

Economic Assessment of Surfing and Saltwater Fishing Values in Brevard County, FL

An Internship Report

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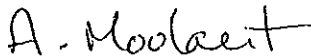
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EXECUTIVE SUMMARY

Like Florida as a whole, Brevard County's economy is strongly tied to its natural coastal resources. Although these coastal ecosystems provide a number of benefits to society, recreational opportunities are the most visible. Yet, coastal recreation values are scattered throughout the literature. Surfing values specifically have only been estimated in California and Australia. Since surfing and recreational saltwater fishing are two of Brevard County's most popular coastal activities, this study attempts to measure their economic value. Internet-based surveys were employed to collect information on how these stakeholders use and value the county's surfing and fishing resources. Analysis assisted in the summary of and comparisons between surfers and anglers. Based on surveys in this report, resident and visiting surfers spend almost 2.5 million person-days and \$53 million each year surfing in Brevard County. Resident and visiting anglers spend just over 2 million person-days and about \$225 million each year fishing in Brevard County. Resource users are willing to pay about \$1.75 million and about \$2 million to improve the county's surfing and fishing, respectively. The asset values associated with these resources is estimated at \$58.3 and \$66.7 million, respectively. While these values may be comparable to similar estimates in the literature, they should be considered conservative, lower bound estimates. They illustrate recreational benefits only and not the total economic value of the host of ecosystem services that these resources provide to the Brevard County public. Since investment in and maintenance of public resources is a primary function of government, the value estimates developed here can and should be included in Brevard County's coastal management and public policy decisions.

INTRODUCTION

Background

It is well recognized that natural systems provide countless benefits to society. These benefits sustain and fulfill our lives and promote our well-being (Daily, 1997). Natural ecosystems are assets that produce a flow of beneficial goods and services over time. In this regard they are not different than any other asset in the economy and should be valued similarly (Barbier, 2007). Unfortunately, the economic value of these goods and services is rarely accounted for in the analyses of local and regional economies (Kroeger, 2005). The exclusion of these values can restrict coastal management. This study attempts to identify the economic values of surfing and fishing in Brevard County, FL.

The structure and functions of ecosystems translate into goods and services that the general public consumes and depends on. Collectively, these goods and services are known as 'ecosystem services'. The Millennium Ecosystem Assessment, the product of global panels of experts, classified ecosystem services into four categories; provisioning, regulating, supporting, and cultural (MEA, 2005). Examples of ecosystem services include food, nutrient cycling, clean air and water, and recreational opportunity. These ecosystem services are invaluable to our society. Yet at the same time they are so fundamental that they are often overlooked and underestimated. However, there is now a growing interest in the analysis and assessment of ecosystem services and they are increasingly being valued in economic and financial terms (BSR, 2007).

Generally speaking, ecosystem services are characterized as public goods that do not have organized markets where they can be bought and sold like other economic goods. Consequently, these nonmarket values tend to go unnoticed and have therefore been historically undervalued. Recently, several studies and researchers have provided frameworks for the evaluation and application of ecosystem services and their nonmarket values. In 1997, it was estimated that the global value of all ecosystem services had a median value of \$33 trillion annually (Costanza et al, 1997). For perspective, the global gross domestic product in 1997 was \$27 trillion (Costanza et al, 1997). This and subsequent studies not only helped promote and market the concept of ecosystem services in the scientific community, but it also highlighted the significance of natural systems as cornerstones of the economy (Kildow, 2006). Today the economic valuation of the stocks and flows of natural capital and ecosystem services are becoming more highly visible and monitored in the scientific literature.

Not surprisingly, coastal and ocean systems had the highest total and per-acre values in the Costanza et al study. These systems provide some of the most vital ecosystem goods and services and play a large and important role in supporting local, regional, and even national economies (Pendleton et al, 2008). Florida's ocean and coastal economies are on the scale of hundreds of billions of dollars and are not only nationally but globally significant (Kildow, 2006). For instance, in 2005 the recreational marine-related industry alone generated an \$18 billion annual economic impact statewide (Kildow, 2006).

Like Florida as a whole, Brevard County's inventory of natural coastal assets provides a wide variety of recreational opportunity and it serves as the foundation for many economic opportunities. Brevard County is known for its seventy-two miles of beaches and significant amount of sensitive environmental

information is scattered throughout the published and unpublished literature and it often appears at incompatible scales of analysis and classified differently by different authors (De Groot, 2002). For example, the Florida literature is riddled with figures estimating the value of beaches and fishing to the recreation and tourism industry. Yet values for surfing and other non-boating activities are almost entirely absent. There is a need for better quality and quantity of economic data regarding the value of oceans and coasts. It is important to understand exactly what these numbers measure and to be able to filter out those numbers that facilitate misrepresentation. Filling in these informational gaps and applying them to Brevard County is another primary reason for this study.

A handful of previous socioeconomic studies conducted in Florida with similar objectives, sowed the seeds and provided the inspiration for this study. These studies, and others of its kind, have traditionally focused on other forms of recreation or other geographical areas than those considered here. Following their lead, this study is an attempt at providing a baseline characterization of surfing and fishing recreation in Brevard County, FL, with a focus on quantifying their economic values and significance. The primary goals of this study are:

1. To estimate the demand and use of surfing and fishing recreation, in terms of person-days.
2. To estimate the economic value and significance of surfing and fishing, by measuring use values and expenditures.
3. To accumulate and analyze the preferences and attitudes of these participants on topics regarding coastal resources and their management.

These results will provide the latest available information that can be applied directly to current management scenarios and alternatives.

METHODS

Survey Design and Development

To obtain the information needed to meet the goals and objectives of this study, two survey instruments were developed. The surveys collected data on resource use and the user's resource-related expenditures, values, views, and demographic and socioeconomic information. One survey was written strictly for surfers and another for anglers. However, they were similar in question type, wording, structure, and organization to assist in direct comparisons between these user-groups.

The design of the survey instruments was inspired by the surveys and interview questionnaires used in three recent socioeconomic studies of coastal recreation whose goals were similar. The survey questions closely followed the wording and format of the questions in these previous studies, in order for the results to be comparable between studies. References regarding general survey design were also consulted to ensure proper technique and to minimize, to the greatest extent possible, all potential sources of error and bias. Further advice was sought from members of the Business School at Florida Tech with experience in this field. The survey instruments were continually tested, modified, and re-drafted throughout February and March, 2008. The final survey instruments included a total of 49 questions each divided into three main sections to coincide with the study's three principal objectives (Appendix A).

An internet-based survey approach was used because of the monetary and temporal constraints of this study. It is acknowledged that online surveys are associated with certain disadvantages as compared to other types of survey methodologies (Fielding et al, 2008). However the advantages of access to large populations and geographical areas, low temporal and monetary costs, quick execution with real time results, and the ease of data collection and downloading far outweighed the disadvantages. Furthermore, measures were taken to address some of the disadvantages of online surveys such as information security, multiple responses, and low response rates.

The two survey instruments were adapted to the online survey software, SurveyMonkey. An active link was created for each survey. These links were then posted on a website or included in an email list. The links were associated with the slogan "*Value Our Coast, Take a Survey*", and accompanied by a short introductory message.

The distribution effort was a multi-phased approach. The primary outlet for the surfing survey was 2ndlight.com. The primary outlet for the fishing survey was the Coastal Angler Magazine (CAM) website. These two websites are popular Brevard County websites that have a constant and consistent viewership. The links were placed directly on their homepage. The secondary outlet for both surveys was the Surfrider Sebastian Inlet Chapter email list; a list that includes both dedicated surfers and anglers. Tertiary outlets included several different surfing and fishing websites with discussion forums and/or message boards. A thread entitled "*Value Our Coast, Take a Survey*" was created in the forum or message board and accompanied by the introductory message and the active link. See Appendix A for more detailed information.

Survey responses were downloaded from SurveyMonkey's database and exported into Microsoft Excel. Microsoft Excel's data analysis toolpak allowed for the production of descriptive and inferential statistics. The descriptive statistics reported in this study come directly from the SurveyMonkey software or the descriptive statistics function in the Microsoft Excel toolpak. Inferential statistics reported here include the results of correlation tests and t-tests. Excel's t-test function includes the option of paired or unpaired and assuming equal or unequal variances. Paired t-tests were used when one user group was involved whereas unpaired t-tests were used when comparing between the two user groups. The assumption of unequal variances was used when there was a large difference between sample sizes and means. The assumption of equal variances was not used in any of the tests.

Definitions

The following definitions were used:

- Resident: An individual whose zipcode is within Brevard County. Referred to in this report as 'resident angler' and 'resident surfer'.
- Visitor: An individual whose zipcode is not within Brevard County but are visiting Brevard County. Referred to in this report as 'visiting angler' and 'visiting surfer'.
- Ecosystem goods and services: The beneficial outcomes that result from ecosystem structure and functions. Ecosystem services refers to a wide range of conditions and processes through which natural ecosystems, and the species that are part of them, help sustain and fulfill human life (Daily, 1997).
- Person-day: One individual participating in a coastal recreational activity for part or all of one day. Also referred to in this report as a surfer-day or angler-day.
- Use value: Is the participant's willingness to pay to use or visit the resource, above and beyond what they already spend on travel costs and other recreational-related expenditures. Also referred to as consumer surplus which is the difference between the actual price paid and what is willing to be paid.
- Non-use value: Is someone's willingness to pay for the maintenance or improvement of the resource even if they never use or visit the resource.
- Total economic value: Includes both use and nonuse value.

RESULTS

General Survey Results & Demographics

Both surveys were open for data collection on April 22, 2008, with the launching of the surfing survey on 2ndlight.com. The fishing survey link was placed at the end of surfing survey, and vice-versa, to encourage those users who also participate in the other activity to complete both surveys. The surfing survey closed on May 30, 2008 for a total of 39 days live (Figure 1). The fishing survey closed on July 20, 2008, for a total of 90 days live (Figure 2).

The completion rate for the surfing survey was 69.1%, with 431 respondents completing the survey out of 624 that started it. The completion rate for the fishing survey was 77.1%, with 81 respondents completing the survey out of 105 that started it. A rough estimate of the margin of error for both samples is 4.8% for surfers and 11.1% for anglers. Note that the margin of error estimate for the angler sample is considerably higher than preferred, and caution must be taken when evaluating and interpreting the results from this sample.

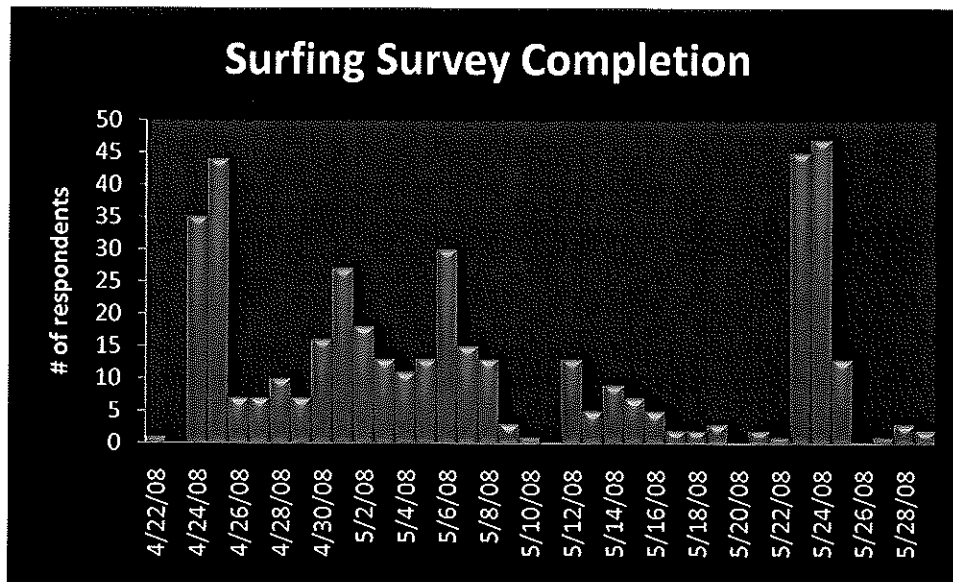


Figure 1: Completion plot of the surfing survey.

Costa Rica, Jamaica, Nicaragua, Mexico, and the Dominican Republic are the frequented non-continental U.S. destinations.

Table 1: Number of surfing trips taken by Brevard resident and visiting surfers.

Surfing Trips (per year)	Resident	Visitor
Out of Resident County	4.0	19.6
Out of Florida	0.8	0.7
Out of U.S.	0.7	0.5

Visiting surfers were estimated to take an average of 15 surfing trips to Brevard specifically each year. The majority of these trips are day trips, meaning they do not require staying overnight in the county. Only 1% said they had surfing trips to Brevard that lasted 6 days or more. Of the visitors that do stay overnight, 56% stay with family or friends while the rest use some other form of lodging.

Table 2 shows the average number of days surfed in Brevard for residents and visitors. Residents surf 130 days per year while visitors surf 32.

Table 2: Average number of days surfed in Brevard County.

Surfer-Days	Resident	Visitor
Days / Week	2.7	0.7
Days / Month	10.9	2.7
Days / Year	130.2	32.2

Surfers rated the quality of the wave as the most important reason that determines where they surf. They also factor in how crowded the break is and how far away it is from their residence more than the water quality and the presence of amenities. Respondents also stated a number of other reasons that determine where they surf. A comprehensive list of these comments is in Appendix D.

When asked to state what factors influence how often they surf, surfers rated job and school obligations as the highest. Travel costs were by far the least important in determining surfing frequency (Figure 3). Other reasons given for determining how often they surf can be seen in Appendix D.

residents travel and the distance visitors travel to their surf break is highly significant ($t(227)=-13.73$, $p=1.22E-31$).

Valuation Section

In this section, surfers were asked about their surfing related equipment and retail purchases and the expenses that they incur while traveling to and enjoying their surf session. Surfers were also asked about their willingness to pay to help maintain and improve the surfing conditions in the county.

Surfers were estimated to purchase a surfboard, on average, every 3 years with a price tag of about \$450. Surfing related retail purchases averaged about \$400 a year. Therefore, surfer's non-travel costs total about \$550 a year (Figure 5).



Figure 5: Surfers annual non-travel costs. Non-travel costs include equipment and surfing related retail purchases.

Resident surfers were estimated to spend about \$9 every day traveling to and from their surf session(s), compared to visitors who spend \$38. For the average resident who surfs 130 days a year, the total travel costs per surfer per year is about \$1130. The average visiting surfer spends almost \$2100 per year. Table 3 shows a breakdown of average values for different travel cost items. Over half of the travel expenses of both resident and visitor surfers are due to gasoline costs.

Table 3: Itemized travel costs of resident and visiting surfers while surfing in Brevard County. 'Other' item includes parking, fees, etc. Travel costs per surfer-day are multiplied by the number of surfer-days per year to obtain an annual figure.

Resident	Gas	Food/Drink	Other	Total
\$ / surfer-day	5	3	1	9
\$ / year	631	389	111	1131
% of total	56%	34%	10%	100%

Resident	1.81	76.00
Visitor	1.75	64.75

Fishing Survey Results

Use Patterns and Behavior Section

In this section, anglers were asked about where and how often they fish in Brevard and the factors that influence those decisions.

Of the anglers who completed the survey, 65% are Brevard residents. The remaining 35% are visitors from other counties in the state. The average resident angler has lived in Brevard for about 16.7 years (mode of >20 years). These residents have fished in Brevard for a similar amount of time, 16.2 years (mode of >20 years). A correlation test between years lived and years fished in Brevard resulted in a correlation coefficient of 0.88, illustrating a very strong, positive relationship.

Resident anglers were estimated to take about 6 trips per year out of Brevard, which is only about 9% of the total fishing trips residents go on per year. Visiting anglers take about 22 fishing trips out of their resident county per year. Of these visiting anglers, 54% said they traveled to Brevard for more than 20 of those trips. The average number of fishing trips to Brevard per visiting angler is 17, or 80% of their total fishing trips out of their resident county. Resident anglers tend to take about 3 fishing trips every 2 years to other states in the U.S. while visiting anglers take about 2 trips every year to other states (Table 7). The respondents did not disclose where the out of state and foreign destinations are.

Table 7: Average number of trips taken for the sole purpose of recreational saltwater fishing.

<u>Fishing Trips (per year)</u>	Resident	Visitor
Out of Resident County	5.9	21.6
Out of Florida	1.5	1.9
Out of U.S.	0.3	0.1

Visiting anglers were estimated to take an average of 17 fishing trips to Brevard each year. The majority of these trips are day trips and do not require staying overnight in the county. Only 4% said they had surfing trips to Brevard that lasted 6 days or more. 82% of visiting angler do not stay overnight in Brevard. Of the visitors that do stay overnight, 80% stay with family or friends while the rest use some other form of lodging.

Table 8 shows the average number of days fished by resident and visiting anglers. Resident anglers who own a boat fish about 78 days per year. Visiting angler boat owners fish 48 days per year. Resident and visiting anglers who do not own boats fish 54 and 36 days per year, respectively.

Table 8: Average days spent fishing in Brevard County for resident and visiting anglers and for those who do and do not own a boat.

<u>Angler-Days</u>	Days / Week	Days / Month	Days / Year
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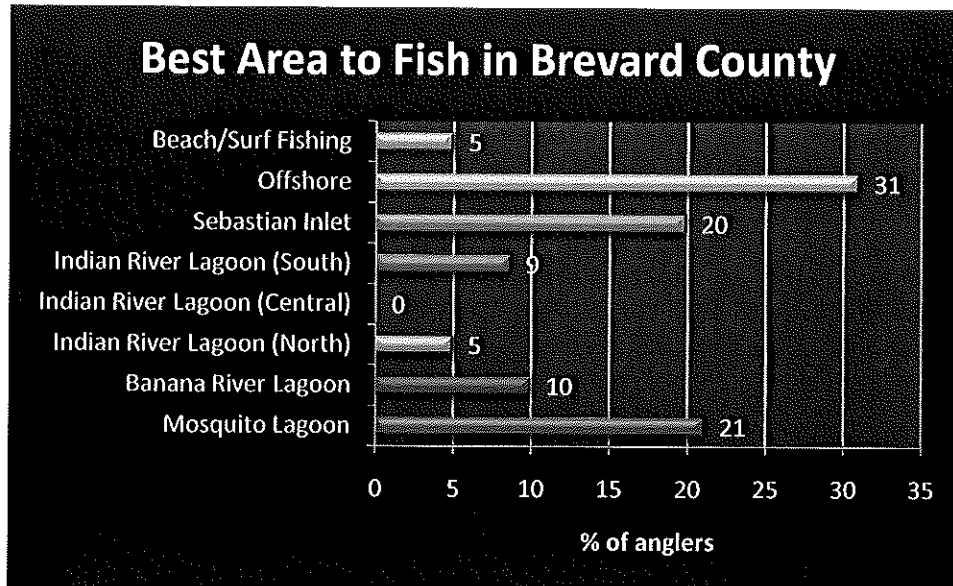


Figure 7: Angler's response to the question of what place is the 'best' place to fish in Brevard County.

Valuation Section

In this section, anglers were asked about their fishing related equipment and retail purchases and the expenses they incur while traveling to and enjoying a day of fishing. Anglers were also asked about their willingness to pay to help maintain and improve the fishing conditions in the county.

Anglers were estimated to spend a little over \$500 a year on equipment and accessories, and \$280 a year on fishing related retail purchases. Angler non-travel costs total about \$790 a year (Figure 8).

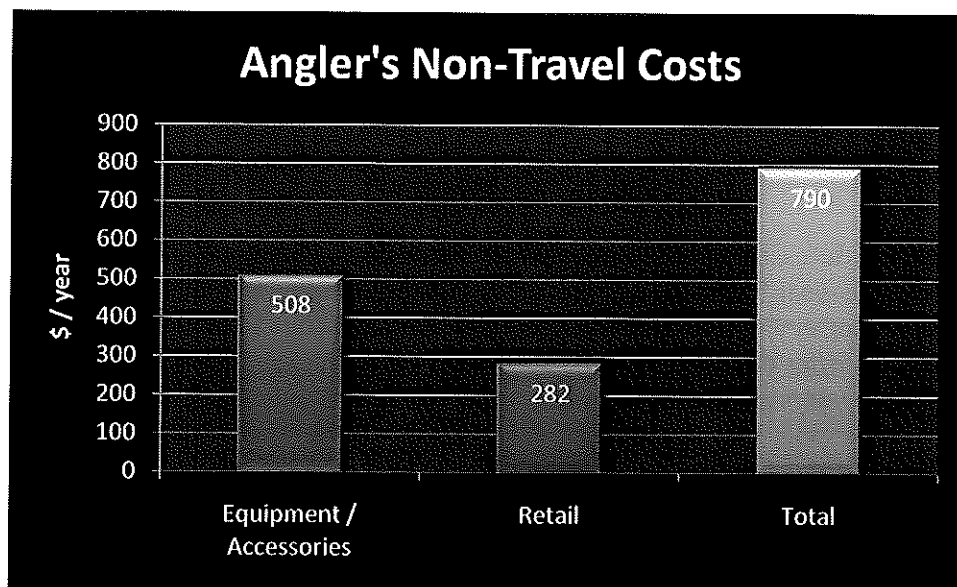


Figure 8: Itemized non-travel expenses that anglers incur each year.

Res. / Non-Owner	54	2912	69	3702
Vis. / Non-Owner	64	2300	86	3090

Table 11 shows resident and visiting angler WTP amounts for both maintaining and improving the surfing conditions in and from their existing condition. Resident and visiting anglers were estimated to be willing to part with \$36 a year to maintain the fishing resources in their existing condition, and a little less than \$60 to improve the conditions. An unpaired t-test showed that the values between residents and visitors are not statistically significant for either maintaining or improving the fishing conditions.

Table 11: Average willingness to pay amounts per angler-day and per year for resident and visiting anglers. Annual WTP amounts were divided by the number of angler-days per year for residents and visitors, respectively, to obtain an estimate for WTP per angler-day.

	Maintain Conditions		Improve Conditions	
	\$ / angler-day	\$ / year	\$ / angler-day	\$ / year
Resident	0.56	36.75	0.87	57.50
Visitor	0.87	36.50	1.40	59.00

Natural Resource and Coastal Management Results from both Surveys

In this section, respondents were asked questions regarding issues dealing with Brevard's natural resources and coastal management policy. Some questions were specific to surfers and to anglers but most questions were identical to allow for direct comparisons.

Surfing Management Section

It was estimated that about 70% surfers are either unaware or do not believe that nearshore reef is present at their typical surf spot. Only 32% of surfers say that nearshore reef is present at their surfing spot. 77% of surfers are in favor of deploying an artificial reef and 65% are in favor of using tax dollars to do so.

Figure 9 shows surfer's opinions on issues and activities that threaten surfing in Brevard. The highest rated concern is coastal development/restricted access, although it is not statistically different than dredge-and-fill activities/beach nourishment. Sea level rise and global warming is the least threatening issue. See Appendix C for the associated p-values. Other threats explicitly stated by surfers are listed in Appendix D.

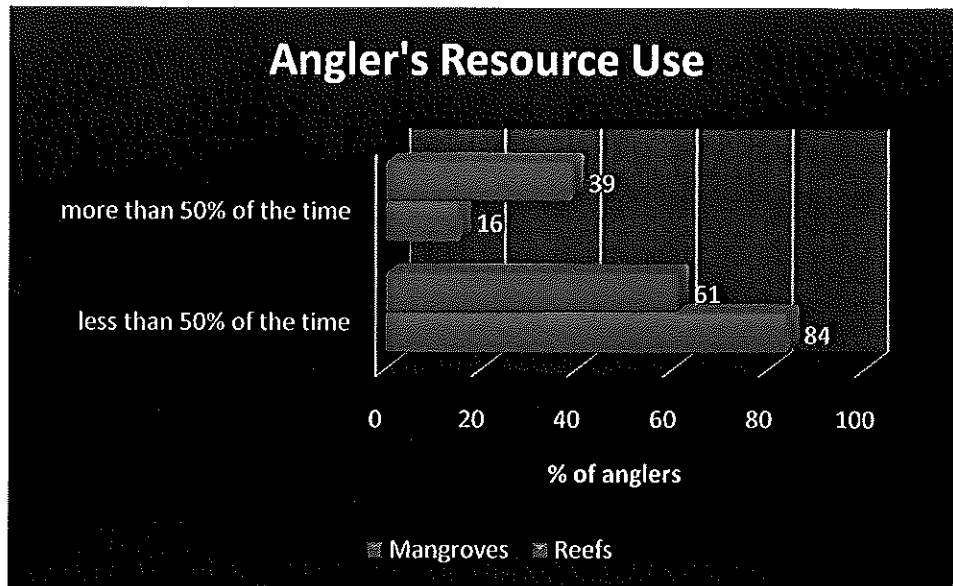


Figure 10: Percent of angler's time spent fishing on, near, or within reefs and mangroves.

Deteriorating water quality and pollution is the most significant concern for anglers. A t-test against the other three stated threats are all statistically significant (Appendix C). Development/dredge-and-fill activities and overfishing/fishing violations are both more significant than sea level rise and global warming, but statistically different between themselves (Figure 11). The respondents also stated some other threats to fishing resources in Brevard (Appendix D).

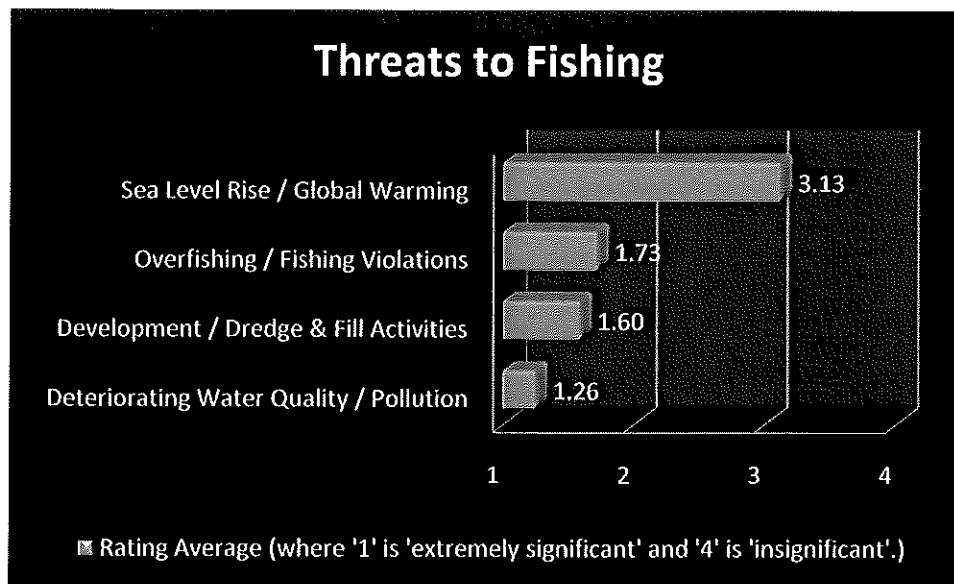


Figure 11: Rated significance of each of the following threats to current fishing resources and conditions. A rating of '1' is 'extremely significant' and a '4' is 'insignificant'. Note: The mode of 'sea level rise and global warming' is 'neither significant nor insignificant'. The mode of 'overfishing and fishing violations' is 'significant'. And the other two threats have modes of 'extremely significant'.

Surfer and Angler Comparisons

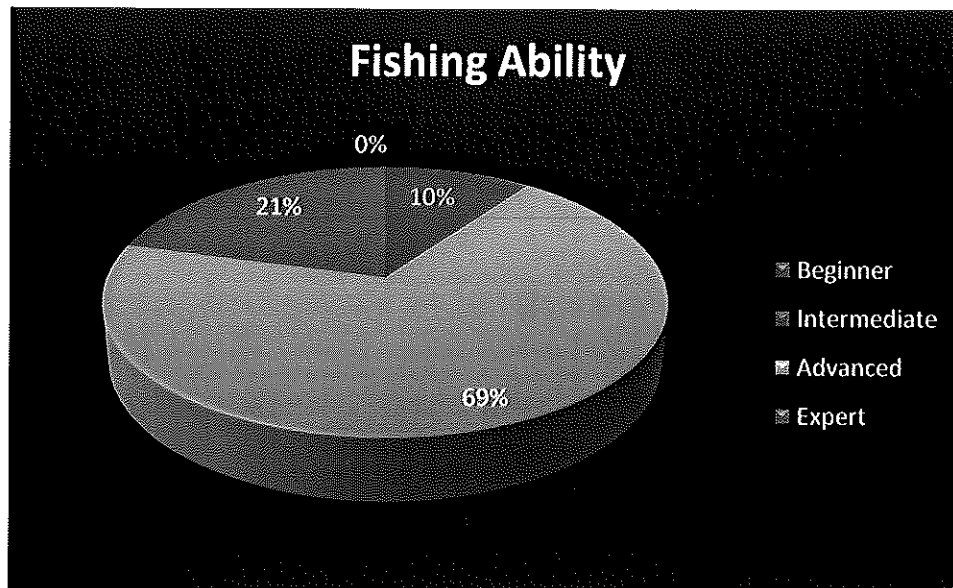


Figure 14: Angler's fishing ability.

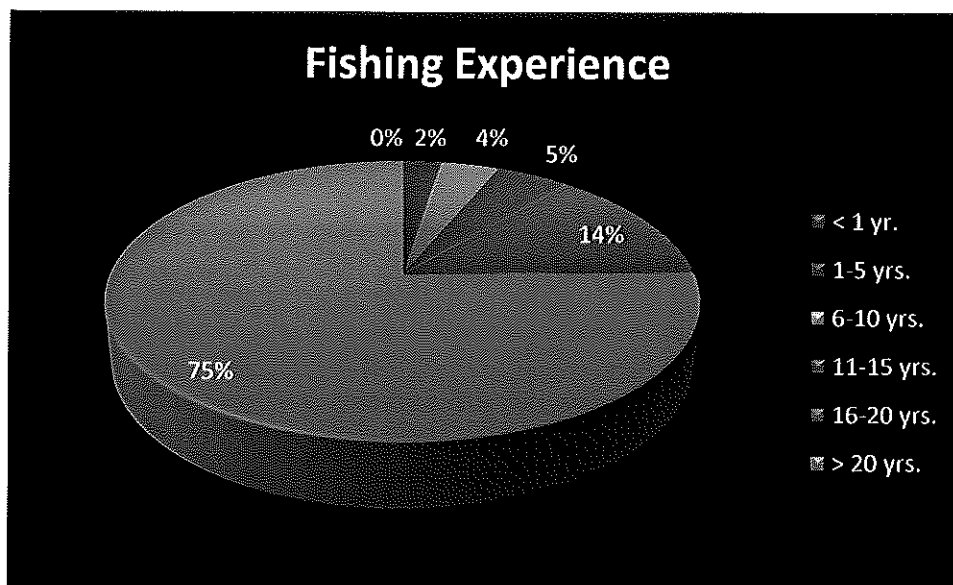


Figure 15: Angler's fishing experience in years.

Surfers and angler's views on beach nourishment and dredge-and-fill activities are very similar and in fact are not statistically different. About 70% of both user groups are either opposed or have negative concerns about these activities while only 10-15% support or have only positive concerns (Figure 16).

beaches, seagrass beds, mangrove areas, and nearshore reefs are going to deteriorate from their existing state within 10 years (all highly statistically significant, see Appendix C). Figures 18 and 19 below show the results in more detail. Anglers believe all of our current resources are currently in 'fair' condition and will still be that way in 10 years, with the exception of seagrass beds which will become 'poor'. Surfers believe that all of our resources are currently in 'fair' condition except beaches which are 'above average'. In ten years, surfers think these resources will all be in 'fair' condition except seagrass beds which will become 'poor'.

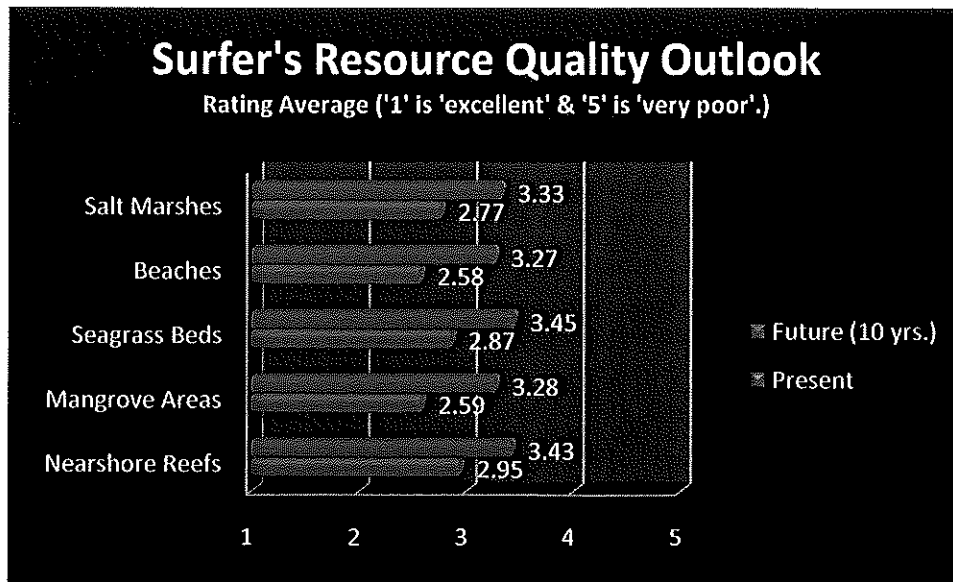


Figure 18: Surfer's median ratings of how the quality of the natural resources will change in 10 years.

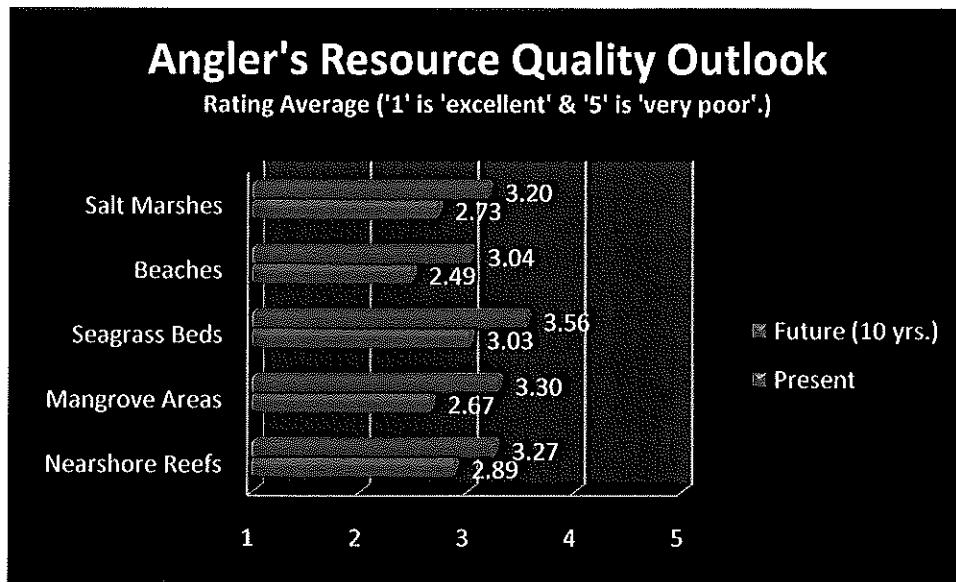


Figure 19: Angler's median ratings of how the quality of the natural resources will change in 10 years.

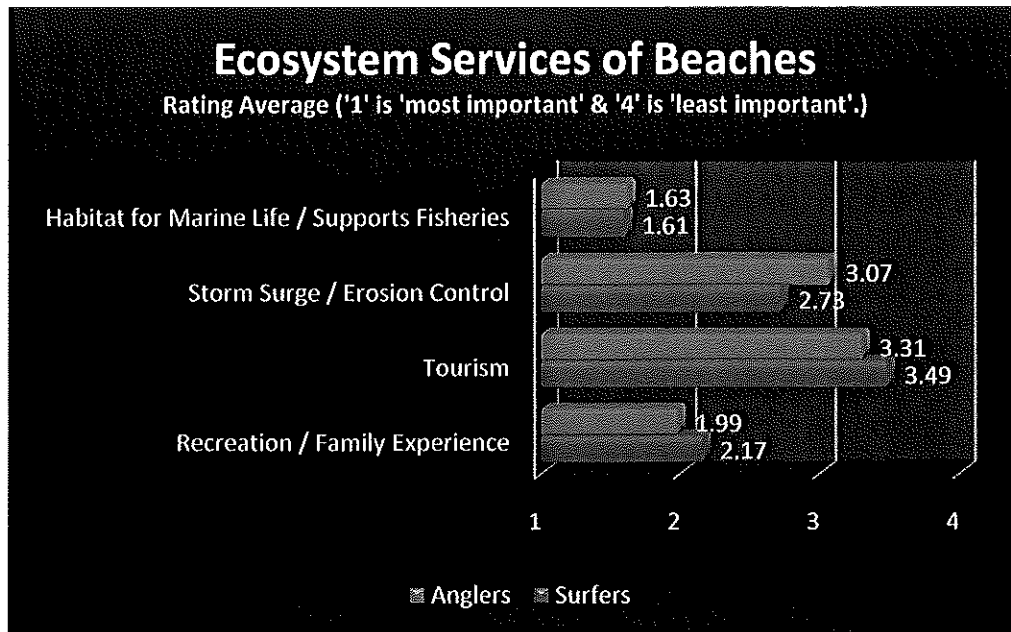


Figure 21: Relative Importance of some of the benefits that reefs provide compared between anglers and surfers. A rating average of '1' is 'most important' and '4' is 'least important'.

Lastly, both user groups were asked about different forms of coastal management needed to better protect and address Brevard's natural coastal resources (Figure 22). Anglers believe more enforcement is necessary whereas surfers thought more land-based zoning, e.g. setbacks, would help. Both anglers and surfers believe more education is also needed. Less than 10% of both surfers and angler believe that management is fine as is or there should be less management. Other management options put forth by the respondents can be seen in Appendix D.

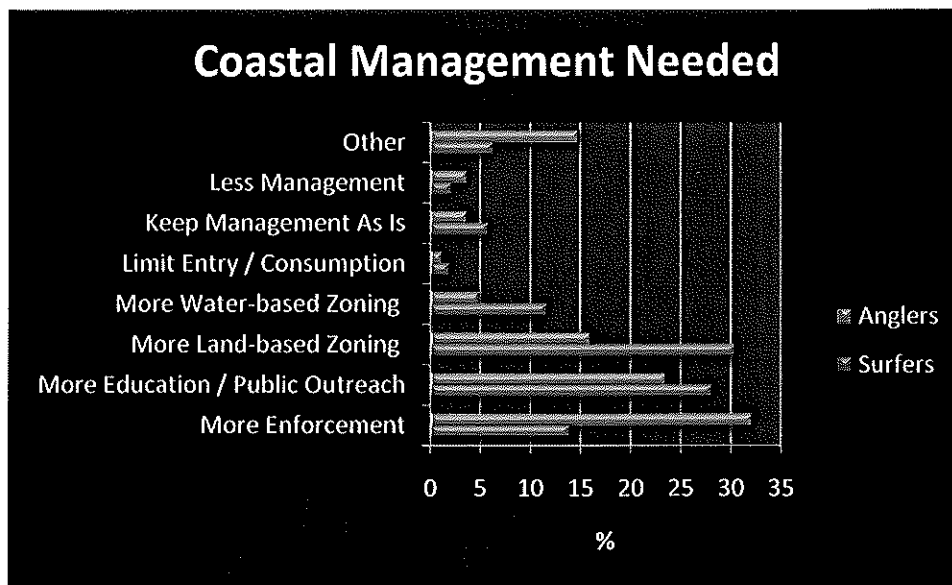


Figure 22: Anglers and surfers opinion of the form of coastal management most needed to better protect our natural coastal resources.

Table 12: Comparison of survey results between anglers and surfers. Values are in 2008 dollars. WTP = willingness to pay.

	Surfers			Anglers				
	Residents	Visitors	Total	Residents		Visitors		Total
				Boat Owner	Non-Owner	Boat Owner	Non-Owner	
Participants	16,864	9,486	26,350	24,621		10,012		34,633
Person-Days per year	130	32		78	54	48	36	
Expenditures per Person-Day	\$ 13.00	\$ 82.00		\$ 123.00	\$ 69.00	\$ 203.00	\$ 86.00	
WTP (improve) per Person-Day	\$ 0.58	\$ 1.55		\$	0.87	\$	1.40	
Total Annual Person-Days	2,192,320	303,552	2,495,872	960,219	664,767	240,288	180,216	2,045,490
Total Annual Expenditures	\$ 28,500,160	\$ 24,891,264	\$ 53,391,424	\$ 118,106,937	\$ 45,868,923	\$ 48,778,464	\$ 15,498,576	\$ 228,252,900
Total Annual WTP (Improve)	\$ 1,271,546	\$ 470,506	\$ 1,742,051	\$ 835,391	\$ 578,347	\$ 336,403	\$ 252,302	\$ 2,002,443

DISCUSSION

Survey Patterns

Resource Use

The surfing survey characterized the resource use and behavior of the county's resident and visiting surfers. As expected, Brevard is an attractive destination for surfers. The number of resident surfers totals about 17,000, or 3% of the county population. The average resident surfer has been surfing in Brevard for over 95% of the time they have lived there. This strongly positive correlation suggests that surfing is a significant part, or possibly a foundation, of their lifestyle. Brevard's surfing resources are also attracting visiting surfers from outside of Brevard, at about 9,500 every year. Whenever non-Brevard surfers are not surfing in their own county, 75% of the time they are surfing in Brevard; every 3 of 4 surfing trips out of the county are to Brevard. Furthermore, the majority of these surfers are highly skilled and experienced. Therefore, not only is there a constant influx of dedicated visitors surfing in Brevard, but there is also an experienced resident user group who has surfed in Brevard for as long as they've lived here.

These dedicated surfers spend many days surfing in Brevard County. Residents surf over 2 million days per year and visitors about 300,000 days. This is likely an upper bound since it means at any day during the year there are over 6000 individuals surfing in Brevard County waters. Yet the days per week surfed is less than 3 days for residents and barely 1 day for visitors. This does not seem unreasonable or unrealistic. The problem then lies with the estimated number of individual resident and visiting surfers, of which we have no known or reliable database or estimate. This magnitude of potential users and their impressive resource use further supports the idea that we need a better understanding of the Brevard surfing industry and its constituents.

Surfing in Brevard County consists of more than the recognizable Cocoa Beach and Sebastian Inlet. Brevard attracts surfers along the entirety of its coast. And although Sebastian Inlet is rated as the single 'best' place to surf in Brevard, Patrick Air Force Base is surfed more frequently. This is partly explained by the average resident surfer living closer to PAFB and the central Brevard coast. But it is worth mentioning that over 40% of resident surfers believe the area from PAFB to IHB as a whole is the best place to surf, 12% more than those in favor of Sebastian Inlet. Visitors, on the other hand, are equally in favor of these two areas. Central Brevard is not only the most frequented but also claimed by many as being just as good as the infamous Sebastian Inlet. Additionally, the tourism-attracting Cocoa Beach area is only rated the best area to surf in Brevard by 11% of visiting surfers and less than 6% of residents.

Since the Brevard County coastline is littered with rideable waves and surfing opportunity, surfers typically have a choice of where they surf. Not surprisingly then, surfers choose their break more on the quality of the wave and how crowded it is than on the proximity to their residence. It was also noted by some surfers that the 'presence of friends' and the 'local vibe' are important factors influencing where they surf. And although some even claimed that they surf at the location that they do because it is close

gasoline costs are almost 50% of these total expenditures, and so a significant increase in prices could possibly have an effect on how often visitors come to Brevard to surf.

Although travel costs and expenditures help determine how much money is infused into the economy from surfing related activities, it does not directly translate into the value one places on surfing. The significant difference between how much residents spend compared to how much visitors spend does not mean that visitors value surfing more than residents. In fact, it was statistically confirmed that it is actually the other way around; residents value surfing in Brevard more than visitors do. The results of the willingness-to-pay questions allow for the estimation of surfers consumer surplus, or use value. It must be noted that the question was asked as the amount one was willing to be paid as a one time payment each year. In this instance, residents are statistically willing to pay more than visitors to both improve and maintain Brevard's surfing conditions. Yet, as will be discussed below, previous studies found that visitors are typically willing to pay more when the question is asked in terms of a person-day and not the entire year. This is an important distinction and further research needs to address such an issue. This must be kept in mind if a payment or funding mechanism is ever developed based on contingent valuation questions.

Surfers were also asked to state how much they would be willing to pay for an artificial reef to improve conditions. In this case, the difference between residents and visitors willingness to pay is not significant. Furthermore, only visitors actually increased how much they were willing to pay per year when the specific program to improve conditions was disclosed. This increase is most likely due to the fact that stakeholders like to be informed of how their money is used and their resource is to be changed. Residents probably did not increase their willingness to pay for a few reasons. One, they already surf a third of the year and additional days, as opposed to other ways to improve their surfing experience, aren't as important to them. And two, they probably have more personal concerns about the program employed to improve the conditions since they are more intimately affected by it than visitors, and so they require more information about how exactly it would benefit them. This sentiment, precisely, can be seen in the comments that the surfers made about this question, see Appendix D.

Like surfers, travel costs are by far the most significant portion of an anglers fishing related expenditures. Unlike surfers, anglers spend a considerable amount of money on fishing. Even anglers who do not own a boat spend more than a visiting surfer and twice as much than the average resident surfer. Furthermore, the difference between the travel costs of anglers that do not own a boat and those that do is three-fold. Boat owners spend more in gasoline costs than non-boat owning anglers spend the entire year.

The difference in willingness to pay amounts between resident and visiting anglers is not significantly different for either maintaining or improving fishing conditions. Similarly, the difference between the willingness to pay amounts of anglers and surfers were not statistically significant. When asked about improving conditions, anglers increased their willingness to pay by 62% and 56%, for residents and visitors respectively. Surfers, on the other hand, increased their willingness to pay for improved conditions by 69% and 38%, respectively. Many users commented that they would pay more than the answer choices given and some even claimed that these resources are 'priceless' to them.

Resource Management Issues

their estimate of total resident recreationists using the IRL and multiplying it by the percentage of those recreationists that claimed they were fishing as their main activity. The value estimated in this report is more concretely based on the fishing license numbers sold to Brevard residents. 25,000 resident anglers is a very conservative estimate for Brevard, with 58,000 resident saltwater anglers more likely an upper bound. Besides the geographic and population difference, the Martin County discrepancy can be explained by the study's focus on angler's strictly using reefs. It does not include those that fish in the IRL. These two studies did not report estimates of the total number of fishing visitors. The USFWS study estimated 1.3 million resident and 0.7 million visiting saltwater anglers in all of Florida. Using the estimates in this report, resident saltwater anglers in Brevard are about 2% of all resident saltwater anglers in Florida and the visiting saltwater anglers to Brevard are about 1.4% of all visiting saltwater anglers to Florida. These percentages are most likely lower bounds due to the conservative estimates of residents and visitors in this study.

The present study's estimates of average person-days spent fishing in Brevard are well above those reported in the previously mentioned studies. Their range is from 5-25 person-days per year. The figure of 25 person-days for resident anglers in Martin County is the closest figure to the 66 person-days estimated here. Again, the Martin County study includes only those days spent on reefs, and therefore if it were to include the days spent fishing in the lagoon of Martin County, their estimate may well approach the 66 person-days estimated here. The USFWS estimate is lower because it is an average of all saltwater anglers throughout Florida. The very low estimate of the IRL study is most likely due to the differences in survey design. Thus, the present study's estimates must be considered an upper bound.

Estimates for total annual person-days are essentially the product of total participants multiplied by the number of person-days per participant per year. Therefore the reasons for the differences between studies mentioned above can also be applied to these estimates. However there are some comparisons that can be made. The total annual saltwater fishing person-days in this report is almost double that of those estimated for the same Brevard anglers in the IRL study. Since the IRL study includes only the person-days spent fishing in the lagoon, and this study includes those days spent inside and outside the inlets, it can be suggested that a majority of Brevard's total angling person-days occur outside the inlets, in the surf, and off-shore. Another interesting comparison is the ratio of total annual resident person-days to visitor person-days. The ratio for this study (4:1) is higher than the IRL (1.3:1) and Martin County (1.7:1) studies but lower than the ratio of the USFWS study (6.3:1) of Florida in general. This could suggest that the number of total visitor person-days is a conservative estimate for Brevard County and not entirely representative of the visiting population.

The range of estimates of expenditures per person-day in the other three previous studies is between \$45 and \$81 for residents, and \$44 and \$243 for visitors. The resident expenditures per person-day estimate in the present study is \$96, but it is a straight average between boat owners and non-boat owners. The estimate for non-boat owning anglers is about \$70 per day in this study, which is within the aforementioned range. There are most likely more non-boat owning anglers in Brevard which would bring this average down and closer to the upper bound of the range. The visitor estimate in this study is \$144 per person-day, which again is a straight average between those who own and those who do not own a boat. The range of visitor expenditures per person-day between boat owners and non-boat owners (\$203-\$86) is similar to, and inclusive in, the range of the other three studies estimates. This suggests that the visitor expenditure per person-day estimate is very reasonable.

Total annual expenditures are hard to compare because they are compounded as a result of the multiplication of total annual person-days and the expenditures per day. A direct comparison to Martin

Estimating recreational expenditures is an acceptable method to help compare the industry to the more traditional sectors of the economy with observable markets. Since recreation related expenditures involve actual market transactions, they are easily measurable. Furthermore, these expenditures can be used in economic impact analyses, which are very politically palatable. The surfing and fishing related spending in Brevard County creates an economic impact for the regional economy. These expenditures create additional sales, jobs, wages, income, and tax revenue. Computing these figures can help assess how protecting, or the failure to protect, these resources affect different sectors of the economy. Table 13 shows a very crude, back-of-the-envelope calculation of the potential economic impact of the surfing and fishing expenditures reported in this study. This quick exercise indicates that surfing and fishing in Brevard potentially create \$25 and \$58 million in additional sales, respectively. To compare, the IRL study referenced above estimates that the value of commercial fish landings in Brevard was \$1.4 million in 2007 and that the economic impact is about \$2.75 million. Tables 14 and 15 further illustrate the market values for other sectors of the economy that are coastal resource dependent. This helps put in perspective how important recreational fishing and surfing is to Brevard County and its economy.

Market values need not be the only values used by policy-makers. The estimation of the nonmarket value of ecosystem services helps reveal social benefits that would otherwise remain hidden. Although the process of estimating economic use values (consumer surplus) may be contentious, they do have serious implications. It has been acknowledged that economic use value is a better leading indicator of the long-term health of the natural resource dependent portion of the economy than market values (Leeworthy & Bowker, 1997). Market values are poor indicators because they can actually increase when natural capital is sacrificed (Leeworthy & Bowker, 1997). The economy and environmental quality and quantity are so intimately linked that it is crucial to understand the magnitude and dynamics of consumer surplus as they relate to the natural capital stock. Since the natural capital stock of Brevard County provides a flow of social and economic benefits each year and into the future, they are an asset class not unlike stocks or money market instruments and can be valued similarly. The asset value of the resources of an area represents the price one would be willing to pay for the resources today based on the flow of annual user values that the resources would generate into the indefinite future (Leeworthy & Bowker, 1997). A quick calculation using the willingness to pay amounts for improving resource conditions for surfing and fishing, and a 3% discount rate, reveals asset values of \$58.3 and \$66.7 million, respectively.

The market and nonmarket values discussed above are only part of the total economic value of Brevard's coastal resources. The nonmarket use values of surfing and fishing are only one of many economic values of coastal recreation, and recreation is only one of many ecosystem services of the coastal zone. For example, the total economic value of Brevard County's beaches includes not only the use value of surfers, but also the use value of all the other beach recreationists, their non-use values, and the economic values of the other ecosystem services of beaches like storm protection, erosion control, and habitat support. The use values estimated in this study are only tiny fractions of the total economic value of ecosystem services of Brevard's natural coastal resources. Estimating total economic values has significant practical applications in land-use decisions and it is quickly becoming a principal land management tool to assess development scenarios and alternatives. The current capabilities of geographical information systems and the evolution of interactive user software that estimates total economic values of ecosystem services by land cover class will assist the agencies and entities involved in both land management, acquisition, and urban and natural resource planning.

Table 13: Comparison of estimates in this study to those of other studies. The Indian River Lagoon (IRL) study estimates are for saltwater anglers in Brevard County (BC) and the dollar amount are in 2007 dollars. The Martin County (MC) estimates apply to saltwater anglers that only used the reefs in Martin County and the values are in 2003 dollars. The USFWS estimates include all saltwater anglers throughout Florida (FL) and the estimates are in 2006 dollars.

	Present Study (BC)					
	Surfing		SW Fishing			
	Residents	Visitors	Residents	Visitors		
Estimated # of participants	16,864	9,486	24,621	10,012		
Person-days per year	130	32	66	42		
Total annual person-days	2,192,000	304,000	1,624,986	420,504		
Expenditures per person-day	\$ 13.00	\$ 82.00	\$ 96.00	\$ 144.50		
Total annual expenditures	\$ 28,500,000	\$ 24,891,000	\$ 155,999,000	\$ 60,763,000		
Use value (maintain) per person-day	\$ 0.35	\$ 1.13	\$ 0.56	\$ 0.87		
Use value (improve) per person-day	\$ 0.58	\$ 1.55	\$ 0.87	\$ 1.40		
Total annual use value (maintain)	\$ 767,200	\$ 343,520	\$ 909,992	\$ 365,838		
Total annual use value (improve)	\$ 1,271,360	\$ 471,200	\$ 1,413,738	\$ 588,706		
	IRL Study (BC)		Reef Study (MC)		USFWS Study (FL)	
	SW Fishing		SW Fishing		SW Fishing	
	Residents	Visitors	Residents	Visitors	Residents	Visitors
Estimated # of participants	58,373	n.a.	11,560	n.a.	1,286,000	716,000
Person-days per year	13	n.a.	25	n.a.	15	5
Total annual person-days	754,000	578,000	289,000	166,000	19,553,000	3,524,000
Expenditures per person-day	\$ 45.50	\$ 195.89	\$ 47.43	43.78 - 128.90	\$ 81.00	\$ 243.00
Total annual expenditures	\$ 37,589,000	\$ 113,224,000	\$ 10,820,000	\$ 14,332,000	\$ 1,583,793,000	\$ 856,332,000
Use value (maintain) per person-day	\$ 66.00	\$ 1.69	\$ 2.64	\$ 23.97	n.a.	n.a.
Use value (improve) per person-day	\$ 72.00	\$ 2.25	\$ 6.22	\$ 2.01	n.a.	n.a.
Total annual use value (maintain)	\$ 49,764,000	\$ 976,820	\$ 762,960	\$ 3,979,020	n.a.	n.a.
Total annual use value (improve)	\$ 54,288,000	\$ 1,300,500	\$ 1,797,580	\$ 333,660	n.a.	n.a.

Table 15: Market Values for the Coastal Economy for Brevard County and Florida as a whole. Values taken directly from the National Ocean Economics Program database. The coastal economy includes all industries located within a coastal county, regardless if they are actually coastal resource dependent. Note: more recent updates will be available in December 2008.

<u>County</u>	<u>Year</u>	<u>Supersector</u>	<u>Establishments</u>	<u>Employment</u>	<u>Wages</u>	<u>GDP</u>
Brevard	2007	Construction	2,340	14,602	\$583,163,381	\$1,098,515,248
Brevard	2007	Financial Activities	1,550	8,393	\$355,019,812	\$2,249,301,680
Brevard	2007	Education and Health Services	1,396	39,708	\$1,640,737,981	\$1,734,570,256
Brevard	2007	Information	172	2,777	\$132,855,172	\$464,542,849
Brevard	2007	Leisure and Hospitality	1,200	21,290	\$331,990,864	\$705,169,665
Brevard	2007	Manufacturing	539	23,612	\$1,517,677,660	\$3,073,198,953
Brevard	2007	Natural Resources and Mining	53	369	\$11,108,153	\$52,252,734
Brevard	2007	Other Services	1,213	5,590	\$132,064,437	\$383,193,259
Brevard	2007	Professional and Business Services	2,931	34,128	\$1,748,008,553	\$3,247,151,049
Brevard	2007	Public Administration	113	15,425	\$774,671,813	\$3,023,810,819
Brevard	2007	Trade, Transportation, and Utilities	3,105	37,168	\$1,098,081,468	\$2,757,433,551
Brevard	2007	Unclassified	84	52	\$1,924,995	n.a.
ALL	2007	Construction	75,873	576,892	\$23,891,051,892	\$45,004,000,000
ALL	2007	Financial Activities	70,866	526,085	\$29,374,330,764	\$177,746,000,000
ALL	2007	Education and Health Services	53,601	1,192,207	\$49,370,459,609	\$59,838,000,000
ALL	2007	Information	8,674	157,880	\$8,841,132,300	\$30,914,000,000
ALL	2007	Leisure and Hospitality	45,048	924,976	\$19,203,629,342	\$40,589,000,000
ALL	2007	Manufacturing	16,499	383,999	\$18,070,207,656	\$36,591,000,000
ALL	2007	Natural Resources and Mining	5,309	93,974	\$2,270,435,606	\$7,746,000,000
ALL	2007	Other Services	48,101	247,134	\$6,830,456,998	\$19,819,000,000
ALL	2007	Professional and Business Services	118,111	1,143,805	\$51,447,742,538	\$93,748,000,000
ALL	2007	Public Administration	4,586	449,746	\$21,919,408,856	\$85,559,000,000
ALL	2007	Trade, Transportation, and Utilities	126,444	1,606,144	\$56,427,853,842	\$136,967,000,000
ALL	2007	Unclassified	4,510	6,124	\$207,944,583	n.a.

Table 17: Selective list of nonmarket valuation studies conducted in Florida from 1997 to present. Source: National Ocean Economic Programs Nonmarket Studies database. Note: this is not a comprehensive list as the database has not been recently updated.

<u>Author & Date</u>	<u>Location</u>	<u>Habitat</u>	<u>Ecosystem Service</u>	<u>Valuation Method</u>
Scrogin, D. & Milon, J.W. 2006.	Everglades	SW Wetlands	All	CM
Solomon, B.D. et al. 2004.	Citrus County	Manatee	Tourism/Recreation	CV
Hazen & Sawyer. 2004.	Martin	Reefs	Tourism/Recreation	CV
Shivlani, M.P. et al. 2003.	South Florida	Beaches	Habitat/Storm Protection	CV
Bhat, M.G. 2003.	Florida Keys	Reefs	Recreation	TC / CV
Thomas, M. & Stratis, N. 2002.	Southwest Florida	n.a.	Boating Recreation	TC
Leeworthy, V.R. et al. 2002.	Florida Keys	Reefs	Snorkeling Recreation	TC / CV
Kazmierczak Jr., R.F. 2001.	Gulf Coast	SW Wetlands	Hunting/Fishing Recreation	n.a.
Johns et al. 2001.	Southeast Florida	Reefs	Recreation	CV
Bell, F.W. et al. 1998.	Northwest Florida	Artificial Reefs	Recreation	CM / TC
Stronge, W.B. & Schultz, R.R. 1997.	Broward County	Beaches	Recreation	CV
Bell, F.W. 1997.	Florida	SW Wetlands	Fishing Recreation	PF
Leeworthy, V.R. and Bowker, J.M. 1997.	Florida Keys	n.a.	Recreation	TC
Greene, G. et al. 1997.	Tampa Bay	n.a.	Fishing Recreation	TC

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- Karen Smith (Coastal Angler Magazine)
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- Chris Lindo (FIT)
- Justin Craig (FIT)
- All Survey Participants

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APPENDICES

APPENDIX A

Survey Distribution Outlets

Surfing Survey:

1. Primary
 - a. 2ndlight.com
2. Secondary
 - a. Surfrider Foundation, Sebastian Inlet Chapter email list
3. Tertiary
 - a. surfguru.com message board/thread

Fishing Survey:

1. Primary:
 - a. Coastal Angler Magazine website (www.coastalanglermagazine.com)
2. Secondary:
 - a. Surfrider Foundation, Sebastian Inlet Chapter email list
3. Tertiary:
 - a. brevardfishing.proboard22.com message board/thread
 - b. Central Florida East Coast fishing website message board/thread
 - c. brevard-county.lagoonner.com message board/thread
 - d. centralfloridafishingreport.com message board/thread

Surfing Survey Questionnaire:

1. Are you a Brevard County, FL resident?
2. What is your zipcode?
3. How many years have you LIVED in Brevard County?
4. How many years have you SURFED in Brevard County?
5. Within the past 2 years, how many SURFING TRIPS have you taken:
6. What is your zipcode?
7. How many SURFING TRIPS do you take to Brevard County in a typical year?
8. While on your SURFING TRIPS in Brevard County, do you typically stay overnight?
9. What is your average length of stay per SURFING TRIP?
10. What is your typical party size per SURFING TRIP?
11. Within the past 2 years, how many SURFING TRIPS have you taken:
12. How would you rate your surfing ability?
13. How many YEARS of surfing experience do you have?
14. In a typical MONTH, how many DAYS do you surf in Brevard County?

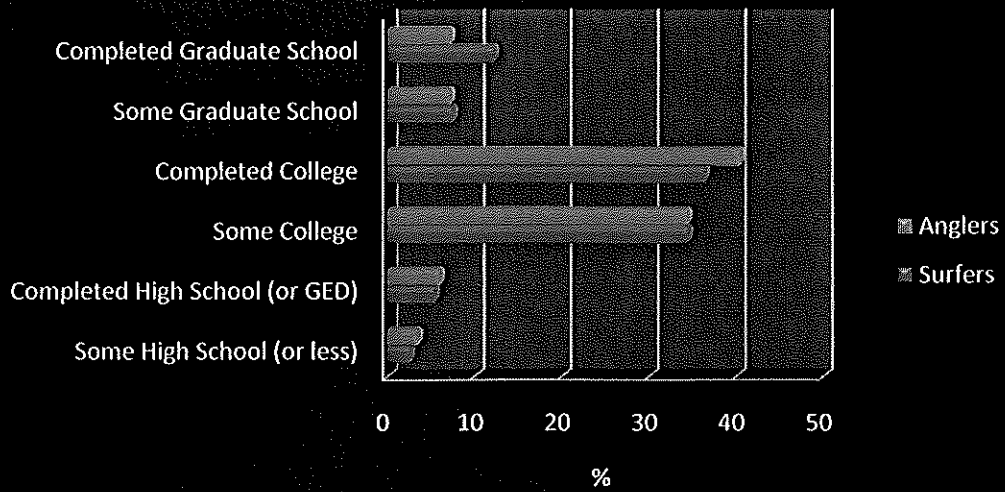
39. In 10 YEARS, how do you believe the quality of the natural coastal resources in Brevard County will be?
40. The following are BENEFITS provided by BEACHES. In order of importance, how would you RANK these BENEFITS? (In other words, if you choose 'tourism' as 'most important' you can't pick any of the others as 'most important'.)
41. The following are BENEFITS provided by REEFS. In order of importance, how would you RANK these BENEFITS? (In other words, if you choose 'tourism' as 'most important' you can't pick any of the others as 'most important'.)
42. In your opinion, which of the following forms of management needs to be put in place to better address and protect the natural coastal resource conditions in Brevard County?
43. Are you a member of an environmental or surfing organization (e.g., Surfrider Foundation)?
44. Which of the following includes your age?
45. Are you male or female?
46. Which best describes your employment?
47. Which best describes your highest level of education?
48. Which of the following includes your annual household income? If you would like to receive a summary report of the results of the survey (when available), please leave an email address in the box below where I can contact you. Thanks.
49. Thank you for completing this survey. If you have any questions, comments, or concerns, please describe in the box below.

Fishing Survey Questionnaire:

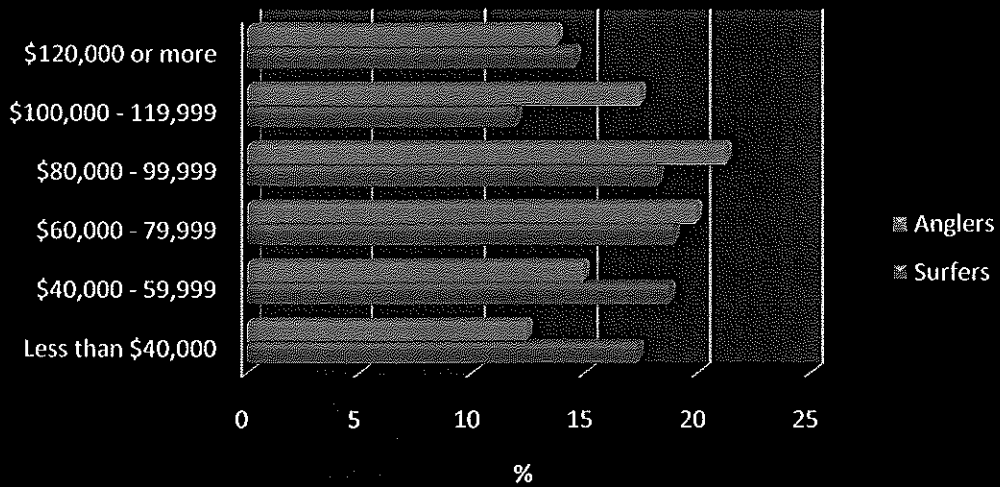
1. Are you a Brevard County, FL resident?
2. What is your zipcode?
3. How many years have you LIVED in Brevard County?
4. How many years have you FISHED in Brevard County?
5. Within the past 2 years, how many FISHING TRIPS have you taken:
6. What is your zipcode? How many FISHING TRIPS do you take to Brevard County in a typical year?
7. While on your FISHING TRIPS in Brevard County, do you typically stay overnight?
8. What is your average length of stay per FISHING TRIP?
9. What is your typical party size per FISHING TRIP?
10. Within the past 2 years, how many FISHING TRIPS have you taken:
11. How would you rate your fishing ability?
12. How many YEARS of fishing experience do you have?
13. In a typical MONTH, how many DAYS do you fish in Brevard County?
14. What are the 3 main reasons that you fish at the locations that you do? (Please choose no more than 3)
15. Please RATE how IMPORTANT each of the following factors are in determining HOW OFTEN you fish recreationally each month?
16. What 3 areas of Brevard County do you fish MOST FREQUENTLY? (Please choose no more than 3)
17. In your opinion, what is the BEST area of Brevard County to fish?
18. How many other anglers, on average, are around the same fishing location you are at each time you go?
19. What type of fishing do you PREFER most?

45. Which best describes your employment?
46. Which best describes your highest level of education?
47. Which of the following includes your annual household income?
48. If you would like to receive a summary report of the results of the survey (when available), please leave an email address in the box below where I can contact you. Thanks.
49. Thank you for completing this survey. If you have any questions, comments, or concerns please describe in the box below.

Education



Income



Overfishing / Fishing Violations	n.a.	n.a.	n.a.	1.75E-21
Sea Level Rise / Global Warming	n.a.	n.a.	n.a.	n.a.

SURFING THREATS:

	CD / RA	D&F / BN	DWQ / P	SLR / GW
Coastal Development / Restricted Access	n.a.	0.116487	0.00185	1.95E-68
Dredge & Fill / Beach Nourishment	n.a.	n.a.	0.137118	2.4E-59
Deteriorating Water Quality / Pollution	n.a.	n.a.	n.a.	4.47E-53
Sea Level Rise / Global Warming	n.a.	n.a.	n.a.	n.a.

SURFERS & ANGLERS RESOURCE OUTLOOK:

	Anglers	Surfers
Nearshore Reefs	1.65E-05	1.46E-30
Mangrove Areas	1.13E-11	1.88E-57
Seagrass Beds	4.47E-09	2.29E-44
Beaches	2.24E-09	3.98E-57
Salt Marshes	1.23E-09	1.17E-44

ANGLERS & SURFERS WTP:

t-Test: Two-Sample Assuming Unequal Variances

	Surfers				Anglers			
	Maintain		Improve		Maintain		Improve	
	Residents	Visitors	Residents	Visitors	Residents	Visitors	Residents	Visitors
Mean	2.8	2.435897	2.516364	1.99359	2.471698	2.464286	2.150943	2.178571
Variance	3.182482	1.9378	2.863782	1.580604	2.561684	2.109788	1.707547	2.078042
Observations	275	156	275	156	53	28	53	28
Hyp. Mean Difference	0		0		0		0	
df	388		399		60		51	
t Stat	2.350544		3.647137		0.021077		-0.08469	
P(T<=t) one-tail	0.009623		0.00015		0.491627		0.466421	
t Critical one-tail	1.64879		1.648682		1.670649		1.675285	
P(T<=t) two-tail	0.019246		0.0003		0.983254		0.932843	
t Critical two-tail	1.966097		1.965927		2.000298		2.007584	

APPENDIX D

Comments and responses to questions that allowed for it.

SURFERS:

Question: What are the 3 main reasons that you surf at the locations that you do? (Please choose no more than 3).

1. own condo on 5th street south cocoa beach
2. Sandy bottom
3. I've surfed my break for almost 35 years and I know all the locals
4. surfing with friends
5. Good vibe
6. brother lives there
7. surfing with friends
8. Photographers / People Present
9. came "up-coast" many times while growing up
10. Surfed there for years now
11. Home Break.....stay away kooks
12. i like it
13. attitude of others in the water
14. on the way to work
15. friends
16. Outdoor Showers
17. surfing friends
18. lack of amenities
19. no rocks
20. the people that i know will be there
21. small parking lot less people and water (wash feet)
22. good crowd of people
23. Friendly People
24. because Australia is too far away
25. behind my condo (second home)
26. tides
27. ocean floor quality
28. great sand bars
29. Warmer water & handles the wind better
30. no rocks on inside break
31. own 2 beach front condos in Brevard
32. fishing is mo bettah on da space coast
33. Good Vibe. Friendly people.
34. no rocks
35. Because there is surf period.
36. WHERE FRIENDS WANT TO GO
37. Warm water
38. clear water down south more sandbars
39. neighborhood crowd, you know locals
40. Niceness of people (no one yelling to get off their wave)
41. Friends and actual waves which we don't have so much in SOFLO
42. I'm in my late 40s
43. raised in b.c.
44. anywhere where the state hasnt dredged the floor so that the waves SUCK
45. friends
46. bottom sandy not rocky
47. its where i grew up
48. Vibe, love the local vibe!
49. surf during lunchtime
50. close to work
51. Because i live here. would rather surf overseas regularly
52. Lots of beautiful wildlife (Canaveral National Seashore)
53. local areas. secret spots;)
54. No trash from stupid locals/tourists (i.e. Wendy's cups at Boardwalk)
55. usually to windy elsewhere
56. friends live close to break
57. no coquina reef
58. Depends on type and direction of the beak
59. Used to live across street and am used to it.
60. Friendly vibe
61. nostalgia/convenience
62. I know people who go there regularly

SURFERS:

Question: Please RATE how IMPORTANT each of the following factors are in determining HOW OFTEN you surf each month.

1. if its really gonna be worth it.
2. nothing
3. What ever is rideable. 3' glass on a Monday morning when all the poor bastards are at work or school typifies my approach.
4. whenever i get free time
5. just great to be in the water even to paddle out
6. Not important
7. Artificial reef or sand flow (Snapper Rocks, AUS) would be a great addition for constant visitation to Brevard County
8. Shuttle taking off/landing which closes playalinda
9. water quality [red tide] don't surf
10. time that is available
11. time
12. pollution
13. wife mad for surfing too much
14. Sometimes I surf less when I'm tired
15. best swell days of the week
16. time
17. time
18. Nearest / Fastest accessibility per my travel route
19. if friends can surf with me
20. stress
21. weather conditions
22. Can friends go?
23. regularly surfing with good friends
24. NOTHING ELSE MATTERS...
25. Chores around the house, tired from work, etc
26. Non crowded surfing conditions is why I love brevard surfing
27. stay in shape
28. Priorities, I weigh conditions to responsibilities.
29. red tide
30. Can't think of any other
31. Overall weather conditions
32. weather
33. Personal responsibilities
34. The older i get...sometimes the aches and pains won't allow me to surf! :(
35. if it's rideable...I'm probably on it
36. when i have gas money or a ride
37. water quality - i.e. red tide
38. Weather, wind/temp/tides

ANGLERS:

Question: Please RATE how IMPORTANT each of the following factors are in determining HOW OFTEN you fish recreationally each month?

1. gas price
2. Weather
3. Other Costs
4. Golf
5. Health
6. I'm an inshore fishing guide
7. Has beach replenishment caused severe water "dirtying"
8. finding bait

SURFERS:

Question: How would you RATE the significance of each of the following as threats to surfing in Brevard County?

1. Army Corp of Engineers
2. Look up global warming, past millions of years, cyclical data... we may be in an up cycle right now compounded by carbon emissions and green house gases.
3. Just say NO to beach renourishment and NO MORE CONDOS!
4. anything that would ruin it.
5. crowds
6. Global Warming is a man made observance
7. Gambling ships dumping poo
8. sea lice
9. the entire North Reach to Patrick is man made WTF is the man made beach going to loose its "natural" condition with the addition of another man made structure. Jeez its all man made.
10. STOP Dredging and Developing
11. Build rock jetties so we can stop spending money on fills
12. SHARKS!!!!!!
13. over population
14. Corrupt Politicians
15. Old People being mean or rude!
16. CRUISE SHIP WASTE
17. beginners surfing at advanced surf spots
18. global warming is a hoax
19. manatees eating seagrass where they DO NOT belong
20. Dredge and fill projects have destroyed the quality of surfing through Cocoa Beach and Patrick. They have created a deep trench along the shore which
41. prevents smaller waves from breaking. Before the dredging it was possible to ride small waves for a fairly long distance because the water was shallow. Now it requires a larger swell to create a wave that last for more than a few seconds.
21. pollution from boats/ships
22. pollution, parking and people
23. Pollution on the beach
24. Local Politicians focusing only on tax dollars returns
25. influx of neophyte surfers male and female
26. Trash!!!!
27. erosion
28. beach restoration
29. littering/trash in water
30. tourism
31. south Florida sewage dumping, cruise ship sewage dumping
32. Fishers
33. population
34. bad attitude "surfers" - a cultural consideration for threats
35. Snowbirds
36. beach trash/cruise ship and commercial vessel waste
37. Trash clean up
38. cruise ship dumping is destroying the oceans
39. break ins to cars in parking areas
40. internet making surfing so popular, the overcrowding in some spots has become disgusting, like human pollution

ANGLERS:

SURFERS:

Question: In Brevard County, what other coastal recreational activities do you participate in? (Choose all that apply)

- | | |
|--|--|
| 1. duck hunting | 17. surfing |
| 2. skimboarding | 18. Visit historic/cultural sites/environmental center, etc. |
| 3. skim | 19. Only surfing (live in SOFLO) |
| 4. SUP | 20. swimming |
| 5. photography | 21. ocean swimming |
| 6. swimming | 22. distance swimming (train for triathlons) |
| 7. motorcycling | 23. ocean swimming |
| 8. Skateboarding!!!! | 24. skimboarding |
| 9. BEER | 25. Drinking |
| 10. only surfing | 26. food, music |
| 11. open water swimming | 27. Visiting the CB Pier for beer and bands |
| 12. bicycling, swimming, fitness | 28. biking, hiking |
| 13. None, I travel to the west coast of Florida for other activities | 29. Skimboarding |
| 14. paddle boarding | 30. bicycle riding |
| 15. DRINKING | 31. skimboarding |
| 16. relaxation | 32. bikeriding on the beach, partying |

ANGLERS:

Question: In Brevard County, what other coastal recreational activities do you participate in? (Choose all that apply)

- | | |
|------------------|----------------|
| 1. PHOTOGRAPHY | 4. geocaching |
| 2. skim boarding | 5. drinking |
| 3. jet ski | 6. photography |

1. enforcement on foot, not constantly by boat
2. more enforcement education land based zoning water based zoned and limit entry
3. need easy acc to the water
4. COMMERCIAL FISHING LIMITS
5. Along with more enforcement, we need to work on an artificial reef program that could not only improve our fishery, but it could also help to protect our beaches and natural reefs.
6. Apply science to your management decisions and cut through the emotional crap. Facts don't lie. If the

rules are based on fact, the public will be more inclined to obey them.

Eliminate double standards. A fish taken for commercial sale is still a fish taken. Slot and catch limits should be the same.

7. less direct/indirect runoff
8. Pay FWC better salaries
9. limit commercial fishing- trawls and longlines bycatch
10. artificial reef program ...sink more ships off of SI
11. growth control
12. More water & land zoning with enforcement

been following this project for years and believe it is a win/win for all parties involved. I own several condo's on the ocean in Brevard and as a surfer & tax payer, I think these artificial reefs down the coast will help with erosion since our sandbars are no longer intact. Thanks. Barry P. Edens Jr. Property Owner/Surfer/Floridian beach lover.

28. seriously manatees are a problem...runoff from st. lucie canal...condo lawns and pools etc. need to be addressed.. I spend a lot more to fish than to surf in Brevard. but lately I have been spending it in centro..more bang for the buck!!! I surfed patric reefs in the 50's they are 60% of what they used to be..thanks...Capt. Fred
29. I am very against the dredging projects.
30. Hi, my name is Matt Badolato. I work for Florida Today newspaper as an outdoor columnist. I would like to put a piece together about this survey and its results, unless another department already has. Let me know via email if this would be possible when results are published. Thanks! (321)223-3383
31. Cocoa beach is an ash tray, I would recommend no smoking on the beach as a high priority.
32. Used to travel to and surf brevard at least 20 times per year. Since moving to st johns from hillsborough is maybe once or twice a year
33. Interesting survey!
34. Thank you for your help protecting the natural environment of Brevard County.
35. Good luck!
36. Being a lifelong resident of Brevard and coming back as a tourist I would certainly utilize this new reef for surfing by coming back and bringing my family and surely spending money in the nearby community.
37. There is no way to tax a community which is not 100% surfers to install a surfing articial reef. 2. The beaurocracy to manage a surfers artificial reef so

that all taxpayers get equal access is too costly of a beast. I see the implementer getting sued if taxes are used to implement. 3. Nee a new plan to implement or you need many, many reefs to solve #2 above - too costly!

38. Good to see people taking notice and action, keep it up!
39. please help keep our beaches bueatfull,clean and open to the public. The Surfing in brevard co. is already better than most places on the east cost. So an artificial reef will need to prove beyond a shadow of a doubt that it will inprove and protect the envirement not just better wave quality after all florida is part of the Atlantic ocean and we are not known for our world class surf spots. just our world Champs!!! Mahalo & Aloha Danny
40. Lets get some reefs and protect the wildlife!!!!!!
41. Keep Florida Natural. Who cares about the tourist industry!
42. SAVE THE SURF!!!
43. Please build an artificial reef for surfing!
44. The reef will only be benefical to Brevard the more reefs we have the better off we will be. As soon as this housing slump is over I will become a perminant resident of Brevard..
45. To whom do you plan on sharing these results, other than the participants? what do you hope to gain by publishing the results? thank you.
46. Thank you
47. I want an artificial reef really bad because the surf in brevard county is usually just OK.
48. If it weren't for all the multi million dollar homes sitting on quick sand, we wouldn't have to spend more than the home is worth to replace the sand. Keep the beaches public. Don't let the public build on the beaches. Just let nature take its course. This is one of the main reasons I surf Playalinda. I think they do it right.

ANGLERS:

End-of-Survey Comments:

1. It is a shame that law enforcement is always out on the water stopping some of the same people over and over again while people on the causeways and piers keep undersize or out of season fish. People that pay to use a boat get checked many times over while people that don't even pay for a license abuse the fishing privilege. Just my observation.....
2. Water pollution is an issue impacting the Indian River and maybe offshore also. But offshore, it's the indiscriminate commercial fishing and all of it's bycatch that I feel is depleting the fishery and causing tighter recreational limits and more enforcement