

CERMES Technical Report N° 3

Recreational Fishing in the British Virgin Islands: Current Status, Opportunities for Development and Constraints

COLIN P. GILLET, ROSEMARY DELAYNEY AND HAZEL OXENFORD



Centre for Resource Management and Environmental Studies (CERMES)
University of the West Indies, Faculty of Pure and Applied Sciences,
Cave Hill Campus, Barbados

2007

ABSTRACT

Recreational Fishing in the British Virgin Islands: Current Status, Opportunities for Development and Constraints

COLIN P. GILLET, ROSEMARY DELAYNEY AND HAZEL OXENFORD

This paper examines the potential to develop the recreational fishing industry in the British Virgin Islands. It reports on the economic potential of the industry, identifies the constraints facing its development as well as examines the recommendations made by the stakeholders within the industry. The need for this information arises from the necessity for greater fisheries contributions to the country's economy. There is, therefore, an increasing need to diversify not only the fisheries product, but also the tourism one.

In order to gather this information, interviews were carried out with twenty visiting anglers to the island, ten sport fishing charter boat operators, various government departments as well as the banking sector and twenty of the local commercial fishermen.

Angler expenditures revealed a total of US\$4,640,000 of direct injection into the local economy using an eight-month sport-fishing season. These investigations revealed some constraints to developing the industry which included political factors and a lack of timely and reliable information. Interviews also focused on the demographics of the anglers, to get an idea of what attracted them to come to the island and what they would like to see done to improve the industry. The visiting anglers were all male with an average age of 44. The majority of them were of Hispanic descent from Puerto Rico and the rest were Caucasian from the United States. There were no Black anglers interviewed. For those anglers with their own boats, the cost per trip depended on the type of fishing, but the main expenditure went to fuel. Marlin was the most targeted species because of the challenge it gave in catching it. Anglers expressed support for management tools, but indicated a need for more information on the fisheries resources to properly manage it. Throughout the report, this need for information arises. Both anglers and operators said that they were willing to support management tools and measures, but only if they had sufficient data to make informed decisions. There was also much concern for the need for increased surveillance and patrolling of the BVI waters to control illegal fishing by foreign boats.

Finally, the report did not take any definitive position on whether or not the recreational fishing industry should be developed. It instead suggests possible recommendations that would need to be strategically implemented before anything is done, including a recreational fishing policy to outline and define what the industry is and how it is to be managed. Any decision should be made only after looking more into the other factors that would affect the industry, including the social and political ramifications. The only way this will work and be sustainable will be through informed decisions.

CONTENTS

ABSTRACT	I
1 INTRODUCTION.....	1
1.1 OVERVIEW OF THE BVI AND ITS FISHING INDUSTRY.....	1
1.2 CONSTRAINTS	1
1.3 THE NEED FOR DIVERSIFICATION OF THE FISHING INDUSTRY	2
1.4 WHY CHOOSE THE BVI FOR SPORT FISHING.....	3
1.5 OVERVIEW OF RELATIONS WITH THE UNITED STATES VIRGIN ISLANDS	3
1.6 THE LACK OF INFORMATION	4
1.7 FISHERIES MANAGEMENT	4
1.8 STATEMENT OF STUDY OBJECTIVES	5
2 METODOLOGY.....	5
2.1 DATA COLLECTION AND ANALYSIS.....	6
3 RESULTS	7
3.1 REVIEW OF PROBLEMS ENCOUNTERED	7
3.2 SOCIAL PROFILES OF ANGLERS	7
3.2.1 <i>Race and ethnicity</i>	8
3.2.2 <i>Female anglers</i>	9
3.2.3 <i>Angler's fishing experience</i>	9
3.2.4 <i>Fishing partners</i>	10
3.3 THE NUMBER OF TIMES PER YEAR THAT ANGLERS GO FISHING	10
3.4 COST PER TRIP FOR ANGLERS.....	11
3.5 ANGLERS' CHOICE OF FISHING DESTINATION.....	12
3.6 QUESTIONS ON THE SOCIAL EFFECTS OF DEVELOPING THE INDUSTRY.....	12
3.7 SPECIES MOST TARGETED BY ANGLERS	13
3.7.1 <i>Reason for choice of species targeted</i>	14
3.8 PARTICIPATION IN FISHING TOURNAMENTS	15
3.8.1 <i>Reasons for increased participation in sport fishing tournaments</i>	15
3.8.2 <i>Suggestions for increased participation in sport fishing tournaments</i>	16
3.9 INTERVIEWS WITH CHARTER BOAT OPERATORS.....	17
3.10 INTERVIEWS WITH LOCAL FISHERMEN	19
3.10.1 <i>Other financial considerations</i>	20
3.11 ECONOMIC IMPACT OF RECREATIONAL FISHING ON THE BVI ECONOMY.....	21
3.11.1 <i>Cost per person for a one day trip to the islands for recreational fishing</i>	21
4 RECOMMENDATIONS.....	22
4.1 RECOMMENDATIONS TOWARDS FUTURE RESEARCH	25
4.2 OTHER ISSUES	25
5 CONCLUSION.....	26
6 REFERENCES.....	28
7 APPENDIX 1: RECREATIONAL FISHERMEN QUESTIONNAIRE	31
8 APPENDIX 2: CHARTER BOAT OPERATOR QUESTIONNAIRE	32

Citation

Gillet, C., R. Delayney and H. Oxenford. 2005. Recreational fishing in the British Virgin Islands: Current status, opportunities for development and constraints. CERMES Technical Report No. 3. 32pp.

1 INTRODUCTION

One of the major problems in fisheries management is the scarcity of information. In the British Virgin Islands (BVI) and probably the wider Caribbean, some of the main reasons for this is the lack of trained personnel, and technology. Even more significant is the lack of funds to carry out the studies needed to get information to use as an effective guide for development of any sector within the fishing industry (OECS, 1999). This report is an attempt to provide information on the marine recreational fishery; its potential, constraints, and recommendations to be used for the management and possible development of this industry in the British Virgin Islands. It should be noted that the words recreational fishing are used to refer to fishing for sport. The phrase recreational fishing is used interchangeably with sport fishing throughout this report.

1.1 Overview of the BVI and its fishing industry

The British Virgin Islands is a cluster of 36 islands and cays in the Caribbean, only 16 of which are inhabited. Located about 80 kilometers 60 miles east of Puerto Rico, north of the Leeward Islands, and adjacent to the U.S. Virgin Islands, the BVI has a total surface area of 59 square miles (151.04 km) and a total population estimate of 19,000 (Development Planning Unit BVI, 2001).

Signs of the influences of fishing on the community and culture of the people of the BVI can clearly be seen in the number of fishing boats docked in the marinas and the string of nets being fixed in back yards and in trees along the roadside. Divided mainly into traditional ‘artisanal,’ and recreational fishing, the fishing industry has been more artisanal than recreational. Marine recreational fishing is fishing not for commercial purposes, but more for relaxation, pleasure, amusement, and subsistence (Antia, 2000). It encompasses a broad and complex industry. Directly related Sectors to recreational fishing include, bait and tackle shops, charter companies and guides, tournaments, marinas and boatyards, fish camps, and other fishing-related dealers. Indirectly related sectors include coastal motels, restaurants, and other leisure and tourism sectors of the economy.

1.2 Constraints

Throughout the years, the recreational fishing sector, and the fishing industry on a whole has never really been a major contributor to the country’s Gross Domestic Product (GDP). A “large percentage of its inherent revenue earning potential is still under-exploited” (Conservation and Fisheries Department, 1997). This can be seen in the low contribution of 2.5% to the GDP (OECS/NRMU, 1998). In 1997, this value was estimated to be US \$5.2 million (Pomeroy, 1999). One reason for this is because “...there are fundamental differences between commercial and recreational fishing and until those differences are recognized, the recreational fishing sector will never be an equal partner with competing interests in discussions about fishery resources” (American Sportfishing Association, 2001). Perhaps the simplest explanation is that the primary objective of commercial fishermen is to sell their catch. Many older fishermen would not go fishing just to throw the fish back into the water. For these older fishermen, going fishing was probably not for the fun of it. For sport fishermen, who usually practice ‘catch and release fishing’, the removal of the fish by commercial fishermen makes it difficult for them to get the experience of actually catching something. Simple differences like this can cause many problems when it comes down to cooperation between the two types of fishing. But these simple differences have to be overcome because diversification in any industry helps that industry to grow and gives it more stability down the road. If commercial fishing fails one year, then

recreational fishing will still be there to bring in foreign exchange to the country. Only with real cooperation through diversification can any solid injection to the country's GDP be seen. More on this topic of diversification will be looked at in section 1.3.

Another major constraint to greater contributions of the fishing sector to the economy has also been the lack of capital (Conservation and Fisheries Department, 1997), to increase fishing effort. Over the years, however, this has changed. This increased effort by the fishers has come about in part due to the increased demand by more and more tourists for seafood. This increased effort does not, however, mean an increase in the catch rates. On the contrary, statistical evidence reveals that the average catch per haul has fallen by 50% from 1975 to 1991 (OECS/NRMU, 1998). In a recent study, 77% of the fishermen interviewed said that the fishing industry was in worse condition than five years ago (Pomeroy, 1999).

1.3 The need for diversification of the fishing industry

Although some might see differences in the types of fishing as a constraint, diversification of any industry is necessary to provide long term stability of that industry. This is done by not 'putting all your fish in one basket' and providing many uses of the same resource. With many of the local fishermen indicating that fishing isn't what it used to be, there is a definite need to diversify the fishing industry so that the fishing resource will not just be left without being used. This "Urge for diversification of the economy could be met by increased government investment in the fisheries sector, where new areas with high yield potential could be exploited (Conservation and Fisheries Department, 1997). This investment in diversifying the industry should look into marine tourism, which is already established over the world not only as a major money earner, but also as a conservation tool used by governmental departments allowing sustainable use of the country's resources. "Marine tourism is a major component of a massive global tourism industry" (Mugatroyd, 1999). The Conservation and Fisheries Department emphasizes that fisheries play an important role in tourism, noting that,

"...the sport fishery has a multi-million dollar earning potential and their proper development should be considered as a strategic priority." This fact has also been recognized by the United States Government. The Magnuson-Stevens Fisheries Conservation Act (1996) of the United States sees recreational fishing as "fishing for sport or pleasure" and has recognized the fact that "...recreational fishing constitutes a major source of employment and contributes significantly to the economy of the Nation", and has as one of its aims in fisheries management "to promote domestic, recreational fishing under sound conservation and management principles, including the promotion of catch and release programs in recreational fishing."

When developing any fishing sector, especially a recreational fishery, there has to be a ready supply of the resource, management and policy in place, and a commitment to sustainability of the resource. In the British Virgin Islands (BVI) "the resource base provides a major attraction for the tourism industry, making recreational fishing critical..." (Fisheries Management Plan, 1998).

With regard to the requirements for developing a sport fishing sector (a ready supply of the resource, a commitment to sustain the resource, and management and policy in place) the BVI already has the two former requirements. It now only needs to get the proper management tools in place.

1.4 Why choose the BVI for sport fishing

Because of its size, speed and spectacular jumps, many big game fishermen consider blue marlin the top prize in the saltwater angling world. In the BVI, the North Drop is considered one of the “best-known billfish destinations in the Caribbean region” (Chambers and Franck, 2001). It is considered one of the best destinations to fish because “to be viable, the sport fishery must provide anglers with an opportunity to go fishing and an expectation and opportunity to catch some fish (Government of British Columbia). The North Drop of the BVI does exactly that.

The reason for the high populations of the Atlantic blue marlin (*Makaira nigricans*) and the white marlin (*Tetrapturus albidus*) is because they are highly migratory species. It is the ocean currents, especially their edges, that bring these marlin through the BVI and the Caribbean region, moving them north as the ocean warms in the late summer and fall until winter drives them south (Gillis, 1999).

Although this ready supply of marlin is the main reason for anglers to go fishing in the BVI, there are other factors that play an important role in attracting them to the island. These include the aesthetics of the island, and uncrowded marinas, but these will only remain with the help and dedication of the managers. The commitment of the Fisheries Department as well as marina managers is strong and can only benefit the development of this recreational industry.

1.5 Overview of relations with the United States Virgin Islands

Despite the commitment to protect their resources and the need by government to diversify the fishing industry, there have been other political constraints facing the industry. “Its performance has been hampered by such constraints as inadequacies in existing policies...and conflicts in the use of traditional fishing grounds for tourism” (Conservation and Fisheries Department, 1997). This conflict presents itself in the tension with the relations with the United States Virgin Islands (USVI). In a recent report on the USVI/BVI matters, issues raised by the BVI Government ranged from its right to manage its fisheries resources, to develop its own sport fishing industry and to gain some economic opportunities from the present sport fishing industry (Abednego, et al, 2000). USVI officials responded to this, along with the move of the Chief Fisheries Officer to suspend all recreational fishing licenses by stating that that action was out of place because it was the “St. Thomas’ interests that run and promote the majority of billfish tournaments which attract sport fishing tourism in the first place” (Marlin 1999). This would affect their recreational fishing industry, since many of their charter boats fish within BVI waters. “It is important to note that only 28.2% of licensed boats are based in BVI, which is an indication of the level of local participation in the fishery. In 1998, there were only seven charter boat owners doing recreational fishing (Pomeroy, 1999). Further analysis of the data showed that 63.4 % of the vessels are based in the USVI, a trend that has been maintained for the past six years (Conservation and Fisheries Department, 1997). The presence of these foreign boats in the territorial waters has always affected the commercial fishermen, where the main problem was not only the large number of foreign fishing boats coming in to fish, but also that the fish were not landed at the BVI Fishing Complex which had been reporting a scarcity of fish (Pomeroy, 1999). The fish were instead landed in the USVI. To date, the legal aspects of territorial waters and boundaries continue to be looked at. Any development of the recreational fishing industry would require some resolution of this issue.

1.6 The lack of information

The development and promotion of recreational fishing in smaller Caribbean states, however, will have other problems as well in the first stages. One of the major problems with developing recreational fisheries has been the lack of information on the industry.

“The limited documentation on the performance of the recreational fishery in the BVI is a constraint to the determination of its potential for development” (Conservation and Fisheries Department, 1997).

This study went on to say that,

“it should be emphasized that the sustainability of any development project for the fishing industry would be largely determined by an effective data collection / management system, as well as a realistic stock assessment of the fishery resources. This is important to avoid the disastrous collapses that have befallen previously under – exploited fisheries all over the world.”

This need for information in fisheries management was also identified in the Magnuson-Stevens Act, (1996) where it states that,

“The collection of reliable data is essential to the effective conservation, management, and scientific understanding of the fishery resources....”

This is also seen in the fact that most studies on evaluating the potential for development of a resource usually end by recommending more studies being done on the subject. This need for more research also includes the need for economic valuation of the industries and what effect changes in visitor expenditure will have on the country’s economy.

Today, in most assessments of environmental resources and the development for sustainable use of them, the economic value of that resource is used to give an idea of that resource’s potential for development. “*Economic valuation* is the attempt to assign quantitative values to the goods and services provided by environmental resources” (Barbier, et al, 1997). This economic value of resources will go far in determining which decisions will be made in relation to the goals of management and their plan for the future.

1.7 Fisheries management

The design of fishery management programmes is an ongoing process due to the dynamic nature of the fishery resources. “Programmes for the conservation and management of the fishery resources are necessary to prevent over-fishing, to rebuild over-fished stocks, to ensure conservation, to facilitate long-term protection of essential fish habitats, and to realize the full potential of the fishery resources” (Magnuson-Stevens Act, 1996). The work of these fisheries managers is not only to protect and preserve, but also to develop and find ways to utilize the resource sustainably. Having a resource and not using it would just be a waste. Sustainable use helps us to have the resource almost indefinitely. It is only when mismanagement and overuse step in, that problems arise and we lose what we overuse.

The objectives of fisheries management should be “biological balance and integrity as well as the quality of the fishing experience” (National Park Service, 1997). Without a good fishing experience, the anglers will not want to come back. So managers should look into every aspect of that fishing experience. This includes working along with the hotels and charter boat operators to ensure that cooperation among all those involved is to give the best overall experience

possible to the angler. What should be made clear is that “Traditional management efforts that focus on maximizing size and number of fish harvested will not be sufficient to provide all the opportunities and experiences desired by this growing non-traditional angler segment” (Sutton, 2001). It is for this reason that reports such as this one also put some focus on angler’s willingness to support management efforts. Without inputs from the stakeholders themselves, the fishery would not run smoothly and would ultimately be unsustainable.

Development of any industry requires that the resources are available, the proper management tools and policy are in place based on reliable and timely information gathering, and that stakeholders are not only informed but are an integral part of the decision making process. Without these, sustainable usage of fisheries resources will not be achieved.

1.8 Statement of study objectives

As stated in the beginning of this report, one of the major problems has been the lack of information about recreational fishing. One of the few reports of the recreational fishing sector by Alimoso and Hodge (1993) analyzed some licensing data kept at the Conservation and Fisheries Department, but did not report in depth on the potential benefits that could come from a local recreational fishery. This research was undertaken to look at the economic and social benefits and constraints in developing a recreational fishing industry. This would lead to a better understanding of the recreational fishing industry in order to give officials information to consider this industry as a strategic priority. Also by getting the views from the different possible stakeholders in the industry, recommendations on how to manage the industry sustainably would also be available.

Another objective of this study was to attempt to fill the gaps in information by reporting and examining the views of those in the industry, those who utilize their services as well as those who would be interested in getting into the industry and the constraints they face in doing so. In essence, the information from this report will help decision makers get an idea of the state of the industry and possible steps to make the industry grow and be sustainable in the future. This paper can thus be used as a starting point for more information gathering on the industry, to keep track of the resulting effects on the economy and environment in order to have a dynamic management plan, and the ability to adapt to changes in the industry. A well designed management approach in this industry would not only make it sustainable, but could be adjusted for adoption by other fishing sectors as well.

2 METHODOLOGY

The information needed about the industry, its users and stakeholders was gathered through surveys, interviews, and by looking at the available information on the industry. In order to gather information on the economic benefits to the country, charter boat owners were asked about the costs of running their boats, the number of anglers they took out per day, as well as the cost per trip. The information looking at the social aspects of developing the recreational fishery was gathered through interviews with the public from the fishermen, as well as recommendations on how they believe the industry can be developed. Views of those interviewed were also obtained on their willingness to support management tools like bag limits, open and closed seasons etc.

Although all was done to ensure that the interviews were completed fully with different groups of individuals within the industry, some persons did not respond to some questions in the survey.

Although this was not the first time such a study has been conducted, trend data was not able to be gathered since only one other such study was done eight years ago (Alimoso and Hodge, 1993).

The data analysis contained in this report highlights the particulars of the data and important insights gained from the interviews. This report also identifies questions and issues that need further examination, and provides recommendations for future research based on the results.

2.1 Data collection and analysis

In this study, the questionnaire was used as a guideline for interviews with twenty anglers and ten charter boat operators who were on the island at the time. Over a two-month period, information was gathered about the angler's demographic characteristics. For the recreational fishers (Appendix A), questions one to seven were aimed at getting information on age and gender, preferred fishing partners as well as ethnicity. Such information allows managers and marketing groups to "better understand the stakeholders that are in fisheries...and to develop programmes responsive to the needs and abilities of these stakeholders" (Antia, 2000). Questions eight to thirteen were designed for those anglers who visited the island in their own fishing boats, and were geared at gathering information on their fishing trips. Questions fourteen to eighteen targeted their involvement in sport fishing tournaments, while the last questions were aimed at gaining their suggestions for what could be done to develop the industry, and the constraints facing this development.

For the charter boat operators, their demographic characteristics were not looked at, but the questions were designed to gain information on their fishing trip, how they market their service and their attitudes towards management issues, as well as their suggestions for developing the industry.

The anglers and operators were found at four of the marinas on the islands. The interviews were not scheduled, but both groups were very cooperative in answering the questions. Interviews with the operators were conducted based on a list of the known operators in the industry. This list was compiled from advertisements in the newspapers and magazines on the island and from recommendations from others in the industry. While this list is as comprehensive as possible, it may not include every operator. Some charter operators did not just do sport fishing activities, but instead did other charters as well, including taxi services. There may be other sources available and should be included in any future survey effort.

Interviews were also conducted with other departments and businesses in the industry. These included the Ministry of Natural Resources and Labour, Development Planning Unit, the Yacht Charter Services, as well as the Department of Wildlife and Fisheries in St. Thomas. These interviews proved to be very helpful in gathering information about the industry including views on how it could be developed. Interviews were also conducted with the Development Bank as well as two other commercial banks on the island to see how difficult it would be for fishermen to get loans to support their participation in the industry. The information gathered from the questionnaire interviews was compiled and simple statistical analysis was done using the Microsoft Excel Program.

Interviews were also held with the local commercial fishermen to get their feelings about the industry, and about the possibility of their entrance into the recreational fishery and the constraints preventing them from doing so.

In order to get an idea of the angler's total expenditure, the average per day trip expenditure was multiplied by the average number of days fished by the anglers, and then multiplied by the average number of anglers taken on a one day trip. This number was then expanded over the entire eight-month recreational fishing season. This gave a total expenditure of the anglers in one season of recreational fishing in the island. The Economic Multiplier is a calculation used by economists to measure not just the actual dollars spent, but the value of those dollars when they are spent again. This multiplier was calculated using a known multiplier value for that island to see the overall economic effect of the direct expenditure of the anglers on the island's economy.

Much of the information was presented as qualitative data and not quantitative. The reason for this stems from the fact that,

“...Qualitative data provide depth and detail for smaller numbers of people, whereas quantitative data uses standardized measures for larger groups of people and often allow generalizations about some broader category of people...qualitative data can be extremely useful in gauging the variety of potential reactions to alternative fisheries management strategies and in helping fisheries managers understand the reasons underlying the behavior or beliefs of fisheries stakeholders” (Murphy and Willis, 1996).

The information was then presented in the results/discussion section of the research. Recommendations were gathered and presented from the findings from the research on how to better manage the industry and what would first be needed in order for the industry to develop.

3 RESULTS

3.1 Review of problems encountered

It was expected that some problems would be encountered. These included the unavailability of some operators for interviews and lack of response to some questions. For this reason, the questionnaires were used to guide the interview, so the structure of each interview was different for each respondent. Another limitation included the lack of literature to review on recreational fishing in the BVI.

One of the main limitations faced in doing the study was the limited numbers of anglers available to participate because of the time of year the exercise was done. By looking at the tourist statistics for the BVI for the past five years, it was found that the months of July-September are lowest months for tourist arrivals and sport fishing anglers (Development Planning Unit Statistics, 2000). Coincidentally, this was also the time during which the study was done. Despite this, all attempts were made to interview as many anglers present as possible.

Comparable questions were used from a similar survey conducted on the island of Barbados. Some of the information gathered in the Barbados report was used in the results and discussion section of this paper as a means of comparison with that island.

3.2 Social profiles of anglers

There were a total of twenty recreational anglers interviewed from three different marinas. These anglers were identified by the type of boat they had, and whether they actually did sport fishing in the area. The average age of the anglers was 44 years. Of those interviewed, 5% were in the 21–30 age group, 30% of them ranged from 31-40 years, another 30% were in the 41-50 age group. The remaining anglers aged 50 and above made up a total of 35% (Figure 3.1).

This shows that while sport fishing is still a “young” developing sector of the fishing industry, many of those anglers actually fishing in the waters for sport were older than fifty. This age distribution for this area shows a huge contrast with that of the anglers in Barbados, where the mean age was only 33 years (Antia, 2000). This ten-year difference in age shows the relatively young population of anglers in Barbados in contrast to the BVI. Trying to target younger anglers in the BVI might necessitate offering more than ‘just fishing’ to this group since younger anglers might not be as seasoned and dedicated as older ones. For this reason, marketing strategies could include offering fishing classes as well as hands on training in special fishing techniques. In contrast to this however, the sooner younger anglers get involved in fishing in the BVI, the more likely they are to return year after year, and the BVI would have a larger population of dedicated anglers.

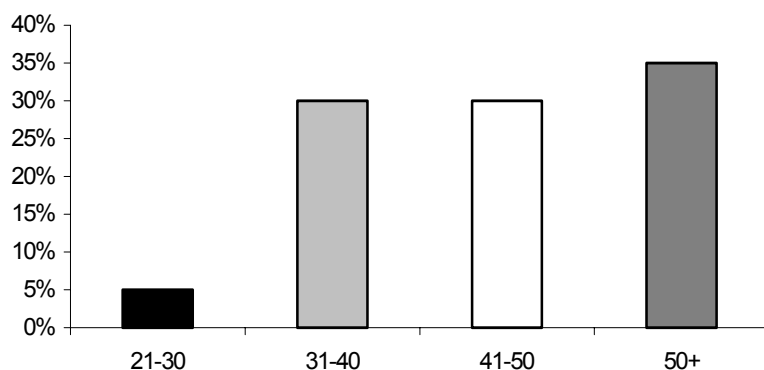


Figure 3.1 Age distribution of anglers

3.2.1 Race and ethnicity

All of the anglers interviewed were male, of which 30% were White from different parts of the United States of America, and those that were of Hispanic descent (70%) were from Puerto Rico. There were no Black anglers interviewed, unlike in Barbados where 8% of the anglers were Black, 16% were mixed and an additional 3% were Indian. The number of White anglers also made up the majority of anglers in Barbados also with an overwhelming total of 73% (Antia 2000). This, however, is only to show a contrast between the two islands. Reasons for participation by other ethnic groups in recreational fishing in Barbados could be different for non-participation in the BVI, especially when one takes the differences in culture as a major factor. One would be inclined to believe that the reason for more Whites being involved in recreational fishing is because more Whites could afford to go recreational fishing. But this does not necessarily have to be the case. It could be that Blacks in the BVI have traditionally been commercial fishermen, and it was never part of culture to go recreational fishing, not because they cannot afford to do so. Fedler (2000) corroborates this point in stating that “...regardless of socioeconomic standing, cultural processes are more important in explaining variation between Blacks and Whites in leisure participation patterns.” If the constraint to participation in recreational fishing is due to a lack of substantial disposable income, managers should find ways to accommodate more Blacks into the industry. One way to achieve this goal would be to target the black youths of the island. By doing this, the parents would be encouraged to take part in tournaments, and other activities aimed at socializing the ‘new’ generation towards sport fishing. Managers should see constraints only as an influence on an individual’s preferences and behaviour, but not as barriers to their participation. Ethnic groups of any economic standing

should believe that they can take part in sport fishing, and it should be management's role to facilitate this participation.

Participation by the other ethnic groups will only come about if managers are up to the challenge of re-socializing these groups of people. As shown in the earlier part of this report, anglers socialized into fishing from early childhood were found more than likely to remain fishing in adulthood. The re-socialization of older anglers might take a longer time, because it would entail moving anglers out of what they have always known, and offering them something 'new.'

The importance of looking at ethnicity and race therefore, must be taken into consideration in management decision making. Managers therefore have to ask questions such as how will the characteristics of these anglers change in the coming decades, and what effects will changes in the demographics of the angler population have on the level of future demand for recreational fishing? (Murdock and Hoque, 1998). This also calls for a sustained and focused research effort targeted on helping managers meet the needs of their increasingly diverse customers. Only then will the goal of increased angler participation be achieved.

It was also observed that most of the Hispanic anglers had their whole family along with them on their fishing trip. Investigations into reasons for this revealed that it is usual for Hispanic anglers to recreate in groups larger than other ethnic groups, and they also placed greater importance on the family oriented benefits of recreation than other groups (Fedler, 2000).

3.2.2 Female anglers

Although there were no female anglers interviewed some of the wives of the anglers enjoyed fishing, going as far as saying that they were better than their husbands. This interest by the wives of the anglers could be developed through the appropriate design of advertising to allow these wives to play a greater role in fishing trips than just that of housewife.

By understanding the differences of women and men in their motives, managers would be able to use this information to design more gender appropriate messages and programmes that will increase participation and result in a whole new market opening up in the industry. In today's society, women are usually considered to be the caregivers for children and responsible for most domestic chores which leave them with little time for outdoor recreation like sport fishing. This view is supported by Fedler (2000). These extra considerations would have to be taken care of first before these wives would be inclined to participate in sport fishing. Some suggestions include the creation of day care centers, and other services that would give the women time to go fishing without having to worry about the family, and what they are going to eat, etc. Also, with the number of female visitors to the island increasing tremendously over the past few years (Development and Planning Unit Statistics), there is great potential for developing other women-only outdoor activities. Education programmes and training sessions on fishing techniques could get them involved in specific types of fishing such as the art of fly-fishing, and long lining. These programs would also follow from the whole idea of re-socializing of anglers.

3.2.3 Angler's fishing experience

Anglers were asked about their main fishing influence. From the results of the interviews, we can see the importance fathers played in getting these anglers interested in fishing since 60% of those interviewed stated that they were influenced in fishing by their fathers. Many of the anglers stated that from the time they were old enough to hold a rod and reel, their fathers began to take them out fishing. From these early days of their childhood, the 'fever' of catching fish has stuck

with them. The rest of those interviewed, 40%, got interested in fishing from their friends. Many of them stated that they still fish with the same people every year. This follows from studies showing that there is a link between childhood recreation socialization and continued involvement in that recreational activity, and that strong family ties influence recreation behavior (Fedler,2000).

3.2.4 Fishing partners

Anglers were asked who they preferred going fishing with more often. This question was asked in order to see how the anglers were to be targeted in advertising. From the interview, 65% of the anglers stated that they preferred going fishing with just their friends because they have been fishing with these persons for years and were able to take a break from the family (Figure 3.2). 20% of the anglers preferred fishing with their family because it allowed them to spend ‘quality’ time with them doing an activity that brought them closer. The other 15% had a mixed preference, towards their fishing partners, stating that it didn’t really matter who they went fishing with, as long as they were fishing. By breaking down the information gathered, we can see that anglers go fishing 1.6 times more with their friends than with their families.

This information can be used by the tourism industry to focus their marketing strategy, especially when looking at package tours for families or for other groups such as friends. Other incentives would only encourage and attract more groups. With family groups, there would be additional consideration for activities for children to do while the parents are out fishing as well as the kind of food and drinks to be taken on the trip. With only a group of friends, some of these considerations might not be so critical.

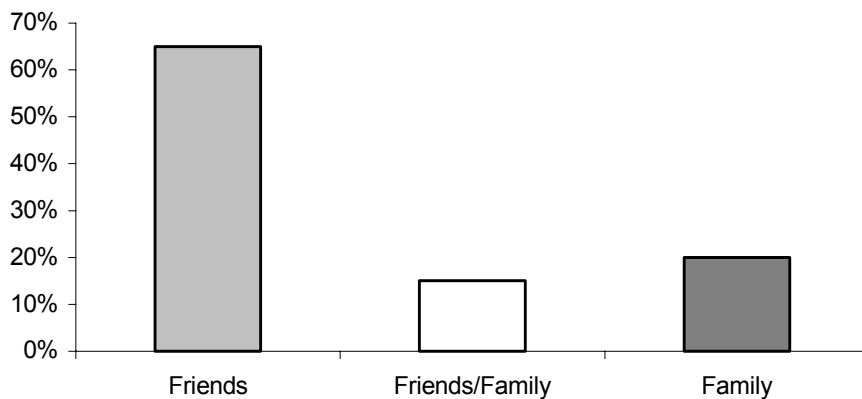


Figure 3.2 Preferred fishing partners by anglers

3.3 The number of times per year that anglers go fishing

Anglers were asked how many times per year they went fishing. For the purposes of this research, ‘going fishing’ refers to the number of times anglers go fishing while on their vacation, whether it is for a couple of days or a few weeks. The anglers interviewed went fishing an average of 4.7 times per year, with most of the anglers, 30% of them, going fishing a total of 3 times per year. The number of times per year that an angler went fishing ranged from 1 to 8. By comparing the number of times the anglers went fishing with their fishing influence, it was found that although most of the anglers became interested in fishing because of their fathers’, they went

fishing more times a year with their friends, allowing us to target more trips for groups of friends than just mere family trips (Figure 3.3).

When asked about the length of time spent fishing, anglers reported an average of 8 hours every time they went fishing or per day. What was found was that although most of the anglers went fishing with their friends most of the time, those that went fishing with their family spent more time fishing than those that went fishing with just their friends, spending an average of 11 hours at sea. Some possible reasons for this is that with the additional activities and responsibilities of the family caused more time to be spent on the sea, but time not necessarily spent fishing. This, however, does not mean that those anglers who went fishing with their families didn't catch fish. By comparing the average catch by preference in fishing partners, it was found that those who preferred to go fishing with their family caught an average of 5 fish per person per trip, while only an average of 4 fish per person per trip were caught by those anglers who went fishing with their friends.

The optimum length of time to catch the most fish, with 4-7 anglers on a trip, was between 8-10 hours with an average of 35 fish per boat being caught. With less than 8 hours of fishing, anglers only caught an average of 14 fish per boat, while more than 10 hours they caught an average 16 fish per boat. This simply means that you do not necessarily catch more fish when you stay longer at sea. Operators can use this information in planning their trips and how long they should be out at sea to provide the best fishing experience for their customers.

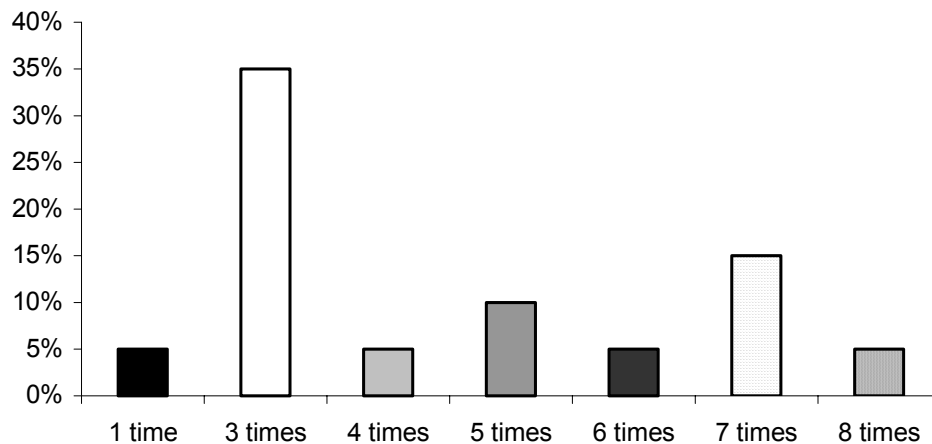


Figure 3.3 Average times per year that anglers go fishing

3.4 Cost per trip for anglers

Looking at the cost for each trip taken, the anglers who visited the island in their own boats pointed out that it varied due to several factors, but the main factor being the cost of fuel. Other costs included food, ice, medicine etc. Some of these costs however cannot be taken into consideration when looking at the economic impact of these anglers on the island's economy, since some of them bring their own food supplies with them and do not necessarily buy them in the BVI.

The average cost of each day fishing trip by these anglers was then estimated by each angler and ranged from about \$750 to \$1250 US depending on the size of the boat and the number of persons going on the day trip. These figures are only estimates, since anglers kept no record of

their cost per trip. The other factors in the cost per day trip all had something to do with how much fuel was being used, which included how far they went out fishing, the sea conditions, the type of fishing done, and how long they were fishing. The farther out they went, the more likely that the sea conditions were rougher than if they stayed closer to shore. The sea conditions is a major factor in determining the cost of the trip since the rougher the sea, the more power would have to be used to move the boat, resulting in more fuel being used. The type of fishing is also a big factor in the cost of the trip since for example, trolling fishing is done by using rods and reels pulling fishing lures behind a slow moving boat. This constant moving of the boat burns fuel by the hour. This trolling method is used to target large oceanic pelagics like marlin. Regular hand lining targets fish species like dolphin and does not need the boat to be moving, so it does not use that much fuel.

3.5 Anglers' choice of fishing destination

The anglers were asked why they chose the BVI to go sport fishing. Results show that all of them said that it was recommended to them to come here to go fishing by their friends. Because of this power of 'word-of-mouth' advertising, it is imperative that the fishing experience gained by one customer is of such a quality that when he speaks of it, others will want to come. Conversely, if the experience is not a good one, then that angler will not encourage others to come. It is said that if a tourist has a good time on his trip, he will tell one or two people. If he doesn't have a good time, he will tell more than ten people. This information is also useful when thinking about marketing the fishing product, especially since so many people learn about the island's resources from their friends. Offering deals for friends, free trips and other perks would attract more of them. The more people who know about the islands as a sport fisherman's paradise, the more will come to find out for themselves.

3.6 Questions on the social effects of developing the industry

After a couple days spent fishing here, respondents were unanimous about their high satisfaction level. Sport fishing in the BVI was rated 'excellent' not only because of the number of times they were able to catch fish, but because of the beauty of the islands, and the fact that the area was not so congested with boats as in the case of St. Thomas. This begs the question, if the industry were to develop, would the people of the BVI want "Nature's Little Secret" to be out? How would the people like the coast to be lined with large marinas and big boats? It could be that this appreciation for the beauty of the island is the determining factor in what attracts the tourists here, because they could easily be in St. Thomas where it would be cheaper for them to moor and where the fuel prices are cheaper.

Speaking with an average of twenty-five random BVI islanders, it was discovered that they fully supported developing the sport fishing industry, but also had similar concerns about having too many boats changing the coastline. Already for such a small island, there are 19 marinas. With larger boats coming in, this number could increase to about 25. Representatives from the largest yacht charters on the island said that they don't get many complaints from their guests about power boats disrupting their cruising, but they did acknowledge that the more crowded the island got with boats, the less attractive it would become to tourists. One suggestion to offset this increase in sport fishing boats would be to increase the number of anglers, but not the number of boats. This could be done by having more charter boats taking out more people, instead of having more sport fishing boats with less people on board. Attracting anglers to charter boat trips would then deal with this problem of overcrowded marinas.

3.7 Species most targeted by anglers

Anglers were asked what species of fish they targeted most. Responses to this question showed that the most preferred species was marlin, with 70% of the anglers going after this large pelagic fish. One reason for this could be that the interviews were conducted during marlin season, and so most of the anglers came during this time just for that type of fish. This bias could be seasonal, with different anglers coming to the island at different times of the year to target different species (Figure 3.4).

By knowing and understanding the different seasons of preferred fish, it would be possible to create specific fishing tournaments only for specific types of fish. This would attract anglers specialized at fishing specific types of fish to enter these tournaments and test their skills against others of the world. By encouraging good competition, these annual tournaments would be looked forward to by these anglers. Table 3.1 shows the times of year for the different type of fishing season, as reported by different charter boat operators interviewed.

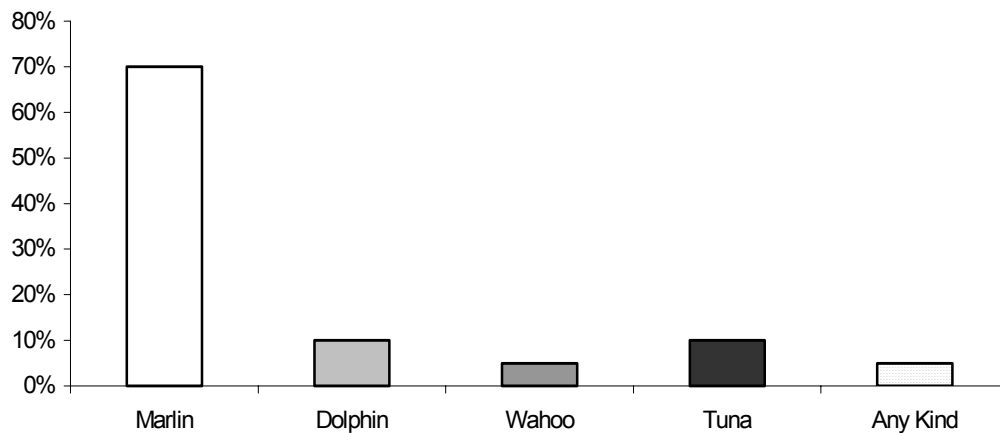


Figure 3.4 Species most targeted by anglers

Table 3.1 Fishing seasons in the BVI

	Wahoo	Tuna	Dolphin	White Marlin	Blue Marlin
October	*				
November	*				
December	*	*	*		
January	*	*	*		
February	*	*	*		
March	*	*	*	*	
April		*	*	*	*
May		*		*	*
June		*		*	*
July				*	*
August					*
September					*

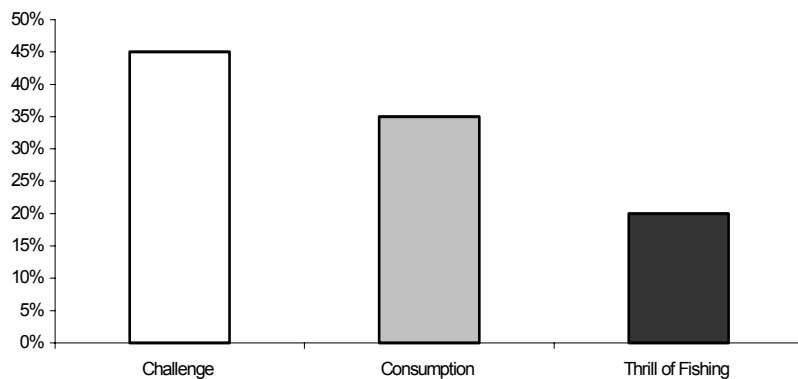
It is important for management to look closely at these large pelagics, in particular because of their transboundary nature, making the stocks a shared resource by many different nations. This could have political considerations in drafting any sort of management plan for this Bill-fishery. Also, because there has been decline in

the population of marlin over the years (The Billfish Foundation, 1993), there has been a move towards encouraging the practice of catch and release fishing, which would allow the fish to be re-caught and not just taken and eaten. Organizations like the Billfish Foundation have already been working with some of the charter boat operators to show them the importance of catch and release fishing. Education is still needed in order to sensitize the public about the need to release these fish if they are caught. In the end, however, it is still a decision made by the charter boat operator on a day by day, customer to customer basis, and not one necessarily rooted in his overall way of doing things. This view is supported by Sutton (2001) when he says that the “choice to participate in catch and release will probably be made at the time the fish is caught...” If regulations on recreational fishing in the future make catch and release fishing mandatory, managers will have to find ways of ensuring it is done, evaluate how operators will react, and determine what effect it would have on the overall fishing experience for the angler.

The other anglers, 10% of them, targeted dolphin and tuna as the second most wanted fish, while wahoo were only targeted by 5% of the anglers. The remaining 5% said that it did not matter what kind of fish they were catching, as long as they could catch something. These anglers can therefore be targeted in advertising by showing them that they will gain more than just a chance of catching fish, but more, have the best fishing experience possible. Sutton (2001) agrees and reports that in a previous study, anglers rated water quality, natural beauty, and privacy while fishing more important than the size and number of fish caught. These characteristics are all present in the BVI, with many secluded areas where anglers could be alone, fishing in crystal clear water. These should be marketed as bonuses to the fishing experience in the BVI.

3.7.1 Reason for choice of species targeted

The choice of the different types of fish was mainly related to the ‘challenge’ of the fishing, as indicated by 45% of the anglers. This challenge was mainly associated with marlin fishing. The challenge of fishing meant mainly the actual luring and hauling in of the fish, while the thrill of fishing had more to do with the overall excitement of being on the sea and even watching the fish being hauled in. The dolphins were targeted because they were mainly used for consumption, while the tuna were targeted because of the thrill of fishing. The anglers stated that the thrill or excitement was what made them want to fish, so was the challenge of fishing for the marlin, which allowed the anglers to develop their skills. Both these reasons were main considerations



in rating their fishing experience as excellent. For those fish that were not taken for consumption, anglers reported that they released all of the marlin and tuna that they caught, although without proper surveillance, it is not possible to say if these fish were actually released or not (Figure 3.5).

Figure 3.5 Reason for choice of species targeted

3.8 Participation in fishing tournaments

Anglers were asked if they participated in fishing tournaments, whether local or international. Of those interviewed, 12 of the anglers said that they did participate in fishing tournaments, 6 of which were international and the other 6 were local tournaments, most of which were organized by the anglers club in St. Thomas. When these 12 anglers were asked if they noticed any trends in participation in fishing tournaments, 42% of those that participated in fishing tournaments indicated that there was an increase in participation. The other 58% stated that there was a decrease in participation in sport fishing tournaments. This view may simply be a result of a decrease in the number of fishing tournament on a whole, since in the BVI, the “Virgin Gorda International Marlin Week” was the “first marlin tournament to be held in BVI waters for at least ten years” (Mihailovich, 2001).

This information was gathered in order to get an idea of what would attract other anglers to new tournaments in the island. This information would allow for more money coming in from angler registration fees and longer stays on the island. Annual tournaments could mean the production of a calendar of tournaments to have individuals or groups of anglers booking ahead of time to go to the island for just that reason. This would help the tourist board in planning other activities for the anglers when they reach the island. Fishing seminars, fishing ‘celebrities’ and expos’ featuring new fishing equipment would all help to make the BVI experience one that the angler will long remember.

3.8.1 Reasons for increased participation in sport fishing tournaments

In response to the questions about the reason for increased participation in sport fishing tournaments, 40% of the anglers indicated that the reasons for the increased participation were that there were more sport fishing boats. Another 40% of the anglers said that this was due to more people becoming interested in fishing, and that more of these people with increased interest have more disposable income (20%) in order to actually get involved in sport fishing. For those who said that there was a decrease in the participation in sport fishing tournaments, the reasons given included high entry fees to the tournaments, and an overall reduced interest in sport fishing.

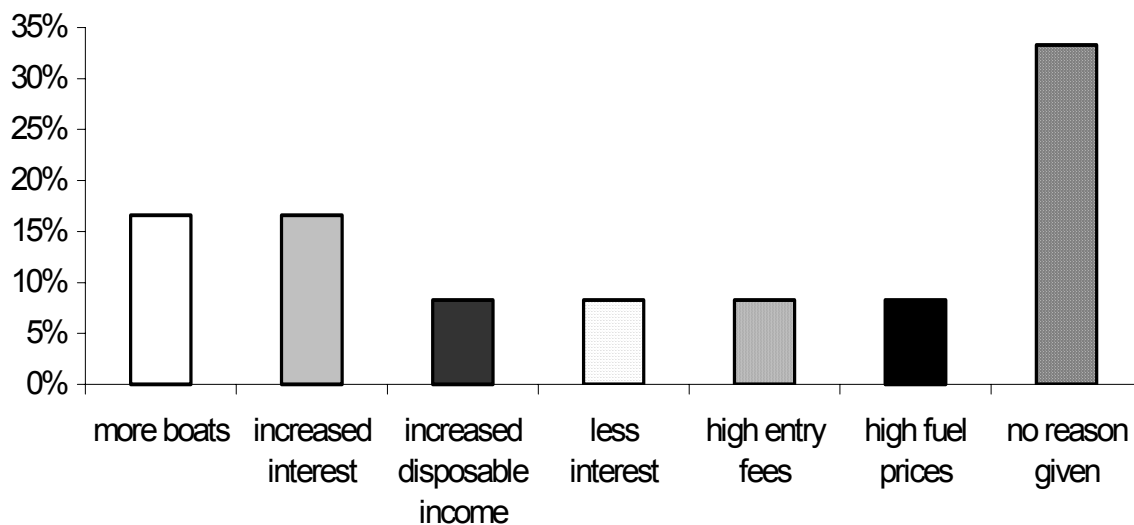


Figure 3.6 Reasons for increased participation in sport fishing tournaments

Tournament organizers have to take these responses into consideration when putting a tournament together. They should try to get more people involved through smaller tournaments or even having “ride alongs” where operators and anglers would allow other anglers to take part in the tournament. Team tournaments would also get more people involved, and increase the level of competition. The more people become involved in one tournament, the more they will want to get involved again the next time around.

3.8.2 *Suggestions for increased participation in sport fishing tournaments*

The anglers gave some suggestions as to how to raise interest, and as a result the level of participation in sport fishing tournaments. Two of the main suggestions were more advertising (27%) and better prizes for the winners (28%). Since very little has been done in the past to advertise sport-fishing tournaments, this suggestion is very applicable to the BVI. This shows the need for a greater role to be played by the Tourism Board in developing the recreational fishing industry.

Anglers indicated that with such high entry fees for the tournaments, there should at least be better prizes for the winners. The incentives should include more recognition for the winners (9%), which could be accomplished by publishing their names in international magazines. 18% of the anglers said that there are too many rules involved in some of the tournaments, which detracted from the anglers’ interest since they just wanted to go fishing without too much hassle. On this point some steps have been taken to change this. In a recent marlin fishing tournament in Virgin Gorda, called the “Virgin Gorda International Marlin Week,” organizers deliberately made the rules minimal “...in keeping with the loose atmosphere and easy style the tournament is trying to create” (Mihailovich, 2001). There were some anglers (18%), who had no suggestions for increasing the participation in sport-fishing tournaments. These anglers were probably not serious tournament participants, who entered them just for the fun of it, and not for any real competition (Figure 3.7).

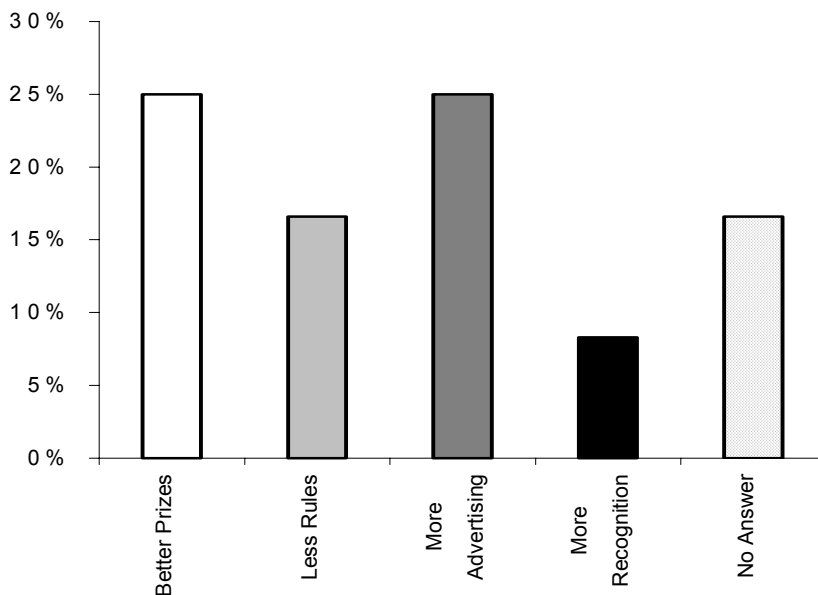


Figure 3.7 Suggestions for increased participation

3.9 Interviews with charter boat operators

Interviews were conducted with sport fishing charter boats on the islands. A total of ten boat owners were interviewed. The specific type of fishing done by each owner ranging from bone fishing to deep-sea marlin fishing with 90% of the operators involved in marlin fishing. One reason for this could be the higher percentage of full day trips made in marlin fishing rather than half day trips, since more money is made from full day trips than half day trips.

These charter boat owners went out on fishing trips on average 4 times per week. During high season, which is primarily from November to February, charter boats can go out almost every day of the week with at least 5-6 anglers going on each trip. All the operators said that they usually have the lowest number of fishing trips during the months of August to October. During this low season most of the owners do all the repairs on their boats, and get ready for the high season again, but some are still able to take out a few anglers for a half day fishing trip. It should be looked into finding other activities to attract anglers during this low season. Special prices for trips and other incentives could allow for more trips to be made, as well as act as a good 'word-of-mouth' marketing tool.

The operators indicated that most of the anglers (70%) they take out on fishing trips during the high season come from the United States, while the rest is a mixture of people from Europe. One reason for this could be the relative closeness of the United States Virgin Islands and the fact that there are more American visitors to the island than Europeans. Figures from 1997 show this point where 194,058 visitors arrived from the United States while only 22,137 visitors arrived from Europe (Development Planning Unit, 2001). In any case, with this knowledge, more should be done to strengthen ties with the USVI as indicated earlier in the introduction. This could eventually find both islands working together to corner the international market on recreational marlin and other deep sea fishing. Instead of trying to separate both islands and claiming who owns what, cooperation could lead to mutual benefits for both islands.

Five of the operators said that most (60%) of their customers made their reservations by e-mail, and the rest by phone or fax. All the operators did some form of advertising in the BVI Welcome Magazine while some had web sites, but most of their customers heard about their fishing trips through word of mouth from friends. With greater promotions and international marketing, especially with increased help from the tourism board, the number of recreational fishermen arriving on the island would increase. Because not much is done to market the BVI as a recreational fishing destination, any new initiative would help.

Operators were asked about the ratio of full day as compared to half-day trips taken during the fishing season. All operators reported that the number of full day fishing trips as compared to half-day fishing trips was equal during the high season, but there was a slight increase in half-day trips during the lower seasons, due to less anglers present. On each trip, the operators said that anglers caught an average of three (3) fish. From the operators' observation, many of the anglers didn't want to catch a specific type of fish, but were just happy to catch something, unlike those seasoned fishermen who came to the island in their own boats and were mainly targeting marlin. For these non-specific fishermen, operators reported that it was the overall experience of being on the water absorbing the sea and the aesthetics of the island that made the anglers enjoy themselves, with no pressure of catching anything. Because of this need for more attractions while out fishing, operators could offer other activities on board their boats (e.g. tour

guiding) to occupy the time of the anglers. One operator allowed the anglers to go swimming off the side of the boat.

Operators were asked about their operating cost for one trip. Results show that an average of US\$240 was spent as operating cost for each trip, whether full day or half day. This was usually the cost for the smaller boats, but this cost went as high as US\$576 for the larger boats, due to more fuel being consumed, with tourists paying up to US\$1,300 for a whole day trip (Table 3.2).

Table 3.2 Detailed breakdown of average expenditure for items for a day trip of sport fishing (all types, not just for marlin) by all charter boat operators. All values in US dollars

Items	Expenditure
Food, drinks and refreshments	\$60
Boat fuel	\$400
Ice	\$16
Bait (live, cut, prepared)	\$50
Loss of gear	\$50
Total	\$576.00

For this reason, most charter boat operators preferred to take visitors out on full day trips rather than half day. One of the operators, however, reported that he discouraged deep-sea marlin fishing to his customers

because it cost too much, and in the end was not economically feasible.

Operators were asked to break down the cost for one marlin fishing trip. The values shown in Table 3.2 are estimated averages from the responses of the operators. These operators indicated the high cost of fuel to reach the fishing grounds as their biggest cost. Other operators, especially the ones doing fly-fishing, did not go out far to fish since their boats are smaller and used for more inshore fishing such as fly fishing, which target species such as bonefish, tarpon and permit. These operators fished along the shallow flats of Beef Island. The fish caught by these anglers are released, while other operators usually give some of their catch to the visitors, and keep the rest, while others sell their catch to restaurants. In this case, one such operator, through an agreement with a local restaurant, exchanged his catch for ice. This practice of selling their catch is commonplace in other Caribbean states (Antia, 2000).

The sale of these fish was probably to help offset the cost of fishing, but it is not known how much of these sales contribute to their earnings. Without there being any strict license enforcement to make the distinction between who can sell fish and who can not, there will be problems and some conflict between commercial fishermen and recreational fishermen. Although most operators did not see any huge conflict between themselves and the commercial fishermen, they did show some instances when they cooperated with them. This included calling the commercial fishermen when they see schools of fish that they are not targeting, or helping them out if they had problems with their boats.

Operators were also asked to give some estimates of the cost of items they had to get in order to start their business and to maintain that business for one year. The figures shown in Table 3.3 are averages of estimates from all the charter boat operators interviewed. This information was helpful in showing potential charter boat operators what they would have to come up with if they wanted to start their own business.

With regards to the operators supporting the tools for fisheries management, half of the operators interviewed said that they would strongly support a minimum size limit by releasing the fish below a certain size. Two of the operators said that they would only support this measure if it were for billfish. These operators were those who would sell some of their catch to local

restaurants and hotels, meaning that they would still want to sell the rest of their catch that was not billfish.

When asked about operators' willingness to support bag limits, most of the operators (70%) said that they were willing to support being able to catch only a certain number of fish per day, but the majority (80%) of them said that there would have to be some form of stock assessment first to see how the fish stocks are doing, so that they would be able to make informed decisions on giving their full support.

They contend that this bag limit was put into effect without sufficient data and good science. For this reason, it is important for the decision makers to have good consultation with the anglers. It is also important that the anglers themselves become a strong lobbying group to have some voice in government.

Operators were asked about their support for the other management tools, which included fishing access restrictions and not being able to retain certain kinds of fish. Similar to the answer to their support of the bag limit, the operators said that they would need some more information about how these tools will affect them, which was expected since they have become accustomed to fishing without much regulation.

Table 3.3 Some detailed costs of starting and maintaining a sport fishing business for one year. All values in US dollars.

Expenditures	Cost (US\$)
<i>Fishing equipment</i>	
30-50ft Sport Fishing Boat	150,000
Rods, reels, poles (6 rods)	3,300
Artificial lures, flies, baits	2,000
Hooks, sinkers, swivels etc.	250
Gaff hooks	300
Depth finders, fish finders and other electronic fishing devices	10,000
Sub-total	155,850
<i>Other expenditures</i>	
Fishing license fees	200
Docking at the marina	60,000
Electricity and water	240
General maintenance, servicing and replacing parts, hauling out of the water, painting, bottom and import duties on goods and freight	35,000
Advertising (website/magazine)	3,000
Other purchases	500
Sub-total	98,940
Total	254,790

This lack of regulation knowledge brings to mind the need for education and outreach programs to show the operators why these management tools are needed. With such a system of education in place, the anglers did say however, that they would support these tools if it meant making sure sport fishing is around for years to come for the enjoyment of future generations.

3.10 Interviews with local fishermen

In order for there to be any kind of development in the sport fishing industry, there has to be some kind of interest and willingness on the part of the local fishermen to

participate. There could be potential in terms of the abundance of fish in the vast fishing area, and the attraction of tourists, but if the local people are not able to get into the industry, there will not be any real development or significant increase in the contributions made by the sport fishing industry.

To get information on the willingness of the local fishermen to get into recreational fishing, non-formal interviews with twenty local commercial fishermen were carried out at random. Results from interviews showed that they all had some interest in getting into the sport fishing industry,

but their main concern was the cost of starting up the business and the other costs involved including the daily running of the business. The other concerns included the fact that they didn't want to have to go out so far to go fishing, when they could just go fishing inshore and catch a lot of fish. The amount of time spent on the sea would be longer since most commercial fishermen only pull up their fish traps once a day and spend the rest of the day on land. Some of them have other business like restaurants to take care of, while others make or mend broken fish traps. In many cases in sport fishing, the fishermen would have to be out all day on the sea with the tourists.

To get an idea of the costs involved in starting and maintaining a sport fishing business, information was gathered from the charter boat owners and operators who are already in operation. The results are listed in Table 3.3.

The figures shown in the Table 3.3 represent the cost of operating the business for one year. These figures, however, do not include repayment of bank loans that, at 10% interest rate can drive this amount a lot higher. Also, the cost of insurance is usually 2 ½ -3% of the value of the boat per year, including liability for the passengers on the boat. When all of this is added together, for most fishermen, the total can be staggering, and chase away any possible persons interest in getting started as a charter boat sport fisherman. By looking at this breakdown of the costs involved in operating a large 30-50ft boat, one of the charter boat operators went as far as saying that he is not making any kind of 'real' money from sport fishing. Until there is some kind of reduction in the cost of fuel or increase in price of the fishing trip, he would not be able to continue sport fishing for a living.

3.10.1 Other financial considerations

In the BVI, most persons wanting to start his or her own business would go to the Development bank. Speaking with a representative of the bank, information was gathered on how easy it is for someone to get a loan from the bank, what someone would need to have, or be able to show in order to get a loan. The representative stated that although sport fishing is similar to regular commercial fishing, the bank would not consider 'crossing over' from one to the next a 'natural transition.' This means that a fisherman would not just be able to get a loan to 'expand' into sport fishing, but would have to go through a whole separate process because it would be seen as a new venture. For this reason, the person would have to give a proposal of what he wants to do, including a statement of his personal affairs, his projections for future operations, marketing strategy etc. The person would have to come up with at least one third (1/3) of the total cost of starting the business, along with evidence to support this. This would include at least two months of working capital to cover the initial months of operation. This amount does not necessarily have to be in cash, but could be the value of assets already owned, as well as security to be offered along with the proposed method of payment.

There is some incentive to get fishermen into the sport fishing industry because it is possible for fishermen to get a lower interest rate from the bank, from 12% to 10% interest, as long as they have a letter from the fisheries department stating that they are registered fishermen. It was stated, however, that their records show that long lining and sport fishing ventures have not been too successful in the past, making them think twice about giving loans for that reason.

This is one of the major deterrents from local fishermen getting into the industry. Getting into the sport fishing industry thus seems to be a very expensive and risky business. The potential is there to attract tourists, but there has to be some kind of aid to the fishermen just to get started.

The risks involved should be thoroughly investigated before any potential operator gets into the industry. What they have to take into serious consideration are the other factors once they begin. One of the major considerations is the amount of money lost due to days lost from not being able to go out, whether it is because of bad weather or no one to take out. Work lost is money not being made, which causes bills to accumulate. This loss of work and time can be extended due to hurricanes or other factors.

In the end, while the BVI has the resources to attract the tourist, the overall problem is not the lack of interest in the recreational industry; it is the inability of the local fishermen to actually get started. Their needs and concerns would first have to be dealt with before moving further.

3.11 Economic impact of recreational fishing on the BVI economy

Operators and anglers were asked to estimate the total cost for an angler to go on a one day fishing trip beginning from the time they leave the airport until they return to the airport the next day (Table 3.4). This was done because “by looking at the amount of tourist expenditure in a country, it is possible to keep track of the economic effects of tourism on that country’s economy” (Srivastava, 2000). By getting an idea of how much each tourist spends on the island, Government can better budget its spending and forecast its revenues. For this report, tourism expenditure is the “total consumption expenditure made by a visitor or on behalf of a visitor for and during his/her trip and stay at a destination” (Srivastava, 2000).

3.11.1 Cost per person for a one day trip to the islands for recreational fishing

Table 3.4 Cost per person for a one day trip to the islands for recreational fishing. Figures obtained from interviews operators and anglers.

Recreational fishing costs	US\$	
Transportation to and from airport	80.00	From these figures we can see that in one day, one recreational fisherman can spend more than \$1,600 in the island just for one fishing trip. This does not include other items bought on the island such as sunscreen, and the tips given at restaurants and hotels. The US \$1,300 for the fishing trip represents the highest charge for a trip as reported by the charter boat operators. This was used in order to get an idea of the most amount of money that can be made by the charter boat operators in one day. The lowest charge was US \$950 for a day trip, but again, these charges depended on the type of fishing, the number of anglers and the area they went fishing in. The number of anglers is a factor since some charter boat owners gave special discounts for large groups. By expanding these numbers you can get a real picture of the kind of money being gained by the island from recreational fishing. Using the average of 5 anglers being taken on a trip for a day by one boat operator, the amount totals up to \$2,900, with the money being spread over a cross section of the businesses on the island. This figure comes from the fact that all five anglers shared the US\$1,300 for the fishing trip. The other charges would be the same for each angler. So each angler would have to pay for his own food at the restaurant, his own bus ride from the airport, and his own souvenirs. These charges without the cost of the trip would come up to US\$1,600. Dividing the cost of the trip among the five of them, each angler would have to come up with another US\$260. Using an average of 5 trips per week, the 5 anglers spend a total of US\$14,500. If there continues to be 5 anglers coming to the island every day for the month, this would come up to US\$58000, and for the whole eight - month season, when extrapolated, this US\$14,500 reaches a total of \$464,000 using only one
Restaurant/one day	70.00	
Hotel (one night in low season)	90.00	
Souvenirs	80.00	
Cost for marlin fishing trip	1300.00	
Total	1620.00	

charter boat operator. This money ends up reaching the gas stations, bait and tackle shops, ice factory, and into the Government purse in the form of duties and other taxes. It should be remembered that these figures are only for one charter boat operator. Assuming that all ten of the charter boat operators made the same number of trips with the same number of anglers on each trip, the angler expenditure would reach an impressive total of US\$4,640,000 of direct injection of 'new' money into the island's economy. This total is only for full-day fishing trips during the high season. For the purposes of this research, half-day trips were not dealt with since most half day charters were done during the low season. When considered however, half-day charters would only increase this total for the entire year.

Although looking at the total expenditure of the visiting anglers helps one to understand the level of economic impact on the tourism industry, "...they are insufficient measures of the value of recreational fishing" (Thailing and Ditton, 2000). Additional impacts of the expenditure made by tourist anglers impact the local economy by bringing in new money into the region which in turn increases the local economic base and produces further direct, indirect and induced impacts" (Thailing and Ditton, 2000). This can be seen in the jobs created, sales, wages, taxes and salaries (Gunderson and Kreag, 2000). In the BVI, all these benefits could be realized if the industry were developed.

The exchange of dollars for goods and services from visitors to the different establishments on the island allows these owners to purchase other goods and services within the local economy. This is the 'Multiplier Effect.' This concept "Indicates how many times the injection of original spending circulates through a local economy (Choi, 2001), and creates additional economic activity (Gunderson and Kreag, 2000). This spending and re-spending of the money continues until all of the money brought into the country has left the national economy (Ditton and Grimes, 1995).

The tourism income multiplier for the BVI of .58 (Choi, 2001) was used to calculate the indirect and induced economic impact of the anglers expenses. This value implies that every dollar spent by the anglers results in US \$.58 in economic impact before the money leaves the country (Ditton and Grimes, 1995). Therefore, the total expenditure of the anglers for one fishing season of US \$4,640,000, had an economic impact of US\$2,691,200 on the BVI economy. One can only expect this amount to increase with increased angler visits, more operators in the industry as well as increased advertising to target markets.

4 RECOMMENDATIONS

Many of the visitors who go to St. Thomas for sport fishing do not realize that it is actually the BVI waters that they are fishing in. Their sport-fishing industry generates an estimated US\$50-\$70 million dollars annually (Mihailovich, 2001). In the BVI, this number is estimated to be more than US\$4 million. What has to happen now is more effort being put into attracting these tourists from St. Thomas to the BVI. This would increase their tourist arrivals, which will translate into thousands of new jobs from new private sector initiatives. The creation of stores like bait shops, tackle shops and other stores to cater to the needs of the sport fishermen will all create new jobs for many people.

The increase in visitors will mean more money being directly paid to government in the form of income and business taxes, as well as licensing fees. This direct contribution to government could total in the hundreds of thousands. This multiplier effect would cause an increase in spending within the island for other local products, and possibly encourage more businesses to

start up. But in order for local fishermen to get involved, they have to first have the capital to do so. The constraints of these fishermen have to be dealt with first and foremost before the industry can go anywhere, especially considering the huge price of a new fishing boat for deep sea fishing.

The recommendations given by the sport fishing operators were similar for all interviewed. The major constraint faced by these operators was the high price of fuel. They all recommended some form of duty free exemption or lowering of the price of fuel, especially for large fishing tournaments. Secondly, they stated that the price of ice and bait are usually high costs to them. It would help them and encourage other fishermen to get into the industry by making it easier for them to get these products. Looking into creating a Fisheries Ice Factory, to sell ice to the fishermen was one recommendation to alleviate the problem of ice availability and cost. The fishermen currently buy most of their ice from the local supermarket. The money made from the creation of this ice factory would go toward future projects of the fisheries department.

It was recommended that there be better facilities at the marinas to accommodate these sport fishing boats. Marinas now have insufficient facilities for these boats and would have to upgrade before more boats could be attracted to the island. This brings to mind the cost of bringing in a new sport fishing boat in terms of duties, which would drive their cost up dramatically.

Interviews with some of the anglers who owned their own boats showed that they had to go through too much government “red tape” to get a license in order to go fishing. This took too much time and was sometimes frustrating which took away from their interest in going fishing here. They showed how easy it was to get a license in St. Thomas, where they could get their license over the internet, and not even have to step foot into the Fisheries Department there. It was recommended that something be done to help stream line this process. The easier it is to get their license, the faster they would be able to go fishing.

To get as much advertising as possible, it is recommended that the operators should work closely with hotels to produce package deals for the tourists. This would then allow for the production of a fishing tournament schedule which would give the tournament anglers times to look forward to by planning out the year. What is needed in terms of advertising is to find a solution to the problem of the US Virgin Islands advertising their sport fishing industry using BVI waters, without anything being paid to the BVI government for this privilege.

The BVI tourist board would also have to do a lot more to advertise to those markets in the United States through magazines like the “Marlin magazine.” This kind of exposure would go far in attracting more tourists to the island.

What is recommended, however, is that more research on the topic be done in the future. The open-access nature of high seas fisheries creates a particularly difficult situation with respect to the control of fishing capacity. Excess capacity means that fleets are larger than they need to be to catch and land. There has to be some kind of idea as to the optimum number of sport fishing licenses given out first before there is any influx of boats to the island.

To make sure that fisheries are harvested at an economically and biologically sustainable level, fisheries managers must have information about the catch, effort, and the harvesters, including recreational anglers. They need to know

- the numbers and weight of fish harvested recreationally,
- the size of the catch,

- the numbers of people participating,
- and the total number of trips that they make (Effort).

From the information gathered, managers and policy makers would be able to establish regulations to control fishing mortality and allow managers to allocate fishery resources among competing user groups, and assess the impacts of regulations on anglers and the sport fishing industry.

This is the real need for fisheries management. The development of timely and reliable fisheries information and statistical data as well as the setting up of a regional network; research and management considerations especially for shared or transboundary fish stocks; the development of methodologies for stock assessments. Without proper information from scientific research, it will be difficult to draft the laws to regulate the industry.

After sufficient information has been gathered, there is a need for the formation of a recreational fishing policy. In a statement by the President of the United States on the 7th of June 1995, he outlined some major objectives that should be included in a recreational fishing policy document, which began by remembering that the quality of fishing is important, requiring a wide range of fishing opportunities. The "recreational fishing experience" has to include more than just the chance to catch a fish. Fresh air, clean water and beautiful scenery are cherished parts of the enjoyment and satisfaction of this outdoor experience.

Although integrated planning and institutional coordination are frequently listed as the primary requirements for effective coastal management, in practice, both have proved difficult to achieve and both entail significant costs. These difficulties come from bureaucratic structures and procedures of government agencies; the complexity of the scientific, technical and economic issues involved; and the potentially large number of informed decisions that need to be taken. Despite these drawbacks, the policy should look into the possibility of creating a Fisheries Council to include the different sectors of the fishing industry, with representatives from each. This council, similar to the Caribbean Fisheries council for the US Virgin island an Puerto Rico, would look at issues facing the fishing industry, and would allow for easier dissemination of information which will go to the sectors of the industry represented at the council.

Other research should investigate how fisheries health and regulatory changes will impact the recreational fishing industry. How will the development of the industry with more boats and tourists affect the fish stock and the water quality and the need for increased surveillance and patrols of the BVI waters to prevent over fishing by foreign vessels? This should include looking into the formation of an Environmental Enforcement Agency, similar to the one in St. Thomas.

Many marine recreational anglers think they don't have much impact on the resource because they take only a few fish, but when they all take a few fish it adds up. There is also the tendency for people to believe that the oceans are infinite, which they are not. In fact, in some industries in the world, quite a few fisheries recreational anglers harvest as much or more fish than commercial fishermen.

Getting the public involved in management is essential. Although the brunt of overall responsibility lies with the Government for managing the fisheries resources, all users of the resources have some responsibility for the conservation and wise use of the fishery. There are direct beneficiaries from a healthy recreational fishery. These include the recreational fishers themselves as well as those businesses that cater to the needs of these fishermen. Their

responsibility extends not only to participating in the protection of the resources but should also extend to assuming part of the cost of maintaining the privileges they enjoy.

A recreational policy establishes the importance of marine recreational fisheries and encourages this public participation in the protection, conservation and improvement of the fisheries resources. The challenge facing the Government, recreational fishing community and other interests is to work together to realize the potential of the marine recreational fisheries. The continuation and improvement of these recreational fisheries is of concern to anglers, related businesses, and the managers of the resources. The improvement of the fisheries opportunities are important to what the BVI offers to its citizens and visitors - a clean, healthy, picturesque and outdoor lifestyle based on renewable resources. Protecting these fish and their habitats, promoting responsible use of the resources and maintaining and developing recreational opportunities makes sense for us and for future generations.

In order to conserve, restore, and enhance these aquatic systems to provide for increased recreational fishing opportunities those in management have to find out how to improve the quantity, function, sustainable productivity, and distribution of the aquatic resources for increased recreational fishing opportunities. To do this, there has to be a continual developing and encouraging of partnerships between governments and the private sector to advance resource conservation and enhance recreational fishing opportunities. However, as other economic sectors expand in the coastal zone, the relative economic importance of fisheries declines. This can be seen in the BVI as the financial services sector continues to contribute millions to the country's GDP, while the contribution from fisheries, although increasing slightly in past years, is still relatively insignificant. This can further weaken the influence of the fisheries agencies in determining policy.

In the end, there is so much more to be done. More studies on the fisheries itself have to be done before any real development can be realized, as agreed on by Steinback and O'Neil (1999) who reported that "Development of recreational management measures to achieve conservation goals require a fair amount of social and economic information." If not, problems could occur in the near future that could have lasting effects for years to come, taking away all the possibilities for any real fisheries management.

4.1 Recommendations towards future research

- The timing of the survey should be done during the height of tourist season, which is during the December to February months. This would allow a larger sample size and probably from more diverse places of the world.
- The interviews should be conducted with the operators during slow business periods of the day. This would make the answers more thorough and more accurate. To do this requires proper advance planning to get the list of the operators to be used in the sample, and to make an interview schedule.
- As was the case in this project, researchers should base future work on questionnaires already developed to save time and costs.

4.2 Other issues

In the survey, several issues and opportunities related to content were identified. These may be worth including in future survey efforts:

- How fisheries health and regulatory changes will impact the recreational fishing industry.
- How will the development of the industry with more boats and tourists affect the fish stock and the water quality.
- The need for increased surveillance and patrols of the BVI waters to prevent over fishing by foreign vessels. This should include looking into the formation of an Environmental Enforcement Agency, similar to the one in St. Thomas.
- Looking into the possibility of creating a Fisheries Council to include the different sectors of the fishing industry, with representatives from each. This council would look at issues facing the fishing industry, and would allow for easier dissemination of information to the different sectors.
- Looking into creating a Fisheries Ice Factory, to sell ice to the fishermen. One of the main concerns by the fishermen was the high cost they pay for ice from the supermarket. The money made from this venture would go toward future projects of the fisheries department.
- The information gathered from the interviews will help the Fisheries Department with their decision making, and the creation of regulations for the industry.

5 CONCLUSION

Marine tourism has become a significant use of ocean and coastal space and resources, which provide a strong attraction for visitors. In the British Virgin Islands, with its abundance of fisheries resources, there is tremendous potential for the development of a local sport fishing industry. The economic impact on the economy of the BVI from the development of a recreational fishing industry totals more than U.S\$4 million.

An industry such as this one would allow for a more sustainable use of the fish through catch and release fishing techniques, other than just taking these fish to be sold and eaten. With tourism, visitors would be able to appreciate the natural resources of the sea. The problem in developing a local sport fishing industry is that the local fishermen do not have the kind of capital to start their own charter boat business. This, along with other constraints hinders their involvement and without some kind of government help, will continue to do so. What can be done, however, is to market the product to those anglers in the United States who already have their boats and have the resources to come here to fish. With time, enough money should be made to allow other operators to get involved in the industry.

It can be seen from the interviews carried out with these anglers from other countries that the fishing on and around this island is some of the best in the world. Using the information gathered from the questionnaire, the tourism department could come up with ways to target these anglers and market this product to them. With the creation of a real recreational fishing policy, it would be easier for the Fisheries Department to control the way in which humans enjoy the marine environment. This has to be managed and controlled in an all inclusive and integrated fashion, working together with all government departments as well as the private sector in order to make this fishing sector sustainable. The usual worry about development and the environment need not exist at odds with the natural environment. Once everything is in place and this inclusive and integrated movement of agencies and departments begins and continues to make a dedicated effort towards sustainably utilizing the fisheries resources, the long term goal of economic and environmental benefits will be realized. As stated by Ishmael (1991), "Development which can meet economic and social needs will of necessity require...of critical

importance, the need to strengthen and build institutional capability...to ensure that policies and plans can be managed, and implemented...to ensure that such capabilities are sustainable over the long term.”

The advantages of education are many and include increased public awareness, greater opportunities for research, less need for enforcement and the establishment of open channels of communication with those involved with the industry. Getting everyone involved in the decision making process will make enforcement of the laws easier through self-policing.

In the end, information and involvement is the key. The more information gathered, the easier it will be to manage the recreational fishing industry. More research is needed, not only on the environmental effects of developing the recreational industry, but also the social impacts. Studies on fish behaviour and stock assessments are also important to know what laws are to be in place to get optimal use of the fishery, with the least amount of impact. Without proper surveillance and enforcement of the laws, there will continue to be problems within the industry from foreign boats. Without this constant ‘eye’ on the industry, sport fishing may turn into commercial fishing if those anglers do not practice catch and release fishing.

The more people are involved, the more interest put on the industry by government, the higher the possibility for development to occur. The more involved the fishermen are in shaping the industry, the less the need for enforcement, and sustainability would be achieved.

6 REFERENCES

- Abednego, D. and R., Delaney. September 2000. A review of USVI/BVI fishing matters. Conservation and Fisheries Department, Road Town, Tortola, BVI.
- Alimoso, S. and S. Hodge. 1993. An analysis of the recreational fisheries of the British Virgin Islands. Conservation and Fisheries Department, Technical Report 17. Road Town, Tortola, BVI.
- American Sportfishing Association, 2001. Recreational vs. commercial fishing. <http://www.asafishing.org/programs/govtaffairs/msca.htm>
- American Sportfishing Association, 2001. The economic importance of sport fishing: economic data on sport fishing throughout the entire United States. <http://www.asafishing.org/statistics/reports/economicimpact.htm>
- Antia, U., P. Characterization of tournament anglers and charter boat operators in Barbados. 2000. MSc Thesis. University of the West Indies.
- Baether, C. July 1999. "Virgin Waters", Marlin –The International Sportfishing Magazine
- Barbier, E. B. M. Acreman and D. Knowler, 1997. Economic valuation of wetlands: a guide for policy makers and planners. Ramsar Convention Bureau Gland, Switzerland
- Bureau of Economic Research-U.S.V.I. 2000. U.S Virgin Islands annual tourism indicators. Government Development Bank. Charlotte Amalie, U.S Virgin Islands.
- Caangelosi, Allegra, 2001. Economic valuation of environmental benefits. <http://www.nemw.org/ERImisystem.htm>
- Chambers, Jim and Capt. Joseph Franck, 2001. Grandeur Hunting. Big Game Fishing Journal. http://www.geocities.com/Eureka/Vault/8020/grander_hunting.html
- Choi, Vivian C. 2001. *On* The multiplier effect. <http://www.admin.gov.gu/commerce/multiplier.htm>
- Conservation and Fisheries Department. 1997. Fisheries development in the British Virgin Islands: emerging issues. A Technical report prepared for the sub-committee on productive sectors, national development strategy. Road Town, Tortola, BVI.
- Degnan, Bill. 1995. President's Corner: From Jersey coast anglers association newsletter. <http://www.jcaa.org/JCNL9502/9502PRES.htm>
- Development Planning Unit (2001) <http://www.dpu.org>
- Development Planning Unit of the British Virgin Islands. About our country. <http://www.dpu.org/AboutOurCountry/AboutOurCountry.htm>
- Development and Planning Unit, 2000. Tourism statistics for the British Virgin Islands. Ministry of Finance, Road Town, Tortola, BVI.
- Ditton, R. B. and S.R. Grimes. 1995. A social and economic study of the Costa Rica recreational billfish fishery. Department of Wildlife and Fisheries Sciences, Texas A&M University.
- Fedler, A. J. 2000. Participation in boating and fishing: A literature review. Recreational Boating and Fishing Foundation, Alexandria, Virginia.
- Ferrell, D. July, 2001 "St. Thomas", Marlin –The International Sportfishing Magazine.
- Fly Fishing in Salt Waters. 2000. The Bones of the BVI: Uncluttered flats, uneducated fish. Volume 7. Number 1. January 2000.
- Gillis, Kirk S. 1999. An application of metric conjoint analysis in marine recreational fisheries management. Department of Recreation Park and Tourism Sciences, Recreation and Resources Development. Texas A&M University.
- Government of British Columbia. Recreational activities.

- <http://www.bcfisheries.gov.bc.ca/rec/recreational.html>
- Gunderson, Jeff and Glenn Kreag. 2000. Estimated economic impact of recreational fishing on Minnesota waters of Lake Superior. <http://www.seagrant.umn.edu/tourism/impact.htm>
- Ismael, Len, 1991. Urbanization dynamics in the Eastern Caribbean: Focus on the Windward Islands. Butterworth – Heinemann Ltd.
- Lettsome, B. 1997. The recovery/development plan for the BVI fisheries complex. Conservation and Fisheries Department, Road Town, Tortola, BVI.
- Mihailovich, S. 2001, “VG to host Marlin Tourney”., The BVI Beacon, July 26 edition.
- MRAG (1993), Large pelagic fisheries in the Caribbean. Their role in the economics of the UK dependent territories. Marine Resources Assessment Group Ltd. Great Britain.
- Murdock, S. and Md. Nazrul H. 1998. The impacts of future demographic change on the demand for outdoor recreational services in Texas and regions in Texas. A technical report completed as part of "Texas Outdoors: A Vision for the Future" study commissioned by the Texas Parks and Wildlife Department Center for Demographic and Socioeconomic Research and Education Department of Rural Sociology, Texas A&M University System.
- Murgatroyd, L. 1999. Managing tourism and recreational activities in Canada’s marine protected areas: The Pilot Project at Race Rocks, British Columbia. Dalhousie University, Halifax, Nova Scotia, Canada.
- Murphy, B. and W. Willis, 1996. Fisheries techniques. 2nd Edition
- OECS/NRMU, 1998. Fisheries management plan for the British Virgin Islands. Prepared for the Conservation and Fisheries Department.
- OECS Regional Fisheries Management and Development Symposium. OECS situational analysis for the British Virgin Islands. 1999. Conservation and Fisheries Department, Road Town, Tortola, BVI.
- Pomeroy, R. 1999. Economic analysis of the British Virgin Islands commercial fishing industry. ICLARM Caribbean/ Eastern Pacific Office and the Conservation and Fisheries Department, Road Town, Tortola, BVI.
- Shaw, J. 2000. Fisheries environmental management review: Gascoyne region. Fisheries Environmental Management Review No.1. Fisheries Western Australia.
- Steinback, S., J. O’Neil, 1999. Summary report of methods and descriptive statistics for the 1994 Northeast region marine recreational economic survey. <http://www.wh.who.edu/techniques/recurvey/chap1.htm>
- Srivastava, R. 2000. Tourists expenditure. Development Planning Unit, Ministry of Finance, Government of the British Virgin Islands. <http://www.dpu.org>.
- Srivastava, R. 2000. Tourism price index. Development Planning Unit, Ministry of Finance, Government of the British Virgin Islands. <http://www.dpu.org>.
- Sutton, S. 2001. Understanding catch-and-release behavior of recreational anglers. Memorial University of Newfoundland.
- Thailing, C. and R. Ditton. 2000. Characteristics, participation patterns, attitudes, management preferences, expenditures, and economic impacts of Toledo Bend Reservoir anglers: Texas and Louisiana. Department of Wildlife and Fisheries Sciences, Texas A&M University
- The Billfish Foundation Newsletter, Billfish. Foundation begins study of recreational billfish fishing in Puerto Rico. Volume 7, Number 1. April 1993.

U.S Department of the Interior. Natural Resource Information Division, Fisheries Management Program, 1997. <http://www.nature.nps.gov/facts/ffish.htm>
Walters, Randolph. (no date) The sport fishery in the British Virgin Islands. Fisheries Division, Ministry of Natural Resources and Environment, Road Town, Tortola, BVI.

7 APPENDIX 1: RECREATIONAL FISHERMEN QUESTIONNAIRE

The Conservation and Fisheries Department B.V.I, along with the Natural Resource Management Program of the University of the West Indies is conducting a study on sport/game fishing in the B.V.I. The objective of the study is to use the information gathered for possible development of the industry, better management as well as for the planning for sustainable fisheries through interviews about the problems facing the industry and recommendations on what is needed to make the industry develop.

1. What is your age? _____
2. Sex, Ethnic Appearance _____
3. Where are you from? _____
4. Who introduced you to fishing? _____
5. What groups of people do you usually fish with? a) by yourself b) friends c) family d) friends and family together e) other
6. How did you first hear about sport fishing in the B.V.I? _____
7. Comparing sport fishing in other countries you have fished, how would you rate your fishing experience in the B.V.I? _____

QUESTIONS ON FISHING TRIPS (for anglers with their own boat)

8. On average, how often do you go out fishing? _____
9. What is the average total time of a regular fishing trip? _____ hrs.
10. What is the average total catch per trip? _____ fish.
11. What is the average operating cost per trip? \$ _____.
12. Which specie of fish do you target when fishing? _____.
13. Why is this your main target? _____

QUESTIONS ON SPORT FISHING TOURNAMENTS

14. Do you take part in sport fishing tournaments? _____.
15. What type of tournaments do you usually take part in? a) international b) regional c) local deep sea d) other _____.
16. From your personal observation, have you noticed any trends in the level of participation in the sport fishing tournaments? _____.
17. What do you think has contributed to this level of participation?
18. Do you have any suggestions on ways in which participation could be improved?

SUGGESTIONS ON DEVELOPMENT OF THE INDUSTRY

19. Do you have any suggestions on what is needed for the sport fishing industry on a whole to be improved?

20. What do you think are some of the constraints facing the development of the industry? _____
_____.

8 APPENDIX 2: CHARTER BOAT OPERATOR QUESTIONNAIRE

The Conservation and Fisheries Department B.V.I, along with the Natural Resource Management Program of the University of the West Indies is conducting a study on sport/game fishing in the B.V.I. The objective of the study is to use the information gathered for possible development of the industry, better management as well as for the planning for sustainable fisheries through interviews about the problems facing the industry and recommendations on what is needed to make the industry develop.

1. What type of fishing charters do you usually take out? a). deep sea b). inshore

2. What is the average number of times do you go out fishing in a week? _____
3. During which months of the year do you most often spend doing full day charters? _____
4. During which months of the year do you most often spend doing half day charters? _____
5. On an average, how many anglers do you take on a fishing charter? _____
6. Which part of the world do most of you customers come from? _____
7. Through what medium do you often use to promote your business? _____
 - Fishing magazine
 - Newspapers
 - Internet
 - Brochures
 - Other _____
8. What is the ratio of full day as compared to half-day trips taken during the fishing season?

9. What is the average number of fish caught per trip? _____
10. What is your average operating cost for one full day trip? \$ _____
11. What happens to the fish that is caught? _____
12. In what ways do you know of any kind of co-operation or friction between commercial and recreational fishermen?
13. Could you indicate whether you support or oppose the use of these management tools?
 - Release fish below a certain size/ weight _____
 - Being able to keep only a certain number of fish caught per day (bag limit) _____
 - Fishing access restrictions in certain coastal areas _____
 - Not being able to retain certain kinds of species _____

SUGGESTIONS ON DEVELOPMENT OF THE INDUSTRY

14. Do you have any suggestions on what is needed for the sport fishing industry on a whole to be improved?

15. What do you think are some of the constraints facing the development of the industry? _____
