

Chapter 1 – Methodology – User Activity

This chapter describes the methods and data used to estimate user activity of residents and visitors on artificial and natural reefs.

1.1 User Activity - Residents

There are two fundamental measures of natural resource user activity such as scuba diving the reef systems off southeast Florida. First, user activity can be measured by the number of boating days. This is usually called “party-days” since each boat carries one or more individuals depending, for the most part, on the size of the boat. Party-days gives us a “boating measure” of activity. This measure is important for several purposes. For instance, this measure can be used to estimate boat ramp use for planning purposes. In addition, this measure can be used to estimate the number of boats that are expected to arrive at artificial and/or natural reefs in a given day.

Finally, the term “party-days” is used in economic analysis because the party is the principal spending unit. When we multiply the number of party-days by the number in the party, we obtain “person-days”. This second measure of boating activity is important since it tells us how many people will be fishing and/or diving on a particular reef during a day. In the case of fishing, a person-day is the principal measure of fishing effort or pressure on a renewable resource (e.g., fishery biomass).

"Person-days" is of particular significance when estimating the “user value” of recreating while using a reef. The principal unit of both consumption and production of an activity involving the reefs is a “person-day”. If it were determined that recreational fishers valued a day of fishing at a reef at \$10 per person per day, then a party of four (i.e., the party-day) would receive \$40 in “use value” (four person days multiplied by the value per person per day from recreational fishing). Thus, while the party-day is boat oriented in terms of accommodating a boatload of fishers, a person-day measures both fishing effort on a resource and the unit of output of the resource available to the user. Thus, the first order of business in this project was to estimate the number of party-days and person-days by residents involved in reef-related activities off the southeastern coast of Florida.

Table 1.1-1 presents resident boater user activity on artificial and natural reefs for Palm Beach, Broward, Miami-Dade and Monroe counties as measured in party-days and person-days. These activity measures were estimated in a two-step procedure. First, a mail survey was sent to a sample of registered boat owners in the four counties in the study area during the Fall of 2000. A total of 12,500 surveys were mailed out to registered boat owners in the study area who owned boats at least 16 feet long. The boat size distinction was made because reef visitations are heavily concentrated among larger boats and we wished to target the segment of the boater population that are heavy reef users. This allowed us to obtain a larger sample of our targeted group with greater statistical reliability. Florida State University received 2,543 completed surveys from resident boaters. Of the surveys received, 65.2 percent of respondents reported using artificial and/or natural reefs in the last 12 months. Eliminating those not using reefs, we obtained 1,658 surveys from resident boaters who indicated they do use the reefs.

The distribution of resident reef users who responded to the survey is provided in the table below.

Boat Length Distributions of Resident Reef Users Who Responded to the 2000 Survey (Percent)

Boat Length Category	Palm Beach	Broward	Miami-Dade	Monroe	Total
16' to 25' 11"	66	65	79	73	71
26' to 39' 11"	29	30	18	23	25
40' to 64' 11"	5	5	3	4	4
65' to 109' 11"	0	0	0	0	0
110' and Greater	0	0	0	0	0
	100	100	100	100	100

The number of registered boats in the county at least 16 feet long, that are owned by a county resident, and that carried parties to the reef in the last 12 months was estimated using the inventory of boat registrations furnished by the Florida Department of Highway Safety and Motor Vehicles (2000). From this inventory, boats less than 16 feet and owners who live outside of the county were excluded. The remaining number of boats in each county was multiplied by the proportion of survey respondents who said they used their boats on the county’s reefs in the last 12 months. The resulting target population of boats carrying parties that used the reefs at least once in the past 12 months is provided below.

Target Population of Resident Boats by County in Southeast Florida

County	Total Registered Boats in County	Target Population - Number of Boats Carrying Parties that Used the Reefs
Palm Beach	56,924	19,463
Broward	61,124	23,854
Miami-Dade	67,936	30,695
Monroe	26,564	14,477

The sample data obtained from the survey was then used in combination with the target population of boats to estimate the total number of party-days spent using artificial and natural reefs off the coast of each county. The results are provided in Table 1.1-1. Reef-using respondents were asked to estimate their total days spent on or about the reefs over the last 12 months. For example, we estimated that resident boaters of Palm Beach County spent a total of 779,000 party-days on reefs over the last 12 months. Total party-days was estimated as follows. Palm Beach County survey respondents stated that they spent, on average, 40 days over the 12-month period using their boat to visit the reef system. The “40-days” was multiplied by the target population of boaters for Palm Beach County (i.e., 19,463 times 40 days). All other estimates of party-days for each county in Table 1.1-1 were derived in the same manner.

Table 1.1-1 (Residents)
A Summary of Resident Boater User Activity on
Artificial and Natural Reefs in Southeast Florida, 2000

Total "Party-Days" on All Reefs		
County	Total Party-Days (Thousands)	Percentage for Each County
Palm Beach	779	20%
Broward	930	24%
Miami-Dade	1,105	29%
Monroe	1,013	26%
Total All Counties	3,827	100%
Total "Party-Days" on Artificial Reefs		
County	Total Party-Days	Percent Spent on Artificial Reefs in County
Palm Beach	281	36%
Broward	319	34%
Miami-Dade	376	34%
Monroe	345	34%
Total All Counties	1,321	35%
Total "Party-Days" on Natural Reefs		
County	Total Party-Days	Percent Spent on Natural Reefs in County
Palm Beach	497	64%
Broward	612	66%
Miami-Dade	729	66%
Monroe	669	66%
Total All Counties	2,507	65%
Total Person-Days on All Reefs (Thousands)		
County	Total Person-Days	Percentage for Each County
Palm Beach	2,978	20%
Broward	3,718	25%
Miami-Dade	4,506	31%
Monroe	3,379	23%
Total All Counties	14,581	100%
Total "Person-Days" on Artificial Reefs		
County	Total Person-Days	Percent Spent on Artificial Reefs in County
Palm Beach	1,075	36%
Broward	1,281	34%
Miami-Dade	1,540	34%
Monroe	1,102	33%
Total All Counties	4,998	34%
Total Person-Days on Natural Reefs		
County	Total Person-Days	Percent Spent on Natural Reefs in County
Palm Beach	1,903	64%
Broward	2,437	66%
Miami-Dade	2,965	66%
Monroe	2,277	67%
Total All Counties	9,582	66%

Note: A party-day is a one-day visit by a party of people. A person-day is a one-day visit by one individual.

Miami-Dade County had the most party-days while Palm Beach County had the least party-days among the four counties evaluated. This was primarily due to the fact that Miami-Dade County has the largest number of boats in the target population. Among all counties, resident boaters spent over 3.8 million party-days using the reef system.

Respondents were asked to distribute their reef activities by the type of reef used. Without much variation among counties, resident reef-users spent two-thirds of their party-days on natural as opposed to artificial reefs. Boater preference for natural reefs is hardly surprising, but it does show that artificial reefs are apparently substitutes for natural reefs. This is of interest to the artificial reef program managed by state and local officials.

The second half of Table 1.1-1 summarizes the estimated number of person-days for residents by county and reef type. For this estimate, we purposely netted out any nonresidents since they are, in fact, tourists. This is a significant factor in the Florida Keys, which attracts more friends and relatives from outside Monroe County than any other county in the study area. Using the results of the survey, the average resident party size was estimated to be 3.8 individuals. The total number of person-days per county is equal to the resident party size times the number of party-days per county. For all four counties, the number of person-days was estimated at 14.6 million. As expected, about two-thirds of these person-days were spent on natural as opposed to artificial reefs.

Respondents were then asked to breakdown their time on reefs by recreational activity. These activities were (1) fishing, (2) snorkeling and (3) scuba diving. Table 1.1-2 summarizes the breakdown of party-days by activity for all the counties. Alternatively, Table 1.1-3 shows the number of party-days and person-days broken down by this classification for each county separately.

**Table 1.1-2 (Residents)
Party-Days by Activity for All Counties**

Activity	Number of Party-Days Spent on Reef System by Activity	Percentage of Total Party-Days by Activity
Fishing	2,040,159	53%
Snorkeling	911,293	24%
Scuba Diving	875,758	23%
Total	3,827,209	100%

Resident fishing constitutes about 53 percent of all resident party-days in the four county study area. Snorkeling and Scuba diving are almost evenly split in terms of the number of party-days, with snorkeling at 911 thousand and scuba diving at 876 thousand party days. Thus, reefs accommodate three rather important recreational activities as indicated in these two tables. These percentages remain similar for both artificial and natural reefs. That is, about two-thirds of fishing, snorkeling and scuba diving are spent on natural as opposed to artificial reefs using party-days as a measure of user activity. Person-days follow the same pattern as discussed for party-days. The activity tables will come into greater play as in other sections of this summary

chapter. For now, the party-day is being used as a spending unit in conjunction with the information on party spending per day obtained from our sample survey of reef users.

Table 1.1-3 (Residents)
Summary of the Kinds of Recreational Activities on Reefs in Southeastern Florida, 2000
(A) Party-Days (Thousands)

Kind of Activity	All Reefs		Artificial Reefs		Natural Reefs	
	Total Party-Days	Each County's Percentage of Total Party-Days	Total Party-Days	Each County's Percentage of Total Party-Days	Total Party-Days	Each County's Percentage of Total Party-Days
Fishing						
Palm Beach	405	20%	146	20%	259	20%
Broward	512	25%	205	28%	307	24%
Miami-Dade	597	29%	227	31%	370	28%
Monroe	527	26%	158	21%	369	28%
Total	2,040	100%	735	100%	1,305	100%
Snorkeling						
Palm Beach	163	18%	77	29%	87	14%
Broward	177	19%	39	15%	138	21%
Miami-Dade	287	32%	80	30%	207	32%
Monroe	284	31%	71	27%	213	33%
Total	911	100%	267	100%	644	100%
Scuba Diving						
Palm Beach	210	24%	59	19%	151	28%
Broward	242	28%	75	24%	167	30%
Miami-Dade	221	25%	69	22%	152	27%
Monroe	203	23%	116	36%	87	16%
Total	876	100%	318	100%	558	100%
(B) Person-Days (Thousands)						
Kind of Activity	Total Person-Days	Each County's Percentage of Total Person-Days	Total Person-Days	Each County's Percentage of Total Person-Days	Total Person-Days	Each County's Percentage of Total Person-Days
Fishing						
Palm Beach	1,551	19%	558	19%	992	19%
Broward	2,154	27%	862	29%	1,292	25%
Miami-Dade	2,578	32%	980	34%	1,598	31%
Monroe	1,744	22%	523	18%	1,221	24%
Total	8,027	100%	2,923	100%	5,103	100%
Snorkeling						
Palm Beach	616	17%	290	27%	327	13%
Broward	732	20%	161	15%	571	22%
Miami-Dade	1,230	33%	344	32%	885	34%
Monroe	1,104	30%	276	26%	828	32%
Total	3,682	100%	1,071	100%	2,611	100%
Scuba Diving						
Palm Beach	811	28%	227	23%	584	31%
Broward	832	29%	258	26%	574	31%
Miami-Dade	698	24%	216	22%	482	26%
Monroe	531	18%	303	30%	228	12%
Total	2,872	100%	1,004	100%	1,868	100%

1.2 User Activity - Visitors

The activity of reef users is summarized in person-days of reef use. For visitors, the number of person-trips to use the reefs is also of interest. In order to measure person-days and person-trips associated with reef use, the total number of person-trips by all visitors to each county must be estimated. Total visitation includes visits to a county by non-residents of that county to participate in any activity be it recreation, business or family matters. The total number of person-trips by all visitors to the county was estimated using the Capacity Utilization Model. This model uses a variety of information obtained from the counties and the responses to the General Visitor Survey.

The model uses the following information for each county. The number of hotel/motel rooms in each county during the study period (June 2000 to May 2001) and the average hotel/motel occupancy rate during the summer and winter of the same study period was obtained from the counties. Summer is defined from June 2000 to November 2000 and winter is defined from December 2000 to May 2001. The model also requires estimates of average party size for those using hotel and motel accommodations, the average trip length in nights for those staying in hotels/motels, and the proportion of visitors who stay in hotels/motels. This information was obtained from the general visitor survey responses.

The equation for the Capacity Utilization Model is as follows.

$$\begin{aligned}
 &\text{Total Number of Person-Trips by All Visitors to the County During a Season} = \\
 &\quad (\text{Hotel/Motel Occupancy Rate} \times \text{Number of Hotel/Motel Rooms} \times \\
 &\quad 183 \text{ Days in the Season} \times \text{Average Party Size for those Using Hotels/Motels}) \\
 &\quad \text{divided by} \\
 &\quad \text{Average Trip Length in Nights for those staying in Hotels/Motels} \\
 &\quad \text{divided by} \\
 &\quad \text{Proportion of Visitors who stay at Hotels/Motels}
 \end{aligned}$$

The results for each of the four counties are provided in Table 1.2-1 and Table 1.2-2, for the summer and winter seasons, respectively.

**Table 1.2-1 (Visitors)
Results of Capacity Utilization Model
Calculation of Number of Person-Trips to County
Summer Season (June 2000 to November 2000)**

Variable	Summer			
	Palm Beach	Broward	Miami-Dade	Monroe
Hotel/Motel Occupancy Rate (k) ^a	0.629	0.662	0.660	0.673
Average Number of Hotel/Motel Rooms During the Year (R) ^b	16,076	28,600	48,000	8,916
Number of Days in Season (p)	183	183	183	183
Average Size of Party for those using hotels/motels (SP) ^c	1.80	2.55	2.86	2.65
Average Trip Length in Nights for those staying in hotels/motels (LS) ^d	3.99	6.26	5.94	4.03
Proportion of Visitors who stay at hotels/motels (g) ^e	0.43	0.42	0.42	0.56
Estimated Number of Person Trips by Visitors who used hotels/motels = $k \times R \times p \times SP / LS$	832,110	1,404,824	2,782,827	720,322
Estimated Total Number of Person Trips by All Visitors to County = $k \times R \times p \times SP / LS / g$	1,938,327	3,314,292	6,574,428	1,288,464

^a Palm Beach County - For year ending September 30, 2000; Broward, Miami-Dade and Monroe Counties - For calendar year 2000. Sources: Palm Beach County Tourist Development Council, Greater Fort Lauderdale Convention and Visitors Bureau, Greater Miami Convention and Visitors Bureau; Monroe County Tourist Development Council. All rates are from Smith Travel Research.

^b Data represent 1999. Source: Florida Department of Professional Regulation, Division of Hotels and Restaurants.

^c From General Visitor Survey responses to Question 25 for parties who stayed in hotels/motels and party size was five or fewer people.

^d From General Visitor Survey responses to Questions 8 (On this trip, how many nights will you have spent in county?) for those respondents who stayed at hotels/motels on this trip.

^e From General Visitor Survey responses to Question 10 (Where are you staying on this trip?). Proportion equal to number of respondents staying at hotel or motel divided by all respondents. All respondents include all accommodation modes and day-trippers (no accommodation) and exclude cruise ship passengers who disembark at Key West for a day trip.

Table 1.2-2 (Visitors)
Results of Capacity Utilization Model
Calculation of Number of Person-Trips to County
Winter Season (December 2000 to May 2001)

Variable	Winter			
	Palm Beach	Broward	Miami-Dade	Monroe
Hotel/Motel Occupancy Rate (k) ^a	0.744	0.763	0.738	0.730
Average Number of Hotel/Motel Rooms During the Year (R) ^b	16,076	28,600	48,000	8,916
Number of Days in Season (p)	183	183	183	183
Average Size of Party for those using hotels/motels (SP) ^c	1.92	2.35	2.24	2.46
Average Trip Length in Nights for those staying in hotels/motels (LS) ^d	8.28	5.00	6.27	5.08
Proportion of Visitors who stay at hotels/motels (g) ^e	0.22	0.31	0.38	0.46
Estimated Number of Person Trips by Visitors who used hotels/motels = $k \times R \times p \times SP / LS$	506,882	1,873,450	2,306,184	575,605
Estimated Total Number of Person Trips by All Visitors to County = $k \times R \times p \times SP / LS / g$	2,313,013	6,088,714	6,039,217	1,263,466

Note: See Table 2.2.1-1 for footnotes.

The number of person-trips for the year 2000-2001 is summarized in Table 1.2-3 for each county. The number of cruise ship passengers who disembarked at Key West during the study period was added to the number of person-trips for Monroe County. The number of cruise ship passengers docking at Key West by month was obtained from the Monroe County Tourist Development Council. These numbers were multiplied by an estimate of the proportion of passengers who actually disembark to visit Key West for a half-day (0.9883 for summer and 0.9547 for winter). This proportion was obtained from Leeworthy, 1996 and is based on a NOAA study of cruise ship passengers in Key West.

Table 1.2-3 (Visitors)
Number of Person-Trips to Each County
All Visitors
June 2000 to May 2001

County	Number of Person-Trips (millions)		
	Summer - 00	Winter - 01	Total
Palm Beach	1.94	2.31	4.25
Broward	3.31	6.09	9.40
Miami-Dade	6.57	6.04	12.61
Monroe ^a	1.51	1.60	3.11
Total	13.33	16.04	29.37

^a Includes cruise ship passengers who disembark at Key West for day trip.

Next, the number of person-trips was converted to number of person-days. For each county, the number of person-trips, as presented on the last rows of Tables 1.2-1 and 1.2-2 (net of cruise ship passengers), was distributed to the different types of accommodation modes and day-trippers. This distribution was based on the general survey responses to Question 10 (Where are you staying on this trip?) and Question 8 (On this trip, how many nights will you have spent?). The proportions of respondents by accommodation are provided in Table 1.2-4.

Table 1.2-4 (Visitors)
Proportion of General Visitor Respondents Surveyed by Accommodation

Accommodation	County							
	Palm Beach		Broward		Miami-Dade		Monroe	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Day Trippers	0.12	0.20	0.13	0.21	0.25	0.34	0.15	0.09
Hotel/Motel/Guest House/Bed & Breakfast	0.43	0.22	0.42	0.31	0.42	0.38	0.56	0.46
Home of Family and Friends	0.36	0.40	0.32	0.24	0.27	0.18	0.07	0.07
Campground	0.00	0.07	0.03	0.11	0.01	0.04	0.16	0.32
Condominium or Second Home (own)	0.08	0.09	0.04	0.04	0.03	0.03	0.04	0.03
Vacation Rental	0.00	0.02	0.02	0.04	0.01	0.01	0.02	0.03
Time Share	0.01	0.01	0.03	0.05	0.01	0.01	0.00	0.01
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
No. of Respondents	396	397	486	260	378	364	635	529

Then, for each accommodation mode and the day-trippers, the number of person-trips was multiplied by average number of days per trip from Question 8. The average number of days per

trip is provided in Table 1.2-5. Then the number of person-trips by accommodation mode and day-trippers was summed over all accommodation modes and day-trippers. The numbers of cruise ship passengers who disembark at Key West for the day were added to the Monroe County results. The numbers of person-days all visitors spent in each county are presented in Table 1.2-6.

**Table 1.2-5 (Visitors)
Average Number of Days Per Trip by Accommodation
General Visitor Survey**

Accommodation	County – Summer				County – Winter			
	Palm Beach	Broward	Miami-Dade	Monroe	Palm Beach	Broward	Miami-Dade	Monroe
Day Trippers	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hotel/Motel/Guest House/Bed & Breakfast	4.99	7.26	6.94	5.03	9.28	6.00	7.27	6.08
Home of Family and Friends	8.46	10.79	10.31	5.36	11.66	10.24	12.44	6.26
All Other Accommodations ^a	17.83	9.02	12.39	5.03	40.85	21.06	16.03	11.54

^a All Other Accommodations include campground, condo or second home, vacation rental and time-share.
Source: General Visitor Survey responses to Question 8 (on this trip, how many nights have you spent in this county) plus 1.

**Table 1.2-6 (Visitors)
Number of Person-Days Spent in Each County
All Visitors
June 2000 to May 2001**

County	Number of Person-Days (Millions)		
	Summer - 00	Winter - 01	Total
Palm Beach	13.41	33.44	46.85
Broward	25.94	58.69	84.63
Miami-Dade	44.19	56.43	100.62
Monroe ^a	5.54	6.60	12.13
Total	89.08	155.16	244.23

^a Includes cruise ship passengers who disembark at Key West for day trip.

The number of person-trips by all visitors is used as the basis for estimating the number of person-days visitors spent using the artificial and natural reefs in each county. For each season, the number of boating person-trips is equal to the total number of person-trips by all visitors times the proportion of person-trips taken by visitors who participated in saltwater boating in the county in the past twelve months. This proportion was taken from the General Visitor Survey answer to Question 13 (Which activities and boating modes did you participate in over the past

12 months in this county?) for one boating activity per respondent divided by the total number of respondents.

To get the number of boating person-trips when the person used the reefs, the number of boating person-trips is multiplied by the proportion of boating person-trips when the respondent used the reefs. This proportion was obtained from the Visitor Boater Screening Tally sheets. These sheets indicated the proportion of boaters intercepted who used the reefs at least once in the past 12 months. The results for the summer, winter and the year are summarized in Tables 1.2-7 to 1.2-9.

**Table 1.2-7 (Visitors)
Person-Trips of Visitors Who Boated
And Visitors Who Used the Reefs Over the Past 12 Months
Summer 2000**

County	Summer – June 2000 to November 2000				
	Total Person Trips to County - All Visitors	Proportion of Person Trips Taken By Visitors Who Boated ^a	Boating Person Trips	Proportion of Boating Person Trips When the Reef was Used for Recreation ^b	Boating Person Trips When the Reef was Used for Recreation
Palm Beach	1,938,327	0.16	306,304	0.98	299,522
Broward	3,314,292	0.20	668,204	0.99	663,312
Miami- Dade	6,574,428	0.28	1,843,418	0.91	1,682,421
Monroe	1,513,099	0.33	502,031	0.90	450,077
Total	13,340,147		3,319,957		3,095,332

^a Saltwater Boating Only. From General Visitor Survey Answer to Question 13 (Which activities_modes did you participate in over the past 12 months in this county) for one boating activity divided by total number of respondents.

^b From the Visitor Boater Tally Sheets: $= 1 - (Q6/(Q6+Q7+Q8+Q10))$

**Table 1.2-8 (Visitors)
Person-Trips of Visitors Who Boated
And Visitors Who Used the Reefs Over the Past 12 Months
Winter 2001**

County	Winter - December 2000 to May 2001				
	Total Person Trips to County - All Visitors	Proportion of Person Trips Taken By Visitors Who Boated ^a	Boating Person Trips	Proportion of Boating Person Trips When the Reef was Used for Recreation ^b	Boating Person Trips When the Reef was Used for Recreation
Palm Beach	2,313,013	0.14	330,430	0.98	323,115
Broward	6,088,714	0.19	1,145,612	0.99	1,137,225
Miami- Dade	6,039,217	0.13	768,919	0.91	701,764
Monroe	1,596,298	0.26	413,226	0.90	370,462
Total	16,037,242		2,658,187		2,532,566

Note: See Table 2.2.1-7 for an explanation of the footnotes.

**Table 1.2-9 (Visitors)
Person-Trips of Visitors Who Boated
And Visitors Who Used the Reefs Over the Past 12 Months
June 2000 to May 2001**

County	Year Round - June 2000 to May 2001		
	Total Person Trips – All Visitors	Boating Person Trips	Boating Person Trips When the Reefs Were Used for Recreation
Palm Beach	4,251,341	636,734	622,637
Broward	9,403,006	1,813,816	1,800,537
Miami-Dade	12,613,645	2,612,337	2,384,185
Monroe	3,109,397	915,257	820,539
Total	29,377,389	5,978,144	5,627,898

Next, the total number of person-days that visitor boaters who used the reefs spent visiting the county was estimated. This estimate is the total boating person-trips when reefs were used times the average days per visit by boaters who use the reefs. The average days per visit by boaters who used the reefs was obtained from the answers to Question 10 of the Visitor Boater Survey (How many nights are you spending on this trip?) where a 1 was added to each answer to represent number of days. The average number of days and the total person days reef users spent in the county in 2000-2001 are provided in Table 1.2-10 for each county.

**Table 1.2-10 (Visitors)
Average Number of Days Visiting County
And Total Person-Days in County
By Visitor Boaters Who Used the Reefs**

County	Average Days Visiting the County Per Trip	Total Person-Days Spent Visiting the County
Palm Beach	5.36	3,336,923
Broward	8.47	15,252,053
Miami-Dade	7.58	18,068,870
Monroe	8.39	6,887,497
Total		43,545,343

To allocate the total person-days spent visiting the county to actual days using the artificial and natural reefs, the daily participation rates of the different boating activities were calculated using the responses to Questions 12, 15, 16 and 17 of the Visitor Boater Survey. Participation rate is the proportion of total days that respondents spent in the county in the last 12 months when the respondent actually participated in a saltwater activity and boat mode. It represents the probability that a visitor boater who uses the reefs will participate in a particular saltwater boating activity and boating mode on any given day.

Question 12 asked the respondent to examine a list of saltwater boating activities and boat modes and read the number corresponding to the activity-boat mode that he/she or someone in his/her party participated in over the past 12 months. The saltwater activity-boat mode list is provided in Appendix B with the Visitor Boater Survey. Question 13 asked if the respondent participated in the activity and boating mode. Question 15 asked how many days in the past 12 months that the respondent participated in the activity-boat mode. From the responses to these questions, the proportions of total visiting days respondents actually spent participating in the activity-boat mode were obtained.

To allocate the total number of days in an activity-boat mode to the use of artificial reefs versus natural reefs versus no reefs, the proportion of fishing days and the proportion of dives spent on each reef/no reef was calculated from the Visitor Boater Survey responses. Question 16 asked the respondent how many days he/she spent on the artificial reef and Question 17 asked the respondent how many days he/she spent on the natural reef. For scuba divers and snorkelers, Question 18 asked for the total number of dives and Questions 19 and 20 asked for the number of dives on artificial versus natural reefs. A dive is defined as exiting and reentering the boat and applies to both divers and snorkelers. From the responses to these questions, the proportions of fishing days spent on the artificial and natural reefs and the proportions of dives spent on the artificial and natural reefs were obtained. For fishing charter and party boats, the proportion of days spent on artificial versus natural versus no reefs was taken from the fishing-related responses to the charter/party boat operator survey.

The proportions of visitor days that visitor boaters who use the reefs participated in fishing and diving/snorkeling are presented in Tables 1.2-11 and 1.2-12. These tables also provide the proportion of fishing days and scuba/snorkeling dives that visitor boaters spent on the artificial, natural and no reefs. For example, visitor boaters who came to Broward County to use the reefs spent 27 percent of their visiting days participating in saltwater fishing from a charter, party, rental or private boat. Of these fishing days, 47 percent of days were spent fishing near artificial reefs, 52 percent of days were spent fishing near natural reefs and 1 percent of days were spent fishing near no reefs. In Palm Beach County, visitor boaters who came to the county to use the reefs spent 32 percent of their visiting days scuba diving or snorkeling. Of these diving/snorkeling days, 25 percent of days were spent on artificial reefs, 74 percent of days were spent on natural reefs, and 1 percent of days were spent on no reefs.

**Table 1.2-11 (Visitors)
Percent of Visitor Person-Days That Reef-Using Boaters Went Saltwater Fishing
And Percent of Fishing Days Spent on Artificial, Natural and No Reefs
From Visitor Boater Survey**

County	Total Respondents	Percent of Visitor Days	Percent of Fishing Days on:			Sum of Proportions
			Artificial Reefs	Natural Reefs	No Reefs	
Palm Beach	490	10%	21%	45%	34%	100%
Broward	252	27%	47%	52%	1%	100%
Miami-Dade	339	22%	24%	61%	15%	100%
Monroe	1,392	26%	20%	40%	40%	100%

Note: Boating Modes are Charter, Party, Rental, and Private (Own or Friend's) Boat.

Table 1.2-12 (Visitors)
Percent of Visitor Person-Days That Reef-Using Boaters Went Scuba Diving or Snorkeling
And Percent of Diving/Snorkeling Dives Spent on Artificial, Natural and No Reefs
From Visitor Boater Survey

County	Total Respondents	Percent of Visitor Days	Percent of Dives on:			Sum of Proportions
			Artificial Reefs	Natural Reefs	No Reefs	
Palm Beach	490	32%	25%	74%	1%	100%
Broward	252	22%	51%	48%	1%	100%
Miami-Dade	339	8%	32%	65%	3%	100%
Monroe	1,392	17%	16%	80%	4%	100%

Note: Boating Modes are Charter, Party, Rental, and Private (Own or Friend's) Boat.

The number of person-days spent in each saltwater boating activity-boat mode was estimated as the total person days reef-using boaters spent visiting the county in year 2000-2001 (from Table 1.2-10) times the proportion of visitor days that these visitors spent participating in each activity-boat mode. Then the number of person-days spent in each saltwater boating activity-boat mode was allocated to artificial and natural reefs based on either the proportion of days or the proportion of dives spent in that activity-boat mode on or near artificial versus natural reefs. Proportion of days was used for all activities except scuba diving and snorkeling where the proportion of dives was used to provide a more accurate indicator of reef use.

A summary of the total person-days that visitors spent participating in all activity-boat modes by type of reef is provided in Table 1.2-13. A summary of total person days visitors spent participating in each activity for each county is provided in Tables 1.2-14 through Tables 1.2-17. The total person-days visitors spent participating in all saltwater activities and boat modes by type of reef is provided in Tables 1.2-18 to 1.2-21 for each county.

Table 1.2-13 (Visitors)
Total Person-Days Visitors Spent on Artificial and Natural Reefs by County
June 2000 to May 2001 (Millions)

County	Number of Visitor Person Days on:		
	Artificial Reefs	Natural Reefs	All Reefs
Palm Beach	0.33	0.93	1.26
Broward	2.69	3.03	5.72
Miami-Dade	1.41	3.25	4.66
Monroe	0.48	1.60	2.08
All Counties	4.91	8.81	13.72

Visitors to the four counties spent about 14 million person-days on the reef systems of southeast Florida from June 2000 to May 2001. About 5 million of these days were spent on artificial reefs and about 9 million of these days were spent on natural reefs.

Table 1.2-14 (Visitors)
Number of Person-Days Spent Using Artificial and Natural Reefs
By Recreation Activity – Palm Beach County

Activity	Number of Person-Days		
	Artificial Reefs	Natural Reefs	All Reefs
Snorkeling	36,940	90,544	127,484
Scuba Diving	237,921	681,802	919,723
Fishing	55,252	158,329	213,580
Glass Bottom Boat Sightseeing	0	0	0
Total	330,112	930,675	1,260,787

Table 1.2-15 (Visitors)
Number of Person-Days Spent Using Artificial and Natural Reefs
By Recreation Activity – Broward County

Activity	Number of Person-Days		
	Artificial Reefs	Natural Reefs	All Reefs
Snorkeling	87,669	266,717	354,386
Scuba Diving	1,587,123	1,433,074	3,020,197
Fishing	1,003,641	1,289,745	2,293,386
Glass Bottom Boat Sightseeing	16,483	37,675	54,157
Total	2,694,915	3,027,210	5,722,125

Table 1.2-16 (Visitors)
Number of Person-Days Spent Using Artificial and Natural Reefs
By Recreation Activity – Miami-Dade County

Activity	Number of Person-Days		
	Artificial Reefs	Natural Reefs	All Reefs
Snorkeling	281,347	599,359	880,706
Scuba Diving	168,664	270,813	439,477
Fishing	959,302	2,363,723	3,323,024
Glass Bottom Boat Sightseeing	3,124	14,060	17,184
Total	1,412,438	3,247,954	4,660,392

Table 1.2-17 (Visitors)
Number of Person-Days Spent Using Artificial and Natural Reefs
By Recreation Activity – Monroe County

Activity	Number of Person-Days		
	Artificial Reefs	Natural Reefs	All Reefs
Snorkeling	121,778	641,218	762,996
Scuba Diving	75,632	282,336	357,967
Fishing	277,349	603,549	880,899
Glass Bottom Boat Sightseeing	3,636	71,363	74,999
Total	478,395	1,598,467	2,076,862

Table 1.2-18 (Visitors)
Number of Person-Days Visitors Spent Participating in Saltwater Boating Activities and Reef Use - June 2000 to May 2001
Palm Beach County

Activity	Boat Mode	Number of Person Days	Number of Person-Days on:		
			Artificial Reefs	Natural Reefs	No Reefs
Snorkeling	Charter/Party	34,171	6,276	27,895	0
	Rental	9,528	5,558	3,970	0
	Private	83,785	25,105	58,679	0
Scuba Diving	Charter/Party	795,460	179,124	607,859	8,477
	Rental	5,257	1,643	3,614	0
	Private	127,484	57,155	70,329	0
Fishing – Offshore / Trolling	Charter	39,428	5,399	18,221	15,808
	Party	73,270	10,032	33,861	29,377
	Rental	16,428	0	986	15,443
	Private	115,655	32,937	64,004	18,714
Fishing – Flats or Back Country	Charter/Party	329	0	0	329
	Rental	329	0	0	329
	Private	657	0	657	0
Fishing Bottom	Charter	18,071	2,474	8,351	7,245
	Party	32,200	4,409	14,881	12,910
	Rental	0	0	0	0
	Private	39,428	0	17,367	22,061
Viewing Nature and Wildlife	Glass Bottom Boat	0	0	0	0
	Back Country Excursion	986	0	0	986
	Rental	5,914	0	0	5,914
	Private	23	0	0	23
Personal Watercraft (jet skis, wave runners, etc.)	Rental	2,629	0	0	2,629
	Private	42,714	0	0	42,714
Sailing	Charter/Party	657	0	0	657
	Rental	1,314	0	0	1,314
	Private	34,171	0	0	34,171
Other Boating Activities	Charter/Party	4,929	0	0	4,929
	Rental	0	0	0	0
	Private	33,185	0	0	33,185
Total Person-Days		1,540,978	330,112	930,675	280,190

Table 1.2-19 (Visitors)
Number of Person-Days Visitors Spent Participating in Saltwater Boating Activities and Reef Use - June 2000 to May 2001
Broward County

Activity	Boat Mode	Number of Person Days	Number of Person-Days on:		
			Artificial Reefs	Natural Reefs	No Reefs
Snorkeling	Charter/Party	233,553	52,880	176,267	4,407
	Rental	0	0	0	0
	Private	125,239	34,789	90,450	0
Scuba Diving	Charter/Party	2,613,090	1,370,373	1,233,489	9,228
	Rental	176,011	88,006	88,006	0
	Private	240,323	128,745	111,579	0
Fishing – Offshore / Trolling	Charter	338,483	48,895	52,970	236,619
	Party	2,034,284	293,859	318,347	1,422,078
	Rental	0	0	0	0
	Private	1,133,919	471,151	637,970	24,797
Fishing – Flats or Back Country	Charter/Party	0	0	0	0
	Rental	0	0	0	0
	Private	88,006	29,335	44,298	0
Fishing Bottom	Charter	6,770	978	1,059	4,732
	Party	169,242	24,447	68,826	118,309
	Rental	0	0	0	0
	Private	301,250	134,976	166,274	0
Viewing Nature and Wildlife	Glass Bottom Boat	54,157	16,483	37,675	0
	Back Country Excursion	20,309	0	0	20,309
	Rental	10,154	0	0	10,154
	Private	74,466	0	0	74,466
Personal Watercraft (jet skis, wave runners, etc.)	Rental	13,539	0	0	13,539
	Private	176,011	0	0	176,011
Sailing	Charter/Party	0	0	0	0
	Rental	0	0	0	0
	Private	44,003	0	0	44,003
Other Boating Activities	Charter/Party	60,927	0	0	60,927
	Rental	3,385	0	0	3,385
	Private	10,154	0	0	10,154
Total Person-Days		7,927,276	2,694,915	3,027,210	2,233,120

Table 1.2-20 (Visitors)
Number of Person-Days Visitors Spent Participating in Saltwater Boating Activities and Reef Use - June 2000 to May 2001
Miami-Dade County

Activity	Boat Mode	Number of Person Days	Number of Person-Days on:		
			Artificial Reefs	Natural Reefs	No Reefs
Snorkeling	Charter/Party	144,205	51,231	79,692	13,282
	Rental	0	0	0	0
	Private	751,307	230,116	519,667	1,524
Scuba Diving	Charter/Party	142,763	25,318	102,677	14,769
	Rental	0	0	0	0
	Private	311,483	143,347	168,136	0
Fishing – Offshore / Trolling	Charter	288,410	93,657	114,974	79,778
	Party	501,833	162,964	200,056	138,814
	Rental	347,534	139,013	208,520	0
	Private	1,455,027	318,640	817,748	318,640
Fishing – Flats or Back Country	Charter/Party	1,442	0	0	1,442
	Rental	0	0	0	0
	Private	637,386	59,393	538,880	39,112
Fishing Bottom	Charter	18,747	6,088	7,473	5,186
	Party	233,612	75,862	93,129	64,620
	Rental	0	0	0	0
	Private	501,833	103,684	382,941	15,207
Viewing Nature and Wildlife	Glass Bottom Boat	18,747	3,124	14,060	1,562
	Back Country Excursion	0	0	0	0
	Rental	2,884	0	0	2,884
	Private	341,766	0	0	341,766
Personal Watercraft (jet skis, wave runners, etc.)	Rental	30,283	0	0	30,283
	Private	73,544	0	0	73,544
Sailing	Charter/Party	23,073	0	0	23,073
	Rental	7,210	0	0	7,210
	Private	235,054	0	0	235,054
Other Boating Activities	Charter/Party	46,146	0	0	46,146
	Rental	2,884	0	0	2,884
	Private	194,677	0	0	194,677
Total Person-Days		6,311,847	1,412,438	3,247,954	1,651,455

Table 1.2-21 (Visitors)
Number of Person-Days Visitors Spent Participating in Saltwater Boating Activities and Reef Use - June 2000 to May 2001
Monroe County (Florida Keys)

Activity	Boat Mode	Number of Person Days	Number of Person-Days on:		
			Artificial Reefs	Natural Reefs	No Reefs
Snorkeling	Charter/Party	269,479	13,413	250,701	5,365
	Rental	65,315	8,476	56,590	249
	Private	465,424	99,889	333,928	31,607
Scuba Diving	Charter/Party	119,816	17,678	99,738	2,401
	Rental	18,600	1,898	16,702	0
	Private	222,331	56,056	165,896	379
Fishing – Offshore / Trolling	Charter	93,863	4,779	41,190	47,894
	Party	110,300	5,616	48,403	56,281
	Rental	35,902	10,097	21,317	4,488
	Private	618,547	119,763	215,028	283,756
Fishing – Flats or Back Country	Charter/Party	18,167	0	0	18,167
	Rental	9,084	0	0	9,084
	Private	305,380	62,694	95,052	147,634
Fishing Bottom	Charter	21,195	1,079	9,301	10,815
	Party	24,223	1,233	10,630	12,360
	Rental	15,572	4,152	7,786	3,633
	Private	467,587	67,935	154,842	244,810
Viewing Nature and Wildlife	Glass Bottom Boat	80,454	3,636	71,363	5,455
	Back Country Excursion	15,572	0	0	15,572
	Rental	50,608	0	0	50,608
	Private	309,273	0	0	309,273
Personal Watercraft (jet skis, wave runners, etc.)	Rental	31,576	0	0	31,576
	Private	154,420	0	0	154,420
Sailing	Charter/Party	12,111	0	0	12,111
	Rental	3,028	0	0	3,028
	Private	18,167	0	0	18,167
Other Boating Activities	Charter/Party	17,735	0	0	17,735
	Rental	2,595	0	0	2,595
	Private	134,091	0	0	134,091
Total Person-Days		3,710,416	478,395	1,598,467	1,633,554