sets that could be used to improve future economic valuation studies of the IRL system.

The study achieves this purpose by providing a regional update of the statewide economic contributions analysis published in the 2013 Florida's Oceans and Coasts report by the Florida Ocean Alliance. This report used a reliable and repeatable set of employment and market data for quantifying the general value of economic activity statewide attributable to productive estuarine and nearshore coastal systems in Florida. Unlike Florida's Oceans and Coasts report, this economic analysis focuses only on the IRL's economic contributions to the IRL region, which includes all of coastal Brevard, Indian River, St. Lucie, and Martin counties and portions of Volusia and Palm Beach counties.

The Florida's Oceans and Coasts report primarily used 2010 and 2011 data. The year 2014 was identified as the "target year" for data and analysis for this update as some employment information categories were not yet available for all of 2015. Year 2014 data provides the most recent and accurate year-long information for the economic contributions analysis.



Key objectives of the study are to: 1) estimate Total Annual Economic Output attributable to the IRL by measuring the direct, indirect, and induced impacts through the IMPLAN Regional Economic Input/Output Model; and 2) establish a repeatable and valid process for analyzing and reporting economic value and contributions of the main traditional coastal industry groups for the IRL using the best available data.

The IMPLAN model includes direct impacts (employment and spending), indirect impacts (secondary effects of spending through incomes generated by relevant industries for housing, etc.), and induced impacts (indirect spending by employees). For example, a boat dealer would be compensated (direct impact), might own a house (indirect impact) and may spend money on dining out, which would generate economic activity through income for cooks and servers in restaurants (induced impacts). IMPLAN incorporate a series of algorithms to calculate direct, indirect and induced impacts that ripple through the economy.

IMPLAN is a computer model that is the national standard for measuring a region's or county's economic activity in terms of sales, income, employment, and tax revenue. In comparison, the Florida's Oceans and Coasts report used the US Bureau of Economic Analysis (BEA) Regional Input/Output Modeling System (RIMS II) to measure broad statewide economic values. It was determined that IMPLAN provided the most detailed and robust econometric model for the regional study. As such, it may not be possible to make direct comparisons of the values and results provided by category and industry group between these two studies.

Similar to the Florida's Oceans and Coasts report, the focus of the economic contributions analysis is based on main traditional coastal industry groups: 1) Living Resources; 2) Marine Industries; 3) Recreation and Visitor-related; and 4) Resource Management. Relevant economic data was collected and geo-coded for these industry sectors by the BEA which are organized under the NAICS. This is the standard classification system used by business and government to categorize economic activity. The 2014 six-digit NAICS code data were used in this effort to further assure that economic contribution data is directly related to the IRL system.

In addition, economic data and analyses were provided for the industry group known as Defense & Aerospace. This industry group was included as an economic contributor because the study considered the economic contribution of this group, particularly around the Cape Canaveral/Cape Kennedy Space Center, to be directly dependent on the geography, climate, and exclusive waterfront locations provided by the IRL. The total annual regional economic contribution of this group alone is estimated to be **\$5.1 billion**.

One of the major economic values related to IRL, which is not analyzed in the Florida's Oceans and Coasts report or this study, is the value premium for waterfront real estate, both commercial and residential, attributable to the IRL. The scope and budget for this economic impact study did not allow for collection and analysis of the thousands of properties along the 156-mile length of the lagoon.

Previous studies that examined real estate values and economic contributions attributable to real property located on or near the IRL include the Apogee Research Inc. (1996) and Hazen and Sawyer (2008). Hazen and Sawyer's study estimated the total increase in property values



attributed to being on or near the IRL is about **\$47 billion**. The study estimated the \$47 billion represented 22 percent of the 2006 market value of all real property in the five-county IRL region. It further estimated the regional annualized contribution to real estate values attributable to the IRL is about **\$934 million**.

Further emphasizing the direct link between a clean and healthy IRL and a strong IRL regional economy is the Florida Realtor's 2015 study on the Impact of Water Quality on Florida Home Values. It estimated for Martin County, that an increase in water clarity (i.e. a one-foot increase in average annual \*Secchi disk depth) raises aggregate property values by 10.32 percent or **\$428 million**. The study further suggests the inverse -- that a one-foot decline in average annual Secchi disk depth results may be associated with similar size losses in aggregate property values.

The overall outputs of this economic valuation update study are as follows:

1. Economic Contribution by Industry
2. Economic Contribution by County
3. Employment in the Indian River Lagoon Regional Economy
4. Total Economic Contribution, Including Indirect and Induced Effects

In addition, this update examines the following elements of the IRL economy:

1. Cost of a Sustainable Indian River Lagoon Economy
2. Return on Investment from a Sustainable Indian River Lagoon
3. Commercial Shellfish and Finfish Industry Contribution and Trends
4. Boat Registration Trends
5. Missing or Incomplete Data Sets

### ***Study Area***

The geographic limits of the study area and the extent of data to be collected and used for the economic valuation analysis extend from the Ponce de Leon Inlet in Volusia County to the Jupiter Inlet in northern Palm Beach County, completely traversing Brevard, Indian River, St. Lucie, and Martin counties. As a result, economic data sets used in this analysis included countywide information on water-related economic drivers for Brevard, Indian River, St. Lucie, and Martin counties. However, this report relies on different assumptions for Volusia and Palm Beach counties. Even though the Ponce de Leon Inlet divides the north-south distance of Volusia County in approximately half, analysis of the population of Volusia coastal municipalities indicates only about 20 percent of this population is adjacent to the IRL system (Exhibit 1). Eighty percent of the population of Volusia County coastal municipalities is adjacent to the Halifax River Lagoon, which extends north from the Ponce de Leon Inlet. Therefore, this report relies on the assumption that only 20 percent of the economic contribution of Volusia County is attributed to the economy of the IRL. Also, the IRL's economic contribution to Palm Beach County was not included in this report. This was because broad countywide data could not be

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\* A Secchi Disk measures visible depth into the water.

disaggregated, and only a small fraction of the countywide economic output totals are attributed to this portion of the study area.

<b>Exhibit 1</b>		
<b>Population of Coastal Municipalities In Volusia County</b>		
<b>Municipalities Associated with Indian River Lagoon</b>	<b>Population</b>	<b>Percent</b>
Edgewater	20,958	
New Smyrna Beach	24,285	
Oak Hill	1,869	
<b>Subtotal</b>	<b>47,112</b>	<b>20%</b>
<b>Municipalities Associated with Halifax River Lagoon</b>		
Daytona Beach	63,534	
Daytona Beach Shores	4,263	
Flagler Beach (part)	60	
Holly Hill	11,712	
Ormond Beach	40,013	
Ponce Inlet	3,047	
Port Orange	58,656	
South Daytona	12,538	
<b>Subtotal</b>	<b>193,823</b>	<b>80%</b>
<b>Total</b>	<b>240,935</b>	<b>100%</b>
<i>Source: Bureau of Economic and Business Research, University of Florida, Florida Estimates of Population 2015</i>		

One of the key objectives of the study was to establish a repeatable and valid process for analyzing and reporting economic contributions of the main traditional coastal industries for the IRL region. The structure of the report is intended to be standardized enough to be easily replicable in the future. The concept was that these types of regional industry-based impact analyses might be repeated regularly in order to monitor the positive and negative economic impacts associated with different lagoon-related economic drivers, and subsequently compare patterns, differences and causal effects of outside forces such as water quality, commercial and recreational fishing productivity, boat sales and registration, real estate values, etc.

## Methodology

This study methodology is intended to instruct an economic valuation and contributions analysis for the IRL region. Using a reliable and repeatable set of employment and market data, the methodology defines a process for quantifying the value of economic activity attributable to the IRL which includes all of coastal Brevard, Indian River, St. Lucie, and Martin counties and a portion of Volusia and Palm Beach counties.

Many of the findings and conclusions of the analysis rely on data that are only defined on a countywide basis, and are not disaggregated for sub-areas of the counties. Because it was not possible to disaggregate the Palm Beach County portion of the study area, and only a small fraction of the countywide economic output totals are attributed to the IRL, Palm Beach County information was not included. In addition, only a portion of Volusia County, south of the Ponce de Leon Inlet, was included in the value and contributions analysis (Exhibit 1).

Key objectives of the methodology are to: 1) establish a repeatable and valid process for analyzing and measuring the economic contributions of the main traditional coastal industry groups for the IRL region using the best available data; and 2) estimate Total Annual Economic Output for the IRL region by measuring the direct, indirect, and induced economic impacts through the IMPLAN Regional Economic Input Output Model. IMPLAN stands for IMPact Analysis for PLANing. It is a computer model which allows the user to measure a region's or county's economic activity terms of sales, income, employment, and revenues. IMPLAN is the national standard and most detailed econometric model for regional analyses of this type.

Five main industry groups were selected for economic analysis. These included: 1) Living Resources; 2) Marine Industries; 3) Recreation and Visitor-related; 4) Resource Management; and 5) Defense & Aerospace. Relevant economic data was collected and geo-coded for these industry groups by the BEA, which are organized under the NAICS codes. This is the standard classification system used by business and government to generate statistical data and categorize the economic activity related to the U.S. business economy. A number of customary data sources were consulted as part of the demographic and economic analysis for this project. However, only NAICS data on 2014 employment in relevant industry sectors for each county were utilized in the IMPLAN economic impact model. NAICS data were provided by the FDEO, Bureau of Labor Market Statistics (LMS), Quarterly Census of Employment and Wages (QCEW) Program. The NAICS code data provided by FDEO, LMS, QCEW included confidential information and is not provided as part of this report. All other data and analysis is included in Appendix 1.

The methodology for developing current estimates of the Total Annual Economic Output for the IRL system are described in the procedure outlined below:

1. Estimate number of covered wage and salary workers based on datasets from FDEO, LMS, QCEW, which reports number of establishments (reporting units), total employment and total (average annual) wages in the selected NAICS codes.
2. Convert estimates of average annual wages and salaries into estimates of employee compensation by multiplying the ratio of employee compensation to wages and salaries

countywide based on BEA wage and salary data. This conversion accounts for allowances related to employer contributions to social security, employee pension and insurance (i.e., fringe benefits).

3. Convert estimates of employee compensation to Total (Labor) Earnings, for each IRL county by selected industry (NAICS codes), using the BEA estimates of labor earnings above.
4. Apply ratio of Total (Labor) Earnings to employee compensation in selected NAICS codes, by industry for each county. This adjustment will reflect earnings of independent contractors or self-employed to employee compensation in these industries.
5. Apply ratios of Total Annual Economic Output to Total Annual (Labor) Earnings for each industry group to labor earnings in the broad coastal industries to develop estimates of contributions to Total Annual Economic Output, by the IRLs five main traditional coastal industry groups.
6. Estimate total contributions to Total Annual Economic Output of the IRLs five main traditional coastal industry groups through the IMPLAN Regional Economic Input Output Model using the following methodology:
  - Use Final Demand multipliers for each industry
  - Use Direct Effect multipliers to derive direct impact from employment estimates
  - Calculate indirect and induced (“ripple”) effects for the IRL counties

#### Other Assumptions and Information

- The year 2014 was identified as the “target year” for data and analysis, as some employment information categories were not yet available for all of 2015. Year 2014 provides the most recent and accurate year-long information for the economic contributions analysis.
- The IMPLAN model includes direct impacts (employment and spending), indirect impacts (secondary effects of spending through incomes generated by relevant industries for housing, etc.), and induced impacts (indirect spending by employees). For example, a boat dealer would be compensated (direct impact), might own a house (indirect impact) and may spend money on dining out, which would generate economic activity through income for cooks and servers in restaurants (induced impacts). IMPLAN incorporates a series of complex algorithms that calculate direct, indirect, and induced impacts.
- The Florida’s Oceans and Coasts report includes some limited economic data points and contributions related to nearshore Atlantic coastal resources and waters. For the IRL region, there is a strong economic interdependence derived from the close physical and ecological relationships and interconnections between the IRL and nearshore Atlantic coastal ecosystems. For example, 75 percent of all commercially landed saltwater fish and 80 to 90 percent of all recreationally caught saltwater fish spend part of their lives in

the Indian River Lagoon (pers.comm. Dr. Zack Jud, Director of Education and Exhibits, Florida Oceanographic Society, March 2016). Therefore, the methodology does not exclude these data points and economic values from the IRL economic contributions analysis.

- One of the major economic values related to the IRL is the value premium for waterfront real estate, both commercial and residential. The scope and budget for this economic impact study did not allow for collection and analysis of the thousands of properties along the 156-mile length of the lagoon, but there is significant potential that additional economic value attributable to the lagoon is represented. These values would include property tax revenues from incremental waterfront property, real estate sales activity for brokers and realtors, premiums for direct access to private piers and other activities.
- When calculating economic outputs and valuations related to the IRL, the industry group known as Defense & Aerospace was included in the study. In the 1950's, the defense and aerospace industry began scouting ideal locations in the United States where space exploration operations could be best established. Aerospace industry representatives, the national space program, and the military were especially attracted to the northern IRL region for its undeveloped open spaces, location abutting wide-water bodies of the IRL and Atlantic Ocean, and its close proximity to the equator. Over time the industry grew, diversified, and flourished in the area and became the international model for how and where to operate a successful aerospace program. Much of the competition in today's aerospace industry sector considers the IRL-region as a geographic paradigm when looking to expand to other states. In addition, the quality of life and place offered by the IRL is important to the industry for recruiting and retaining a new generation of talented engineers and technicians who can be particularly discriminating about who they work for and where they work (pers.comm. Dale Ketcham, Chief of Strategic Alliances, Space Florida. June 2016). Including the Defense & Aerospace industry was the subject of significant debate by the subject matter experts. For this reason, this report presents economic output figures for the IRL region with and without contributions from this industry group.
- NAICS code descriptions only include those employees who pay into the unemployment tax system. Self-employed, seasonal, part-time and contract employees are not included in the NAICS code totals; this factor suggests that employment and compensation values for each employment category do *not* reflect total employment and compensation for the IRL geographic area. As an example, the NAICS codes lists very few commercial fishermen employed in the IRL counties, but there are many self-employed, part-time and seasonal fishing employees in the IRL region.
- Although tourism is Florida's largest industry, using the NAICS code employment approach is not structured to capture all visitor-related expenditures and jobs for IRL region, especially in the Food & Beverage and Accommodation categories. For example, some tourists are defined as overnight guests who are "visiting friends and relatives" (VFRs). This definition is important because expenditures made by the VFR market are significant, but are separate from documented hotel, condominium and seasonal rental occupants who pay for lodging. County-specific, visitor-related economic data in the IRL



study area is also limited and inconsistent. Florida's Tourism Development Tax offers one measure, but the amount tourism tax charged varies by county, and includes a state and local tax rate charged on hotels, condominium and residential rentals in aggregate.

In order to disaggregate and supplement data gaps in the economic impact of all "visitor-related" or tourism expenditures, the study utilized 2015 economic reporting documents from STR Global, the industry leader in hotel performance data; Visit Florida's 2014 Florida Visitor Study which includes IRL region-specific visitor expenditure and economic impact data; and employment generation data contained in a 2013 study by the Center for Competitive Florida and Florida Tax Watch titled, Investing in Tourism: Analyzing the Economic Impact of Expanding Florida Tourism. Appendix 1 provides further explanation of how employment and expenditures in the Food & Beverage and Accommodation categories were adjusted to more accurately measure these economic impacts for the IRL region.

- The Florida Department of Revenue receives a flat six percent share of the Tourism Development Tax (TDT); individual Florida counties are also allowed to set their local TDT rates, which range from four percent to six percent of all hotel/motel, condominium and seasonal rental properties. The state's six percent share has *not* been included in the total TDT calculations, because it is used to fund statewide tourism marketing and other programs.
- The scope of work for this study was to document as many water-related economic activities associated with the IRL, the amount of employment, sales tax and other public revenues generated, and the aggregated economic effects of these sources on the regional economy within the designated geographic area defined as the IRL.
- The structure of the report is intended to be standardized enough to be easily replicable in the future. These types of regional industry-based economic impact analyses might be repeated regularly in order to monitor the positive and negative economic impacts associated with different water-related economic drivers, and subsequently compare patterns, differences and causal effects of outside forces. These forces may include water quality, commercial fishing volumes, boat sales and registrations, real estate values, etc.
- **Confidential Labor Statistics**

Total annual economic output information for the IRL region was calculated using raw NAICS code data related to wages, income, employment and sales. Some of the detailed industry data had to be suppressed in order to protect information about individual employers. This is based on confidentiality requirements written in State Law. Confidential data is noted with an asterisk in each table or figure where this confidentiality applies.

## Economic Contribution of Living Resources

The Living Resources industry group included three industry sectors represented in the NAICS code data (Table 1). The total annual wages of Living Resources was \$1,277,712 in 2014. The dominant sector in Living Resources was \*Shellfishing, followed by Other Marine Fishing (29.0%) and \*Finfishing.

<b>Table 1</b> <b>Living Resources</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>		
<b>Industry Sector</b>	<b>Total Annual Wages</b>	<b>Percent</b>
Finfishing	*	*
Shellfishing	*	*
Other Marine Fishing	\$370,689	29.0%
<b>Total</b>	<b>\$1,277,712</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the total annual wages in Volusia County</i>		

\*Confidential data

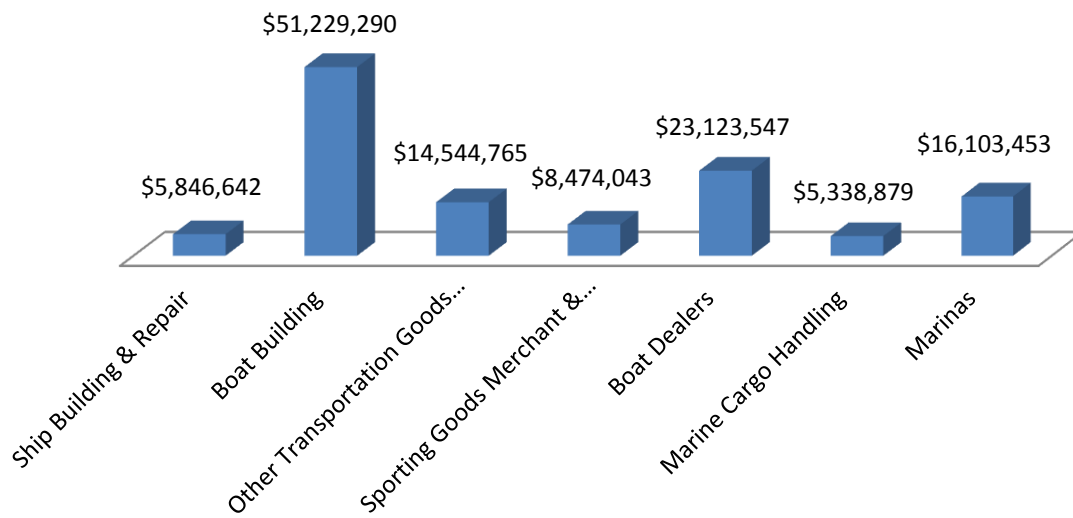
## Economic Contribution of Marine Industries

The Marine Industries industry group included 16 industry sectors represented in the NAICS code data (Table 2; Figure 2). The total annual wages of Marine Industries was \$130,669,582 in 2014. The dominant sectors in Marine Industries were Boat Building (39.2%), followed by Boat Dealers (17.7%), and Marinas (12.3%).

<b>Table 2</b> <b>Marine Industries</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>		
<b>Industry Sector</b>	<b>Total Annual Wages</b>	<b>Percent</b>
Ship Building & Repair	\$5,846,642	4.5%
Boat Building	\$51,229,290	39.2%
Other Transportation Goods Merchant Wholesalers	\$14,544,765	11.1%
Sporting Goods Merchant & Marine Pleasure Craft Wholesalers	\$8,474,043	6.5%
Boat Dealers	\$23,123,547	17.7%
Deep Sea Freight Transportation	*	*
Deep Sea Passenger Transportation	NA	NA
Coastal & Great Lakes Freight Transportation	NA	NA
Coastal & Great Lakes Passenger Transportation	*	*
Inland Water Freight Transportation	\$1,050,178	0.8%
Inland Water Passenger Transportation	NA	NA
Ports and Harbor Operations	*	*
Marine Cargo Handling	\$5,338,879	4.1%
Navigational Services to Shipping	\$2,667,622	2.0%
Other Support Activities for Water Transportation	\$1,463,244	1.1%
Marinas	\$16,103,453	12.3%
<b>Total</b>	<b>\$130,669,582</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the total annual wages in Volusia County</i>		

\*Confidential data

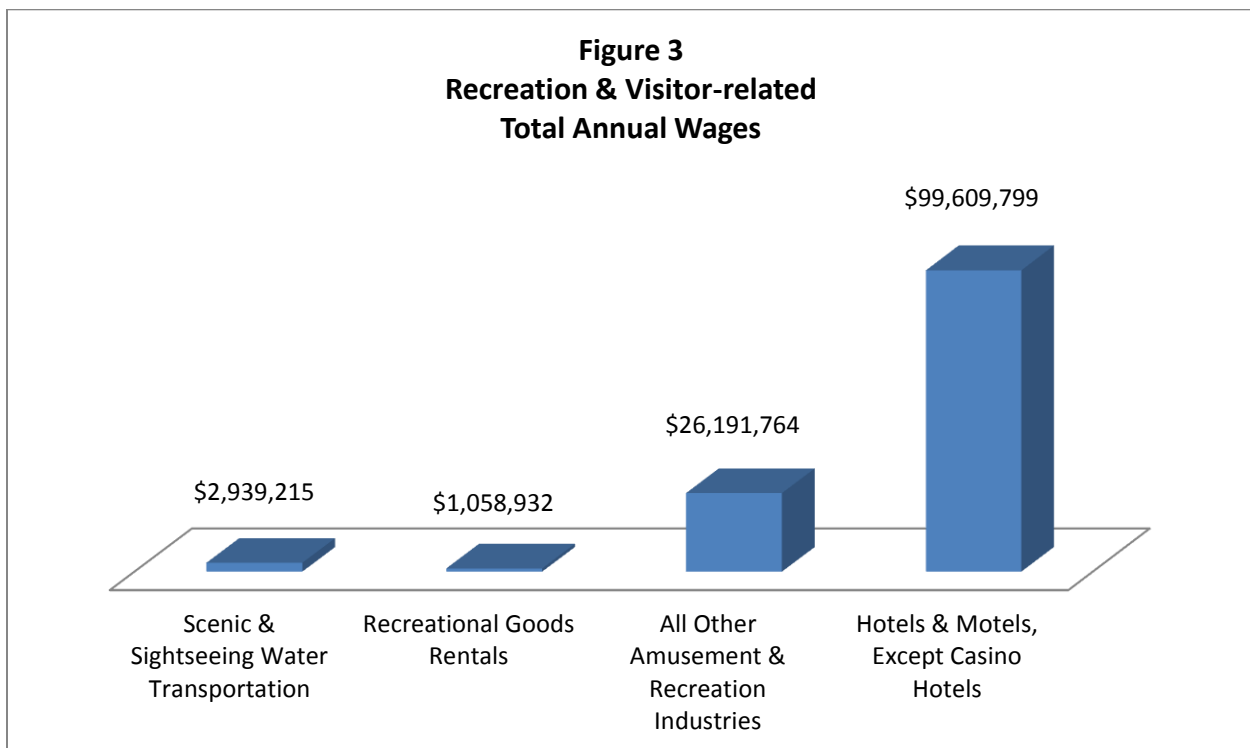
**Figure 2**  
**Marine Industries**  
**Total Annual Wages**



## Economic Contribution of Recreation & Visitor-related

The Recreation and Visitor-related industry group included four industry sectors represented in the NAICS code data (Table 3; Figure 3). The total annual wages of Recreation & Visitor-related was \$129,799,711 in 2014. The dominant sectors in Recreation & Visitor-related were Hotels & Motels, Except Casino Hotels (76.7%), followed by All Other Amusement & Recreational Industries (20.2%).

<b>Table 3</b> <b>Recreation &amp; Visitor-related</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>		
<b>Industry Sector</b>	<b>Total Annual Wages</b>	<b>Percent</b>
Scenic & Sightseeing Water Transportation	\$2,939,215	2.3%
Recreational Goods Rentals	\$1,058,932	0.8%
All Other Amusement & Recreation Industries	\$26,191,764	20.2%
Hotels & Motels, Except Casino Hotels	\$99,609,799	76.7%
<b>Total</b>	<b>\$129,799,711</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the total annual wages in Volusia County</i>		

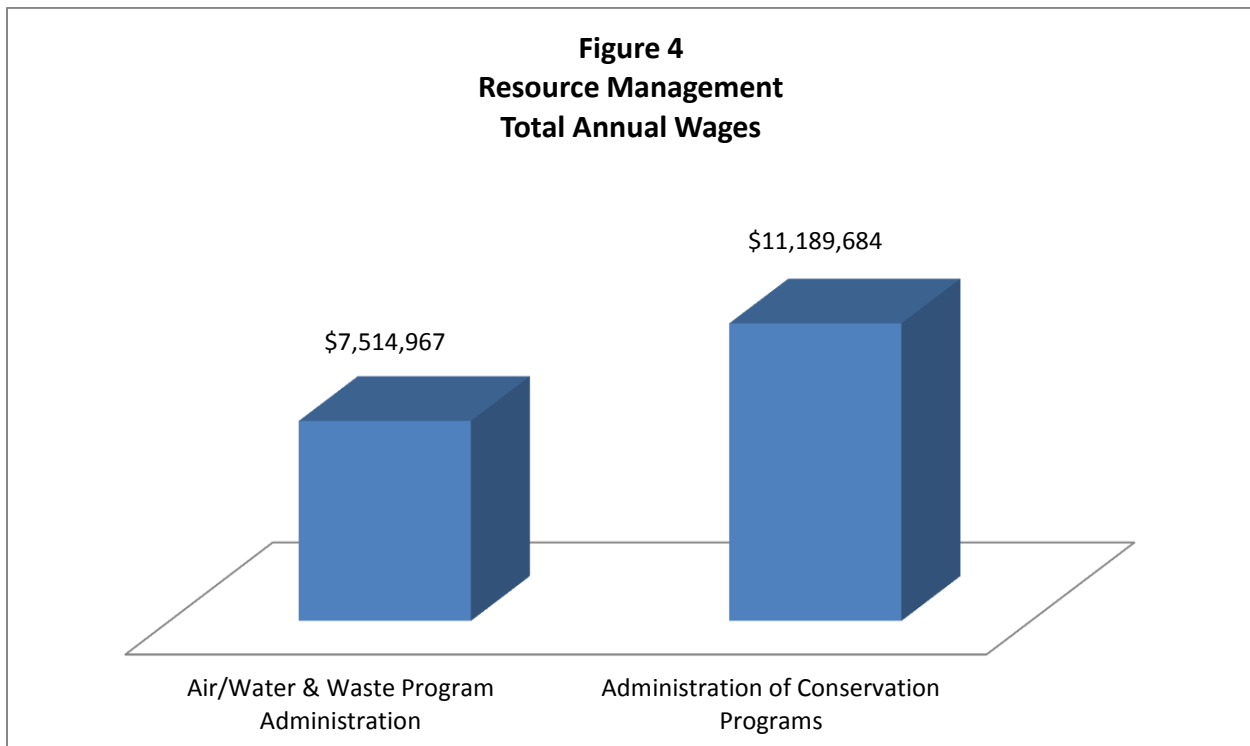




## Economic Contribution of Resource Management

The Resource Management industry group included two industry sectors represented in the NAICS code data (Table 4; Figure 4). The total annual wages of Resource Management was \$18,704,651 in 2014. The dominant sectors in Resource Management were Administration of Conservation Programs (59.8%), followed by Air/Water & Waste Program Administration (\$40.2%).

<b>Table 4</b> <b>Resource Management</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>		
<b>Industry Sector</b>	<b>Total Annual Wages</b>	<b>Percent</b>
Air/Water & Waste Program Administration	\$7,514,967	40.2%
Administration of Conservation Programs	\$11,189,684	59.8%
<b>Total</b>	<b>\$18,704,651</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the total annual wages in Volusia County</i>		



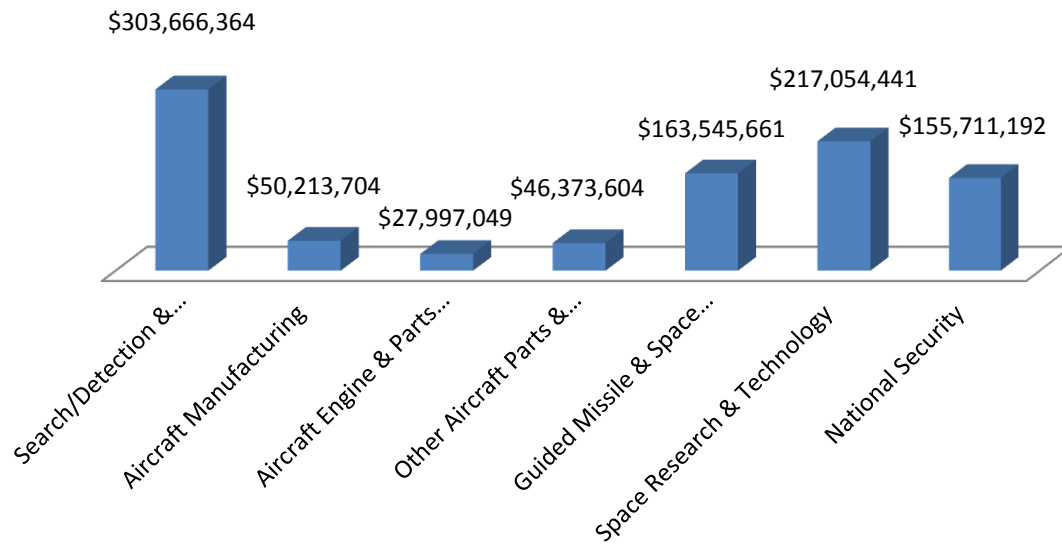
## Economic Contribution of Defense & Aerospace

The Defense & Aerospace industry group included nine industry sectors represented in the NAICS code data (Table 5; Figure 5). The total annual wages of Defense & Aerospace was \$969,319,495 in 2014. The dominant sectors in Defense & Aerospace were Search/Detection & Navigation Instruments (31.3%), followed by Space Research & Technology (22.4%), Guided Missile & Space Vehicle Manufacturing (16.9%) and National Security (16.1%).

<b>Table 5</b> <b>Defense &amp; Aerospace</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>		
<b>Industry Sector</b>	<b>Total Annual Wages</b>	<b>Percent</b>
Search/Detection & Navigation Instruments	\$303,666,364	31.3%
Aircraft Manufacturing	\$50,213,704	5.2%
Aircraft Engine & Parts Manufacturing	\$27,997,049	2.9%
Other Aircraft Parts & Equipment	\$46,373,604	4.8%
Guided Missile & Space Vehicle Manufacturing	\$163,545,661	16.9%
Space Vehicle Propulsion Units & Parts Manufacturing	*	*
Other Guided Missile & Space Vehicle Parts	*	*
Space Research & Technology	\$217,054,441	22.4%
National Security	\$155,711,192	16.1%
<b>Total</b>	<b>\$969,319,495</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the total annual wages in Volusia County</i>		

\*Confidential data

**Figure 5**  
**Defense & Aerospace**  
**Total Annual Wages**

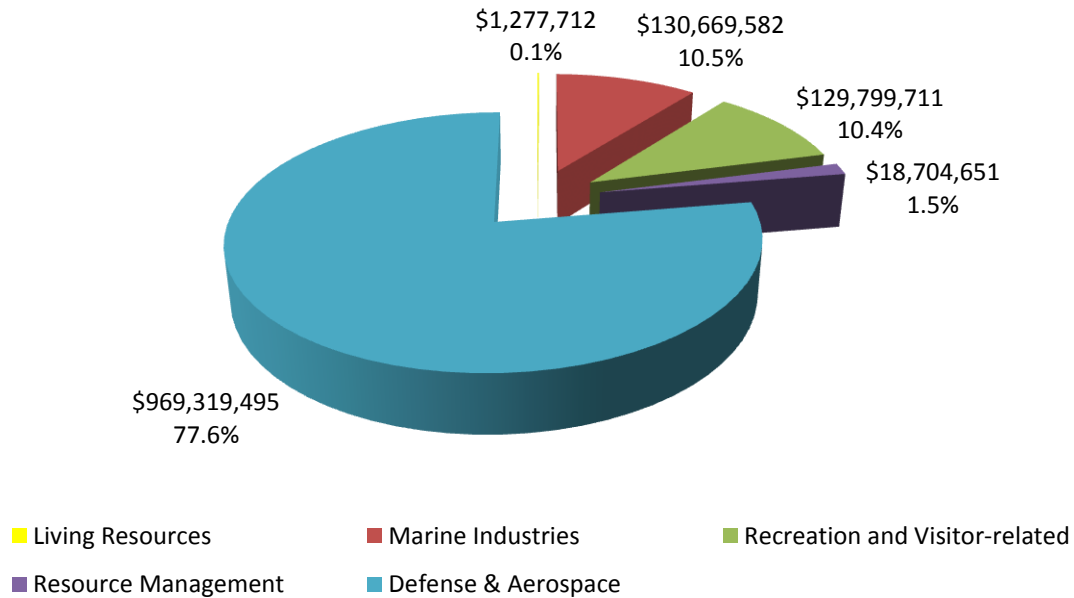


## Economic Contribution of Industry Groups

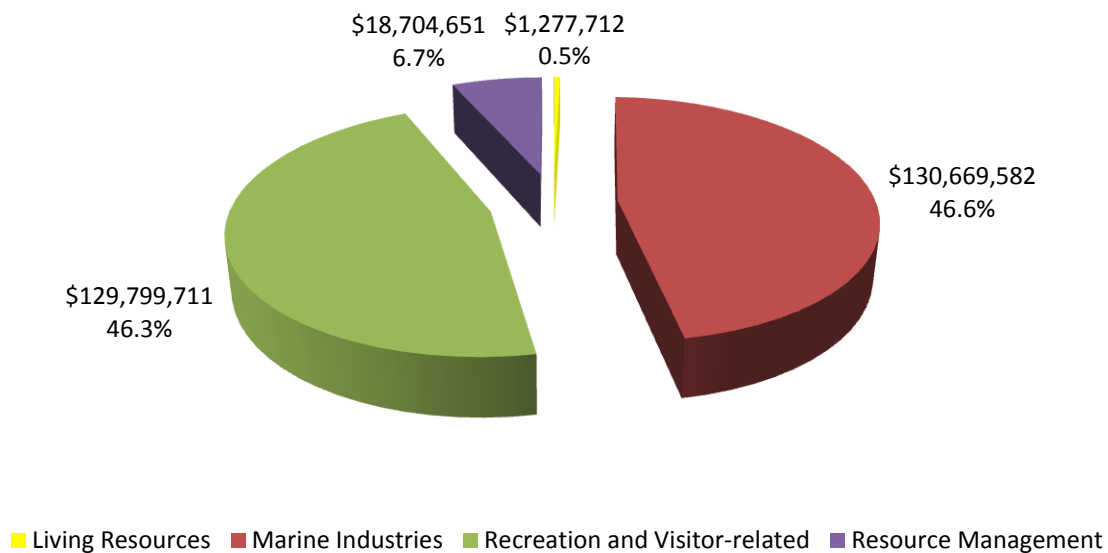
The industry group contribution to the economy of the IRL based on NAICS data is presented in Table 6 and Figures 6A and 6B. Defense & Aerospace is considered an important component of the economy of the IRL study area. However, because the economic activity associated with Defense & Aerospace is not considered to be completely dependent on water-related lagoon activities, the total economic contribution of the industry groups are compared with and without Defense & Aerospace. The total annual wages of the industry groups in the IRL study area was \$1,249,771,151 in 2014 including Defense & Aerospace, and \$280,451,656 without Defense & Aerospace. The total annual wages of the Defense & Aerospace industry group was 7.4 times as large as the next largest industry group, Marine Industries. Without Defense & Aerospace, the dominant industry groups were Marine Industries (46.6%) and Recreation and Visitor-related (46.3%), followed by Resource Management (6.7%), and Living Resources (0.5%).

<b>Table 6</b> <b>Industry Group</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
Industry Group	Total Annual Wages	Percent
Living Resources	\$1,277,712	0.1%
Marine Industries	\$130,669,582	10.5%
Recreation and Visitor-related	\$129,799,711	10.4%
Resource Management	\$18,704,651	1.5%
Defense & Aerospace	\$969,319,495	77.6%
<b>Total</b>	<b>\$1,249,771,151</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
Industry Group	Total Annual Wages	Percent
Living Resources	\$1,277,712	0.5%
Marine Industries	\$130,669,582	46.6%
Recreation and Visitor-related	\$129,799,711	46.3%
Resource Management	\$18,704,651	6.7%
<b>Total</b>	<b>\$280,451,656</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the total annual wages in Volusia County</i>		

**Figure 6A**  
**Total Annual Wages**  
**With Defense & Aerospace**



**Figure 6B**  
**Total Annual Wages**  
**Without Defense & Aerospace**



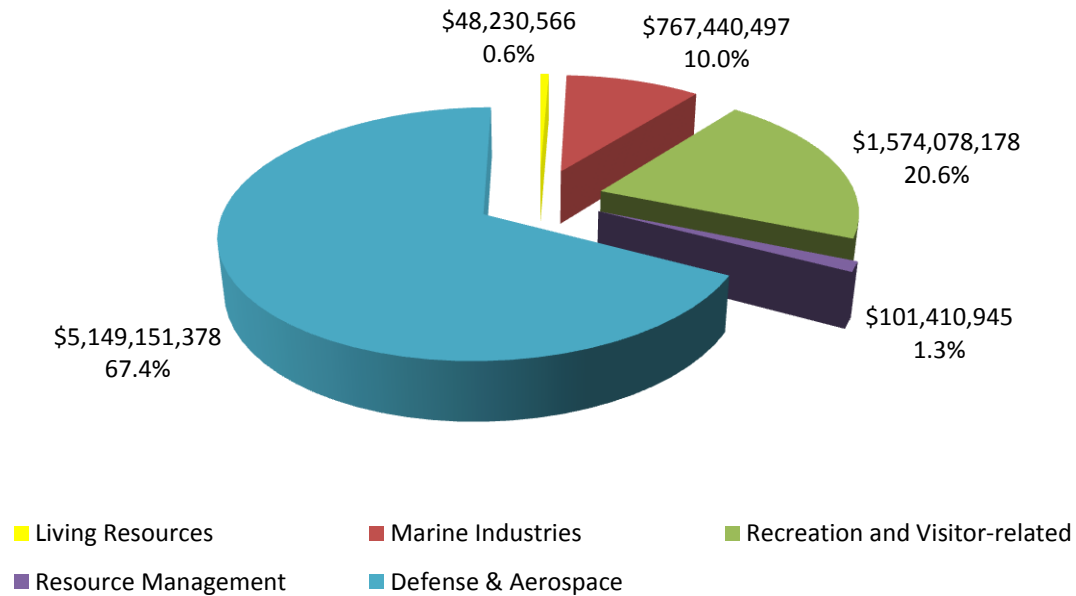
## Total Economic Contribution of Industry Groups

The IMPLAN model was run to provide an estimate of the total economic activity related to each industry group associated with the IRL study area (Table 7; Figures 7A and 7B). Defense & Aerospace is considered an important component of the economy of the IRL study area. However, because the economic activity associated with Defense & Aerospace is not considered to be completely dependent on water-related lagoon activities, the total economic contribution of the industry groups are compared with and without Defense & Aerospace. The total economic activity of the industry groups was \$7,640,311,564 in 2014 including Defense & Aerospace, and \$2,491,160,186 without Defense & Aerospace. Excluding Defense & Aerospace, the dominant industry groups were Recreation and Visitor-related (63.2%), followed by Marine Industries (30.8%), Resource Management (4.1%), and Living Resources (1.9%).

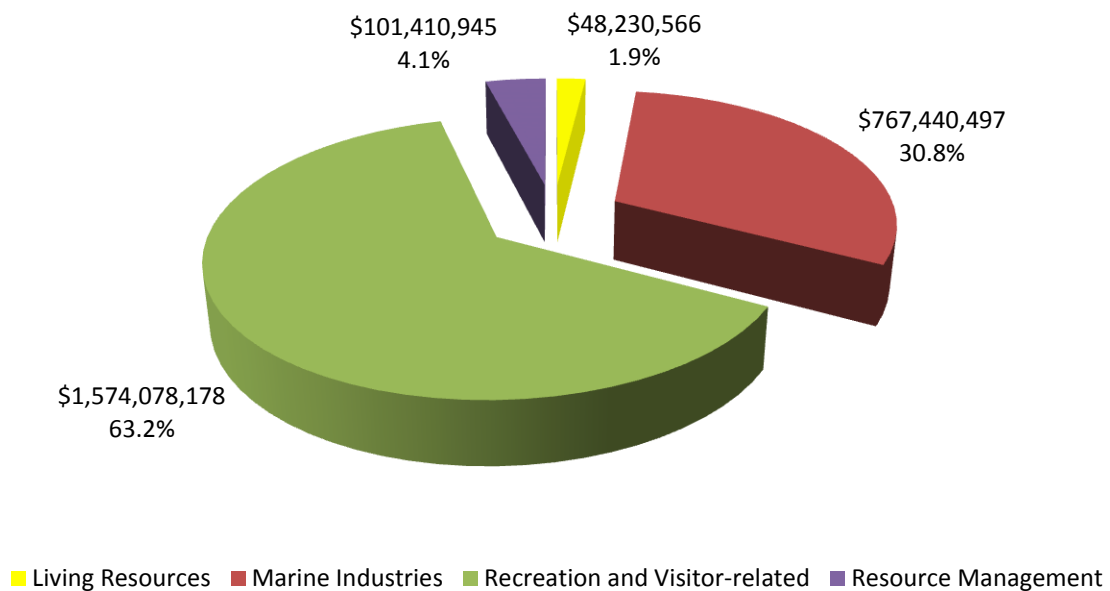
<b>Table 7</b> <b>Industry Group</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$48,230,566	0.6%
Marine Industries	\$767,440,497	10.0%
Recreation and Visitor-related	\$1,574,078,178	20.6%
Resource Management	\$101,410,945	1.3%
Defense & Aerospace	\$5,149,151,378	67.4%
<b>Total</b>	<b>\$7,640,311,564</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$48,230,566	1.9%
Marine Industries	\$767,440,497	30.8%
Recreation and Visitor-related	\$1,574,078,178	63.2%
Resource Management	\$101,410,945	4.1%
<b>Total</b>	<b>\$2,491,160,186</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the amount in Volusia County</i>		
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		



**Figure 7A**  
**Industry Group Total Economic Contribution**  
***With Defense & Aerospace***



**Figure 7B**  
**Industry Group Total Economic Contribution**  
***Without Defense & Aerospace***

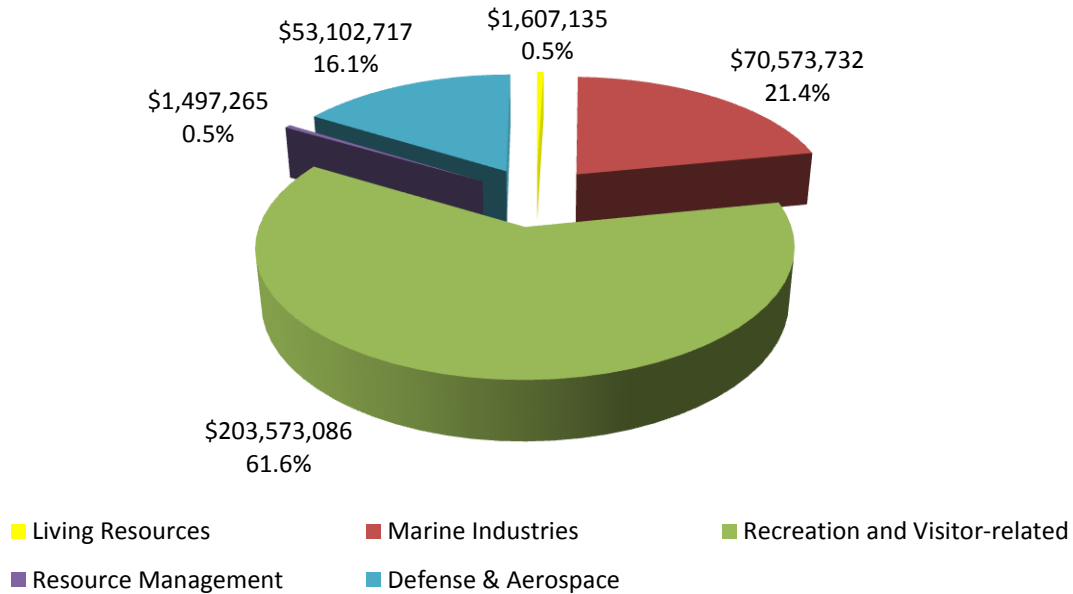


## Total Economic Contribution of Volusia County

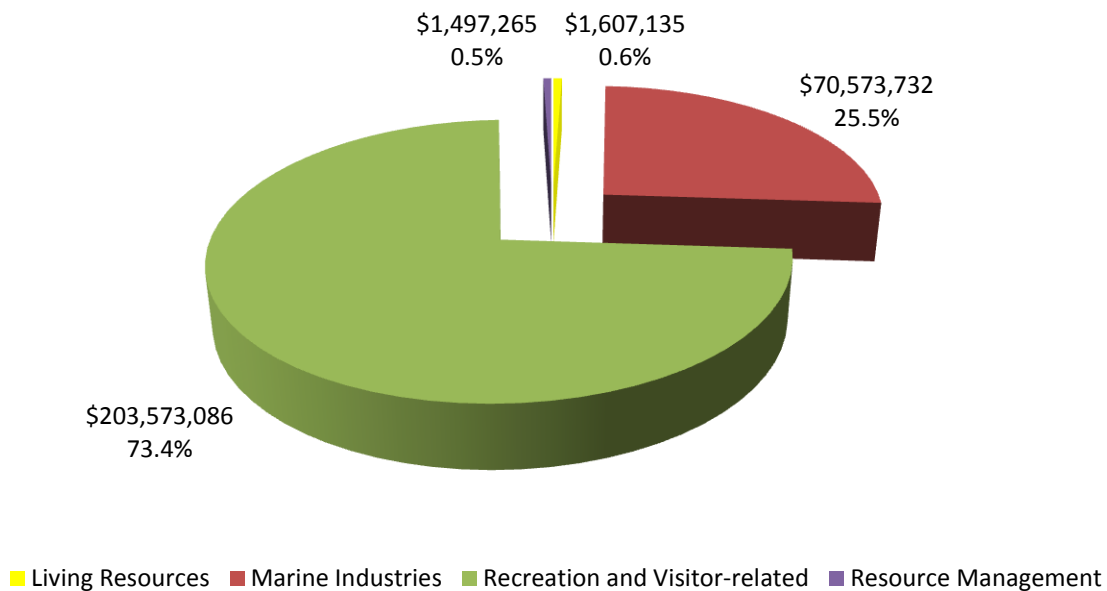
The IMPLAN model was run to provide an estimate of the total economic activity related to each industry group associated with the Volusia County portion of the IRL study area (Table 8; Figures 8A and 8B). Because 80 percent of the population of Volusia County coastal municipalities is adjacent to the Halifax River Lagoon rather than the IRL, only 20 percent of the Volusia County economic activity is included in this analysis. The total economic activity of the industry groups in Volusia County was \$330,353,935 in 2014 including Defense & Aerospace, and \$277,251,218 without Defense & Aerospace. Excluding Defense & Aerospace, the dominant industry groups were Recreation and Visitor-related (73.4%), followed by Marine Industries (25.5%), Living Resources (0.6%), and Resource Management (0.5%).

<b>Table 8</b> <b>Volusia County</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$1,607,135	0.5%
Marine Industries	\$70,573,732	21.4%
Recreation and Visitor-related	\$203,573,086	61.6%
Resource Management	\$1,497,265	0.5%
Defense & Aerospace	\$53,102,717	16.1%
<b>Total</b>	<b>\$330,353,935</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$1,607,135	0.6%
Marine Industries	\$70,573,732	25.5%
Recreation and Visitor-related	\$203,573,086	73.4%
Resource Management	\$1,497,265	0.5%
<b>Total</b>	<b>\$277,251,218</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the amount in Volusia County</i>		
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		

**Figure 8A**  
**Volusia County Total Economic Contribution**  
***With Defense & Aerospace***



**Figure 8B**  
**Volusia County Total Economic Contribution**  
***Without Defense & Aerospace***

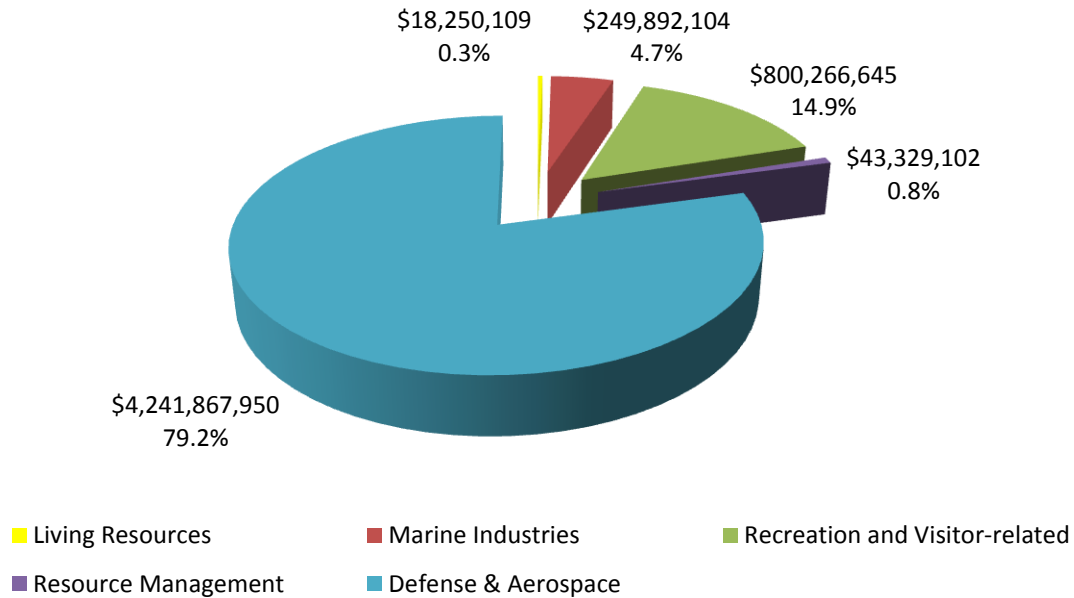


## Total Economic Contribution of Brevard County

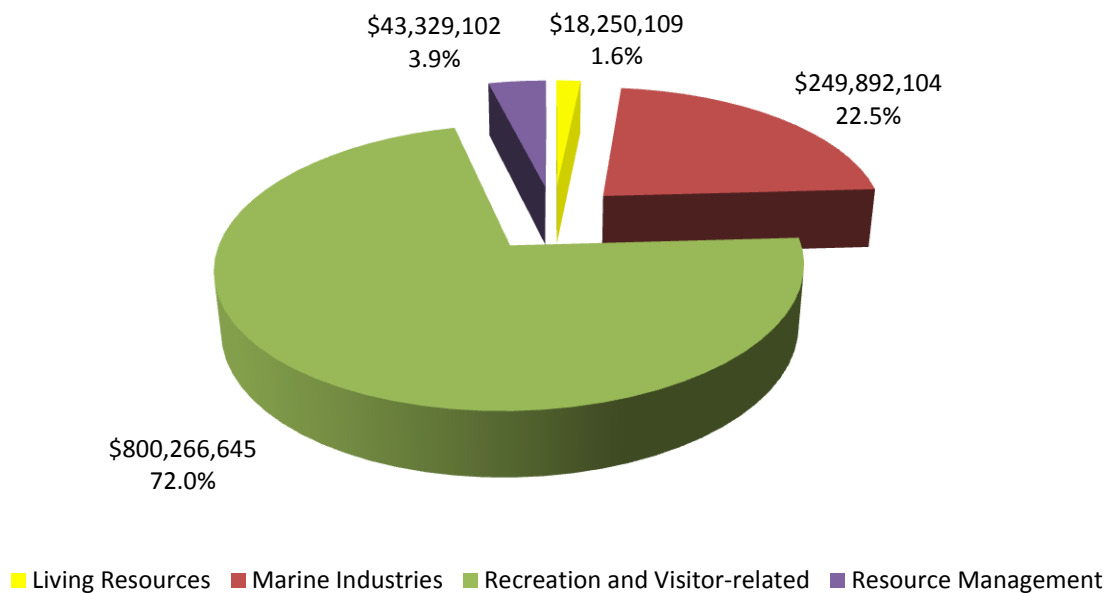
The IMPLAN model was run to provide an estimate of the total economic activity related to each industry group associated with the Brevard County portion of the IRL study area (Table 9; Figures 9A and 9B). The total economic activity of the industry groups in Brevard County was \$5,353,605,910 in 2014 including Defense & Aerospace, and \$1,111,737,960 without Defense & Aerospace. Excluding Defense & Aerospace, the dominant industry groups were Recreation and Visitor-related (72.0%), followed by Marine Industries (22.5%), Resource Management (3.9%), and Living Resources (1.6%).

<b>Table 9</b> <b>Brevard County</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$18,250,109	0.3%
Marine Industries	\$249,892,104	4.7%
Recreation and Visitor-related	\$800,266,645	14.9%
Resource Management	\$43,329,102	0.8%
Defense & Aerospace	\$4,241,867,950	79.2%
<b>Total</b>	<b>\$5,353,605,910</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$18,250,109	1.6%
Marine Industries	\$249,892,104	22.5%
Recreation and Visitor-related	\$800,266,645	72.0%
Resource Management	\$43,329,102	3.9%
<b>Total</b>	<b>\$1,111,737,960</b>	<b>100.0%</b>
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		

**Figure 9A**  
**Brevard County Total Economic Contribution**  
***With Defense & Aerospace***



**Figure 9B**  
**Brevard County Total Economic Contribution**  
***Without Defense & Aerospace***



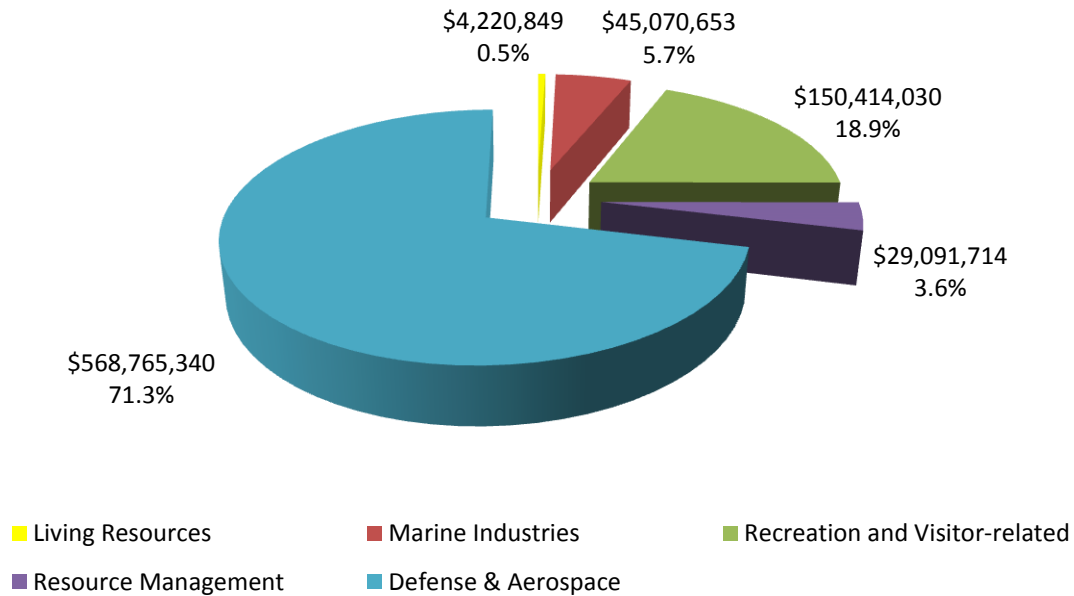
## Total Economic Contribution of Indian River County

The IMPLAN model was run to provide an estimate of the total economic activity related to each industry group associated with the Indian River County portion of the IRL study area (Table 10; Figures 10A and 10B). The total economic activity of the industry groups in Indian River County was \$797,562,586 in 2014 including Defense & Aerospace, and \$228,797,246 without Defense & Aerospace. Excluding Defense & Aerospace, the dominant industry groups were Recreation and Visitor-related (65.7%), followed by Marine Industries (19.7%), Resource Management (12.7%), and Living Resources (1.8%).

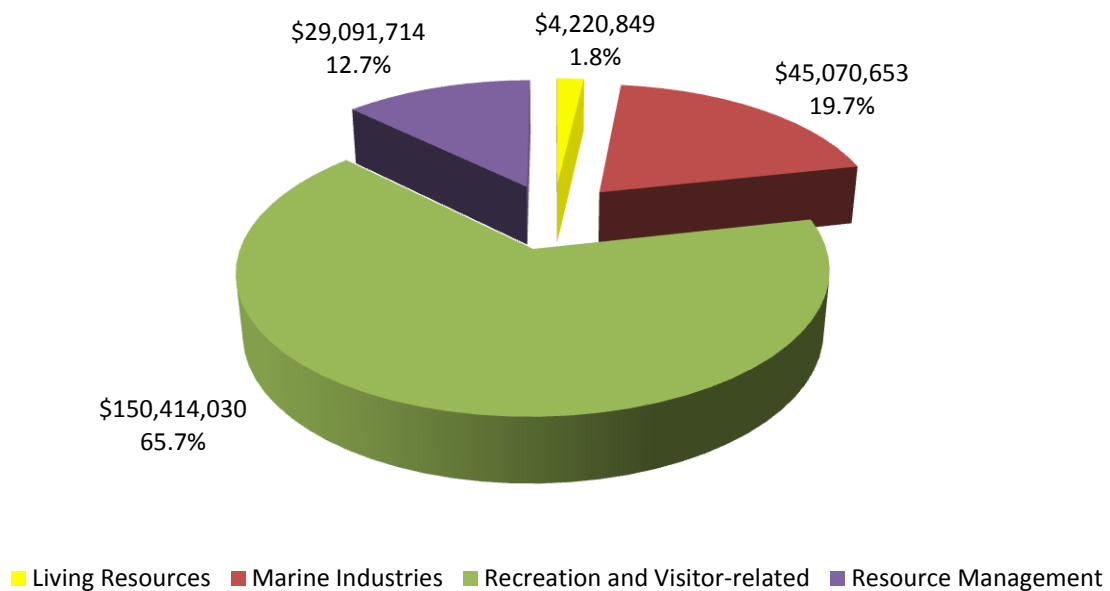
<b>Table 10</b> <b>Indian River County</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b>With Defense &amp; Aerospace</b>		
Industry Group	Amount	Percent
Living Resources	\$4,220,849	0.5%
Marine Industries	\$45,070,653	5.7%
Recreation and Visitor-related	\$150,414,030	18.9%
Resource Management	\$29,091,714	3.6%
Defense & Aerospace	\$568,765,340	71.3%
<b>Total</b>	<b>\$797,562,586</b>	<b>100.0%</b>
<b>Without Defense &amp; Aerospace</b>		
Industry Group	Amount	Percent
Living Resources	\$4,220,849	1.8%
Marine Industries	\$45,070,653	19.7%
Recreation and Visitor-related	\$150,414,030	65.7%
Resource Management	\$29,091,714	12.7%
<b>Total</b>	<b>\$228,797,246</b>	<b>100.0%</b>
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		



**Figure 10A**  
**Indian River County Total Economic Contribution**  
***With Defense & Aerospace***



**Figure 10B**  
**Indian River County Total Economic Contribution**  
***Without Defense & Aerospace***

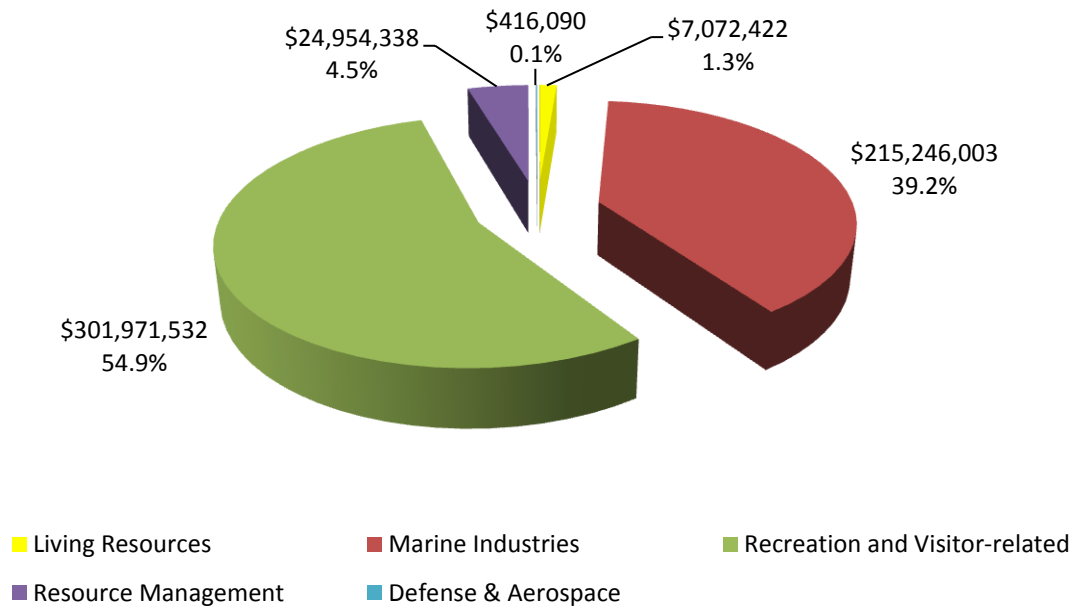


## Total Economic Contribution of St. Lucie County

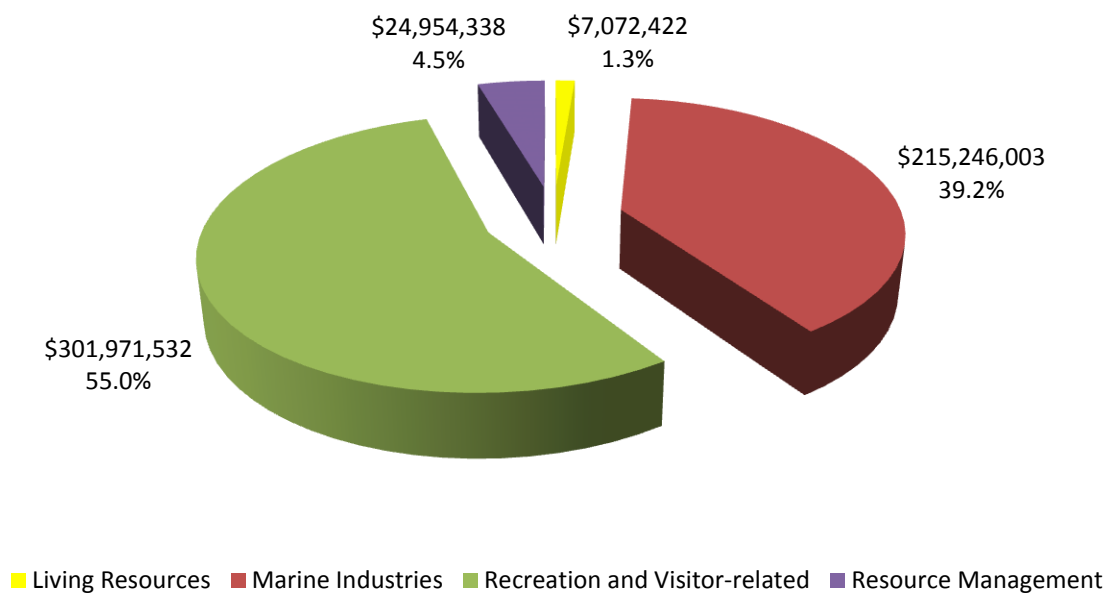
The IMPLAN model was run to provide an estimate of the total economic activity related to each industry group associated with the St. Lucie County portion of the IRL study area (Table 11; Figures 11A and 11B). The total economic activity of the industry groups in St. Lucie County was \$549,660,385 in 2014 including Defense & Aerospace, and \$549,244,295 without Defense & Aerospace. Excluding Defense & Aerospace, the dominant industry groups were Recreation and Visitor-related (55.0%), followed by Marine Industries (39.2%), Resource Management (4.5%), and Living Resources (1.3%).

<b>Table 11</b> <b>St. Lucie County</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$7,072,422	1.3%
Marine Industries	\$215,246,003	39.2%
Recreation and Visitor-related	\$301,971,532	54.9%
Resource Management	\$24,954,338	4.5%
Defense & Aerospace	\$416,090	0.1%
<b>Total</b>	<b>\$549,660,385</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$7,072,422	1.3%
Marine Industries	\$215,246,003	39.2%
Recreation and Visitor-related	\$301,971,532	55.0%
Resource Management	\$24,954,338	4.5%
<b>Total</b>	<b>\$549,244,295</b>	<b>100.0%</b>
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		

**Figure 11A**  
**St. Lucie County Total Economic Contribution**  
***With Defense & Aerospace***



**Figure 11B**  
**St. Lucie County Total Economic Contribution**  
***Without Defense & Aerospace***

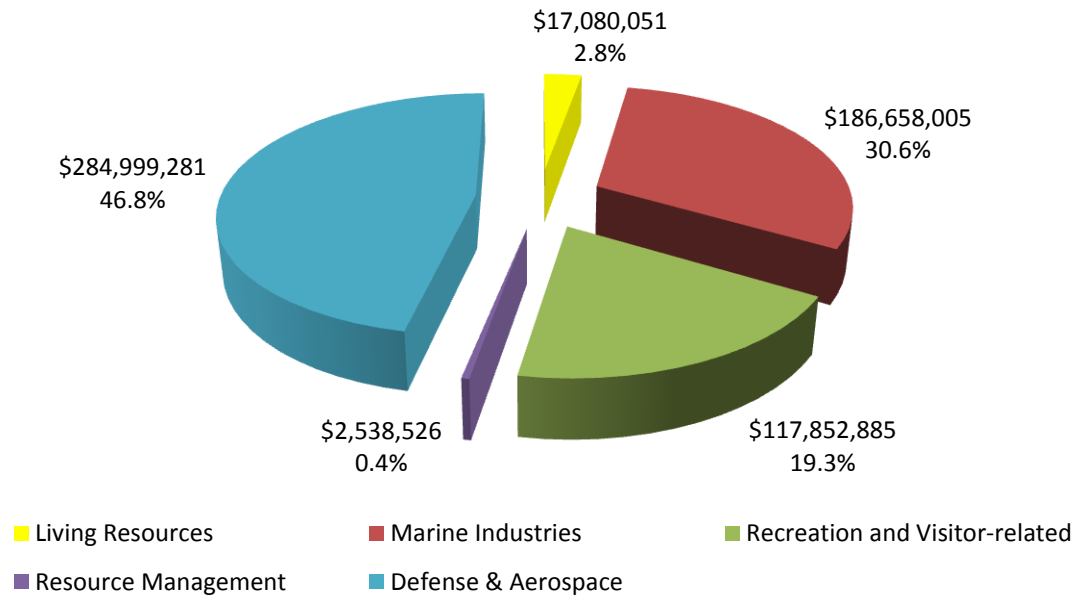


## Total Economic Contribution of Martin County

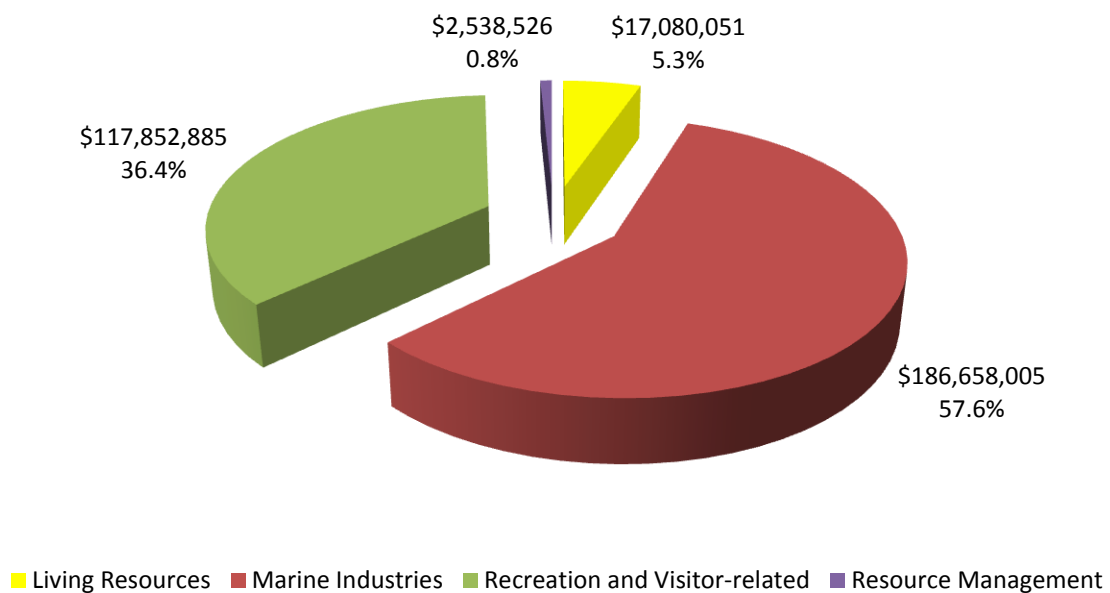
The IMPLAN model was run to provide an estimate of the total economic activity related to each industry group associated with the Martin County portion of the IRL study area (Table 12; Figures 12A and 12B). The total economic activity of the industry groups in Martin County was \$609,128,748 in 2014 including Defense & Aerospace, and \$324,129,467 without Defense & Aerospace. Excluding Defense & Aerospace, the dominant industry groups were Marine Industries (57.6%), followed by Recreation and Visitor-related (36.4%), Living Resources (5.3%), and Resource Management (0.8%).

<b>Table 12</b> <b>Martin County</b> <b>Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$17,080,051	2.8%
Marine Industries	\$186,658,005	30.6%
Recreation and Visitor-related	\$117,852,885	19.3%
Resource Management	\$2,538,526	0.4%
Defense & Aerospace	\$284,999,281	46.8%
<b>Total</b>	<b>\$609,128,748</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
<b>Industry Group</b>	<b>Amount</b>	<b>Percent</b>
Living Resources	\$17,080,051	5.3%
Marine Industries	\$186,658,005	57.6%
Recreation and Visitor-related	\$117,852,885	36.4%
Resource Management	\$2,538,526	0.8%
<b>Total</b>	<b>\$324,129,467</b>	<b>100.0%</b>
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		

**Figure 12A**  
**Martin County Total Economic Contribution**  
**With Defense & Aerospace**



**Figure 12B**  
**Martin County Total Economic Contribution**  
**Without Defense & Aerospace**



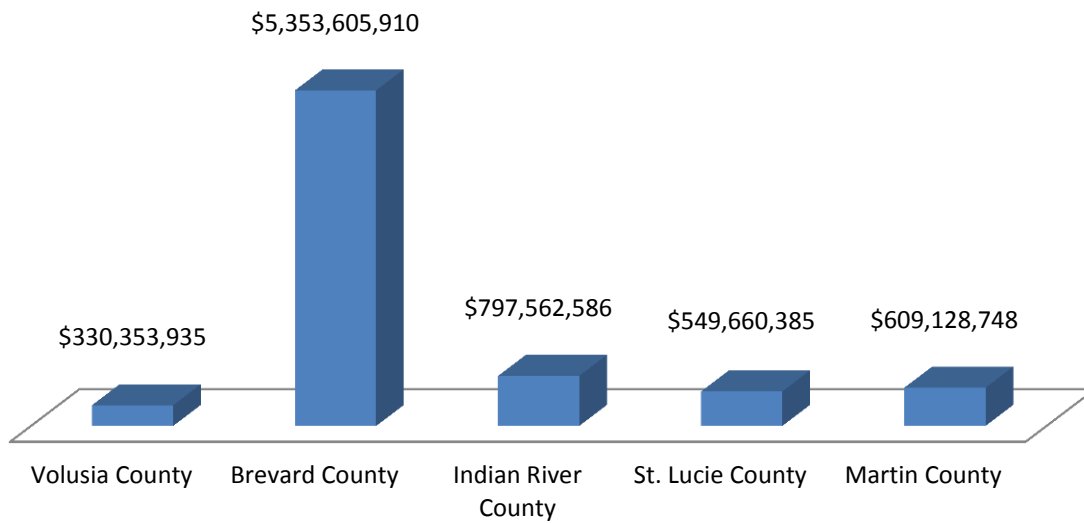
## Total Economic Contribution of Indian River Lagoon Counties

The IMPLAN model was run to provide an estimate of the total economic activity associated with lagoon-related industries in each of the counties within the IRL study area (Table 13; Figures 13A and 13B). Because 80 percent of the population of Volusia County coastal municipalities is adjacent to the Halifax River Lagoon rather than the IRL, only 20 percent of the Volusia County economic activity is included in this analysis. The total economic activity of the counties in the IRL study area was \$7,640,311,564 in 2014 with Defense & Aerospace, and \$2,491,160,186 without Defense & Aerospace. Brevard County had the highest total economic contribution with or without Defense & Aerospace. Excluding Defense & Aerospace, Brevard County had the greatest economic contribution (44.6%), followed by St. Lucie County (22.0%), Martin County (13.0%), Volusia County (11.1%), and Indian River County (9.2%).

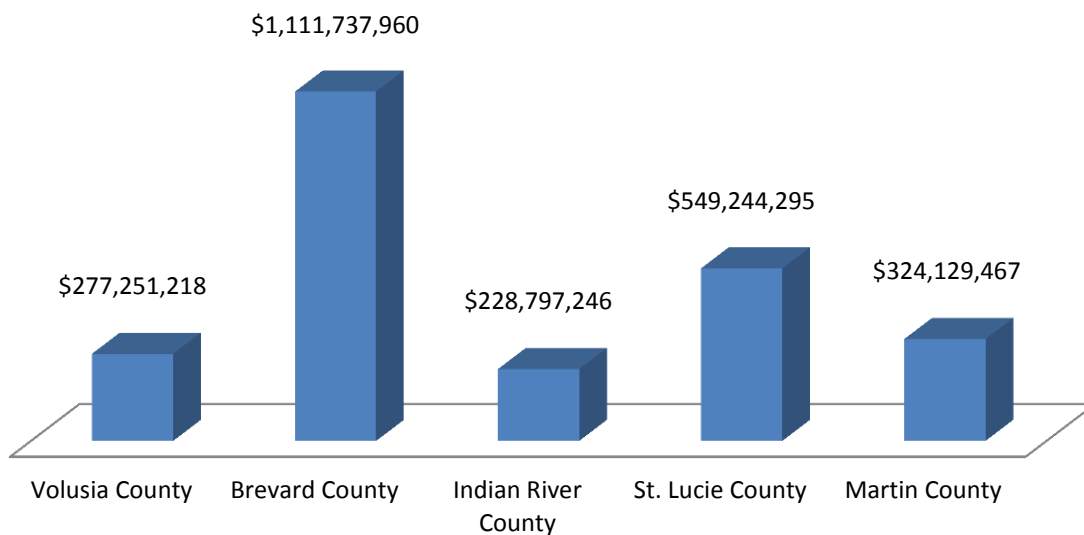
<b>Table 13</b> <b>County Contribution to the Indian River Lagoon Economy</b> <b>Total Output Amount Based on IMPLAN Analysis</b>		
<b><i>With Defense &amp; Aerospace</i></b>		
<b>County</b>	<b>Amount</b>	<b>Percent</b>
Volusia County	\$330,353,935	4.3%
Brevard County	\$5,353,605,910	70.1%
Indian River County	\$797,562,586	10.4%
St. Lucie County	\$549,660,385	7.2%
Martin County	\$609,128,748	8.0%
<b>Total</b>	<b>\$7,640,311,564</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>		
<b>County</b>	<b>Amount</b>	<b>Percent</b>
Volusia County	\$277,251,218	11.1%
Brevard County	\$1,111,737,960	44.6%
Indian River County	\$228,797,246	9.2%
St. Lucie County	\$549,244,295	22.0%
Martin County	\$324,129,467	13.0%
<b>Total</b>	<b>\$2,491,160,186</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the amount in Volusia County</i>		
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>		
<i>Total output amount equals all sales associated with that economic activity or jobs classification</i>		



**Figure 13A**  
**County Total Economic Contribution**  
***With Defense & Aerospace***



**Figure 13B**  
**County Total Economic Contribution**  
***Without Defense & Aerospace***



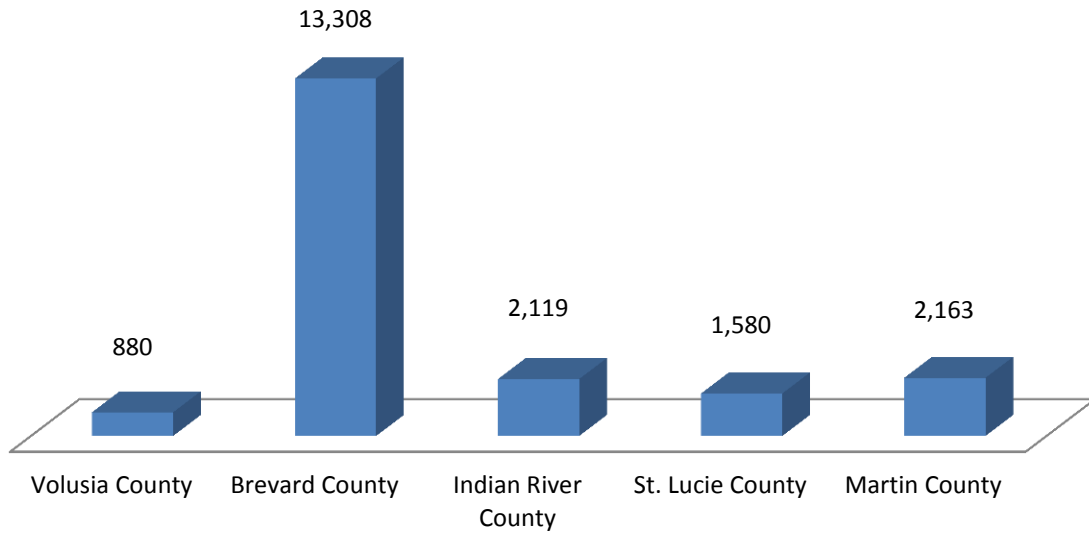
## Employment in Indian River Lagoon Counties

Total employment in the industry groups impacting the IRL economy based on NAICS data was 20,050 with Defense & Aerospace and 9,231 without Defense & Aerospace (Table 14; Figures 14A and 14B). Defense & Aerospace employment accounted for more than half (54%) of the total employment in all industry groups. Brevard County had the largest employment both with (13,308) and without (4,208) Defense & Aerospace. Without Defense & Aerospace, Recreation and Visitor-related employment accounted for 60.7% of all employment, followed by Marine Industries (34.8%), Resource Management (3.9%), and Living Resources (0.5%).

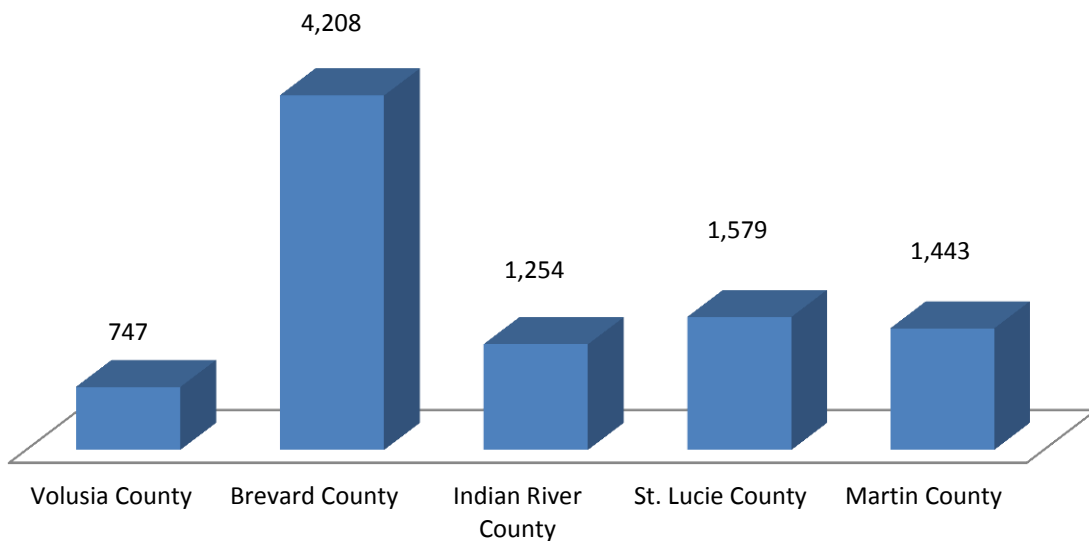
<b>Table 14</b> <b>Employment in Indian River Lagoon Counties</b> <b>Based on 2014 NAICS Data from FDEO, LMS, QCEW</b>							
<b>With Defense &amp; Aerospace</b>							
<b>County</b>	<b>Living Resources</b>	<b>Marine Industries</b>	<b>Recreation and Visitor-related</b>	<b>Resource Management</b>	<b>Defense &amp; Aerospace</b>	<b>Total</b>	<b>Percent</b>
Volusia County	*	237	498	*	*	880	4.4%
Brevard County	34	1,189	2,780	205	9,100	13,308	66.4%
Indian River County	*	196	966	*	865	2,119	10.6%
St. Lucie County	*	815	726	*	*	1,580	7.9%
Martin County	*	780	631	*	720	2,163	10.8%
<b>Total</b>	<b>50</b>	<b>3,217</b>	<b>5,601</b>	<b>363</b>	<b>10,819</b>	<b>20,050</b>	<b>100.0%</b>
<b>Percent</b>	<b>0.2%</b>	<b>16.0%</b>	<b>27.9%</b>	<b>1.8%</b>	<b>54.0%</b>	<b>100.0%</b>	
<b>Without Defense &amp; Aerospace</b>							
<b>County</b>	<b>Living Resources</b>	<b>Marine Industries</b>	<b>Recreation and Visitor-related</b>	<b>Resource Management</b>	<b>Defense &amp; Aerospace</b>	<b>Total</b>	<b>Percent</b>
Volusia County	*	237	498	*		747	8.1%
Brevard County	34	1,189	2,780	205		4,208	45.6%
Indian River County	*	196	966	*		1,254	13.6%
St. Lucie County	*	815	726	*		1,579	17.1%
Martin County	*	780	631	*		1,443	15.6%
<b>Total</b>	<b>50</b>	<b>3,217</b>	<b>5,601</b>	<b>363</b>		<b>9,231</b>	<b>100.0%</b>
<b>Percent</b>	<b>0.5%</b>	<b>34.8%</b>	<b>60.7%</b>	<b>3.9%</b>		<b>100.0%</b>	
<i>Adjusted to include 20% of the employees in Volusia County</i>							
<i>Reflects employees covered under Unemployment Insurance and Reemployment Assistance</i>							

\*Confidential data

**Figure 14A**  
**Employment in Indian River Lagoon Counties**  
***With Defense & Aerospace***



**Figure 14B**  
**Employment in Indian River Lagoon Counties**  
***Without Defense & Aerospace***

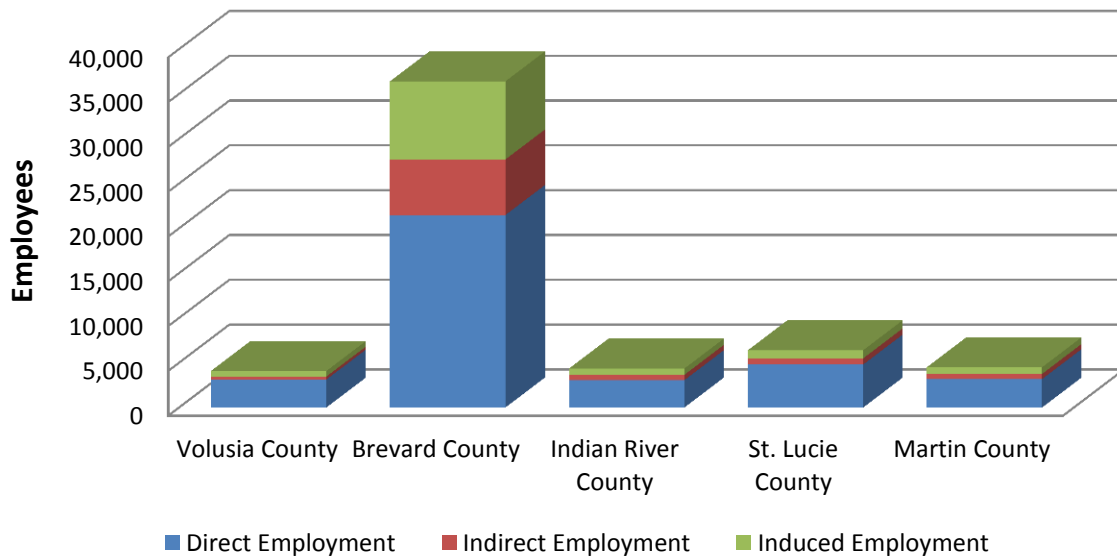


## County Contribution to Employment

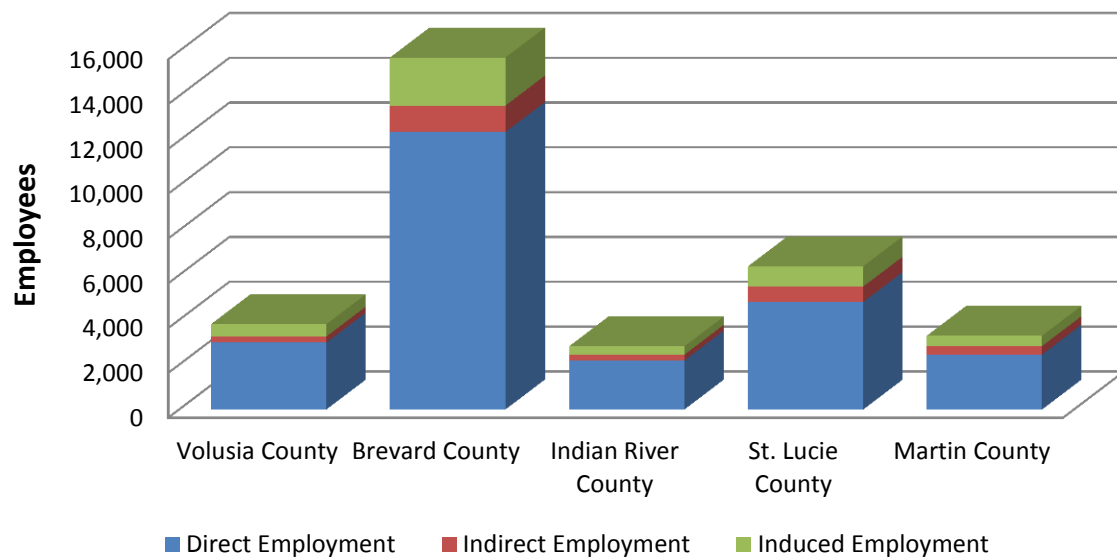
The IMPLAN model was run to provide an estimate of the indirect, induced, and total employment in each county of the IRL study area (Table 15; Figures 15A and 15B). With Defense & Aerospace, Brevard County had the highest total employment (65.4%), followed by St. Lucie County (11.5%), Martin County (8.1%), Indian River County (7.8%), and Volusia County (7.3%). Without Defense & Aerospace, Brevard County had still the highest total employment (49.1%), followed by St. Lucie County (20.0%), Volusia County (11.9%), Martin County (10.3%), and Indian River County (8.8%).

<b>Table 15</b> <b>County Contribution to Employment</b> <b>Based on IMPLAN Analysis</b>					
<b><i>With Defense &amp; Aerospace</i></b>					
County	Direct Employment	Indirect Employment	Induced Employment	Total	Percent
Volusia County	3,121	336	615	<b>4,072</b>	<b>7.3%</b>
Brevard County	21,485	6,200	8,715	<b>36,400</b>	<b>65.4%</b>
Indian River County	3,057	593	697	<b>4,347</b>	<b>7.8%</b>
St. Lucie County	4,802	688	902	<b>6,392</b>	<b>11.5%</b>
Martin County	3,173	572	740	<b>4,485</b>	<b>8.1%</b>
<b>Total</b>	<b>35,638</b>	<b>8,389</b>	<b>11,669</b>	<b>55,696</b>	<b>100.0%</b>
<b><i>Without Defense &amp; Aerospace</i></b>					
County	Direct Employment	Indirect Employment	Induced Employment	Total	Percent
Volusia County	2,988	269	549	<b>3,806</b>	<b>11.9%</b>
Brevard County	12,385	1,182	2,145	<b>15,712</b>	<b>49.1%</b>
Indian River County	2,192	254	372	<b>2,818</b>	<b>8.8%</b>
St. Lucie County	4,801	687	902	<b>6,390</b>	<b>20.0%</b>
Martin County	2,453	378	459	<b>3,290</b>	<b>10.3%</b>
<b>Total</b>	<b>24,819</b>	<b>2,770</b>	<b>4,427</b>	<b>32,016</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the employees in Volusia County</i>					
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>					

**Figure 15A**  
**County Contribution to Employment**  
***With Defense & Aerospace***



**Figure 15B**  
**County Contribution to Employment**  
***Without Defense & Aerospace***

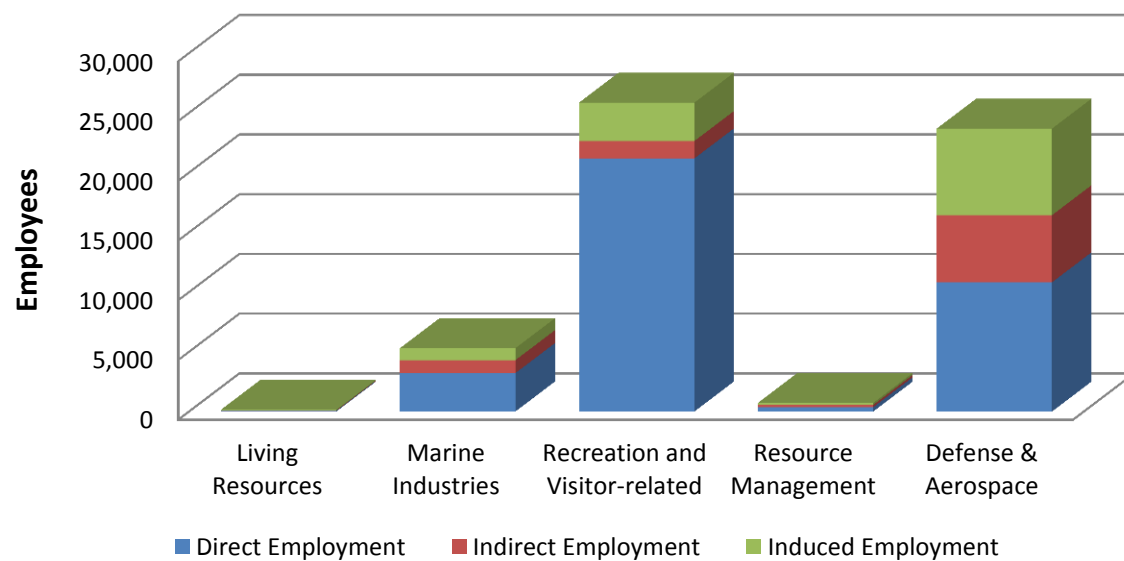


## Industry Group Contribution to Employment

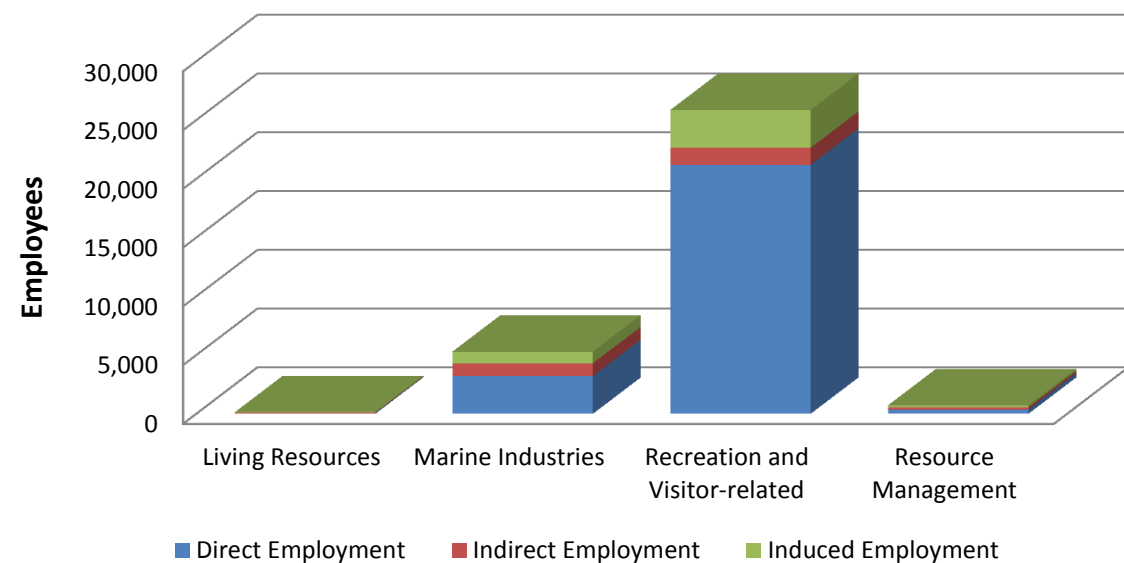
The IMPLAN model was run to provide an estimate of the indirect, induced, and total employment in each industry group the IRL study area (Table 16; Figures 16A and 16B). With Defense & Aerospace included, Recreation and Visitor-related had the highest total employment (46.4%), followed by Defense & Aerospace (42.5%), Marine Industries (9.5%), Resource Management (1.3%), and Living Resources (0.3%). Without Defense & Aerospace, Recreation and Visitor-related had the highest total employment (80.7%), followed by Marine Industries (16.6%), Resource Management (2.3%), and Living Resources (0.4%).

Table 16 Industry Group Contribution to Employment Based on IMPLAN Analysis					
<b>With Defense &amp; Aerospace</b>					
Industry Group	Direct Employment	Indirect Employment	Induced Employment	Total	Percent
Living Resources	50	42	52	144	0.3%
Marine Industries	3217	1082	1000	5299	9.5%
Recreation and Visitor-related	21189	1451	3212	25852	46.4%
Resource Management	363	196	162	721	1.3%
Defense & Aerospace	10819	5619	7242	23680	42.5%
<b>Total</b>	<b>35638</b>	<b>8390</b>	<b>11668</b>	<b>55696</b>	<b>100.0%</b>
<b>Without Defense &amp; Aerospace</b>					
Industry Group	Direct Employment	Indirect Employment	Induced Employment	Total	Percent
Living Resources	50	42	52	144	0.4%
Marine Industries	3217	1082	1000	5299	16.6%
Recreation and Visitor-related	21189	1451	3212	25852	80.7%
Resource Management	363	196	162	721	2.3%
<b>Total</b>	<b>24819</b>	<b>2771</b>	<b>4426</b>	<b>32016</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the employees in Volusia County</i>					
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>					

**Figure 16A**  
**Industry Group Contribution to Employment**  
***With Defense & Aerospace***



**Figure 16B**  
**Industry Group Contribution to Employment**  
***Without Defense & Aerospace***



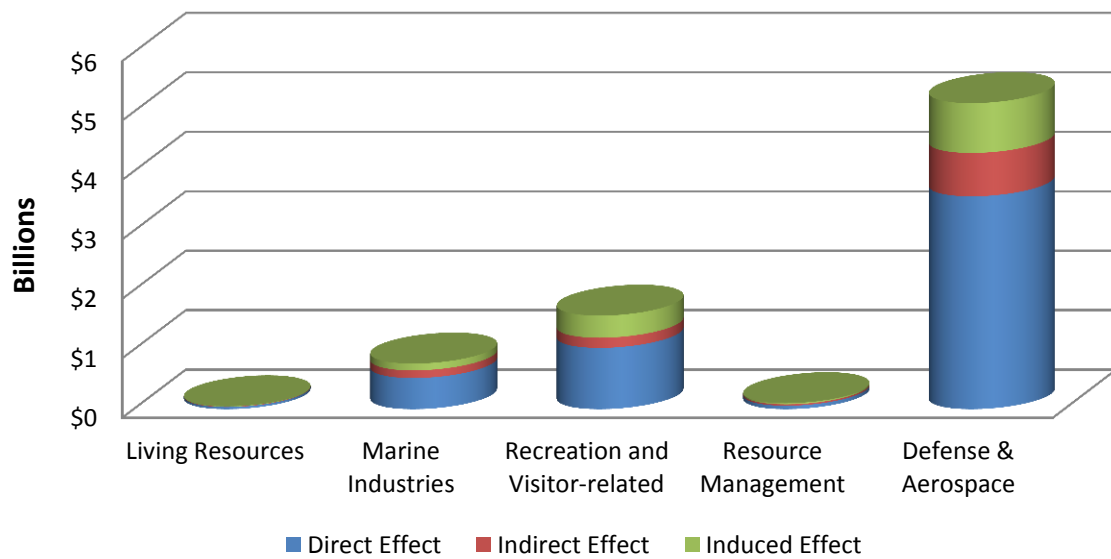


## Total Economic Contribution by Industry Group

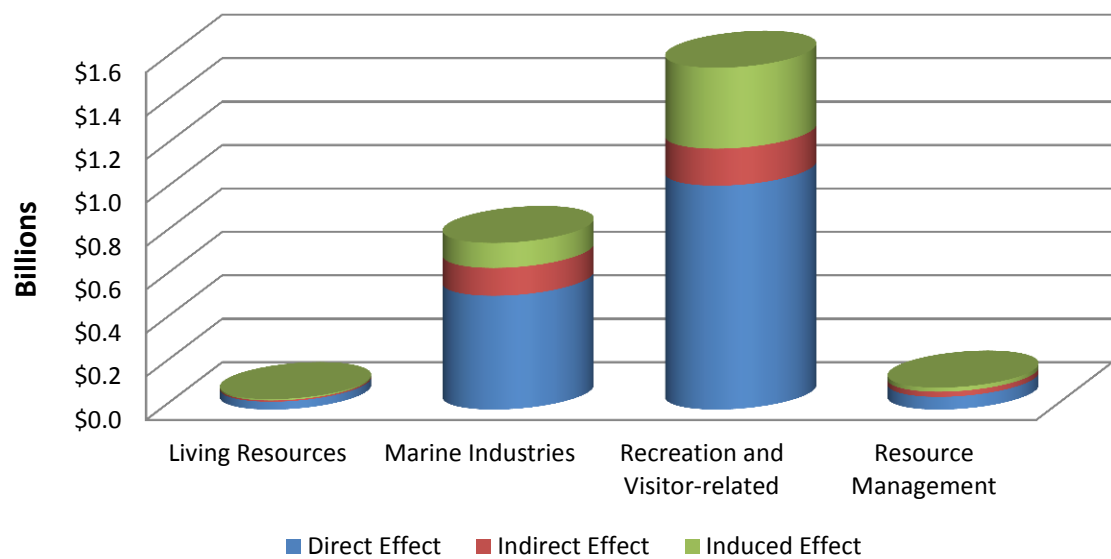
The IMPLAN model was run to provide an estimate of the direct effect, indirect effect, induced effect, and total economic contribution of each industry group the IRL study area (Table 17; Figures 17A and 17B). The total economic contribution of the industry groups analyzed was \$7,640,311,564 with Defense & Aerospace, and \$2,491,160,186 without Defense & Aerospace. Considering all five industry groups, Defense & Aerospace had the highest economic contribution (67.4%), followed by Recreation and Visitor-related (20.6%), Marine Industries (10.0%), Resource Management (1.3%), and Living Resources (0.6%). Without Defense & Aerospace, Recreation and Visitor-related had the highest economic contribution (63.2%), followed by Marine Industries (30.8%), Resource Management (4.1%), and Living Resources (1.9%).

Table 17 Total Economic Contribution by Industry Group Based on IMPLAN Analysis					
<b>With Defense &amp; Aerospace</b>					
Industry Group	Direct Effect	Indirect Effect	Induced Effect	Total	Percent
Living Resources	\$36,352,575	\$5,898,065	\$5,979,927	<b>\$48,230,566</b>	<b>0.6%</b>
Marine Industries	\$524,134,087	\$128,143,592	\$115,162,818	<b>\$767,440,497</b>	<b>10.0%</b>
Recreation and Visitor-related	\$1,031,020,914	\$170,340,248	\$372,717,015	<b>\$1,574,078,178</b>	<b>20.6%</b>
Resource Management	\$58,757,539	\$23,595,112	\$19,058,293	<b>\$101,410,945</b>	<b>1.3%</b>
Defense & Aerospace	\$3,580,678,909	\$729,949,742	\$838,522,727	<b>\$5,149,151,378</b>	<b>67.4%</b>
<b>Total</b>	<b>\$5,230,944,025</b>	<b>\$1,057,926,759</b>	<b>\$1,351,440,780</b>	<b>\$7,640,311,564</b>	<b>100.0%</b>
<b>Without Defense &amp; Aerospace</b>					
Industry Group	Direct Effect	Indirect Effect	Induced Effect	Total	Percent
Living Resources	\$36,352,575	\$5,898,065	\$5,979,927	<b>\$48,230,566</b>	<b>1.9%</b>
Marine Industries	\$524,134,087	\$128,143,592	\$115,162,818	<b>\$767,440,497</b>	<b>30.8%</b>
Recreation and Visitor-related	\$1,031,020,914	\$170,340,248	\$372,717,015	<b>\$1,574,078,178</b>	<b>63.2%</b>
Resource Management	\$58,757,539	\$23,595,112	\$19,058,293	<b>\$101,410,945</b>	<b>4.1%</b>
<b>Total</b>	<b>\$1,650,265,115</b>	<b>\$327,977,017</b>	<b>\$512,918,053</b>	<b>\$2,491,160,186</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the amounts in Volusia County</i>					
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>					

**Figure 17A**  
**Total Economic Contribution by Industry Group**  
***With Defense & Aerospace***



**Figure 17B**  
**Total Economic Contribution by Industry Group**  
***Without Defense & Aerospace***

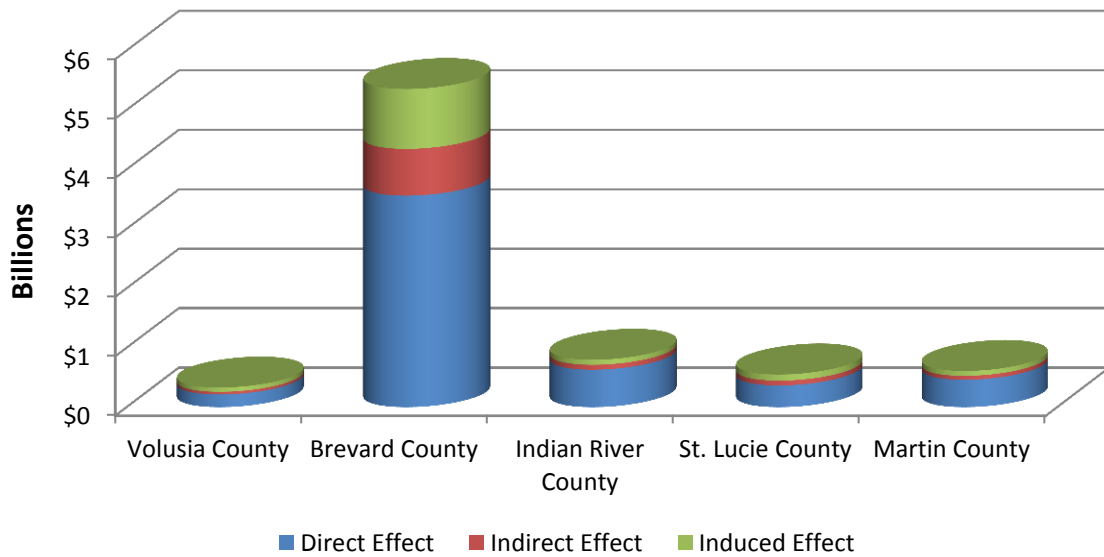


## Total Economic Contribution by County

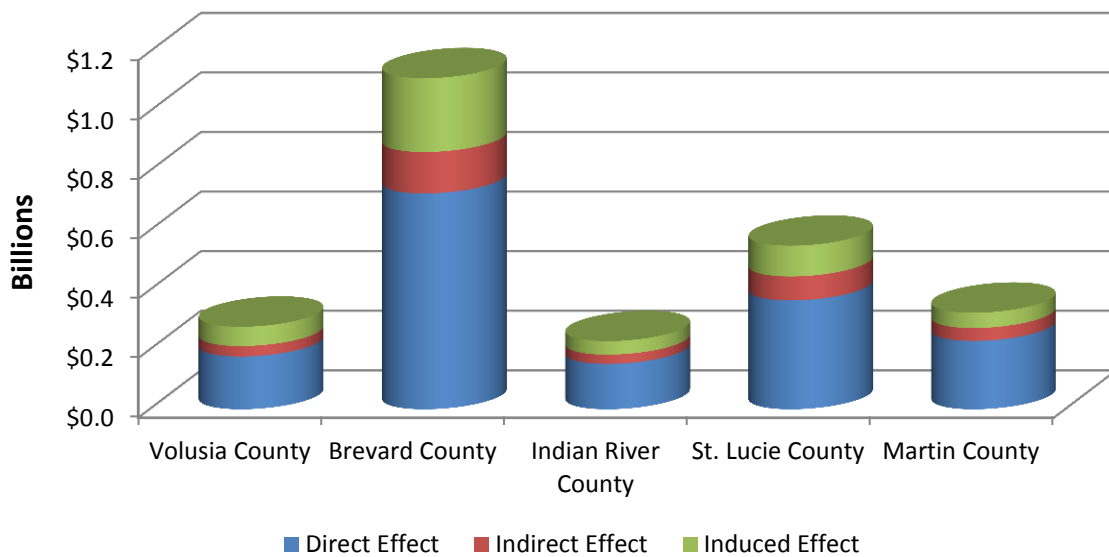
The IMPLAN model was run to provide an estimate of the direct effect, indirect effect, induced effect, and total economic contribution of each county in the IRL study area (Table 18; Figures 18A and 18B). The total economic contribution of the counties analyzed was \$7,640,311,564 with Defense & Aerospace, and \$2,491,160,186 without Defense & Aerospace. With Defense & Aerospace, Brevard County had the highest total economic contribution (70.1%), followed by Indian River County (10.4%), Martin County (8.0%), St. Lucie County (7.2%), and Volusia County (4.3%). Without Defense & Aerospace, Brevard County had still the highest total economic contribution (44.6%), followed by St. Lucie County (22.0%), Martin County (13.0%), Volusia County (11.1%), and Indian River County (9.2%).

Table 18 Total Economic Contribution by County Based on IMPLAN Analysis					
<b>With Defense &amp; Aerospace</b>					
County	Direct Effect	Indirect Effect	Induced Effect	Total	Percent
Volusia County	\$214,178,839	\$43,375,814	\$72,799,282	<b>\$330,353,935</b>	<b>4.3%</b>
Brevard County	\$3,559,409,878	\$786,540,410	\$1,007,655,622	<b>\$5,353,605,910</b>	<b>70.1%</b>
Indian River County	\$630,482,916	\$82,211,375	\$84,868,295	<b>\$797,562,586</b>	<b>10.4%</b>
St. Lucie County	\$366,010,100	\$80,314,689	\$103,335,596	<b>\$549,660,385</b>	<b>7.2%</b>
Martin County	\$460,862,292	\$65,484,471	\$82,781,985	<b>\$609,128,748</b>	<b>8.0%</b>
<b>Total</b>	<b>\$5,230,944,025</b>	<b>\$1,057,926,759</b>	<b>\$1,351,440,780</b>	<b>\$7,640,311,564</b>	<b>100.0%</b>
<b>Without Defense &amp; Aerospace</b>					
County	Direct Effect	Indirect Effect	Induced Effect	Total	Percent
Volusia County	\$177,578,323	\$34,697,695	\$64,975,199	<b>\$277,251,218</b>	<b>11.1%</b>
Brevard County	\$724,837,337	\$138,916,024	\$247,984,599	<b>\$1,111,737,960</b>	<b>44.6%</b>
Indian River County	\$152,437,370	\$31,062,306	\$45,297,570	<b>\$228,797,246</b>	<b>9.2%</b>
St. Lucie County	\$365,692,976	\$80,247,706	\$103,303,613	<b>\$549,244,295</b>	<b>22.0%</b>
Martin County	\$229,719,109	\$43,053,286	\$51,357,072	<b>\$324,129,467</b>	<b>13.0%</b>
<b>Total</b>	<b>\$1,650,265,115</b>	<b>\$327,977,017</b>	<b>\$512,918,053</b>	<b>\$2,491,160,186</b>	<b>100.0%</b>
<i>Adjusted to include 20% of the amounts in Volusia County</i>					
<i>Adjusted to include estimated total jobs in Accommodations and Food Services within Recreation &amp; Visitor-related industry group</i>					

**Figure 18A**  
**Total Economic Contribution by County**  
***With Defense & Aerospace***



**Figure 18B**  
**Total Economic Contribution by County**  
***Without Defense & Aerospace***



## Cost of a Sustainable Indian River Lagoon Economy

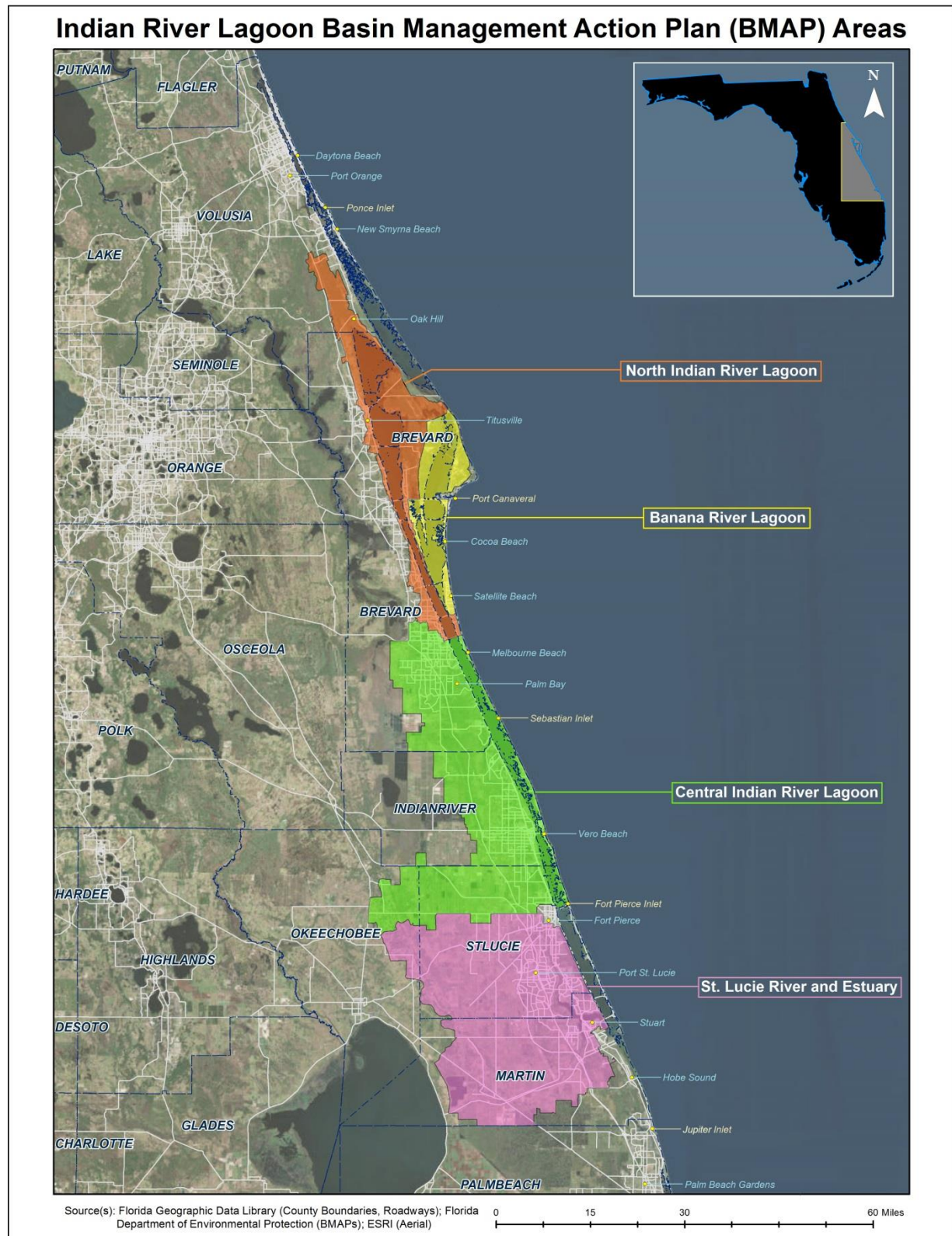
Enhancing water quality, increasing habitat, providing additional points of access, and implementing best management practices to improve the IRL can generate thousands of new jobs and increase the value and output of the IRL-based economy. This presumes state and local plans to improve the lagoon's health and productivity are implemented and continue to be successful in the future. Implementing these plans will require a long-term commitment of time and funding. One way to estimate how much it will cost annually and cumulatively over time to achieve a sustainable IRL, is to estimate the cost of implementing the adopted Basin Management Action Plans (BMAPs) for the IRL region.

The Florida Department of Environmental Protection BMAP initiative is based on their Total Maximum Daily Load (TMDL) program, which is a statewide watershed-based management approach to restore and protect water quality in Florida. TMDLs are developed, allocated, and implemented through phased approach, which includes the development of a BMAP. Each BMAP contains a comprehensive set of strategies/projects for restoring impaired waters by reducing pollutant loadings to meet the allowable loadings established in a TMDL. TMDLs are water quality targets based on state water quality standards for specific pollutants such as excessive nitrogen and phosphorus. BMAPs are broad-based plans that are developed with local stakeholders and rely on local input and local commitment for implementation.

Most of the IRL is addressed by four adopted BMAPs, which cover an area of over 990,000 acres. These BMAPs are spread across boundaries of five IRL counties and two regional planning councils (Exhibit 2). TMDL reduction targets focus on improving water clarity and quality by reducing total nitrogen and phosphorus loads to the lagoon (Exhibit 3).

Exhibit 2 Indian River Lagoon BMAPs		
BMAP	County	Regional Planning Council
North Indian River Lagoon	Brevard, Volusia	ECFRPC
Banana River Lagoon	Brevard	ECFRPC
Central Indian River Lagoon	Brevard, Indian River, St. Lucie	ECFRPC and TCRPC
St. Lucie River and Estuary*	Martin, St. Lucie	TCRPC
* A portion of eastern Okeechobee County also is included in the St. Lucie River and Estuary BMAP		

Exhibit 3 TMDL Total Required Reductions (Pounds/Year)		
BMAP	Total Nitrogen	Total Phosphorus
North Indian River Lagoon	221,863.9	52,057.2
Banana River Lagoon	192,708.0	38,647.0
Central Indian River Lagoon*	836,713.0	144,453.0
St. Lucie River and Estuary	1,053,414.0	404,166.0
Total	2,304,698.9	639,323.2
* Reduction allocations were not calculated when this BMAP was developed, but TMDL's have been set.		





TCRPC and ECFRPC (2015) estimated it would cost \$4.6 billion to accomplish the required nutrient load reductions in all four of the BMAPs which is intended to establish a sustainable IRL. By this measure, and extended over a 20-year period, it would require an annual investment of \$230 million to sustain an IRL-based economy. Based on the estimated 2015 population of the IRL counties, the annual cost per person equates to about \$140. If this is divided equally among IRL-county households, each would pay around \$334 a year, or about \$28 a month. The 1996 Economic Assessment and Analysis of the IRL found that 1000 IRL households polled said they would be willing to pay an additional \$60 a year to support IRL improvement programs. The 2008 update of this study found that 50 percent of the 985 IRL households polled would be willing to pay a one-time tax of \$20 to improve the lagoon, with about 27 percent of the respondents willing to pay a one-time tax of \$400.

The cost calculations outlined above assume that IRL residents will bear the full cost of BMAP implementation. This is not likely to be the case. Floridians outside the IRL region will contribute to state water quality improvement programs and water management district projects through state sales taxes and federal income taxes redistributed to the IRL region in the form of state and federal assistance. American and foreign tourists will also offset some local implementation costs through sales and other special taxes levied on local goods and services that may flow to state water quality improvement programs. In addition, use of Land Acquisition Trust Fund monies may also offset the cost of BMAP-related water quality improvement projects for the lagoon.

## Return on Investment from a Sustainable Indian River Lagoon

One way to calculate the current Return on Investment (ROI) from the Indian River Lagoon is to establish a ratio of annual costs for providing a productive and sustainable IRL, compared to the lagoon's total annual economic output. Achieving water quality targets called for in the IRL-region BMAPs should result in a sustainable IRL. It is estimated that meeting these targets will cost the region \$230 million a year over the next 20 years. This report estimates the 2014 Total Annual Economic Output is valued at \$7.6 billion. This value should remain stable or increase over time as water quality improves from implementing the IRL BMAPs. When comparing this average annual cost to the IRL's total average annual economic output of \$7.6 billion, the ROI from a sustainable IRL is 33 to 1. Or, for every dollar spent on achieving a sustainable IRL, the lagoon returns \$33 in total economic value. Over the years, as the IRL improves in health and productivity, annual ROI in the future can be expected to increase.

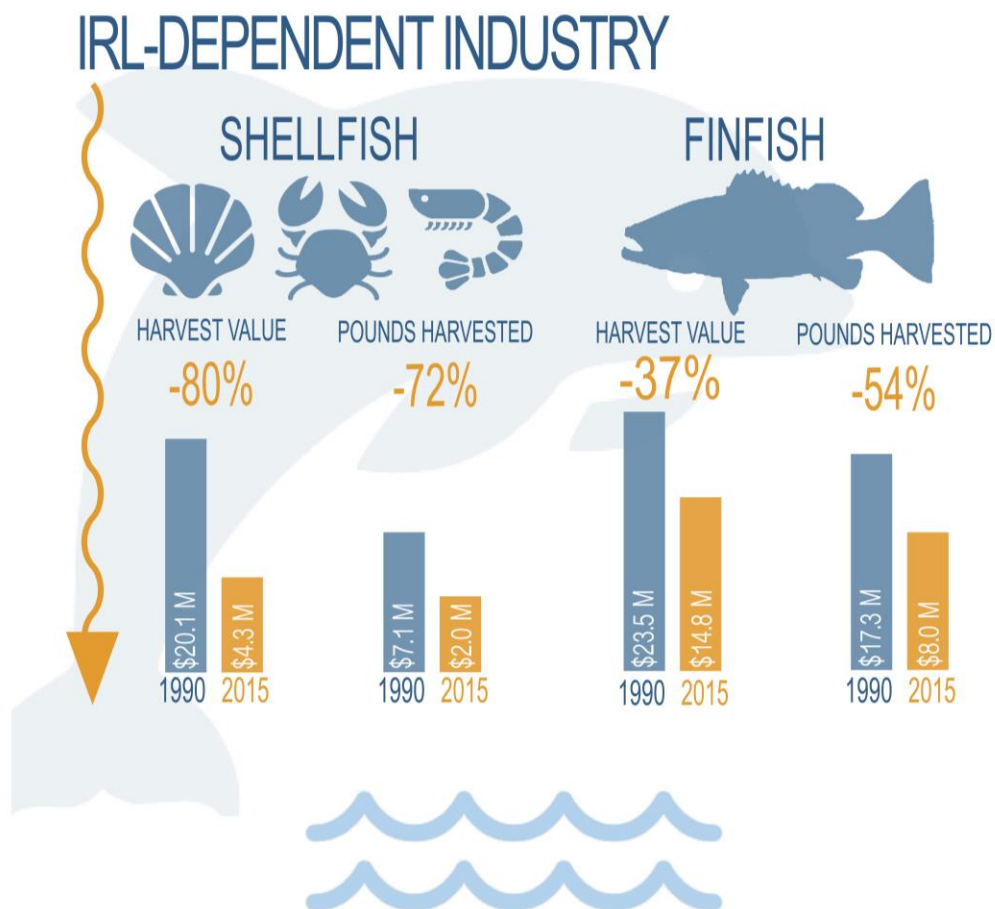




## An Indian River Lagoon-Dependent Industry in Decline

Commercially harvested clams, oysters, crabs and shrimp were worth \$12.6 million at the docks in 1994 (Apogee Research Inc. 1996). Adjusted for inflation, this 1994 amount is \$20.1 million in 2015 dollars. The overall value of the commercial clam, oyster, crab, and shrimp harvest for 2015 is \$4.3 million (NOAA 2015) – a decline of nearly 80 percent. Pounds of shellfish harvested have also declined during about that same period, from 7.1 million pounds to 2 million pounds, or almost 72 percent. IRL counties showing the sharpest decline in value and pounds harvested were Volusia, Brevard and Martin.

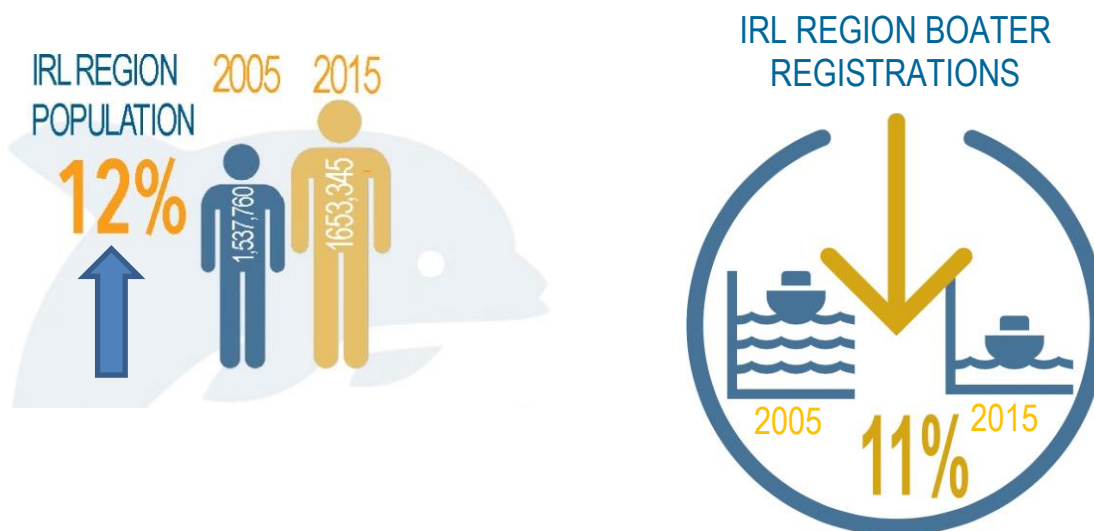
The commercial fin fishery fared a little better, but still showed significant declines in value and pounds landed. In 1990, the estimated value of commercial fin fish landed was worth \$13 million (FFWCC 2016). Adjusted for inflation, this 1990 amount is \$23.5 million in 2015 dollars. The overall value of the commercial fin fish harvest for 2015 is estimated at \$14.8 million – a decline of 37 percent. Pounds of fin fish landed also declined during that same period, from 17.3 million pounds to 8 million pounds or almost 54 percent. Indian River Lagoon counties showing the sharpest declines in value and pounds harvested are Brevard, Indian River, and Martin counties.



## Boat Registrations as an Indicator of the Indian River Lagoon's Environmental and Economic Health

One indicator of the environmental health and economic productivity of the IRL is the increase or decrease in boat registrations over time. Increased access and use of the IRL by boats for fishing and other outdoor lagoon-based activities clearly has an economic impact on retail, lodging, marine industry and food and beverage sectors, and also on sales tax, fuel tax, boat registration fees and fishing license revenues. Recreational fishing represents significant spending for lodging, transportation, food, fishing equipment, etc. Average per capita spending for resident anglers is estimated to total approximately \$186 per person per year, and spending by non-resident anglers is estimated to average approximately \$440 per person per year. Recreational boating, fishing and other water-related activities dependent on the IRL accounts for around \$1.2 billion in total annual spending. This level of economic impact is also a clear indication of the willingness of residents and visitors to pay for access to lagoon fishing grounds and other lagoon-based activities.

Information provided by the Florida Department of Highway Safety and Motor Vehicles (2005-2015) indicate a declining trend in boat registrations for the IRL region has been observed in the last decade. Boat registration has decreased by 13,045 or by 11 percent since 2005, while the IRL region's population has increased by 12 percent or by 115,585 residents. Much of the decline has been for boats in the 12 to 39-foot range with boat registrations in the 40-foot and larger class remaining relatively flat. The sharpest declines in boat registrations have occurred in Brevard, Volusia and St. Lucie counties.



## Missing and Incomplete Data

An economic impact analysis of this type is highly dependent on both the quantity and the quality of the available data from which conclusions can be drawn. This study is based on comprehensive information from a number of sources, including the FDEO Labor Market Statistics Center; VisitFlorida, the state's tourism development agency; and other federal, state, and local agencies.

While there is a large amount of data available that is central to completion of this analysis, there are data gaps, inconsistent methodologies across counties in documenting tourism and tourist/visitor expenditure differences in the level of detail available between jurisdictions, and differences in the manner and frequency with which data is collected and distributed. The following list of missing and incomplete data is provided as a potential tool to both increase the amount, breadth, and consistency of information to be used in future economic valuation updates for the IRL.

The environmental sustainability of the IRL and of all of Florida's waterways and ocean areas is inextricably linked to sustaining future economic activity as well. Improving the following data sources and opportunities to increase information about IRL economic activity will also improve the analytical process and the accuracy of the conclusions. A list of missing and incomplete data includes the following:

1. Many data categories and NAICS code information are not available at the block level or zip code level. Breaking down demographic and employment information at a more detailed level would make it possible to include economic activity information for the portions of Palm Beach and Volusia counties that are part of the IRL study area. **It is suggested that the State of Florida take actions necessary to record NAICS code data by zip code.**
2. While an assumed incremental value of waterfront real estate was included in a previous study, the hedonic analysis of assumed values and distances were not fully documented, and the scale and scope of this analysis was not expansive enough to document comparative values along the 300 plus miles of shoreline along the IRL. The IRL adds value to both commercial and residential real estate adjacent to and near waterfronts, but a larger study would be required to meaningfully document the full measure of that increment, or multiple location-based increments.
3. NAICS code data from FDEO, LMS, QCEW were used as the basis of the economic activities incorporated into the IMPLAN model. These data are considered the most comprehensive employment measure in economic analysis, but it is also possible that some employment categories that support IRL economic activities may not be reflected in the NAICS categories.
4. The data are not all inclusive. State labor statistics are based on employees who pay into the unemployment tax system, but do not include a portion of self-employed, part-time and seasonal workers.

5. Geography may also affect how data is captured. For example, within the commercial fishing industry it is possible that fishing boats may come to the IRL and ocean fishing grounds nearby from other Florida counties or out of state, but their employment and commercial haul information would not be captured as part of the IRL study area.
6. The significant amount of economic activity for the Defense and Aerospace industry group was considered dependent on its proximity to IRL and the Atlantic Ocean. Clearly the Kennedy Space Center and Cape Canaveral have had a profound effect on related corporate office locations, government facilities and tourism, particularly in Brevard County. However, the dependency level of these industries on an environmentally-sustained IRL was a more complex correlation to document. For this reason, the analysis includes economic impacts with and without the defense and aerospace industries.
7. At a statewide impact level of \$67 Billion (in 2015), tourism is Florida's largest single industry, both in terms of direct expenditures and indirect impacts. VisitFlorida, the official state tourism marketing and documentation agency, provides both regional and statewide data on the multiple categories of tourism impact. Within the IRL study area, however, there is a significant inconsistency in the degree of detail available on annual tourism and visitor volumes, expenditures and trends. Palm Beach County has very comprehensive data, but the bulk of the tourism activity is not in the Jupiter area, and totals were available only at the countywide level. Within the IRL study area, most of the tourism development funding made possible by the tourist tax is used for marketing purposes, not for documentation of tourist and visitor volumes, so it is not possible to understand trends and direct/indirect effects on a county-by-county basis. **It is suggested that a statewide effort be created to determine a core of tourism information to be collected at the county level annually paid for through the tourism taxes collected through VisitFlorida.** The core data should include:
  - a. total visitor volume (including both hotel-related stays and an estimate of VFRs, which are not included in hotel-based visitor documentation;
  - b. leisure and business-based visitor volumes;
  - c. average length of stay;
  - d. average party size;
  - e. primary activities motivating the stay in Florida; and
  - f. average per person and per visitor party expenditures by category
8. Over time, the cruise terminals and port authorities in the IRL study area will have data on shipping volumes, employment and other economic activities. At the time of this study, there was not sufficient information available from port authorities and terminals to document volume and trends. Because Florida has undertaken a statewide initiative to upgrade its ports in response to widening of the Panama Canal (and the larger ships and cargo volumes it will accommodate), this economic sector is likely to grow over time.
9. Recreational fishing is another major industry in Florida with permits for freshwater and saltwater fishing held by both state residents and out-of-state recreational fishermen. In order to consider expenditures for recreational fishing, the study used a report on spending released

in 2008 by NOAA and the National Marine Fisheries Agency and based on a state-by-state national survey. The size of this recreational industry in Florida suggests the impact should be included, but the data collected in 2006 is out-of-date. NOAA is currently conducting the national survey again, and the updated expenditures report is expected to be released sometime over the next one-to-two years. The future update of this analysis should include the updated information on recreational fishing expenditures in Florida.

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