

# Chapter 2: Methodology – Economic Contribution of Resident and Visitor Reef Use

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This chapter describes the methods used to estimate the economic contribution of the reef-related expenditures that were not presented in the Final Report in the interest of brevity.

## 2.1 Economic Contribution of Resident Reef Use

Recreational boating activities that use artificial and natural reefs are only possible by spending money to get to the reef (e.g., gas and oil) and payment of fees (e.g., marina storage costs) for various aspects of boating. The primary spending unit for this reef-related recreation is the boating party. While recreating on the reefs, a boating party may spend money on food and beverages from stores and/or restaurants. Because the primary objective of the boating party is to recreate on or about a reef, reef-related expenditures are those that were incurred during reef-related recreation activity. Thus, the first objective in calculating the economic contribution was to estimate total expenditures by reef users over a twelve-month period. Such expenditures support the payment of wages to workers who serve the reef-users. Thus, the economic contribution is embodied in spending that creates income and employment.

Recreational fishing from shore or from boats away from reefs would not be included in the economic contribution. Such economic contribution must be reef-related to facilitate statements regarding the importance of artificial and natural reefs in generating economic activity within the county under consideration. Without a reef system, residents and visitors would spend money in other counties with reef systems.

For residents, reefs are usually reached by private pleasure craft. Such pleasure craft are usually registered in the resident's county. Also, residents may reach the reef system by hiring private boats such as charter and party craft. In a study by Bell et al,<sup>1</sup> residents of Northwest Florida overwhelmingly used their own boats to reach the reef system while visitors used a mix of their own pleasure boats and rental craft such as charter and party boats. A direct survey of the charter and party boat industry in Northwest Florida revealed that this segment relies on visitors for 90-95 percent of their business.

To estimate the economic contribution of resident reef users, all registered pleasure boats in the county reported as of July 2000 by the Florida Department of Highway Safety and Motor Vehicles, hereinafter referred to as DHSMV,<sup>2</sup> were identified and assigned the name ALLREGB. A Glossary of ALL the abbreviated terms used in these tables and in the following model, is

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<sup>1</sup> Bell, Frederick W., Mark A. Bonn and Vernon R. Leeworthy, "Economic Impact and Importance of Artificial Reefs in Northwest Florida," Office of Fisheries Management and Assistance Service, Florida Department of Environmental Protection, Tallahassee, Florida, December 1998.

<sup>2</sup> Florida Department of Highway Safety and Motor Vehicles, "Revenue Report." July 1, 1999 to June 2000, Tallahassee, Florida. 2001.

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provided in Table A.2.1-1, at the end of Section 2.1. The Tables A.2.1-2 through Table A.2.1-13, located at the end of Section 2.1, present the results of the model for each county.

Not all registered boats in the county use the reef system so the following equation was used to obtain the number of registered boats in the county used for reef-related recreation:

(1)  $REGBTR = ALLREGB * \%16ft+ * \%REEFU$  where,

**REGBTR** = number of registered boats in the county used for recreation on reefs in the past twelve months;

**ALLREGB** = all registered boats reported by the Florida Department of Highway Safety and Motor Vehicles (DHSMV) in the county;

**%16ft+** = percent of all registered boats 16 feet and greater (as reported by DHSMV);

**%REEFU** = percent of owners of boats 16 feet and over who used the reefs for recreation in the county where they reside (from survey responses);

Equation (1) provides an estimate of the number of pleasure craft in the county that were used at least once during the last 12 months to reach an artificial and/or natural reef for the purpose of some kind of recreation such as fishing; snorkeling and scuba diving. Of the three terms on the right hand side of equation (1), two are obtained directly from the DHSMV (ALLREGB and %16ft+). When these two terms are multiplied together, the resulting calculation is the number of boats from the county under study that potentially could use the reef system. This yields a group of local pleasure craft that may or may not have used the reef system. This was the targeted sample from which the mail survey sample was taken. For Palm Beach, Broward and Miami-Dade Counties, 3,000 survey instruments were sent to this segment of ALLREGB. Due to questions added to the Monroe County survey, 3,500 mail surveys were sent to this county. The survey results were used to estimate %REEFU.

Equation (2) provides an estimate of the number of boats registered in the county that are used by reef-using residents of the county.

(2)  $RREGBT = REGBTR * \%RES$  where,

**RREGBT** = number of registered boats in county used by county residents for recreation on reefs during the past 12 months.

**%RES** = percent of all registered boats owned by residents of the county.

The term %RES was obtained from DHSMV then applied to REGBTR. This information provided an estimate of RREGBT, which is the number of resident boat owners who used their

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pleasure craft to recreate on the reefs in their county at least once during the last 12 months (i.e., Winter of 1999 to Fall of 2000).

The sample survey also yielded the number of party days per RREGBT. Each respondent using the reef system was asked how many days they had recreated on an artificial and/or natural reef over the last 12 months. Thus, the following equation yielded the total number of party days spent by residents on the county's reef system (PARTDA).

$$(3) \text{ PARTDA} = \text{RREGBT} * \text{RDAYS/BT}$$

where,

PARTDA = total number of party days spent by residents on the county's reef system;

RREGBT = the number of resident boat owners who used their pleasure craft to recreate on the reefs in their county at least once during the last 12 months (From Equation (2));

RDAYS/BT = average reef party days per boat over the last 12 months (from survey responses).

Equation (3) translates a stock of pleasure craft into the number of "party" days spent per year on the reef system. For example, if 1,000 pleasure craft were used to recreate on the reef system in the last 12 months and, if on average, the craft was used on the County's reef system 20 party days per year, then 20,000 is the estimate for PARTDA in equation (3).

Of the 20 party days that the individual craft was used on the reef system in the discussion above, the respondents or reef-users were asked to break these days down into the following recreational categories:

$$(4) \text{ PARTDAF} = \% \text{ SALTF} * \text{PARTDA} \quad (\text{FISHING})$$

$$(5) \text{ PARTDAS} = \% \text{ SALTS} * \text{PARTDA} \quad (\text{SNORKELING})$$

$$(6) \text{ PARTDAD} = \% \text{ SALTD} * \text{PARTDA} \quad (\text{SCUBA DIVING})$$

where,

PARTDAF = Estimated number of party days engaged in saltwater fishing on reefs;

PARTDAS = Estimated number of party days engaged in saltwater snorkeling on reefs;

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PARTDAD	= Estimated number of party days engaged in saltwater scuba diving on reefs.
%SALTF	= Percent of total reef days devoted to saltwater fishing (from survey responses).
%SALTS	= Percent of total reef days devoted to saltwater snorkeling (from survey responses).
%SALTD	= Percent of total reef days devoted to saltwater scuba diving (from survey responses).

where the last three terms above add to 100%.

Equations (4)-(6) provide a breakdown of the total party days spent on the reef system over the last 12 months by type of recreational activity: fishing, snorkeling and scuba diving. The reason for this was two fold. First, it was important to better define the kinds of recreation while using the reef system. Second, it was believed that the spending per party might vary with the kind of recreation pursued on the reef system. This would give an idea of just how the economic contribution might vary depending upon the particular recreational use of the reef system. That is, an artificial reef might be constructed primarily for fishers who may spend more per party day in the local economy than those engaged in snorkeling.

The next important element in estimating the economic contribution is the primary spending unit, which is the recreational party. In Bell et al (1998), it was recognized that spending by residents was complicated in that residents of interior or other coastal counties may be a part of the primary spending unit. Such expenditures would be by visitors to the individual county and not by residents. A party in the Florida Keys might consist of the resident boat owner and her uncle Harry and aunt Laura from Michigan. Some areas attract relatives more than others, but some downward adjustment must be made to “net-out” visitor spending from resident spending. For each of the recreational activities on reefs discussed above, the total party size and the number in the total party that are residents of the county under study were analyzed. This information was requested from the respondents to the mail survey. In addition, they were asked to give the total party spending per day whether resident or visitor. Then, the following three equations were used to estimate total spending by recreational activity for residents only:

- (7)  $\$EXPENF = \$EPPDF * \% \text{ IN COUNTF} * PARTDAF$  (FISHING)
- (8)  $\$EXPENS = \$EPPDS * \% \text{ IN COUNTS} * PARTDAS$  (SNORKELING)
- (9)  $\$EXPEND = \$EPPDD * \% \text{ IN COUNTD} * PARTDAD$  (SCUBA DIVING)

where,

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\$EXPENF	= Total reef-related expenditures on fishing (\$ million);
\$EXPENS	= Total reef-related expenditures on snorkeling (\$ million);
\$EXPEND	= Total reef-related expenditures on scuba diving (\$ million);
\$EPPDF	= Expenditures per party per day on reef-related fishing;
\$EPPDS	= Expenditures per party per day on reef-related snorkeling;
\$EPPDD	= Expenditures per party per day on reef-related scuba diving
%IN COUNTF	= Percent of fishing party that represents residents of the county under study;
%IN COUNTS	= Percent of snorkeling party that represents residents of the county under study;
%IN COUNTD	= Percent of scuba diving party that represents residents of the county under study;

PARTDAF; PARTDAS and PARTDAD = from equations (4) through (6) above.

It is possible that visitors may pay less than their share of the total party spending since there are a lot of fixed costs such as marina fees, which the local resident would probably pay. However, uncle Harry from Michigan, as discussed above, may pick up the entire restaurant check. It was well beyond the scope of this study to pursue individual expenditures by first residents and then visitors. These estimates are believed to be conservative and err on the side of understating resident spending on reef-related activities.

Survey respondents were also asked to breakdown their recreational days by reef type. Thus, based upon the percent of days spent on artificial and natural reefs respectively, the spending on each kind of reef can be estimated by dividing equations (7) through (9) into artificial and natural reef use. It was assumed that the expenditures per party day would be the same whether one were fishing on an artificial reef or a natural reef. This was obvious from the expenditure categories where marina storage; gas and oil and spending on food and beverages consumed about 75 percent of total party day spending. That is, costs such as marina storage will be the same whether you are reef fishing or not. It certainly should not vary with the kind of reef one chooses. Any difference in expenditures per party between reef types would come from very small samples since reef users must first be divided into the kind of recreation first (e.g., fishing).

The survey respondents were asked to break down their total party spending per day into 12 spending categories. Each type of expenditure may create a different impact on income and employment. For example, restaurants are very labor intensive (i.e., require a lot of labor per

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dollar of sales) while gasoline stations are very capital intensive (i.e., require little labor per dollar of sales). Thus, residents who spend proportionately more money on food and drink as opposed to gas and oil will create more local jobs than if the opposite situation existed. This is why a breakdown of the reef-users expenditure pattern is important.

From the U.S. Census of Business, 12 spending categories were matched to the appropriate industrial categories called NAICS – North American Industrial Classification System – to obtain the percent of sales paid as wages and the sales-to-employment ratios for each industry. This external data set was a useful resource in the estimation of the wage and employment impact of reef user spending in each county. The following equations were used:

$$(10) \text{ EMPLOYF} = (\$EXPENF) / \$S/E \quad (\text{FISHING})$$

$$(11) \text{ EMPLOY S} = (\$EXPENS) / \$S/E \quad (\text{SNORKELING})$$

$$(12) \text{ EMPLOYD} = (\$EXPEND) / \$S/E \quad (\text{SCUBA DIVING})$$

where,

EMPLOYF = Employment generated in county under study by reef-using fishers;

EMPLOY S = Employment generated in county under study by reef-using snorkelers;

EMPLOYD = Employment generated in county under study by reef-using scuba divers;

\$EXPENF; \$EXPENS; and \$EXPEND. From Equations (7) through (9)

\$S/E = Sales-to-employment ratios, by NAICS Industry categories matched to spending categories for each activity.

The first term on the right hand side of equation (10) was taken from equation (7), which is the estimated total spending by residents who fish on or near the reefs in the county under study. For each of the 12 categories of spending under \$EXPENF, employment generated in that category was estimated by dividing the amount spent for that category by the category's ratio of sales to employment adjusted to 2000 dollars. When summed over all spending categories, this yielded the aggregate employment generated from reef-related spending. This was done for fishing, snorkeling and scuba diving as provided in equations (10), (11) and (12). Readers interested in expenditures on individual items, may review the Final Report or the tables at the end of this chapter.

The wages generated from the hiring of the employees estimated in equations (10) through (12) were obtained using the U.S. Census of Business (1997) data that correspond to the 12 individual spending categories for each recreational activity as follows:

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$$(13) \$WAGEF = \%WAGE * \$EXPENF \quad (\text{FISHING})$$

$$(14) \$WAGES = \%WAGE * \$EXPENS \quad (\text{SNORKELING})$$

$$(15) \$WAGED = \%WAGE * \$EXPEND \quad (\text{SCUBA DIVING})$$

Where,

$\$WAGEF$  = Wages generated by expenditures of reef-using fishers;

$\$WAGES$  = Wages generated by expenditures of reef-using snorkelers;

$\$WAGED$  = Wages generated by expenditure of reef-using scuba divers;

$\%WAGE$  = Wages as a percent of sales, by NAICS Industry categories matched to spending categories.

$\$EXPENF$ ;  $\$EXPENS$  and  $\$EXPEND$ . From Equations (7) through (9)

Finally, the total economic contribution of resident recreational activities on all reefs was obtained by addition of the above equations as follows:

TOTAL SPENDING BY RESIDENT REEF USERS:

$$(16) SPEND = \$EXPENF + \$EXPENS + \$EXPEND$$

TOTAL EMPLOYMENT GENERATED BY RESIDENT REEF USERS:

$$(17) EMPLOY = EMPLOYF + EMPLOY S + EMPLOY D$$

TOTAL WAGES GENERATED BY RESIDENT REEF USERS:

$$(18) WAGE = \$WAGEF + \$WAGES + \$WAGED$$

Equations (16) through (18) show aggregate spending by reef users and the wages and employment they generate for the county under analysis. These totals and components are contained in each chapter of the Final Report.

The survey respondents were asked to break down all of their recreational activities discussed above by whether they took place on artificial reefs or natural reefs. They did this by breaking their total days fishing, for example, into how many days were spent on artificial versus natural reefs versus no reefs. Thus, the economic model was actually more elaborate than presented above because there was a partitioning of the spending by reef type. For example, this led to the

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assignment of total spending, wages and employment in equations (16) through (18) into the two types of reefs. In general, about two-thirds of the economic contribution was due to natural reef use while one-third was due to artificial reef use among the four counties under study in Southeast Florida.



**Table A.2.1-1**  
**Glossary of Abbreviated Terms Used in This Section, Resident Reef-User Economic Contribution**

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\$EPPDD	expenditures per party per day on reef-related scuba diving.
\$EPPDF	expenditures per party per day on reef-related fishing.
\$EPPDS	expenditures per party per day on reef-related snorkeling.
\$EXPEND	total reef-related expenditures on scuba diving (\$ Million).
\$EXPENF	total reef-related expenditures on fishing (\$ Million).
\$EXPENS	total reef-related expenditures on snorkeling (\$ Million).
\$S/E	sales-to-employment ratios by NAICS Industry categories matched to spending categories
% 16ft+	percent of all registered boats 16 feet and greater.
% ARTRED	percent of total diving days on artificial reefs.
% ARTREF	percent of total fishing days on artificial reefs.
% ARTRES	percent of total snorkeling days on artificial reefs.
% IN COUNTD	percent of scuba diving party that represents residents from the county under study.
% IN COUNTF	percent of fishing party that represents residents from the county under study.
% IN COUNTS	percent of snorkeling party that represents residents from the county under study.
% NATRED	percent of total diving days on natural reefs.
% NATREF	percent of total fishing days on natural reefs.
% NATRES	percent of total snorkeling days on natural reefs.
% REEFU	percent of owners of boats 16 feet and over who used the reefs for recreation in the county where they reside.
% RES	percent of all registered boats owned by residents of the county.
% SALTD	percent of total reef days devoted to saltwater scuba diving.
% SALTF	percent of total reef days devoted to saltwater fishing.
% SALTS	percent of total reef days devoted to saltwater snorkeling.
% WAGE	wages as a percent of sales by NAICS Industry categories matched to spending categories.
ALLREGB	all registered boats reported by the Florida DHSMV in the county.
DAYARTD	party days spent diving on artificial reefs.
DAYARTF	party days spent fishing on artificial reefs.
DAYARTS	party days spent snorkeling on artificial reefs.
DAYNATD	party days spent diving on natural reefs.

**Table A.2.1-1  
Glossary of Abbreviated Terms Used in This Section, Resident Reef-User Economic Contribution**

DAYNATF	party days spent fishing on natural reefs.
DAYNATS	party days spent snorkeling on natural reefs.
EMPLOY	aggregate employment generated by resident reef users – for All activities.
EMPLOYD	employment generated in county under study by reef-using scuba divers (number of full and part-time jobs).
EMPLOYF	employment generated in county under study by reef-using fishers (number of full and part-time jobs).
EMPLOYSS	employment generated in county under study by reef-using snorkelers (number of full and part-time jobs).
NAICS	North American Industrial Classification System – used to obtain the percent of sales paid as wages and the sales-to-employment ratios for each industry.
PARTDA	total number of party days spent by residents on the County’s reef system.
PARTDAD	estimated number of party days engaged in saltwater scuba diving on reefs.
PARTDAF	estimated number of party days engaged in saltwater fishing on reefs.
PARTDAS	estimated number of party days engaged in saltwater snorkeling on reefs.
RDAYSBT	average reef party days per boat over the last 12 months.
REGBTR	number of registered boats in county used for recreation on the reef system in the past twelve months.
RREGBT	number of registered boats in county used by county residents for recreation on the reefs during the past twelve months.
SPEND	aggregate spending derived from resident reef users – for All activities (\$ Million).
WAGE	aggregate wages generated by resident reef users – for All activities.
WAGED	wages generated by expenditures of reef-using scuba divers (\$ Million).
WAGEF	wages generated by expenditures of reef-using fishers (\$ Million).
WAGES	wages generated by expenditures of reef-using snorkelers (\$ Million).

## 2.2 Economic Contribution of Visitor Reef Use

The methods used to estimate reef use and reef-related expenditures by visitors to each county are provided in the Final Report. This Section describes how the visitor reef-related expenditures were used to estimate the countywide sales, income, and employment, generated by reef use for each county. Total economic contribution is defined for purposes of this study as the direct, indirect and induced sales, total income<sup>3</sup>, employment<sup>4</sup> and indirect business taxes generated from reef use<sup>5</sup>. Hazen and Sawyer utilized the IMPLAN Model<sup>6</sup> to estimate the economic contribution for Palm Beach, Broward and Miami-Dade Counties as described in Section 2.2.1 of this Technical Appendix. An alternative method was used to estimate the economic contribution of reef-related activities by visitors to Monroe County and is described in Section 2.2.2 of this Technical Appendix.

### 2.2.1 Method for Estimating Economic Contribution – Palm Beach, Broward and Miami-Dade Counties

The economic contributions of reef-related recreation by visitors to Palm Beach, Broward and Miami-Dade counties were estimated using the IMPLAN Model as follows. The Visitor Boater Survey asked respondents how much money they and members of their party spent on their last day that they participated in fishing, scuba diving and snorkeling in the county by expenditure category. The respondent was also asked how many people spent or benefited from those expenditures. This information was used to estimate the average expenditure per person per fishing day, snorkeling day and scuba diving day and by boating mode. The average expenditures per person per day were then multiplied by the number of person-days by boating mode and reef type to obtain an estimate of the total itemized expenditures associated with reef related activities during the 12-month period 2000-2001. Per person and total itemized expenditures for each county are summarized in Tables 2.2.2-1 through 2.2.2-8 in the Final Report.

The reef-related visitor expenditures were then used to estimate the economic contribution of artificial and natural reefs to each of the counties. Expenditures by visitors generate income and jobs within industries that supply reef-related goods and services, such as charter/ party boat operations, restaurants and hotels. These industries are called direct industries. In addition, these expenditures create multiplier effects wherein additional income and employment is created, as the income earned by the reef-related industries is re-spent within the county. These additional effects of reef-related expenditures are called indirect and induced. Indirect effects are generated as the reef-related industries purchase goods and services from other industries in the

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<sup>3</sup> Total income includes wages, salaries and benefits paid to employees and payments received by self-employed individuals as labor. In addition, income includes “other property income” that consists of rents, royalties and dividends.

<sup>4</sup> Includes full and part-time employment.

<sup>5</sup> Indirect business taxes include excise taxes, property taxes, fees, licenses and sales taxes paid by businesses.

<sup>6</sup> IMPLAN Pro Model, Version 2.0, Minnesota IMPLAN Group, Inc., Stillwater, Minnesota. Data represent 1998 economic conditions.

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county. Induced effects are created when employees of the direct and indirect industries spend their money in the county.

The IMPLAN Model for Broward, Palm Beach and Miami-Dade counties was used to estimate the total economic contribution of reef-related expenditures. IMPLAN uses an input/output approach to evaluate the relationships within an economy. This includes the relationship between businesses and final consumers as well as among businesses. The model captures all monetary market transactions from consumption in a given period of time. With input/output analysis, mathematical formulas are used to predict how changes in spending within a county will impact the entire county economy.

There are two aspects of the IMPLAN Model that are important to evaluate economic contributions. First, IMPLAN provides a *descriptive model* that includes information on countywide economic transactions. This information is organized in *regional economic accounts*. The descriptive model also describes the movement of goods and services within and outside the county or region (*called regional trade flows*). Finally, the descriptive model includes a series of *social accounts* that describe non-industrial transactions within a region such as taxes paid by businesses and households, and government payments to these entities.

A second important aspect of the IMPLAN Model is the *predictive model*. The predictive model is used to estimate economic multipliers that describe the response in the economy to a stimulus (e.g. direct expenditures by reef visitors). The multipliers are mathematically derived by IMPLAN using a Leontief Inverse and are used to estimate indirect and induced affects.

To use the IMPLAN Model to estimate the economic contribution of reef-related activities required a series of steps. First, the itemized expenditures estimated for each county were matched to industries included in the IMPLAN Model as summarized in Table A.2.2-1

**Table A.2.2-1  
Expenditures Categories as Applied to IMPLAN Model Sectors**

IMPLAN Sector Number	IMPLAN Sector	Reef Expenditure Categories Applied to Each Sector
436	Transportation - Water	Bait, Tackle, Ice, Ramp Fees, Marina Fees
450	Food Stores	Food and Beverages – Stores
451	Auto Service Stations	Auto Gas, Boat Fuel
454	Eating and Drinking	Food and Beverages - Restaurants/Bars
455	Miscellaneous Retail	Shopping
463	Hotels and Lodging	Lodging, Camping Fees

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477	Auto Rental and Leasing	Auto Rental
488	Amusement and Recreational Services	Charter/Party Boat Fee, Boat Rental, Air Refills, Equipment Rentals, Glass Bottom Boat Rides

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Next, the direct expenditures were converted to dollar values that represent the year of the data used by the IMPLAN Model to generate the multipliers. In this case, all direct sales made in 2000 were converted to 1998 dollars. The estimated economic contributions were then converted back to 2000 dollars.

In addition, a series of margins were applied to the expenditures for retail items to convert purchaser prices to producer prices because multipliers are based on producer prices. For example when a household buys a retail item, only a portion of the total expenditure will go directly to the retailer. The rest will go to the industries that produced the good. For retail industries only, purchaser prices are greater than producer prices. Therefore the expenditures on retail items were adjusted to represent producer prices.

Economic contributions for each county were estimated by multiplying the direct expenditures that contribute to the economies of each county by the appropriate I-O multipliers. The resulting values for sales, income and indirect business taxes were then converted to represent year 2000 dollars. The economic contribution for Palm Beach, Broward and Miami-Dade Counties are summarized in Tables 2.2.2-9 through 2.2.2-11 in the Final Report.

### 2.2.2 Economic Contribution of Visitors to Monroe County

The economic contribution to Monroe County from reef related expenditures by visitors was estimated as follows using a different approach than was used for the other counties. The IMPLAN model was not used for Monroe County because the research team has had problems calibrating the IMPLAN Model for Monroe County during previous projects.

The Monroe County approach utilized several ratios on economic measures derived from data published by the U.S. Census (1997 Economic Census) and the Bureau of Economic Analysis. The first two ratios used in this analysis were the direct wage-to-direct sales and direct wages-to-direct employment for Monroe County as derived in Table A.2.2.2-1<sup>7</sup>. Total annual sales, payroll and employment by industry were taken from the 1997 Economic Census for Monroe County for industries providing the reef-related goods and services and are summarized in columns 1 through 5. Column 6 summarizes the direct wage-to-direct sales ratio for each industry and was calculated by dividing total payroll (wages and salaries) per industry by total annual sales. Column 7 provides the direct wages-to-direct employment ratio, which was calculated by dividing total payroll by total employment for each industry.

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<sup>7</sup> For this analysis, the term wages is defined as wages and salaries and does not include proprietors' income.

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In addition, two other ratios calculated in Table A.2.2.2-2 were important to this analysis. This included the countywide total income-to-wage and salaries ratio and the countywide proprietor's income-to-proprietor's employment ratio. Both of these ratios were calculated for Monroe County using data from the U.S. Bureau of Economic Analysis for 1997.

These ratios were used to estimate the total income and employment contributions to Monroe County from visitor expenditures as follows.

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**Table A.2.2.2-1**  
**Derivation of Direct Wages-to-Direct Sales and Direct Wages-to-Direct Employment Ratios for Monroe County, 1997<sup>1</sup>**

NAICS Code	Industry	Sales (\$1,000)	Annual Payroll (\$1,000) <sup>2</sup>	Paid Employees	Wages-to-Sales-Ratio	Wages-to-Employment Ratio
(1)	(2)	(3)	(4)	(5)	(6) = (4) / (3)	(7) = (4) / (5) * 10 <sup>3</sup>
721	Hotels and Motels	\$569,086	\$151,297	10,939	0.2659	\$13,831
N/A	Automotive Rental <sup>3</sup>	N/A	N/A	N/A	0.1524	\$19,577
445	Food Stores	\$233,474	\$21,961	1,561	0.0941	\$14,069
447	Gasoline Stations	\$83,127	\$5,829	384	0.0701	\$15,180
722	Eating and Drinking Places	\$233,198	\$62,955	5,831	0.2700	\$10,797
453	Miscellaneous Retail	\$49,242	\$9,355	650	0.1900	\$14,392
713	Amusement and Recreational Services	\$46,243	\$11,177	667	0.2417	\$16,757

<sup>1</sup> Data by industry was taken from the 1997 Economic Census: Monroe County, Florida, U.S. Census Bureau. The data in this table reflect total sales, payroll and employees for businesses with employees. Non-employee businesses are not included in this table.

<sup>2</sup> Annual payroll includes wages and salaries but does not include proprietors' income.

<sup>3</sup> The breakdown of industries provided in the 1997 Economic Census did not include a category for Auto Rentals and Leasing. Therefore the wage-to-sales and wages-to-employment ratios were taken from a previous study by Leeworthy, December 1996 that estimated these ratios for Monroe County.

**Table A.2.2.2-2**  
**Derivation of Direct Income-to-Wages and Salaries Ratio for Monroe County**

<b>(1)</b>	Employment by Place of Work (1) = (2) + (3)	51,305
<b>(2)</b>	Wages and Salary Employment	40,104
<b>(3)</b>	Proprietor's Employment	11,201
<b>(4)</b>	Wage & Salaries and Other Labor Income (\$1,000)	\$1,046,181
<b>(5)</b>	Proprietor's Income (\$1,000)	\$170,154
<b>(6)</b>	Total Income by Place of Work (\$1,000) (6) = (4) + (5)	\$1,216,335
<b>(7)</b>	<b>Direct Income-to-Wages &amp; Salaries Ratio (7) = (6)/(4)</b>	<b>1.163</b>
<b>(8)</b>	<b>Proprietor's Income-to-Proprietor's Employment Ratio (8) = (5)/(3)</b>	<b>\$15,191</b>

Bureau of Economic Analysis, 1997

**Direct Wages & Salaries and Direct Employment.** The direct wages and salaries associated with visitor spending were estimated by multiplying the direct wage-to-direct sales ratio for each industry by the itemized expenditures by visitors as shown in Table A.2.2.2-3 for artificial reefs and Table A.2.2.2-4 for natural reefs. The direct employment due to visitor spending is also estimated in these tables by dividing direct wages and salaries (column 4) by the direct wages-to-direct employment ratio (column 5).



Table A.2.2.2-3

## Derivation of Direct Wages, Salaries and Direct Employment From Visitor Expenditures in Monroe County – Artificial Reefs

Expenditure Category	Total Visitor Expenditures	Wage-to-Sales Ratio (Direct)	Direct Wages and Salaries	Wages-to-Employment Ratio (Direct)	Direct Employment
(1)	(2)	(3)	(4) = (2) * (3)	(5)	(6) = (4) / (5)
Transportation - Water	\$7,626,791	0.2417	\$1,843,407	\$16,757	110
Food Stores	\$9,326,234	0.0941	\$877,243	\$14,069	62
Auto Service Stations	\$12,966,536	0.0701	\$909,234	\$15,180	60
Eating and Drinking	\$11,142,883	0.2700	\$3,008,174	\$10,797	279
Miscellaneous Retail	\$7,228,354	0.1900	\$1,373,243	\$14,392	95
Hotels and Lodging	\$18,552,984	0.2659	\$4,932,490	\$13,831	357
Auto Rental and Leasing	\$1,875,831	0.1524	\$285,877	\$19,577	15
Amusement and Recreational Services	\$4,636,973	0.2417	\$1,120,763	\$16,757	67
<b>Total</b>	<b>\$73,356,586</b>		<b>\$14,350,431</b>		<b>1,044</b>

**Table A.2.2.2-4**  
**Derivation of Direct Wages, Salaries and Direct Employment From Visitor Expenditures in Monroe County – Natural Reefs**

<b>Expenditure Category</b>	<b>Total Expenditures</b>	<b>Wage-to-Sales Ratio (Direct)</b>	<b>Direct Wages and Salaries</b>	<b>Wages-to-Employment Ratio (Direct)</b>	<b>Direct Employment</b>
Transportation - Water	\$16,854,888	0.2417	\$4,073,851	\$16,757	243
Food Stores	\$27,085,778	0.0941	\$2,547,739	\$14,069	181
Auto Service Stations	\$31,189,681	0.0701	\$2,187,071	\$15,180	144
Eating and Drinking	\$39,515,821	0.2700	\$10,667,838	\$10,797	988
Miscellaneous Retail	\$24,573,805	0.1900	\$4,668,534	\$14,392	324
Hotels and Lodging	\$65,463,748	0.2659	\$17,404,169	\$13,831	1,258
Auto Rental and Leasing	\$7,959,339	0.1524	\$1,213,003	\$19,577	62
Amusement and Recreational Services	\$32,518,977	0.2417	\$7,859,884	\$16,757	469
<b>Total</b>	<b>\$245,162,036</b>		<b>\$50,622,088</b>		<b>3,669</b>

## 2.0 Methodology – Economic Contribution of Resident and Visitor Reef Use

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**Total Sales, Income and Employment.** To estimate total sales required two steps. First, total expenditures for all industries (\$73 million for artificial reefs and \$245 million for natural reefs) were multiplied by the percentage of inputs that are purchased locally in Monroe County (.70).<sup>8</sup> An output multiplier<sup>9</sup> of 1.6 was then multiplied by the in-county sales to derive total direct, indirect and induced sales from reef-related visitor expenditures as summarized in Table A.2.2.2-5 for artificial reefs and Table A.2.2.2-6 for natural reefs.

**Table A.2.2.2-5  
Derivation of Total Sales Generated by Reef-Related  
Activities in Monroe County - Artificial Reefs**

1	Total Visitor Expenditures	\$73,356,586
2	Percent of Inputs Purchased Locally	0.7
3	Direct Sales (3) = (1) x (2)	\$51,349,610
4	Output Multiplier	1.6
5	<b>Total Sales (5) = (3) x (4)</b>	<b>\$82,159,376</b>

**Table A.2.2.2-6  
Derivation of Total Sales Generated by Reef-Related  
Activities in Monroe County - Natural Reefs**

1	Total Visitor Expenditures	\$245,162,036
2	Percent of Inputs Purchased Locally	0.7
3	Direct Sales (3) = (1) x (2)	\$171,613,426
4	Output Multiplier	1.6
5	<b>Total Sales (5) = (3) x (4)</b>	<b>\$274,581,481</b>

Estimating total income also required two steps. First, the direct wages and salaries calculated in Tables A.2.2.2-3 and A.2.2.2-4 for artificial and natural reefs were multiplied by the direct income-to-wages and salaries ratio (1.163) from Table A.2.2.2-2. This yields an estimate of total direct income to workers and proprietors. Next, total direct income was multiplied by the income multiplier (1.6)<sup>10</sup>, to obtain total direct, indirect and induced income from visitor reef-related expenditures in Monroe County. Total income associated with artificial and natural reefs is summarized in Tables A.2.2.2-7 and A.2.2.2-8, respectively.

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<sup>8</sup> This percentage was taken from the study by Leeworthy (December 1996).

<sup>9</sup> The output multiplier was taken from Leeworthy, (December 1996).

<sup>10</sup> The income multiplier was taken from Leeworthy, (December 1996).

**Table A.2.2.2-7  
Derivation of Total Income Generated by Reef-Related Activities in  
Monroe County - Artificial Reefs**

Direct Wages & Salary Income	\$14,350,431
Direct Income-to-Wages & Salaries Ratio	1.1626
Total Direct Income (wages, salaries and proprietors' income)	\$16,684,428
Income Multiplier	1.6
Total Income	\$26,695,085

**Table A.2.2.2-8  
Derivation of Total Income Generated by Reef-Related Activities in  
Monroe County - Natural Reefs**

Direct Wages & Salaries Income	\$50,622,088
Direct Income-to-Wages & Salaries Ratio	1.1626
Total Direct Income (wages, salaries and proprietors' income)	\$58,855,416
Income Multiplier	1.6
Total Income	\$94,168,665

Finally, several steps were taken to estimate the total employment contribution from visitor expenditures in Monroe County as follows. First, direct wage and salary employment, estimated in Tables A.2.2.2-3 and A.2.2.2-4, was multiplied by the employment multiplier, to get total wage and salary employment. (1.6).<sup>11</sup> Next, proprietor employment was estimated by dividing proprietors' income by the proprietor's income-to-employment ratio from Table A.2.2.2-2. Then direct proprietor employment was multiplied by the employment multiplier to get total proprietor employment. Total wage and salary employment was then added to total proprietor employment to get an estimate of the total direct, indirect and induced employment generated by reef-related activities. This derivation is summarized in Tables A.2.2.2-9 and A.2.2.2-10 for artificial and natural reefs.

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<sup>11</sup> The employment multiplier was taken from Leeworthy (December 1996).

## 2.0 Methodology – Economic Contribution of Resident and Visitor Reef Use

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**Table A.2.2.2-9  
Derivation of Total Employment Generated by Reef-Related Activities in  
Monroe County - Artificial Reefs**

Direct Wage & Salary Employment	1,044
Employment Multiplier	1.6
Total Wage and Salary Employment <sup>12</sup>	1,670
Proprietor's Employment	
Proprietor's Income (Direct Income minus wages & salaries)	\$2,333,997
Proprietor's Income-to-Employment Ratio	\$15,191
Proprietor's Employment (Direct)	154
Employment Multiplier	1.6
Proprietor's Employment (Total) <sup>10</sup>	246
Total Employment (Direct, Indirect and Induced)	
Wage & Salary	1,670
Proprietor	246
<b>Total Employment Generated</b>	<b>1,916</b>

**Table A.2.2.2-10  
Derivation of Total Employment Generated by Reef-Related Activities  
in Monroe County - Natural Reefs**

Direct Wage & Salary Employment	3,669
Employment Multiplier	1.6
Total Wage and Salary Employment <sup>13</sup>	5,870
Proprietor's Employment	
Proprietor's Income (Direct Income minus wages & salaries)	\$8,233,328
Proprietor's Income-to-Employment Ratio	\$15,191
Proprietor's Employment (Direct)	542
Employment Multiplier	1.6
Proprietor's Employment (Total) <sup>11</sup>	867
Total Employment (Direct, Indirect and Induced)	
Wages & Salary	5,870
Proprietor	867
<b>Total Employment Generated</b>	<b>6,737</b>

<sup>12</sup> This includes Direct, Indirect and Induced Wage and Salary Employment.

<sup>13</sup> This includes Direct, Indirect and Induced Wage and Salary Employment.

TABLE A.2.1-2 (Residents)										
ESTIMATION OF THE NUMBER OF PARTY-DAYS AND PERSON-DAYS SPENT USING REEFS, BY "RESIDENTS" IN PALM BEACH COUNTY, FLORIDA - 2000										
DISTRIBUTION OF BOATING PARTY DAYS BY ACTIVITY: FISHING, SNORKELING & DIVING										
REGBTR	%RES=	RREGBT	RDAYS/BT	TOTAL PARTY DAYS (PARTDA)	%SALTF	PARTDAF	%SALTS	PARTDAS	%SALTD	PARTDAD
19,561	0.995	19,463	40.00	778,532	0.52	404,837	0.21	163,492	0.27	210,204
				START HERE:	ALLREGB	%16FT+	%REEFU	REGBTR		
					56,924	0.64	0.54	19,561		
DISTRIBUTION OF PARTY DAYS BY ACTIVITY AND REEF TYPE										
ESTIMATED PARTY DAYS FISHING ON REEFS:										
%ARTREF	%NATREF	DAYARTF	DAYNATF	TOTAL PARTY DAYS (PARTDAF)						
0.36	0.64	145,741	259,095	404,837						
% OF TIME QUESTION										
0.33	0.62		CONSISTENT							
ESTIMATED PARTY DAYS SNORKELING ON REEFS:										
%ARTRES	%NATRES	DAYARTS	DAYNATS	TOTAL PARTY DAYS (PARTDAS)						
0.47	0.53	76,841	86,651	163,492						
ESTIMATED PARTY DAYS DIVING ON REEFS:										
%ARTRED	%NATRED	DAYARTD	DAYNATD	TOTAL PARTY DAYS (PARTDAD)						
0.28	0.72	58,857	151,347	210,204						
ESTIMATION OF RESIDENT PERSON DAYS BY ACTIVITY AND REEF TYPE										
ACTIVITY OR REEF TYPE	TOTAL PARTY DAYS	RESIDENT PARTY SIZE	TOTAL RESIDENT PERSON DAYS							
<b>FISHING</b>	404,837	3.83	<b>1,550,524</b>							
Artificial Reef	145,741	3.83	558,189							
Natural Reef	259,095	3.83	992,336							
<b>SNORKELING</b>	163,492	3.77	<b>616,364</b>							
Artificial Reef	76,841	3.77	289,691							
Natural Reef	86,651	3.77	326,673							
<b>DIVING</b>	210,204	3.86	<b>811,386</b>							
Artificial Reef	58,857	3.86	227,188							
Natural Reef	151,347	3.86	584,198							
<b>Grand Total Resident Person-Days:</b>			<b>2,978,274</b>							

TABLE A.2.1-3 (Residents)							
PALM BEACH COUNTY RESIDENT BOATER SPENDING PER PARTY-DAY; WAGES AND EMPLOYMENT BY ACTIVITY AND EXPENDITURE CATEGORY							
<b>FISHING PARTY DAYS (PARTDAF):</b>				404,837			
<b>FISHING ACTIVITY SCENARIO (F)</b>				<b>%INCOUNTF=</b>	0.79		
CATEGORY	\$EPPDF (Dollars)	\$EXPENF (\$Million)	\$S/E	EMPLOYF (Persons)	%WAGE	\$WAGEF (\$Million)	NAICS NUMBER
B.FUEL	93.98	30.06	0.31	96	0.05	1.43	447
BAIT	26.98	8.63	0.14	62	0.13	1.10	4511102
TACKLE	26.45	8.46	0.14	61	0.13	1.08	4511102
ICE	8.23	2.63	0.31	8	0.05	0.13	447
FOD/STO	25.89	8.28	0.14	60	0.11	0.87	445
FOD/RES	26.77	8.56	0.04	228	0.27	2.35	722
GAS AUT	14.76	4.72	0.32	15	0.05	0.23	447
BT.RAMP	10.00	3.20	0.11	29	0.17	0.55	71393
MAR FEE	75.00	23.99	0.11	214	0.17	4.09	71393
EQ.RENT	0.00	0.00	0.15	0	0.14	0.00	532292
SUNDR	9.36	2.99	0.15	19	0.09	0.28	452
OTHER	60.02	19.20	0.15	124	0.10	1.85	452
<b>TOTAL</b>	<b>377.44</b>	<b>120.71</b>	<b>0.13</b>	<b>917</b>	<b>0.12</b>	<b>13.96</b>	
<b>SNORKELING PARTY DAYS (PARTDAS):</b>				163,492			
<b>SNORKELING ACTIVITY SCENARIO (S)</b>				<b>%INCOUNTS=</b>	0.80		
CATEGORY	\$EPPDS (Dollars)	\$EXPENS (\$Million)	EMPLOY S (Persons)	\$WAGES (\$Million)			
B.FUEL	46.42	6.07	19	0.29			
BAIT	0.43	0.06	0	0.01			
TACKLE	1.60	0.21	2	0.03			
ICE	8.44	1.10	4	0.05			
FOD/STO	24.46	3.20	23	0.34			
FOD/RES	24.90	3.26	87	0.89			
GAS AUT	19.13	2.50	8	0.12			
BT.RAMP	1.74	0.23	2	0.04			
MAR FEE	41.08	5.37	48	0.92			
EQ.RENT	2.12	0.28	2	0.04			
SUNDR	8.92	1.17	8	0.11			
OTHER	19.18	2.51	16	0.24			
<b>TOTAL</b>	<b>198.42</b>	<b>25.95</b>	<b>218</b>	<b>3.07</b>			
<b>SCUBA DIVING PARTY DAYS (PARTDAD):</b>				210,204			
<b>SCUBA DIVING ACTIVITY SCENARIOS (D)</b>				<b>%INCOUNTD=</b>	0.85		
CATEGORY	\$EPPDD (Dollars)	\$EXPEND (\$Million)	EMPLOYD (Persons)	\$WAGED (\$Million)			
B.FUEL	75.49	13.49	43	0.64			
BAIT	2.67	0.48	3	0.06			
TACKLE	10.74	1.92	14	0.25			
ICE	6.03	1.08	3	0.05			
FOD/STO	19.35	3.46	25	0.36			
FOD/RES	23.74	4.24	113	1.16			
GAS AUT	9.96	1.78	6	0.08			
BT.RAMP	2.36	0.42	4	0.07			
MAR FEE	31.64	5.65	51	0.96			
EQ.RENT	24.66	4.41	29	0.62			
SUNDR	6.94	1.24	8	0.12			
OTHER	59.82	10.69	69	1.03			
<b>TOTAL</b>	<b>273.40</b>	<b>48.85</b>	<b>368</b>	<b>5.42</b>			

**TABLE A.2.1-4 (Residents)**

**PALM BEACH COUNTY SUMMARY OF RESIDENT BOATER SPENDING, WAGES AND EMPLOYMENT GENERATED - BY ACTIVITY AND REEF TYPE**

SUMMARY-ARTIFICIAL REEF				SUMMARY-NATURAL REEF				SUMMARY-ALL ACTIVITIES			
ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)
FISH	43.5	5.0	330	FISH	77.3	8.9	587	FISH	120.7	14.0	917
SNORKEL	12.2	1.4	103	SNORKEL	13.8	1.6	116	SNORKEL	26.0	3.1	218
S.DIVING	13.7	1.5	103	S.DIVING	35.2	3.9	265	S.DIVING	48.8	5.4	368
<b>TOTAL</b>	<b>69.3</b>	<b>8.0</b>	<b>536</b>	<b>TOTAL</b>	<b>126.2</b>	<b>14.5</b>	<b>968</b>	<b>TOTAL</b>	<b>195.5</b>	<b>22.5</b>	<b>1,503</b>

**SUMMARY OF TOTAL SPENDING, EMPLOYMENT, AND WAGES - BY EXPENDITURE CATEGORY**

Category	SPEND (\$Million)	%	Employment (Persons)	%	Wages Generated (\$ Million)	%
B.FUEL	49.62	0.25	159	0.11	2.37	0.11
BAIT	9.16	0.05	66	0.04	1.17	0.05
TACKLE	10.59	0.05	76	0.05	1.35	0.06
ICE	4.81	0.02	15	0.01	0.23	0.01
FOD/STO	14.94	0.08	109	0.07	1.57	0.07
FOD/RES	16.06	0.08	428	0.28	4.40	0.20
GAS AUT	9.00	0.05	28	0.02	0.43	0.02
BT RAMP	3.85	0.02	34	0.02	0.66	0.03
MAR FEE	35.01	0.18	313	0.21	5.98	0.27
EQ RENT	4.68	0.02	31	0.02	0.66	0.03
SUND	5.40	0.03	35	0.02	0.51	0.02
OTHER	32.39	0.17	209	0.14	3.12	0.14
<b>TOTAL</b>	<b>195.51</b>	<b>1.00</b>	<b>1,503</b>	<b>1.00</b>	<b>22.45</b>	<b>1.00</b>



TABLE A.2.1-5 (Residents)										
ESTIMATION OF THE NUMBER OF PARTY-DAYS AND PERSON-DAYS SPENT USING REEFS, BY "RESIDENTS" IN BROWARD COUNTY, FLORIDA - 2000										
DISTRIBUTION OF BOATING PARTY DAYS BY ACTIVITY: FISHING, SNORKELING & DIVING										
REGBTR	%RES=	RREGBT	RDAY/BT	TOTAL PARTY DAYS (PARTDA)	%SALTF	PARTDAF	%SALTS	PARTDAS	%SALTD	PARTDAD
23,974	0.995	23,854	39	930,317	0.55	511,674	0.19	176,760	0.26	241,882
				START HERE:	ALLREGB	%16FT+	%REEFU	REGBTR		
					61,124	0.65	0.61	23,974		
DISTRIBUTION OF PARTY DAYS BY ACTIVITY AND REEF TYPE										
ESTIMATED PARTY DAYS FISHING ON REEFS:										
%ARTREF	%NATREF	DAYARTF	DAYNATF	TOTAL PARTY DAYS (PARTDAF)						
0.40	0.60	204,670	307,005	511,674						
% OF TIME QUESTION										
0.32	0.57		CONSISTENT							
ESTIMATED PARTY DAYS SNORKELING ON REEFS:										
%ARTRES	%NATRES	DAYARTS	DAYNATS	TOTAL PARTY DAYS (PARTDAS)						
0.22	0.78	38,887	137,873	176,760						
ESTIMATED PARTY DAYS DIVING ON REEFS:										
%ARTRED	%NATRED	DAYARTD	DAYNATD	TOTAL PARTY DAYS (PARTDAD)						
0.31	0.69	74,984	166,899	241,882						
ESTIMATION OF RESIDENT PERSON DAYS BY ACTIVITY AND REEF TYPE										
ACTIVITY OR REEF TYPE	TOTAL PARTY DAYS	RESIDENT PARTY SIZE	TOTAL RESIDENT PERSON DAYS							
<b>FISHING</b>	511,674	4.21	2,154,148							
Artificial Reef	204,670	4.21	861,659							
Natural Reef	307,005	4.21	1,292,489							
<b>SNORKELING</b>	176,760	4.14	731,787							
Artificial Reef	38,887	4.14	160,993							
Natural Reef	137,873	4.14	570,794							
<b>DIVING</b>	241,882	3.44	832,075							
Artificial Reef	74,984	3.44	257,943							
Natural Reef	166,899	3.44	574,132							
<b>Grand Total Resident Person-Days</b>			<b>3,718,011</b>							

TABLE A.2.1-6 (Residents)							
BROWARD COUNTY RESIDENT BOATER SPENDING PER PARTY-DAY; WAGES AND EMPLOYMENT BY ACTIVITY AND EXPENDITURE CATEGORY							
<b>FISHING PARTY DAYS (PARTDAF):</b>				511,674			
<b>FISHING ACTIVITY SCENARIO (F)</b>			<b>%INCOUNTF=</b>	0.79			
CATEGORY	\$EPPDF (Dollars)	\$EXPENF (\$Million)	\$S/E	EMPLOYF (Persons)	%WAGE	\$WAGEF (\$Million)	NAICS NUMBER
B.FUEL	88.07	35.60	0.33	107.45	0.05	1.62	447
BAIT	29.39	11.88	0.15	79.28	0.12	1.46	4511102
TACKLE	35.92	14.52	0.15	96.89	0.12	1.79	4511102
ICE	9.05	3.66	0.33	11.04	0.05	0.17	447
FOOD/STO	27.59	11.15	0.13	85.01	0.11	1.20	445
FOOD/RES	32.35	13.08	0.04	345.45	0.26	3.41	722
GAS AUTO	16.00	6.47	0.33	19.52	0.05	0.29	447
BT.RAMP	7.11	2.87	0.09	31.62	0.24	0.70	71393
MAR FEE	49.28	19.92	0.10	201.42	0.24	4.85	71393
EQ. RENT	0.21	0.08	0.10	0.86	0.25	0.02	532292
SUNDRIES	7.65	3.09	0.08	39.38	0.10	0.30	452
OTHER	27.79	11.23	0.15	75.51	0.10	1.09	452
<b>TOTAL</b>	<b>330.41</b>	<b>133.56</b>	<b>0.12</b>	<b>1,093</b>	<b>0.13</b>	<b>16.91</b>	
<b>SNORKELING PARTY DAYS (PARTDAS):</b>				176,760			
<b>SNORKELING ACTIVITY SCENARIO (S)</b>			<b>%INCOUNTS=</b>	0.79			
CATEGORY	\$EPPDF (Dollars)	\$EXPENF (\$Million)	EMPLOYF (Persons)	\$WAGES (\$Million)			
B.FUEL	87.30	12.19	37	0.55			
BAIT	1.47	0.21	1	0.03			
TACKLE	4.45	0.62	4	0.08			
ICE	5.74	0.80	2	0.04			
FOOD/STO	29.46	4.11	31	0.44			
FOOD/RES	85.90	12.00	317	3.13			
GAS AUTO	10.44	1.46	4	0.07			
BT.RAMP	4.19	0.59	6	0.14			
MAR FEE	91.57	12.79	129	3.11			
EQ. RENT	10.84	1.51	15	0.38			
SUNDRIES	10.71	1.50	19	0.15			
OTHER	33.11	4.62	31	0.45			
<b>TOTAL</b>	<b>375.18</b>	<b>52.39</b>	<b>599</b>	<b>8.56</b>			
<b>SCUBA DIVING PARTY DAYS (PARTDAD):</b>				241,882			
<b>SCUBA DIVING ACTIVITY SCENARIOS (D)</b>			<b>%INCOUNTD=</b>	0.85			
CATEGORY	\$EPPDD (Dollars)	\$EXPEND (\$Million)	EMPLOYD (Persons)	\$WAGED (\$Million)			
B.FUEL	94.78	19.49	59	0.89			
BAIT	1.30	0.27	2	0.03			
TACKLE	46.39	9.54	64	1.18			
ICE	8.07	1.66	5	0.08			
FOOD/STO	35.05	7.21	55	0.77			
FOOD/RES	53.15	10.93	289	2.85			
GAS AUTO	12.37	2.54	8	0.12			
BT.RAMP	5.62	1.16	13	0.28			
MAR FEE	70.36	14.47	146	3.52			
EQ. RENT	25.21	5.18	52	1.30			
SUNDRIES	9.59	1.97	25	0.19			
OTHER	45.96	9.45	64	0.92			
<b>TOTAL</b>	<b>407.85</b>	<b>83.85</b>	<b>781</b>	<b>12.13</b>			

**TABLE A.2.1-7 (Residents)**

**BROWARD COUNTY SUMMARY OF RESIDENT BOATER SPENDING AND WAGES AND EMPLOYMENT GENERATED - BY ACTIVITY AND REEF TYPE**

SUMMARY-ARTIFICIAL REEF				SUMMARY-NATURAL REEF				SUMMARY-ALL ACTIVITIES			
ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)
FISH	53.4	6.8	437	FISH	80.1	10.1	656	FISH	133.6	16.9	1,093
SNORKEL	11.5	1.9	132	SNORKEL	40.9	6.7	467	SNORKEL	52.4	8.6	599
S.DIVING	26.0	3.8	242	S.DIVING	57.9	8.4	539	S.DIVING	83.9	12.1	781
<b>TOTAL</b>	<b>90.9</b>	<b>12.4</b>	<b>811</b>	<b>TOTAL</b>	<b>178.9</b>	<b>25.2</b>	<b>1,662</b>	<b>TOTAL</b>	<b>269.8</b>	<b>37.6</b>	<b>2,473</b>

**SUMMARY OF TOTAL SPENDING, EMPLOYMENT, AND WAGES - BY EXPENDITURE CATEGORY**

Category	SPEND (\$Million)	%	Employment (Persons)	%	Wages Generated (\$ Million)	%
B.FUEL	67.28	0.25	203	0.08	3.06	0.08
BAIT	12.35	0.05	82	0.03	1.52	0.04
TACKLE	24.68	0.09	165	0.07	3.04	0.08
ICE	6.12	0.02	18	0.01	0.28	0.01
FOOD/STO	22.47	0.08	171	0.07	2.41	0.06
FOOD/RES	36.00	0.13	951	0.38	9.39	0.25
GAS AUTO	10.47	0.04	32	0.01	0.48	0.01
BT RAMP	4.61	0.02	51	0.02	1.12	0.03
MAR FEE	47.17	0.17	477	0.19	11.49	0.31
EQ. RENT	6.78	0.03	69	0.03	1.70	0.05
SUNDRIES	6.56	0.02	84	0.03	0.64	0.02
OTHER	25.31	0.09	170	0.07	2.46	0.07
<b>TOTAL</b>	<b>269.8</b>	<b>1.00</b>	<b>2,473</b>	<b>1.00</b>	<b>37.6</b>	<b>1.00</b>

TABLE A.2.1-8 (Residents)										
ESTIMATION OF THE NUMBER OF PARTY-DAYS AND PERSON-DAYS SPENT USING REEFS, BY "RESIDENTS" IN MIAMI-DADE COUNTY, FLORIDA - 2000										
DISTRIBUTION OF BOATING PARTY DAYS BY ACTIVITY: FISHING, SNORKELING & DIVING										
REGBTR	%RES=	RREGBT	RDAYS/BT	TOTAL PARTY DAYS (PARTDA)	%SALTF	PARTDAF	%SALTS	PARTDAS	%SALTD	PARTDAD
30,849	0.995	30,695	36	1,105,005	0.54	596,703	0.26	287,301	0.20	221,001
				<b>START HERE:</b>	<b>ALLREGB</b>	<b>%16FT+</b>	<b>%REEFU</b>	<b>REGBTR</b>		
					67,936	0.66	0.69	30,849		
DISTRIBUTION OF PARTY DAYS BY ACTIVITY AND REEF TYPE										
ESTIMATED PARTY DAYS FISHING ON REEFS:										
%ARTREF	%NATREF	DAYARTF	DAYNATF	TOTAL PARTY DAYS (PARTDAF)						
0.38	0.62	226,747	369,956	596,703						
% OF TIME QUESTION										
0.31	0.64	CONSISTENT								
ESTIMATED PARTY DAYS SNORKELING ON REEFS:										
%ARTRES	%NATRES	DAYARTS	DAYNATS	TOTAL PARTY DAYS (PARTDAS)						
0.28	0.72	80,444	206,857	287,301						
ESTIMATED PARTY DAYS DIVING ON REEFS:										
%ARTRED	%NATRED	DAYARTD	DAYNATD	TOTAL PARTY DAYS (PARTDAD)						
0.31	0.69	68,510	152,491	221,001						
ESTIMATION OF RESIDENT PERSON DAYS BY ACTIVITY AND REEF TYPE										
ACTIVITY OR REEF TYPE	TOTAL PARTY DAYS	RESIDENT PARTY SIZE	TOTAL RESIDENT PERSON DAYS							
<b>FISHING</b>	596,703	4.32	2,577,755							
Artificial Reef	226,747	4.32	979,547							
Natural Reef	369,956	4.32	1,598,208							
<b>SNORKELING</b>	287,301	4.28	1,229,649							
Artificial Reef	80,444	4.28	344,302							
Natural Reef	206,857	4.28	885,347							
<b>DIVING</b>	221,001	3.16	698,363							
Artificial Reef	68,510	3.16	216,493							
Natural Reef	152,491	3.16	481,870							
<b>Grand Total Resident Person-Days:</b>			<b>4,505,767</b>							

TABLE A.2.1-9 (Residents)							
MIAMI-DADE COUNTY RESIDENT BOATER SPENDING PER PARTY-DAY; WAGES AND EMPLOYMENT BY ACTIVITY AND EXPENDITURE CATEGORY							
<b>FISHING PARTY DAYS (PARTDAF):</b>					596,703		
<b>FISHING ACTIVITY SCENARIO (F)</b>				<b>%INCOUNTF=</b>	0.80		
CATEGORY	\$EPPDF (Dollars)	\$EXPENF (\$Million)	\$S/E	EMPLOYF (Persons)	%WAGE	\$WAGEF (\$Million)	NAICS NUMBER
B.FUEL	84.99	40.57	0.33	124.54	0.04	1.82	447
BAIT	28.65	13.68	0.18	74.55	0.11	1.54	4511102
TACKLE	25.80	12.32	0.18	67.13	0.11	1.38	4511102
ICE	8.34	3.98	0.33	12.23	0.04	0.18	447
FOOD/STO	30.25	14.44	0.13	109.31	0.10	1.47	445
FOOD/RES	17.61	8.41	0.04	203.39	0.27	2.25	722
GAS AUTO	20.25	9.67	0.33	29.69	0.04	0.43	447
BT.RAMP	34.26	16.35	0.09	178.06	0.26	4.25	71393
MAR FEE	55.13	26.32	0.09	286.53	0.26	6.85	71393
EQ.RENT	4.21	2.01	0.08	25.60	0.32	0.64	532292
SUNDRIES	7.49	3.58	0.17	20.72	0.10	0.35	452
OTHER	28.52	13.61	0.17	78.89	0.10	1.33	452
<b>TOTAL</b>	<b>345.50</b>	<b>164.93</b>	<b>0.14</b>	<b>1,211</b>	<b>0.14</b>	<b>22.49</b>	
<b>SNORKELING PARTY DAYS (PARTDAS):</b>					287,301		
<b>SNORKELING ACTIVITY SCENARIO (S)</b>				<b>%INCOUNTS=</b>	0.82		
CATEGORY	\$EPPDS (Dollars)	\$EXPENS (\$Million)	EMPLOYS (Persons)	\$WAGES (\$Million)			
B.FUEL	59.82	14.09	43	0.63			
BAIT	2.73	0.64	4	0.07			
TACKLE	15.44	3.64	20	0.41			
ICE	8.88	2.09	6	0.09			
FOOD/STO	27.61	6.50	49	0.66			
FOOD/RES	16.20	3.82	92	1.02			
GAS AUTO	11.14	2.62	8	0.12			
BT.RAMP	8.40	1.98	22	0.51			
MAR FEE	74.16	17.47	190	4.54			
EQ.RENT	3.53	0.83	11	0.26			
SUNDRIES	6.82	1.61	9	0.16			
OTHER	15.35	3.62	21	0.35			
<b>TOTAL</b>	<b>250.08</b>	<b>58.92</b>	<b>475</b>	<b>8.84</b>			
<b>SCUBA DIVING PARTY DAYS (PARTDAD):</b>					221,001		
<b>SCUBA DIVING ACTIVITY SCENARIOS (D)</b>				<b>%INCOUNTD=</b>	0.87		
CATEGORY	\$EPPDD (Dollars)	\$EXPEND (\$Million)	EMPLOYD (Persons)	\$WAGED (\$Million)			
B.FUEL	65.13	12.52	38	0.56			
BAIT	25.91	4.98	27	0.56			
TACKLE	1.32	0.25	1	0.03			
ICE	6.70	1.29	4	0.06			
FOOD/STO	27.09	5.21	39	0.53			
FOOD/RES	22.74	4.37	106	1.17			
GAS AUTO	19.08	3.67	11	0.16			
BT.RAMP	10.07	1.94	21	0.50			
MAR FEE	47.08	9.05	99	2.35			
EQ.RENT	20.27	3.90	50	1.23			
SUNDRIES	7.31	1.41	8	0.14			
OTHER	16.18	3.11	18	0.30			
<b>TOTAL</b>	<b>268.88</b>	<b>51.70</b>	<b>423</b>	<b>7.60</b>			

**TABLE A.2.1-10 (Residents)**

**MIAMI-DADE COUNTY SUMMARY OF RESIDENT BOATER SPENDING AND WAGES AND EMPLOYMENT GENERATED - BY ACTIVITY AND REEF TYPE**

SUMMARY-ARTIFICIAL REEF			SUMMARY-NATURAL REEF			SUMMARY-ALL ACTIVITIES					
ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)
FISH	62.67	8.54	460	FISH	102.26	13.94	751	FISH	164.93	22.49	1,211
SNORKEL	16.50	2.48	133	SNORKEL	42.42	6.36	342	SNORKEL	58.92	8.84	475
S.DIVING	16.03	2.36	131	S.DIVING	35.67	5.25	292	S.DIVING	51.70	7.60	423
<b>TOTAL</b>	<b>95.2</b>	<b>13.4</b>	<b>724</b>	<b>TOTAL</b>	<b>180.3</b>	<b>25.6</b>	<b>1,385</b>	<b>TOTAL</b>	<b>275.5</b>	<b>38.9</b>	<b>2,109</b>

**SUMMARY OF TOTAL SPENDING, EMPLOYMENT, AND WAGES - BY EXPENDITURE CATEGORY**

Category	SPEND (\$Million)	%	Employment (Persons)	%	Wages Generated (\$ Million)	%
B.FUEL	67.19	0.24	206	0.10	3.02	0.08
BAIT	19.30	0.07	105	0.05	2.17	0.06
TACKLE	16.21	0.06	88	0.04	1.82	0.05
ICE	7.36	0.03	23	0.01	0.33	0.01
FOOD/STO	26.15	0.09	198	0.09	2.66	0.07
FOOD/RES	16.60	0.06	402	0.19	4.43	0.11
GAS AUTO	15.96	0.06	49	0.02	0.72	0.02
BT RAMP	20.27	0.07	221	0.10	5.27	0.14
MAR FEE	52.84	0.19	575	0.27	13.74	0.35
EQ. RENT	6.74	0.02	86	0.04	2.13	0.05
SUNDRIES	6.59	0.02	38	0.02	0.64	0.02
OTHER	20.34	0.07	118	0.06	1.98	0.05
<b>TOTAL</b>	<b>275.5</b>	<b>1.00</b>	<b>2,109</b>	<b>1.00</b>	<b>38.9</b>	<b>1.00</b>

**TABLE A.2.1-11 (Residents)**

**ESTIMATION OF THE NUMBER OF PARTY-DAYS AND PERSON-DAYS SPENT USING REEFS, BY "RESIDENTS" IN MONROE COUNTY, FLORIDA - 2000**

**DISTRIBUTION OF BOATING PARTY DAYS BY ACTIVITY: FISHING, SNORKELING & DIVING**

REGBTR	%RES=	RREGBT	RDAY/BT	TOTAL PARTY DAYS (PARTDA)	%SALTF	PARTDAF	%SALTS	PARTDAS	%SALTD	PARTDAD
14,549	0.995	14,477	70	1,013,355	0.52	526,945	0.28	283,740	0.20	202,671
				<b>START HERE:</b>	<b>ALLREGB</b>	<b>%16FT+</b>	<b>%REEFU</b>	<b>REGBTR</b>		
					26,564	0.726	0.754	14,549		

**DISTRIBUTION OF PARTY DAYS BY ACTIVITY AND REEF TYPE**

<b>ESTIMATED PARTY DAYS FISHING ON REEFS:</b>				
%ARTREF	%NATREF	DAYARTF	DAYNATF	TOTAL PARTY DAYS (PARTDAF)
0.30	0.70	158,083	368,861	526,945
<b>% OF TIME QUESTION</b>				
0.20	0.68		CONSISTENT	
<b>ESTIMATED PARTY DAYS SNORKELING ON REEFS:</b>				
%ARTRES	%NATRES	DAYARTS	DAYNATS	TOTAL PARTY DAYS (PARTDAS)
0.25	0.75	70,935	212,805	283,740
<b>ESTIMATED PARTY DAYS SCUBA DIVING ON REEFS:</b>				
%ARTRED	%NATRED	DAYARTD	DAYNATD	TOTAL PARTY DAYS (PARTDAD)
0.57	0.43	115,523	87,149	202,671

**ESTIMATION OF RESIDENT PERSON DAYS BY ACTIVITY AND REEF TYPE**

ACTIVITY OR REEF TYPE	TOTAL PARTY DAYS	RESIDENT PARTY SIZE	TOTAL RESIDENT PERSON DAYS
<b>FISHING</b>	526,945	3.31	1,744,187
Artificial Reef	158,083	3.31	523,256
Natural Reef	368,861	3.31	1,220,931
<b>SNORKELING</b>	283,740	3.89	1,103,747
Artificial Reef	70,935	3.89	275,937
Natural Reef	212,805	3.89	827,810
<b>DIVING</b>	202,671	2.62	530,998
Artificial Reef	115,523	2.62	302,669
Natural Reef	87,149	2.62	228,329
<b>Grand Total Resident Person-Days:</b>			<b>3,378,932</b>

1,101,861.83	1.86	3.37
2,277,070.32	0.89	2.075
3,378,932.15	2.62	5.445
		0.618348624

**TABLE A.2.1-12 (Residents)**

**MONROE COUNTY RESIDENT BOATER SPENDING PER PARTY-DAY; WAGES AND EMPLOYMENT BY ACTIVITY AND EXPENDITURE CATEGORY**

<b>FISHING PARTY DAYS (PARTDAF):</b>					526,945		
<b>FISHING ACTIVITY SCENARIO (F)</b>				<b>%INCOUNTF=</b>	0.68		
<b>CATEGORY</b>	<b>\$EPPDF (Dollars)</b>	<b>\$EXPENF (\$Million)</b>	<b>\$S/E</b>	<b>EMPLOYF (Persons)</b>	<b>%WAGE</b>	<b>\$WAGEF (\$Million)</b>	<b>NAICS NUMBER</b>
B.FUEL	77.47	27.76	0.23	122.13	0.07	1.95	447
BAIT	22.87	8.19	0.12	68.19	0.15	1.25	4511102
TACKLE	24.81	8.89	0.12	73.98	0.15	1.35	4511102
ICE	12.33	4.42	0.23	19.44	0.07	0.31	447
FOOD/STO	27.58	9.88	0.16	62.93	0.09	0.93	445
FOOD/RES	33.07	11.85	0.04	282.19	0.27	3.20	722
GAS AUTO	7.63	2.73	0.23	12.03	0.07	0.19	447
BT.RAMP	2.23	0.80	0.12	6.53	0.17	0.14	71393
MAR FEE	18.68	6.69	0.12	54.71	0.17	1.14	71393
EQ.RENT	0.74	0.27	0.05	4.89	0.23	0.06	532292
SUNDRIES	5.88	2.11	0.12	17.03	0.10	0.22	452
OTHER	16.45	5.89	0.12	47.65	0.10	0.61	452
<b>TOTAL</b>	<b>249.74</b>	<b>89.49</b>	<b>0.12</b>	<b>772</b>	<b>0.13</b>	<b>11.34</b>	

<b>SNORKELING PARTY DAYS (PARTDAS):</b>				283,740	
<b>SNORKELING ACTIVITY SCENARIO (S)</b>				<b>%INCOUNTS=</b>	0.64
<b>CATEGORY</b>	<b>\$EPPDS (Dollars)</b>	<b>\$EXPENS (\$Million)</b>	<b>EMPLOY S (Persons)</b>	<b>\$WAGES (\$Million)</b>	
BT.FUEL	37.30	6.77	30	0.47	
BAIT	2.07	0.38	3	0.06	
TACKLE	11.62	2.11	18	0.32	
ICE	4.65	0.84	4	0.06	
FOOD/STO	22.44	4.07	26	0.38	
FOOD/RES	28.15	5.11	122	1.38	
GAS AUTO	5.65	1.03	5	0.07	
BT.RAMP	6.29	1.14	9	0.19	
MAR FEE	21.31	3.87	32	0.66	
EQ.RENT	3.22	0.58	11	0.14	
SUNDRIES	10.20	1.85	15	0.19	
OTHER	28.96	5.26	43	0.54	
<b>TOTAL</b>	<b>181.86</b>	<b>33.02</b>	<b>316</b>	<b>4.47</b>	

<b>SCUBA DIVING PARTY DAYS (PARTDAD):</b>				202,671	
<b>SCUBA DIVING ACTIVITY SCENARIOS (D)</b>				<b>%INCOUNTD=</b>	0.72
<b>CATEGORY</b>	<b>\$EPPDD (Dollars)</b>	<b>\$EXPEND (\$Million)</b>	<b>EMPLOYD (Persons)</b>	<b>\$WAGED (\$Million)</b>	
B.FUEL	40.41	5.90	26	0.41	
BAIT	2.10	0.31	3	0.05	
TACKLE	5.74	0.84	7	0.13	
ICE	5.75	0.84	4	0.06	
FOOD/STO	20.76	3.03	19	0.28	
FOOD/RES	15.34	2.24	53	0.60	
GAS AUTO	11.11	1.62	7	0.11	
BT.RAMP	2.29	0.33	3	0.06	
MAR FEE	9.47	1.38	11	0.23	
EQ.RENT	27.67	4.04	74	0.94	
SUNDRIES	6.12	0.89	7	0.09	
OTHER	24.47	3.57	29	0.37	
<b>TOTAL</b>	<b>171.23</b>	<b>24.99</b>	<b>243</b>	<b>3.34</b>	



**TABLE A.2.1-13 (RESIDENTS)**

**MONROE COUNTY SUMMARY OF RESIDENT BOATER SPENDING AND WAGES AND EMPLOYMENT GENERATED - BY ACTIVITY AND REEF TYPE**

SUMMARY-ARTIFICIAL REEF				SUMMARY-NATURAL REEF				SUMMARY-ALL ACTIVITIES			
ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)	ACTIVITY	SPEND (\$Million)	WAGES (\$Million)	EMPLOY (Persons)
FISH	26.85	3.40	232	FISH	62.64	7.94	540	FISH	89.49	11.34	772
SNORKEL	8.26	1.12	79	SNORKEL	24.77	3.35	237	SNORKEL	33.02	4.47	316
S.DIVING	14.24	1.90	139	S.DIVING	10.74	1.44	105	S.DIVING	24.99	3.34	243
<b>TOTAL</b>	<b>49.3</b>	<b>6.4</b>	<b>449</b>	<b>TOTAL</b>	<b>98.2</b>	<b>12.7</b>	<b>882</b>	<b>TOTAL</b>	<b>147.5</b>	<b>19.15</b>	<b>1,331</b>

**SUMMARY OF TOTAL SPENDING, EMPLOYMENT, AND WAGES - BY EXPENDITURE CATEGORY**

Category	SPEND (\$Million)	%	Employment (Persons)	%	Wages Generated (\$ Million)	%
BT.FUEL	40.43	0.27	178	0.13	2.83	0.15
BAIT	8.88	0.06	74	0.06	1.35	0.07
TACKLE	11.84	0.08	99	0.07	1.80	0.09
ICE	6.10	0.04	27	0.02	0.43	0.02
FOOD/STO	16.99	0.12	108	0.08	1.60	0.08
FOOD/RES	19.20	0.13	457	0.34	5.18	0.27
GAS AUTO	5.38	0.04	24	0.02	0.38	0.02
BT. RAMP	2.28	0.02	19	0.01	0.39	0.02
MAR FEE	11.95	0.08	98	0.07	2.03	0.11
EQ. RENT	4.89	0.03	90	0.07	1.13	0.06
SUNDRIES	4.85	0.03	39	0.03	0.50	0.03
OTHER	14.72	0.10	119	0.09	1.52	0.08
<b>TOTAL</b>	<b>147.5</b>	<b>1.00</b>	<b>1,331</b>	<b>1.00</b>	<b>19.1</b>	<b>1.00</b>