Recreational Carrying Capacity Assessment for Port Antonio

Submitted to the

Tourism Product Development Company Ltd.

SMITH WARNER INTERNATIONAL
COASTAL & ENVIRONMENTAL ENGINEERING

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1. Introduction

1.1. Project Background

With the growing number of visitors to Jamaica over the past decade, there has come an increase in the number of hotels, and the number and variety of water sports offered around the island. Additionally, the growth of the hotel and leisure watersport industry throughout the country has had a significant impact on the coastal and marine ecology of several of our resort areas. This has also had impacts on safety, with reports being made of frequent marine accidents. In fact, for the period January 2001 to December 2003, 43 watersports-related incidents were reported. These issues have the potential to negatively affect tourism in Jamaica.

The Maritime Authority of Jamaica (MAJ) in conjunction with the Ministry of Industry and Tourism along with other concerned agencies is interested in streamlining the management of leisure water-sporting activities, and to integrate this into an overall framework for inter-sectoral management of tourism products, coastal environmental health and marine safety. As such they have commissioned a study, to be coordinated and managed by the Tourism Product Development Company (TPDCo), *to determine the capacity and safety in marine recreational areas in Jamaica*.

In November 2004 TPDCo contracted ***Smith Warner International*** to carry out the desired capacity and safety studies in six designated areas around the island, as follows:

1. St. Ann to St. Mary (including Ocho Rios, Tower Isle to Mammee Bay Point, Runaway Bay and Discovery Bay);
2. Negril (Bloody Bay to Norman Manley Sea Park);
3. Port Antonio (East and West Harbours);
4. Montego Bay (Bogue Lagoon to Rose Hall Beach);
5. Kingston (Lime Cay to Port Royal); and
6. St. Elizabeth (Black River up to Broad River).

1.2. Project Objectives

There are five (5) primary objectives for the overall capacity and safety study. These are to:

I. Establish optimum capacity(ies) for water sports operations in Marine and Riverine Recreational Areas islandwide;

II. Provide guidelines for the delimitations of zones for water sports activities in the determined focus locations, especially in Marine Parks;

III. Document the environmental impacts of the water sports on the focus areas;

IV. Provide guidelines for the overall development of water-sports activities in Jamaica in relation to safety, security and marine/riverine pollution prevention; and

V. Recommend better environmental management systems for the marine protected areas.

Additionally, the TPDCo is interested in determining the potential impact of zoning and leisure-craft regulations on the tourism product (visits by tourists to the island) and as such requires that a marketing study be done to ascertain such information and to guide the development of marketing and promotions pertaining to regulated water sports activities.

1.3. Document Objectives

This document conveys the findings and recommendations for one of the six locations studied, *Port Antonio*. The information presented in this report has been obtained through desk review, and field investigations[1], and is offered to assist decision-makers in formulating policies and regulations to ensure safety and environmental health in Port Antonio. The recommendations outlined are intended to be used as tools in the evaluation of options for minimizing user conflicts, incidents and environmental concerns in the locations studied in Port Antonio. Further information on the overall development of water-sports activities in Jamaica in relation to safety, security and marine/riverine pollution prevention will be presented in the Final Report for the overall Capacity & Safety study.

This report addresses the following:

- The nature and extent of watersporting activities in Port Antonio.
- The recreational carrying capacity of East and West Harbours in Port Antonio.
- The characteristics of the Port Antonio watersports market.
- Recommendations and a summary of the findings.

[1] Site visits made on January 17 and 21, 2005.

2. Site Description – Port Antonio

2.1. General Description

The town of Port Antonio is situated on the north-east coast of the island nestled between the Blue Mountains and the Caribbean Sea. The town spans two distinct bays, East and West Harbour, which are separated by the Titchfield Peninsula. For the purpose of this study the area considered spans from Bryan's Bay (Nose Point) in the west, to Folly Point in the east, and includes Navy Island located to the north of the West Harbour (Figure 2.1).

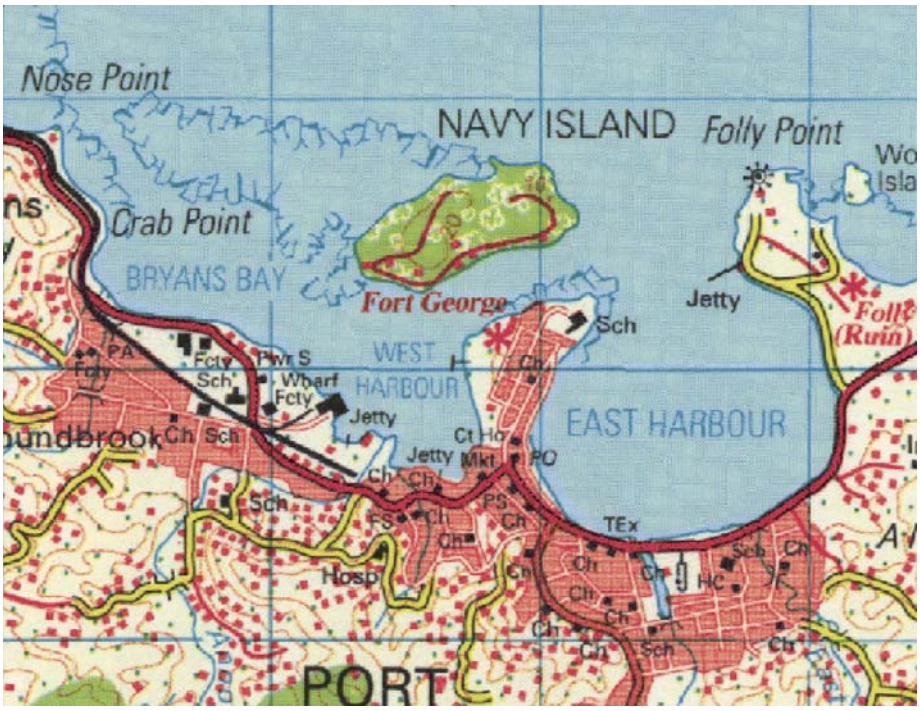

Figure 2.1 Map of the study area in Port Antonio

West Harbour and Navy Island

East Harbour

The West Harbour is the hub of most of the water-based activity of the town, accommodating two marinas, the cruise-ship pier, the boundbrook pier (commercial activity) and fishing beaches. By contrast, the East Harbour has little water-based activity with the exception of an extensive fishing beach.

The management of the shipping channel and the general activities in both harbours are managed by the Port Authority of Jamaica.

2.2. Water Sports Activities

2.2.1. Nature and Extent of Watersports Activities

There is very limited watersport activity in Port Antonio. From observation the watersport on offer is limited to SCUBA diving by **Lady G'Diver** from the Port Antonio Marina at West Harbour.

Dive Boat Leaving the Port Antonio Marina

Lady G'Diver offers dives twice per day at 11:00 a.m. and 2:00 p.m. The operation has one single engine vessel power boat and two smaller single engine canoes (one marked as a rescue boat). The operation also offers certification for those wishing to learn SCUBA diving. The operation has only recently (December 2004) moved to the marina (previously located in San San, Portland). Dive site locations are outside of the East and West Harbours in the vicinity of San San and north of Navy Island.

There is at least one power boat which offers deep sea fishing. *La Nadine* is berthed at the Port Antonio Marina but there was no further information available.

The 'old' Port Antonio Marina is the traditional venue for the staging of the Sir Henry Morgan Anglers Club Marlin tournament, usually held in October. At that time of year the area is very busy with local and overseas sport fishing boats.

The 'Old' Port Antonio Marina

Interviews held with a variety of persons indicate that the use of the harbours for watersport, inclusive of jet-skiing, is extremely limited. Jet-skiing seems only to be carried out by persons from Kingston who bring their own watercraft.

From an interview held with the manager of the Port Antonio Marina it is apparent that there will be an increase in the number and types of watersport (parasailing, jet-ski tours, sunfish sailing, kayaking) offered in the area.

2.2.2. Watersports Operators

Information obtained from TPDCo (subsequent to the submission of the Inception Report for this study) indicated that there is only one licensed watersport operator, Lady G'Diver. During the field assessment there was no evidence of other watersport services being offered for hire. It is however believed that there are 2-3 power boats which may from time to time offer deep sea sport fishing.

2.2.3. Water vessels

Information obtained from the Maritime Authority of Jamaica (MAJ) indicated there are two (2) motorized vessels registered in Port Antonio for tourism purposes. The Fisheries Division has 34 fishing boats registered in Port Antonio. However, during the field observations, a total of 89 vessels were observed in the study area. These are presented in Table 2.1 following.

Table 2.1 Vessels observed in study area

Location	*Type of Vessel*	*Number*	*Notes*
East Harbour	[2]Yacht (*Whimsie*)	1	Anchored in north eastern extent of the harbour
East Harbour Fishing Beach	Dug out canoe	2	Propelled by oar/paddle
	Fibreglass fishing canoe	18	Told that 25-30 boats berth there
	Fibreglass fishing canoe	4	In disrepair on land
	Large canoe	2	One on land in disrepair, one in the sea
West of East Harbour Fishing Beach	[3]Fiberglass canoe	6	
	Dug out canoe	1	Propelled by oar/paddle
PA Marina	Small power boat	6	2 were Marina Police boats
	Power boat	2	
	Yacht	8	
Old PA Marina	Yacht	1	
	Power boats	4	
Marina Fishing Beach	Fibreglass Canoe	16	12 in the water
	Fibreglass Canoe	4	In disrepair on land
Boundbrook Fishing Beach	Fibreglass Canoe	14	
Total		**89**	

2.3.Maritime Safety

2.3.1. Safety Procedures

There were only five vessels observed underway in the harbours. Two of these vessels were incoming (through the channel) and proceeded at relatively high speeds. Other vessels were operating at much slower speeds, especially when departing berths in the

[2] Yachts include both motorized and sailing vessels.
[3] Fibreglass canoes are considered as motorized vessels.

harbour. Vessel traffic was minimal and it cannot be said that within that context that any conduct was unsafe.

2.3.2. Rescue Boats

The only rescue boat observed belonged to the Lady G'Diver operation. On January 17 it was seen on a trailer on land, while on January 21 it was seen berthed at the Port Antonio Marina.

Lady G'Diver rescue boat at PA Marina

2.3.3. Traffic Patterns

Traffic inbound to West Harbour is traditionally from the east in the channel between Titchfield Peninsula and Navy Island. Traffic outbound from the West Harbour follows the same channel. There is relatively little traffic coming into the West Harbour from the west, and this is limited to fiberglass canoes coming from Bryan's Bay.

No observations of traffic were noted in the East Harbour.

2.3.4. Swimming

Swimming or rather wading occurs sporadically along the coastline of both harbours and the beach at Navy Island with the only formal site being the Ken Jones Pier Beach in the West Harbour. The swimming area for this beach is clearly marked, and signs are posted to indicate the non-swimming areas, and the times allowed for swimming.

2.4.Environmental Conditions

The study area falls within the proposed Port Antonio Marine Park. The design and management of the park was proposed in 1998 by the Portland Environment Protection Agency (PEPA), however the approval of this protected area by the National Environment and Planning Agency has yet to happen, and so there are no legislated or recognized environmental management initiatives for the general study area. However, the Port Antonio Marina is a pilot Blue Flag location.

The Blue Flag Campaign for beaches and marinas is a voluntary programme intended to provide identification of certified environmentally-friendly and safe beaches and marinas. The Campaign is owned and run by the Foundation for Environmental Education (FEE), a not-for-profit non-governmental organization based in Denmark.

The concept of the Blue Flag began in France in 1985 and was formalized throughout Europe in 1987. The Blue Flag is now flown in over 29 countries, and the Campaign has proven to be an effective environmental management tool especially regarding water quality standards, safety standards and environmental advocacy through education.

The Caribbean Blue Flag programme was established in 2001 and formalized in 2002, and is currently operated by a consortium comprised of the Caribbean Conservation Association (CCA), the Caribbean Tourism Organisation (CTO) and the Caribbean Alliance for Sustainable Tourism (CAST).

The award of the Caribbean Blue Flag is based on compliance with more than 20 criteria, covering the following categories:

1. Water Quality
2. Environmental Education and Information
3. Environmental Management
4. Safety and Services.

Among the requirements and responsibilities associated with flying the Blue Flag, the annual certification requires these facilities to do the following:

Water Quality

- Compliance with requirements and standards of Class I Waters as defined by the Protocol Concerning Pollution from Land-based Sources and Activities.
- No direct discharge of industrial, sewage effluent or storm water to the beach.
- Monitoring of the health of coral reefs located in the vicinity of the beach.

Environmental Education and Information

- Information about bathing water quality should be prominently displayed.
- Information about sensitive environmental resources should be available.

Environmental Management

- Environmental management of the beach taking into account sensitive species and habitats must be carefully planned and enforced.
- All buildings and equipment of the beach must be properly maintained.
- The entire length of the beach must be clean.

Safety and Services

- An adequate number of trained lifeguards and lifesaving/first aid equipment must be available at the beach.
- There must be management of different users and uses of the beach so as to prevent conflicts and accidents.

2.4.1. Land Based Pollution

The main land based sources of pollution to the harbours include nutrients, solid waste (floatables) and also sediment from the rivers and gullies. This pollution is worsened during periods of heavy rainfall. Other sources of pollution result from poor waste management practices at the fishing beaches (solid waste, sewage, fish offal, fishing equipment-maintenance) and at the Titchfield High School (solid waste).

Garbage on Titchfield Peninsula

Floatables in East Harbour

2.4.2. Ship source pollution

Potential for sewage, oils etc to arise from any vessels in the harbours. As a Blue Flag Pilot Marina, the Port Antonio Marina should encourage good practices.

2.4.3. Refueling

The refueling of vessels was observed to occur in three ways:

- at the Old Port Antonio Marina where vessels may pull alongside the fuel pump,
- by truck and manually at the Port Antonio Marina,
- and manually at the fishing beaches (the Boundbrook Fishing Beach has a Fisheries Division depot onsite).

3. Carrying Capacity Analysis

3.1. The Concept of Carrying Capacity

The term carrying capacity is derived from ecological science, where it represents the number of organisms that the physical and ecological resources of a given area can support in a particular period of time. A similar meaning has been given to the term which has been adopted by various other disciplines, among them tourism management and recreational management.

3.1.1. Tourism (Visitor) Carrying Capacity

In the tourism industry, carrying capacity refers to the number of people who can use a given area in a particular period of time without an unacceptable alteration to the physical environment. For coastal and marine destinations the determination of tourism/visitor carrying capacity has typically been associated with marine protected areas (MPAs), and has addressed the number of visitors that can be accommodated at a particular site each year without an unacceptable impact on the physical and ecological resources.

Strictly speaking, the visitor carrying capacity is a determination of the maximum number of people that can be accommodated in a given area at a given time. It asks the question *'How many visitors is too many*?'. For example, how many divers can be accommodated at a coral reef location each year without causing an unacceptable change to the reef system? Conducting such carrying capacity assessments often proves challenging given the difficulties of measuring 'unacceptable impact'. This requires knowing what amount of change to the reef is acceptable, which itself necessitates substantial data, and the findings can be quite controversial.

Giving consideration to this limitation of measuring 'unacceptable impact', a basic formula for calculating tourism (visitor) carrying capacity was developed by the WTO and UNEP in 1992. The equation is:

Visitor Carrying Capacity = Area used by visitors ÷average individual standard

The average individual standard, measured in unit area per person, is the space a visitor requires for an acceptable experience at the location. This is therefore a subjective value, and is dependant on a number of factors including: the type of area, the activities undertaken and the management initiatives at the location. However, while acceptable experiences are subjective, measuring them is less difficult and controversial than measuring unacceptable impact.

This approach to determining visitor carrying capacity is more in keeping with the concept of **Limits of Acceptable Change** (LAC). The determination of LAC does not itself provide a 'carrying capacity' in its strict sense, but it provides a set of conditions, (biological, physical and social) that are deemed to be appropriate by resource managers. The determined limits are intended to reflect values, preferences, science, policy and public input, and can be maintained through a variety of policies. The LAC

can therefore still answer the question, '*how many visitors is too many*?', and often leads to a management approach that involves resource use zoning.

3.1.2. Recreational Carrying Capacity

With respect to recreational management, such as is applied in terrestrial parks and on rivers and lakes, the term carrying capacity is used to indicate the number of vessels/ entities that can be operated within a defined location without compromising safe recreational use, aesthetic enjoyment, and/or environmental quality (Progressive AE, 2001). Some typical recreational carrying capacity studies assess the number of kayak entities that can occupy a waterway, or the number of water vessels that can operate on a lake at a given time without negatively affecting safety, aesthetics and/or environmental quality on the waterway or the lake. Essentially, such recreational carrying capacity assessments aim to answer the same general question *'how many is too many'*?

The general equation for determining recreational carrying capacity is as follows:

Recreational Carrying Capacity = Area suitable for recreation ÷ Desired density.

Desired density, measured as the number of vessels per unit area, is the space required for each vessel in order to promote safe use, aesthetic appeal and environmental quality. Similar to the average individual standard used in tourism carrying capacity determinations, the desired density is a subjective value, and is dependant on a number of factors including time, location, activities offered and management approaches. The concept of recreational carrying capacity, like visitor carrying capacity, is as much perception as it is science (Mahoney and Stynes, 1995).

3.2. Determining Recreational (Boating) Carrying Capacity

In the context of marine recreational areas and for the purpose of this study, carrying capacity can be defined as the number of vessels that can be operated in a given location without compromising safe, recreational use, aesthetic enjoyment and/or environmental quality. Calculating recreational carrying capacity can be done according to the abovementioned formula. For example, in a location with an area of 100acres suitable for recreation, and a desired boat density of 10acres/boat, the recreational carrying capacity is as follows:

Recreational Carrying Capacity = $100m^2 \div 10\ m^2$ boat = 10 boats

Such a location could accommodate 10 boats at a time safely without compromising aesthetics or environmental quality.

In order to determine the area suitable for recreation and the desired densities, the following parameters need to be ascertained:

1. The **physical characteristics** of the location, including the available water surface area, the maximum depths, the mean depths, and the shoreline accessibility. This can be done from charts, maps, aerial or satellite photography.

2. The **use characteristics** of the area such as the number and types of vessels. This can be obtained from licensing records and field surveys.
3. The **usable water area.** This is a determination of the areas that can safely accommodate water-based activities. Areas that are too shallow, too rocky, have strong currents, are shipping channels etc., may be deemed not-usable, and should be subtracted from the total available water surface.
4. The **desired vessel density**. This is the most subjective component of the capacity study. In previously conducted studies, the desired densities have been determined through:
   - analysis of spatial requirements of different boat types;
   - requirements for safe vessel operation; and
   - social research (through surveys) that ascertained the user groups, their perceptions of crowding, and acceptable levels of change to the environment.
5. The **use rate**, to note the differences between typical and peak use times.
6. The potential **environmental impacts,** with an awareness of the ecology of the area, and the threats to the sensitive organisms and areas.

Essentially, no conclusive studies have been done that answer the general question: *How many vessels is too many?* There is therefore, no single standard that can be applied in all situations for the desired boating density. This can be attributed to the fact that, ultimately, recreational capacity decisions are about people's access to recreational opportunities and the quality of their experiences (Chilman). Each location is different, and users will have different perspectives on *what is too many vessels*.

Nonetheless, the few studies that have been done with the objective of determining optimum boating densities, have come up with ranges of acceptable boating densities, based on user groups, activities, safety, and user perceptions. These are summarized in Table 3.1.

Table 3.1 Summary of Optimum Boating Densities

Source	*Recommended Density*	*Uses Prescribed*
Jackson et al, 1989	20 acres/boat (81,000 m^2/boat)	Waterskiing & Motor Cruising
	8 acres/boat (32,000m^2/boat)	Kayaking & Sailing
	10 acres/boat (40,500 m^2/boat)	All uses combined
Duke Power, 1999	4 acres/boat (17,000 m^2/boat)	Fishing, Sailing & Jet Skiing
	1 acre/boat (5,000 m^2/boat)	Canoe/Kayak
	9 acres/boat (36,000 m^2/boat)	Motor Boating
	12 acres/boat (49,000 m^2/boat)	Water Skiing.

3.3. Carrying Capacity Analysis for Port Antonio

3.3.1. Assumptions

Research has shown that with increasing density of boats, the potential for negative impacts increases. However, despite a growing interest in recreational carrying capacity and recreational boating management, only a few scientific studies have been done to determine ***optimum (desired) boating densities***. These studies have primarily been conducted for lake environments, and no studies on recreational carrying capacity or optimum boating densities are known to have been conducted for marine/coastal environments.

Given the lack of a precedent marine recreational carrying capacity study, some assumptions have been made in conducting this recreational carrying capacity assessment. These are as follows:

1. The spatial constraints of an enclosed lake environment can be simulated in the marine environment, by setting a seaward boundary for the location.
2. The ranges of desired boating densities determined in lake based studies can be applied to marine locations, given that the activities are of a similar nature (e.g. fishing, water skiing, cruising, jet skiing etc.). These are presented in Table 3.1

3.3.2. Area suitable for Recreation

The area suitable for recreation in Port Antonio has been estimated using the 1:50,000 (metric) topographic maps commissioned by the Government of Jamaica (1984) and the CYC chart No. 458 (1:7500 scale), and by setting the outer, seaward boundary for the area from Bryans Bay (Nose Point) to Folly Point, including Navy Island, as shown in Figure 3.1 following by the red line.

Using the CYC chart, the water surface area of the study location is approximately 1,810,000 m^2. The non-usable area of water which has been determined to include the reef areas, the navigation/shipping channel and a 100m coastal buffer for berthing, anchoring and safe approach to port, is estimated to be 780,000 m^2. This leaves an estimated 930,000 m^2 as water area usable for recreational purposes (Table 3.2).

Table 3.2 Area Suitable for Recreation

	Total Water Area (m^2)	*Non-usable area (m^2)*	*Usable Area (m^2)*
West Harbour	860,000	460,000	400,000
East Harbour	950,000	320,000	630,000

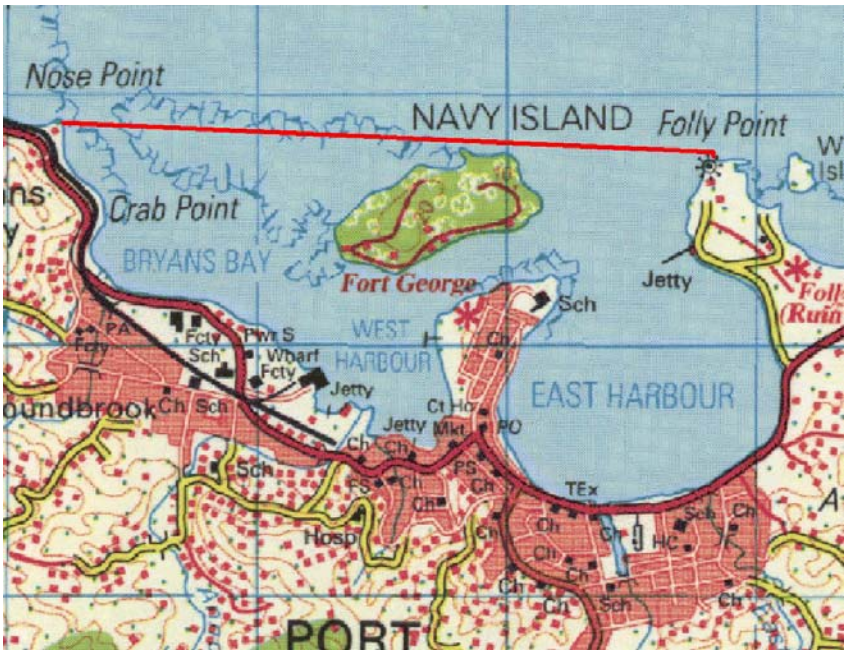

Figure 3.1 Seaward Boundary of the Study Area

3.3.3. Use Characteristics

Based on the desk review and field observations, the following table presents the types of vessels in use in Port Antonio (a summary of Section 2.2.3).

Most of the vessels registered in this area, berth there and only use the harbours when traveling out to and in from the open sea. It is not likely that there will be this many vessels in the harbours at one time, unless:

- There is a special event such as the annual marlin tournament when there will be a greater number of vessels traveling through the harbours. This will be an increase in traffic in the harbours, but not necessarily an increase in the recreational use of the harbours.
- There is an increase in the offering of watersporting activities, such as is proposed by the PA Marina.

Table 3.3 Vessel Use Characteristics

Vessel Type	*Number of Registered Vessels*	*Number of Observed Vessels*
Yacht	-	10
Fishing canoes	34	67
Powerboat	2	12
Total	36	89

3.3.4. Desired Density & Recreational Boating Capacity

Based on some of the previous studies done (Table 3.1) to determine optimum densities for lake conditions, a desired density of 10acres (40,500m^2) of water surface per boat has been selected as a conservative, combined density for all types of boating activity.

Applying the equation for recreational carrying capacity (Section 3.2), the boating (vessel) capacity for West Harbour and East Harbour have been calculated, and are presented in Table 3.4 following.

Table 3.4 Combined Use Vessel Carrying Capacity for Port Antonio– Study Area

	Usable Water Area	*Optimum Boating Density (combined use)*	*Carrying Capacity (CC) for combined use*
West Harbour	400,000 m^2	40,500m^2/vessel	9 vessels
East Harbour	630,000 m^2	40,500m^2/vessel	15 vessels

Based on this calculation, the study area can accommodate a total of 24 motorized and non-motorised vessels combined, without compromising safe, recreational use, aesthetic enjoyment and/or environmental quality. This is well within the number of vessels that were observed in operation, although it is significantly lower than the number of vessels observed berthed in the area.

3.3.5. Constraints

As mentioned previously, recreational carrying capacity is as much perception as it is science. The determination of the carrying capacity for water vessels in Port Antonio was done based on the assumptions presented in Section 3.3.1, and with several constraints. These include:

- **The short duration of the study period**. The single field observation (two days) facilitated through this study does not allow for a true assessment of vessel use patterns or density over time. No comparison can be made between the average use periods and the peak use periods.
- **The lack of site-specific user information**. Without the conduct of a 'perception' survey, there is no way to truly develop a site-specific optimum boating density for Port Antonio. The social survey designed into this study is a marketing survey and addresses more the watersports market profile, and not so much the perceptions. Furthermore, this social survey is too small a sample size to develop a true picture of the user perceptions of safety and aesthetics on the water in Port Antonio.

Given these limitations to the carrying capacity assessment, the findings (vessel numbers) presented in Section 3.3.4 should be used as guides, and not definitive or finite figures.

A more comprehensive carrying capacity assessment could provide a location-specific study that would provide the necessary information on perception and actual use areas and patterns, and would therefore provide a more exact assessment of recreational vessel capacity in Port Antonio. The number of each type of vessel that could be accommodated based on demand and optimum density could then be determined, and used to further guide the licensing of watersporting activities. Such a study would require the following:

- Developing a profile of recreation users through on-site and mail surveys. This will enable the measurement of visitor expectations, perceptions of existing conditions, and satisfaction and opinions of shoreline management.
- Measuring recreation use patterns, with the aid of aerial and ground counts, over an extended period of time, to account for peak and low use periods.

4. Marketing Analysis

4.1. Background & Methodology

A marketing analysis was conducted in the study area in order to determine the following:

- The current level of participation in water sports in Port Antonio.
- Whether or not what was being offered in the water sports industry was what was in demand by visitors to the island.
- Whether or not the water sports operators were providing enough services to fill the needs of current and potential participants.
- Whether or not the quality of the water sports services offered made Jamaica a true competitor in the water sports industry.
- Whether or not there was space for improvement of water sports services and protection of marine and riverine areas through regulation.
- What marketing strategies would be useful in encouraging interest in Jamaica as a water sport destination?

In conducting the market survey, a questionnaire was drawn up, with emphasis placed on obtaining the views of participants in water sport activities in Port Antonio. Independent, non-focused interviews were conducted with water sport operators and stakeholders in the focus areas to get a feel for the context within which the data was being gathered.

A questionnaire consisting of 11 questions was developed, some of which were split into 2 or more sections, using the objectives of the study as a guideline. With consideration of the expected unwillingness of tourists to spend vacation times completing a lengthy survey more closed-ended than open-ended questions were included. The questionnaires contained 4 biographical questions, and 7 others geared towards gleaning information on the above bullet points.

The questionnaire was pilot tested among foreign nationals residing in Jamaica and who frequently participate in water sports, to test its level of 'user-friendliness'/ appropriateness, inclusive of:

- logical sequencing of questions;
- ease of comprehension of questions and instructions; and
- possible resistance to unforeseen implications of questions.

These completed surveys and the individuals' personal assessments were discussed to see whether the intended meaning of the questions was clear, and if their responses were typical of what could be considered useful for this exercise. A copy of the survey instrument is presented in Appendix I.

A two (2) person team implemented the surveys in Port Antonio. Respondents were approached randomly in the vicinity of water sports facilities, and were screened only to

see if they had already participated in water sports while in Jamaica. The researchers were not required to survey tourists only.

Only the East and West Harbours of the Port Antonio Marina were surveyed. The Marina is the new location of the only water sports operator in Port Antonio, Lady G Divers, which had just relocated from the Blue Lagoon. Introductions were made to Ms. Lee, the owner, who explained that the seas were rough and all the dive trips for the day had been cancelled. The Marina was sparsely populated with only a few persons who were staying at private villas and hotels in the area, and those who were resident on the yachts docked there. A total of 20 surveys were administered and 19 returned from the East and West Harbours in Port Antonio.

The responses were coded, entered on the Statistical Package for Social Sciences (SPSS) and analysed. Bar and pie charts were used to graphically depict relevant information. A calculation of margin of error is not appropriate due to the qualitative nature of the data. The term missing is used by SPSS to indicate an unanswered question.

4.1.1. Constraints

In completing data collection, a number of difficulties surfaced.

1. While the questionnaire was tested among visitors, some of the questions appeared to be challenging when taken out into the field. For instance, question 3 asked the respondent to indicate nationality, and quite a few respondents understood the question to be asking their racial background. Anecdotal evidence suggests that American tourists have a similar difficulty when completing the Jamaican Customs and Immigration forms.
2. Tourists are most readily available during late morning to late afternoon, severely shortening the time in each day which can be dedicated to surveying. Time allotted the team to complete both research and report of analysis did not allow for proper canvassing of visitors.
3. Tourists are generally unwilling to complete questionnaires or submit to any surveys while on vacation. As with any written survey, great care had to be taken to insure that respondents were not simply writing in *ad hoc* responses in order to be done with the exercise. However another dimension was added by the prevalence of 'touts' in tourist areas, as prospective respondents immediately assumed that researchers were attempting to sell something, and rebuffed all attempts at communication.

As this forms the first part of the research effort, it is possible to remedy these difficulties in future sampling drives. Primarily, sampling must take place over a longer time period in order to mitigate the negative effects of the idiosyncrasies of a visiting and itinerant sample population.

4.2.S.W.O.T. Analysis

Port Antonio is well known as the meeting place for the world's rich and famous. Its appeal being the laid back atmosphere mixed with old world style. Once a British naval stronghold, this region of the island is popular with filmmakers for its rich historical value. The island's first hotel (Titchfield Hotel) was located here and today, Port Antonio is popular with serious minded sport fishers and lovers of eco-tourism.

Strengths

- Rich historical background.
- Environmentally protected area (Blue Mountain/John Crow Mountain National Park) along with Port Antonio Marine Park (Proposed).
- World-renowned Rio Grande River (rafting purposes) and Blue Lagoon (diving).
- Numerous dive sties (approx. 30) within close proximity to shore line.
- Recent Blue Flag accreditation of the Marina.
- Undamaged reef and variety of marine life.
- No visible signs of harassment or illegal water sports operators.
- Harbour noted for providing secure anchoring.
- More than half of the total water area (approx. 1,030,000 m^2) is suitable for recreational purposes (i.e the East and West harbours combined).

Weaknesses

- Port Antonio is perceived as the least accessible region in Jamaica due to its mountainous terrain and poor conditions of the main access roads and the closure of the local aerodrome.
- Demand for water sports is low.
- Harbor is too shallow to accommodate large cruise vessels.
- Insufficient and inadequate support systems (tours, food and beverage outlets and attractions.)
- Minimal number of environmentally conscious stakeholders.
- In spite of Blue Flag accreditation, the proposed design and management of the Port Antonio Marine Park submitted by Port Antonio Environmental Protection Agency (PEPA) has not received approval from NEPA resulting in lack of legislated or recognized environmental management initiative for the study area.
- Lack of decompression chamber in this region.

Opportunities
▪ Development/improvement to the Port Antonio Marina ideal for mooring of private yachts. ▪ Potential to establish, implement and enforce environmentally sound policies and guidelines for stakeholders is great. ▪ Targeting different niche markets (Surfers, underwater trekking and submarine tours) for this region of the island. ▪ Development of support systems sufficient and suited for the clientele would create employment opportunities and positively impact economic growth of this region. ▪ Plans by public and private sector organizations to have Port Antonio the first designated "Green Destination" on island.
Threats
▪ Impact of inclement weather on accessibility by road into this region. ▪ "Survival type" economic activity (e.g. illegal logging and sand mining) over sustainable economic activity may negatively impact the environment.

4.3.Findings of User Survey

The following is a presentation of the information gleaned from the survey conducted in Port Antonio.

Nationality
▪ American - 11 ▪ German - 3 ▪ Jamaica - 1 ▪ Norwegian - 3 ▪ French - 1
Gender
Of the persons interviewed in Port Antonio: ▪ 10 were male, and ▪ 9 female.

Age Group
Port Antonio generally attracts a more mature age group. ▪ Ages 16 – 25 years- 1 persons ▪ Ages 26 – 35 years- 4 persons ▪ Ages 36 – 45 years- 7 persons ▪ Ages 46 – 55 years- 3 persons ▪ Over 56 years - 4 persons
Motivation/Attitude
Water sports were a major determinant in why visitors to the area chose Jamaica, factoring in 84% of the responses: ▪ 31.6% water sport (6) ▪ 21.1% scenery and water sports (4) ▪ 21.1% culture, scenery and w/sport (4) ▪ 10.5% all (2)

4.4.Market Size & Potential for Growth

Though there have been some investments and increase in room nights, Port Antonio has not had significant growth. Of the persons questioned the majority of persons (84%) stayed a minimum of seven (7) nights.

Number of Visitors (December 2004): 1,976 persons

Potential Revenue from water sports: USD 49,7952 – 435,708

There is a range of accommodation offered in Port Antonio, as presented following.

	Units				Rooms			
	2000	2001	2002	2003	2000	2001	2002	2003
<50 rooms	13	13	13	12	227	227	224	210
51 – 100	2	2	2	3	170	170	170	222
101 – 200	0	0	0	0	0	0	0	0
>200 rooms	0	0	0	0	0	0	0	0
Total Hotel	**15**	**15**	**15**	**15**	**397**	**397**	**394**	**432**
Guest Houses	34	42	42	43	244	279	279	285
Resort Villas	97	98	98	98	259	264	264	264
Apartments	1	1	1	1	10	10	10	10
TOTAL	**147**	**156**	**156**	**157**	**910**	**950**	**947**	**991**

- Source: JTB Tourism Statistics 2003 Table 25
- The Jamaica Tourist Board in consultation with the Tourism Product Development Co. has removed some accommodation from the current listing because they either have remained closed over an extended period of time or are no longer being used as a tourist accommodation.
- The Guesthouse accommodation category since 2001 includes properties that offer Bed & Breakfast facilities.

It is reasonable to conclude that the area has potential for further development of water sport activities, as in its current state Port Antonio attracts visitors to the area for that reason. Despite the fact that some of the attractions in Port Antonio were closed i.e. Blue Lagoon and Reich Falls, those interviewed did not express dissatisfaction with the activities available. The team observed that the majority of the respondents appeared to have greater levels of disposable income given the large and well-appointed yachts in evidence.

Combined with the information on age group, this suggests that Port Antonio may be marketed as a destination for the more affluent, mature, and sedate visitor with a less hectic pace.

For Port Antonio to be successfully marketed and advertised as a niche market for scuba and water ski enthusiasts, it will need the following:

1. increase in room capacity;
2. additional water sports facilities.

Port Antonio has only one (1) water sports operator who has been operating in the area for over 25 years (Lady G Divers) and has established a loyal clientele which possibly account for the many repeat visitors.

4.5. Watersports - Competition for Jamaica

Jamaica is subject to competition from within and from other destinations. Within the Jamaican market, competition is primarily between the marketing regions. There has been a marked difference in the water sporting needs of visitors to the island within the last twenty (20) years. Client expectations have shifted from the glass bottom boat rides, snorkeling and diving and now include Aqua-cycles, Hobie cats, Jet-skis/Wave runners and Para-sailing. Independent water sports operators are a "dying breed" since the larger (all-inclusive) resorts commenced operating water sporting facilities rather than outsourcing the department to sub-contractors. Initially, these independent water sports operators would use the resort as a base and were able to attract guests from villas, guest houses and smaller hotels. They are now however, marketing and selling the same products which are now already included in the all-inclusive packages. Independent operators concentrated on niche marketing at dive shows instead of one of the numerous offerings of an all-inclusive package.

Since January 2005, the Sandals chain has moved away from including SCUBA diving in the package. The once included Resort training (Introduction to SCUBA) is now available at a surcharge (US$70 per person) with an additional US$180 for persons wishing to be certified internationally (PADI). Of note, is the fact that one of their resorts has experienced a thirty percent (30%) increase in persons taking the certification course. Currently this resort offers between three (3) to five (5) dives per day in addition to training dives and the increasingly popular night dives. A maximum number of certified divers who this resort takes out daily are 15 – 20 persons. The increased growth in demand is most likely due to increased promotion/marketing of this revenue earner on resort by resort personnel.

Turks and Caicos, the ABC islands (Aruba, Bonaire, Curacao), the Cayman Islands, Cancun and St Lucia are five (5) of the primary regional destinations. Turks and Caicos' development is primarily due to water sporting (SCUBA diving in particular). The ABC islands and Cancun also heavily market water sports as their primary attraction. A local Dive Operator with over 20 years diving is of the view that the offerings of the above referenced destinations pale in comparison to the wonders to be seen in Jamaica's waters. Most lack variety and safety requirements are lacking.

4.5.1. Key Success Factors

The following factors would be essential to any efforts to effectively market Jamaica as a water sport destination:

- Effectively segment the tourism market and target water sporting enthusiasts
- Position Jamaica as a choice water sport destination offering a variety of water sporting activities blended with culture and eco-tourism
- Educate and change the mind-set of local stakeholders to the benefits of sustainable tourism development

4.5.2. Critical Issues

Tourism is the world's largest industry with eco-tourism its fastest growing sector. The possibility of water sport developing as another niche market for Jamaica's tourism is encouraging. Environmental degradation and pollution, harassment, limited growth potential due to space limitations in marine traffic areas, inadequate and insufficient support systems, and lack of enforcement of regulations have been cited as critical factors which could negatively impact this development.

Jamaica as a destination is still considered one the most exciting within the Caribbean. The combination of climate, geography, culture and activities provides strong competitive advantage over the destinations (in the Caribbean). The perception of crime is the significant drawback.

To ensure a viable product, a clear and concise marketing strategy must be developed which addresses these critical issues.

With the proper marketing, there is potential for water sports to grow as another niche market in Jamaica.

4.5.3. Macro-Environment

Sociological -World wide, values are constantly changing among different population sectors. Across sectors, people are seeking a better quality of life and self-reliance. Populations are aging as a result of improved health and declining birth rates and trends indicate significant changes in family structure. These changes have brought about adjustments in the process of acquiring customers and how customers close purchase decisions.

Economical – Jamaica is a key member of the Caribbean Common market (CARICOM), which is strategically located 1,000 miles from the United States of America (USA), the world's richest market place. The economic policies of Jamaica encourage foreign investment in areas that earn or save foreign exchange, generate employment and use local raw materials. The government provides a wide range of incentives to investors, including remittance facilities to assist in repatriating funds to the country of origin; tax holidays which defer taxes for a period of years; and duty-free access for machinery and raw materials imported for approved enterprises. (www.investjamaica.com).

The recent granting of approved tourist destination to Jamaica by China (February 2005) will facilitate a development of China's outbound tourist market while ultimately reducing the island's dependence on the more traditional markets (namely USA which presently accounts for 72% of visitors to the island).

The current development of the West Harbour in Port Antonio has now created modern facilities for the boating and sailing fraternity. This coupled with the proposed development of a ferry system to facilitate large cruise ship stops in Port Antonio will ensure that Port Antonio will be on the itineraries of the ever-expanding market of

recreational boating. (www.portland-coc.org). This can be the catalyst to Portland regaining its position of a top Caribbean exclusive destination.

Political – Jamaica has one of the most stable democracies in the world. This is important especially to a sector such as tourism. A stable political environment will encourage investment by both local and foreign investors. It means also that there is little risk of visitors being caught in the middle of any political unrest.

Regulatory – The island boasts a most liberal and modern regulatory environment in the western hemisphere. There are not constraints to capital flows in and out of the country as exchange controls have been removed and the net international reserve is in a strong position. Tough legislation has also been implemented to protect the integrity of the country's financial system. These measures have the full endorsement of multilateral and rating agencies as well as the private capital markets. (www.investjamaica.com).

4.6. Recommended National Watersports Marketing Strategy

4.6.1. Marketing Objectives

- Establish Jamaica as a choice destination for water sporting
- Provide world class facilities (direct and support)
- Achieve sustainability through effective regulations and enforcing of same

The priority is to establish Jamaica as a leading water sport destination while capturing the uniqueness of each resort area.

4.6.2. Segmentation & Target Market

Age:	25 – 54 years old
Gender:	Male and Female
Ethnic Origin:	Multinational - Jamaican, North American, Europeans, and Asian

The intention is to pursue a niche marketing strategy. Our research has shown that persons will travel for water sport in combination with other appealing factors. The diversity of Jamaica's culture and geography will play a key role in the decision made for the final venue on island.

4.6.3. Perceptual Positioning & Distribution

Promotional and advertising material ought to reflect the variety and range of water sporting activities available based on resort destination. The appeal will be directly to the water sports enthusiast love for this particular sporting activity in different sections of the same island.

The distribution channels will be the traditional channels of the tour operator/wholesaler, the travel agencies, direct through consumer shows and the Internet. Familiarization tours by travel agents and tour operators of the various water sport facilities are encouraged. Press releases on newsworthy items will be circulated (such as National Geography recently published a photograph taken here in Jamaica of a Black shark on top of a Spotted Eagle Ray). Word-of-mouth advertising and client retention programs will provide secondary support.

4.6.4. General Recommendations

- Closer monitoring of the use of marine traffic areas in all resort areas.
- Decompression chamber required in (at least) one other resort area.
- Introduction of other water sport activities to cater to the wide cross section of consumers (such as underwater trekking, submarine underwater tour, wake boarding, surfing, Regattas (in selected areas)
- Strict regulation (with severe penalties) to reduce and/or control the effects of pollution and environmental degradation.
- Encourage investment in support systems in areas where the need has been identified.

5. Summary of Findings

5.1. Watersports Capacity, Safety & Zoning

There is very limited watersport activity in the study area. From observation the watersport on offer is limited to SCUBA diving by **Lady G'Diver** from the Port Antonio Marina at West Harbour. Boat activity within the harbours appears to be related to the movement of vessels in and out of the harbour, and very little recreational activity actually takes place in the harbour. There is, however, more watersporting activity outside of the study area, in the vicinity of Port Antonio. This has not been considered in this assessment.

The recreational vessel capacity assessment indicates that based on the available information, and considering the observed use patterns, the present use of the harbours is within the vessel capacity of the area. Nonetheless, given the constraints of the capacity assessment, little can be said about the vessel density and traffic control during peak periods such as the October Marlin tournament.

As an active Harbour, receiving cruise ships, commercial vessels, leisure boats and fishing canoes, respect is apparently given to the shipping channel and general rules of marine transport.

There is no existing zoning in West or East Harbours, and with the observed use patterns there is no apparent urgent need for zoning. However, should the offering of watersports in Port Antonio increase, there will be a need to have designated areas for particular water-based activities (zoning). These will have to give due consideration to the shipping channel, the fishing beaches, and the sensitive mangrove, seagrass and coral reef communities in the area, as well as the perceptions and opinions of the users and stakeholders respectively.

Further guidance on the implementation of zonation for multi-use marine areas will be provided in the final report for the overall study on *Capacity and Safety in Marine Recreational Areas*.

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