

Recreational Carrying Capacity Assessment for St. Ann to St. Mary

Submitted to the

**Tourism Product Development
Company Ltd.**



May 31, 2005

Acknowledgements

Smith Warner International would like to thank Krishna Desai for his contribution to the preparation & content (including photographs) of this document. We would also like to thank Mr. Everett Heron of Resort Divers Ltd. for his time and willingness to share his watersports marketing experience.

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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 2004, 56 watersport-related incidents were reported to the Jamaica Tourist Board (an average of 14 per year), including six fatalities. This obviously has the potential to negatively impact the tourism industry.

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 wish 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 this overall capacity and safety study. These are:

- 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, *St. Ann to St. Mary*. The information presented in this report has been obtained through desk review, and field investigations¹, and is offered to assist decision-makers in formulating policies and regulations to ensure safety and environmental health in St Ann and St. Mary. 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 St. Ann and St. Mary. 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 St. Ann to St. Mary.
- The recreational carrying capacity of heavily used areas in St. Ann to St. Mary.
- The characteristics of the St. Ann & St. Mary watersports market.
- Recommendations and a summary of the findings.

¹ Site visits made from January 27 to 31, 2005.

2. Site Description – St. Ann to St. Mary

2.1. General Description

The major tourism destinations in Jamaica occur along the island's north coast. In particular, the stretch of coastline from Montego Bay to Tower Isle is dominated by tourism-related development and activities. For the purpose of this study the area considered spans a large section of the north coast shoreline, from Discovery Bay (St. Ann) in the west to Tower Isle (St. Mary) in the east, including Runaway Bay, Mammee Bay and Ocho Rios (Figure 2.1).



Figure 2.1 Study Area

A continuous reef extends across much of the study area, running parallel to the shore. For most of the area, a shallow lagoon extends from the reef to the shore, which is protected from wave action by the reef and conducive to recreational activities. North of the reef crest the sea floor slopes into deeper waters extending to the north coast trench.

2.1.1. The Ocho Rios Marine Park

Most of the study area falls within the proposed Ocho Rios Marine Park (ORMP). The boundaries of the Park as gazetted in August 1999 commence to the west along the high water mark where the shoreline boundaries of the properties of Drax Hall and Mammee Bay meet and have the approximate geographical coordinates of Latitude 18 26.15 N and Longitude 77 10.19 W. The southern boundary then extends along the high water mark of the coastline for approximately 13.5 kilometres (km) to the eastern boundary. The eastern boundary lies at Frankfurt Point with approximate geographical coordinates of Latitude 18 25.11 N and Longitude 77 03.17 W. The northern boundary lies in the sea at the 1000 meter contour line (Figure 2.2).

The ORMP comprises a sizeable area (approximately 13.5 km x 13 km) however, the majority of use – both recreational and commercial – is concentrated in a very narrow band along the coastline.

Ecological communities found within the boundaries of the ORMP include coral reefs (hard and soft corals), sandy shores, sea grass beds, rocky shores, and small stands of mangroves.

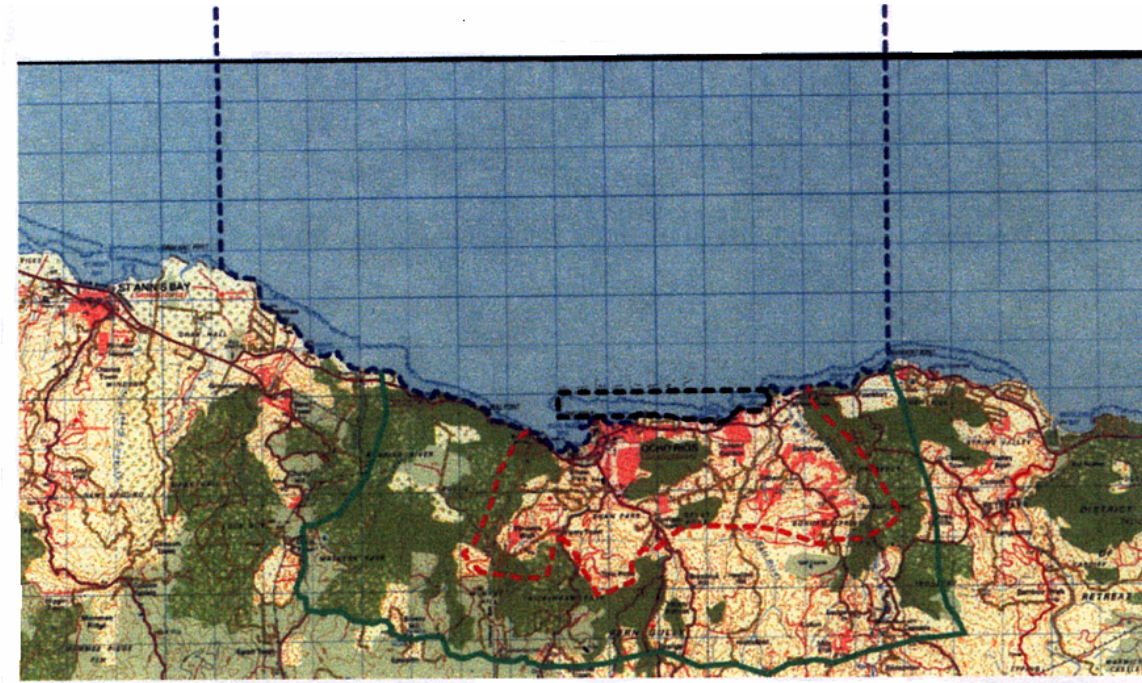


Figure 2.2 Proposed Ocho Rios Marine Park

The Management Plan for the ORMP indicates that there is proposed zoning for the park, as well as zoning recommendations provided by the National Environment and Planning Agency (NEPA). The main proposed use zones are:

- Research Only
- Multiple Recreational Use/No Fishing
- Multiple Recreational Use /No Jet Skis
- Diving, Snorkelling, Restoration & Research
- No Wake Zone
- Shipping Channel
- Transportation Channel
- Limited Recreational Use & Research

The NEPA proposed zoning involves the following zones:

- Fishing
- Fish Sanctuaries
- Swimming
- Anchoring & Mooring
- Motorised Craft
- Non-Motorised Craft
- Environmental Restoration
- Scientific Research

2.2. Water Sports Activities

2.2.1. Discovery Bay

This bay is large and has a variety of activities on the coastline. From west to east these include the UWI's Discovery Bay Marine Lab, Columbus Park, Port Rhodes, a small fishing beach adjacent to Port Rhodes, Port Side Villas, JDF Coast Guard station, Puerto Seco Bathing Beach, Discovery Bay Fishing Beach, and Fortlands Subdivision (villas).



UWI Discovery Bay Marine Lab has a slipway and docks with several small boats used in connection with research. No watersport activity is based here. Port Rhodes operates a pier used to facilitate the loading of bulk ore carriers. The bay has navigation aides that demarcate the deep channel. No attempt was observed to sterilize an area of water around the pier. There is a small fishing beach immediately to the east of Port Rhodes. There is no listing on the Fisheries Division list.

Port Side Villas is on the JTB listing as offering jetskis and snorkeling. When visited there was no such activity occurring there. A groundsman was asked about watersport activity occurring there and he indicated that it had not been for some time.

There is a JDF-Coast Guard pier that hosts patrol craft. Puerto Seco Bathing Beach offers an opportunity for recreational bathing. The swim area is properly demarcated by a buoyed line.

The Discovery Bay Fishing Beach offers berthing for fisher canoes. Approximately 15 fibreglass canoes were observed. The Fisheries Division list has 65 boats for the Discovery Bay beach.

There are several villa type residences in the Fortlands subdivision which is located in the eastern extent of the bay. Several of these villas have non-mechanized watercraft on the sea side of the properties. These were observed from Port Side Villas using binoculars. While it is known that some of these villas are offered for rental it is not clear that the water craft are licensed for tourism.

2.2.2. Runaway Bay

This area is a long, wide bay, occupied by all-inclusive resorts (Breezes, FDR) other hotels and private villas. A variety of watersports activities are offered in the area,

including diving, sailing, glass-bottom tours, and paddle boats. Patch reefs are found close to shore at various points along the bay, with the fringing reef occurring slightly further offshore.

An informal discussion with a young man on Jan 30 2005 who was renting a waverunner at the beach immediately east of Breezes revealed that the waverunner comes from a location in Salem, where a total of four waverunners (both 700 and 1200 cc) are kept. These are operated from Salem in the east to Discovery Bay in the west. He indicated that before renting the waverunners to tourists explanations are given to the riders as to where to be careful in terms of reefs and boats, and a life jacket is provided. A visit in the late afternoon confirmed that there were indeed 4 waverunners housed at the dilapidated structures at the Salem public bathing beach (owned by the NRCA)



An interview with Rudolph Bisengeberger of Jamaqua Dive Limited, which operates from Club Caribbean and Club Ambiance (last day of operation from Club Caribbean) revealed that he and a few other operators in the area have spent many years and much money putting a mooring system in place for diving. However, some operators use the moorings improperly and this results in the moorings being torn out. There is currently limited cooperation between the dive operators.

2.2.3. Mammee Bay/Old Fort Bay

Jamaica Fun Cruises operates from Drabar Villa located on the beach of Old Fort Bay. From the JTB listing watersport offered includes Sailing, snorkeling and kayaking. The vessels observed were consistent with that listing. No activity was occurring at the time of observations.

Jamaica Fun Cruises offers non-mechanized activities 2-3 days per week between 8:00 – 12:00. The bookings for these activities are restricted to groups from the cruise ships in Ocho Rios.



The operator of Jamaica Fun Cruises indicated that there are approximately 6 privately owned waverunners in the villas associated with the bay. The illegal operators tend not to solicit in the bay however they do transit across the bay.

An un-named private villa along the beach had 3 waverunners and a large power boat on trailers in the drive way.

Sandals Dunn’s River is situated in the Mamee Bay/Old Fort Bay area. The hotel offers diving, water skiing, sailing, and snorkeling. The vessels observed are consistent with the offerings as listed on the JTB list.

There was one waverunner soliciting clients in the vicinity of the hotel swimming area. The vessel had no markings on the hull leading to the belief that this was an illegal operator. The waverunner was operated in a way which resulted in an unpredictable path of travel in close proximity to the swim area. The operator does close passes near the beach/bathing area of the hotels and displays some stunts to attract attention, then will cruise up and down and then moor the vessel.



The hotel sits on a stretch of coastline which is fronted by a sandy beach and fringing reef some distance to the north. The reef provides ample sheltered water for the types of non-mechanized watersport on offer. The swim area is buoyed and there are suitable areas for the ingress and egress of water vessels.

To the west of the hotel a new development is underway by RIU. This hotel should be 800-900 rooms. When it comes into operation there may be conflicts with water use and vessel density, additionally it may attract further pressure from illegal operators.

2.2.4. Dunn's River

There is an old pier to the east of the beach which is no longer in use. The new pier to the west of the beach allows visiting watercraft an opportunity to load and unload passengers. At the time of observation there was a 'party' catamaran and a glass bottom boat tied there.

There is a large buoyed swimming area which seems to be heavily used by bathers. There are also snorkellers within and outside of the swim area.



There was one waverunner being used and then soliciting clients in the vicinity of the swimming area. The vessel had no markings on the hull leading to the belief that this was an illegal operator. The waverunner was operated in a way which resulted in an unpredictable path of travel in close proximity to the swim area. The operator does close passes near the beach/bathing area of the hotels and displays some stunts to attract attention, then will cruise up and down and then moor the vessel.

There were two waverunners on the beach to the east of the new pier. One of these, 'Old Dog', had broken down. We towed the waverunner to an informal boat repair yard in Mammee Bay adjacent to an open lot. The operator indicated that business had been bad since 9/11.

From observations made of the Ocho Rios Marina it is clear that there are many vessels which transport tourists from the cruise ship pier to Dunn's River, or offer watersport activities to tourists who are already at Dunn's River.

2.2.5. Ocho Rios

Island Village/Sailors Hole

Non-mechanized watersports (Kayaking, Snorkelling, Windsurfing, Hobie Cat, and Pedal Bikes) offered from the beach complex through Beachworld Ltd. The types of vessels seen are consistent with the JTB list.

Mechanized watersports are limited to waverunners. There were two waverunners with "ORO" numbers on the hull and one without seen to be soliciting. In the case of the licenced waverunners it is not certain whether their licence allows them to operate in this area. The third waverunner is suspected to be illegal as it has no marking on its hull.

The waverunners were operated in a way which resulted in an unpredictable path of travel in close proximity to the buoyed swimming area. The operator does close passes near the beach/bathing area and displays some stunts to attract attention, then will cruise up and down and then moor the vessel.



OR Marina

A wide range of watersports are sold here from kiosks. Many vessels which offer watersports (Parasail, deep sea fishing, catamaran cruises, glass bottom boats, snorkeling etc) are docked here at night and depart early in the morning or when required.

Watersport vessels leave the marina and may proceed either to the UDC pier, to the dock on the cruise ship complex (rare) or out of the bay and to the east toward Mahogany Beach (even when unloaded). Most vessels which are outbound maintain very slow speeds to the UDC pier or until they are almost clear of the Ocho Rios Bay mouth, this is especially so for the larger vessels (catamarans and power yachts). Smaller vessels may exit the marina and pier at higher speeds.





Ocho Rios Beach

Jet Ski, Glass Bottom Boating, and Deep Sea Fishing are the only activities occurring or being offered at this location. Operators indicated that there is very little business. Only 2 bikes can be operated by any one license holder at one time. They operate within the bay and when the cruise ship is in port the space available is even more limited. When the port starts to enforce (it doesn't seem to be now) the port security code which requires minimum distances from cruise vessels they believe the remaining space will be too limited and may lead to many bikes in a small area leading to collisions and injuries.

The swim area in the bay is demarcated by floating rope and with warning signs not to proceed beyond the rope. There is a line of emergent markers to keep vessels out. Some glass bottom boats anchor/tied up with in the area of emergent poles.



Waverunners are most probably stored in a shed at the Jamaica Grande end of the beach. When rides are being sold the waverunners are parked at the back of the beach immediately east of the UDC public beach entry point. The operators sit together under a small tent with a bench and park 2-6 waverunners on the beach at the edge of the sea. When waverunners are rented they exit in the zone alongside (to the east) of the UDC pier and then proceed in a circular pattern (anti-clockwise) between the UDC pier, the eastern groyne and cruise ship pier. Some of the waverunner traffic is not during rentals but rather of employees going to and fro. This traffic tends to be at much greater speed, especially when approaching the coastline.



UDC Pier



Watersports Enterprises

At the eastern end of the bay, along the pier Watersports Enterprises Limited (Ernest Smatt) is the major operator. The watersports on offer and the types of vessels observed include SCUBA diving, sailing, deep-sea fishing, parasailing, water skiing, snorkeling and glass bottom boating. Other vessels are also marked with Jamaica Grande, but it is not certain who operates them (perhaps Watersports Enterprises).

The JTB listing is consistent for Watersports Enterprises except for waverunners.

The pier is near to a buoyed swim zone that is in front of Jamaica Grande, there is no line of poles to further buffer the swim area as occurs in other parts of the bay. There is a sunken boat at the northern extent of the pier.

Most of the vessels are apparently registered (according to their markings) in other countries (Cayman, Virgin Islands).





2.2.6. East of Ocho Rios

Mahogany Beach

Island Dog Watersports operates from this location. Snorkelling, Banana Boat Rides, Waterskiing, Parasailing, and Glass Bottom Boat rides are offered. Rental is made to tourists arriving by party catamaran (e.g. Cool Runnings) or by tourists who arrive from the road.

A concrete pier is used to launch most watersport (except kayaks and towed rides, launched from beach) that Island Dog Watersports offers. The pier is also used by other vessels that visit (e.g. Cool Runnings Party Catamaran) and by other persons who offer watersport there (variety).

The bathing area is partially buoyed. One parasailing trip was seen to take place north of the fringing reef (crest) in the open sea. The towed float ride was done in loose circles to the immediate west of the pier and beach at Mahogany Beach.





Beaches Royal Plantation

There are three hotels adjacent to each other in this section of the coast. Sandals Ocho Rios, Beaches GrandSport and Royal Plantation (all owned by Sandals Resorts International). Most of the vessels observed had 'Sandals' indicated in one way or another but it may be that they are offered across the properties.

The information from the JTB list is consistent with what was observed for Sandals Ocho Rios (Sailing, Glass Bottom Boat Rides, Kayaking and Paddle Boating). It is noted that this listing does not include SCUBA diving, and such a vessel was present.

The information from the JTB list is consistent with what was observed for Beaches GrandSport and Royal Plantation (kayaking, Sailing, and SCUBA diving).

There was one Parasail boat "Lady Boss" which was soliciting in the area. While 'JMWORO' numbers were seen on the hull these could not be discerned due to distance. It is not clear, if this is a licenced operator, whether the terms of their licence allow solicitation in this location.

There was one waverunner soliciting clients and subsequently being operated by a tourist in the vicinity of the hotels. The vessel had no markings on the hull leading to the belief that this was an illegal operator.



Shaw Park

JTB list has an operator, Hope Watersports (Snorkelling, cruising, glass bottom boat), as operating from the Shaw Park Hotel. The vessels seen at the hotel were kayaks and sunfish. This is inconsistent with the data provided. It is known that the hotel has been out of operation from some time and has only recently been acquired.

Misc.

There are privately owned villas and strata along the coastline between Mahogany Beach and Beaches Grandsport/Sandals Ocho Rios. The coastline is rocky cliff. There are a variety of slipways, docks and piers where vessels can be launched and tied up. This allows owners of personal watercraft to access the sea for their private usage. Examples are at Hog Hole where there is the Santa Maria strata and Mr. Von Strolley's villa.



2.2.7. Tower Isle

Not much activity seen due to inclement weather and late time of visit. Water skiing, SCUBA diving, windsurfing, hobie cat sailing and kayaking offered. From JTB list sunfish sailing, glass bottom boat rides and snorkeling also offered.



2.3. Marine Vessels

Given the geographic extent, the volume of tourism-related activity and the limited time available to cover the area, it is difficult to give a definite number of the vessels operating or berthing in the area. However, the following table presents the findings of the observations made during the field assessment.

The information obtained from the MAJ indicates that there are 69 motorised vessels and 64 non-motorised vessels registered in Ocho Rios for tourism purposes. A further 13 motorised and 64 non-motorised are registered in Rio Bueno, giving a total of 200 vessels registered for tourism in the study area. The data obtained from the Fisheries Division indicates that there are 499 fishing boats registered in the study area.

Table 2.1 Vessels Observed in Study Area

	<i>Mechanised</i>	<i>Non-mechanised</i>	<i>Total</i>
Discovery Bay	27	27	54
Runaway Bay	18	48	66
Mammee Bay/Old Fort Bay	7	40	47
Sandals Dunn’s River	6	14	20
Dunn’s River	5	-	5
Ocho Rios Bay	15	-	15
Ocho Rios Marina	45	2	47
Island Village	22	5	27
Watersports Enterprise	24	13	37
Mahogany Beach	14	10	24
East of Ocho Rios	7	5	12
Sandals/Beaches Royal Plant.	10	36	46
Shaw Park	7	17	24
Reggae Beach	5	4	9
Couples	3	5	8
Total	215	226	441

2.4. Maritime Safety

The records provided by the JTB on watersports accidents/incidents for the Period January 2001-December 2004 indicate that 24 of the 56 (43%) recorded incidents took place in the Ocho Rios area. Of the 24 incidents in the study area, 19 involved waverunners/jet skis. Two of the jet ski incidents were fatal. Given these statistics it is clear that there are concerns regarding maritime safety in the study area, and in particular, with the use of waverunners/jet skis.

2.4.1. Swimming

In locations where swimming areas are demarked it was observed that swimmers and waders generally respected the confines of the area. However, the concern is that in many of the heavily trafficked areas there is no clearly defined swimming zone. In such cases several activities take place in the same space, proving hazardous especially to the swimmers and snorkellers.

2.4.2. Safety Procedures

In general, safe vessel operation was observed on the water. The major exception to safe operation was the non-predictable use of waverunners, particularly by agents in their efforts to advertise the vessels for hire and in general transit.

In most instances where buoyed swimming areas were demarked, vessels respected the line and did not operate within the swimming area. However, in some cases the vessels operated very close to the buoy line, or moored in proximity to the swimming area or on the buoyed line. This poses a danger to the swimmers.

Mooring lines in multi-use areas and in close proximity to swimming zones was observed, and also poses a danger. In fact, one of the reported fatal incidents in Ocho Rios was a result of a rider on a waverunner running into a mooring line and being thrown from the vessel.

2.4.3. Rescue Boats

Several rescue boats were observed during the field assessments. Few were in the water and prepared to travel, and most of them were beached or on trailers. The boats associated with the larger facilities and the all-inclusive properties tended to have the rescue boats on the water. The less formal operations tended not to have obviously available rescue vessels (none marked as rescue vessels).

Specifically, in Ocho Rios Bay the operators indicated that they rotate daily the responsibility for a rescue boat rather than each licensee having a boat for them. However, no boat labeled as a rescue vessel was seen. It is believed that they use one of the waverunners as a rescue boat.

2.5. Environmental Conditions

The ORMP is home to several sensitive ecosystems: Coral reefs, seagrass beds and some mangroves. The area is also an important fishing location, and there are a number of important fish nursery areas in the park. The activities associated with watersports operations often have a negative impact on the environment, particularly through pollution. The following presents an overview of the observed sources of pollution associated with watersports operations.

2.5.1. Land Based Pollution

The main source of pollution from land in proximity to watersports operations is solid waste (on land and in water). In some locations piles of solid wastes were being burned. In others, solid waste was simply strewn around. Old boat parts such as pieces of engines, blocks and propellers were often seen on the back of the beach areas where watersports operators were located.

Other pollutants included oil from boats stored on shore dripping and causing sheens on docks which could potentially then enter the sea after rain events. The cleaning of fish in the general areas was also observed, and blood and other fish material were released into the sea.

2.5.2. Ship source pollution

The washing of vessels when moored or berthed, particularly with the use of chemicals (soap, bleach) is a source of pollution from ships/vessels. The disposal of parts and oils is also a source of pollution. The fuelling of vessels on the water or while moored or berthed is another potential source of ship pollution.

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:

$$\text{Visitor Carrying Capacity} = \text{Area used by visitors} \div \text{average individual standard}$$

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:

$$\text{Recreational Carrying Capacity} = \text{Area suitable for recreation} \div \text{Desired density.}$$

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 100 acres suitable for recreation, and a desired boat density of 10 acres/boat, the recreational carrying capacity is as follows:

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

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**

<i>Source</i>	<i>Recommended Density</i>	<i>Uses Prescribed</i>
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 St. Ann to St. Mary

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

Carrying capacity assessments were conducted for the more heavily trafficked areas including Discovery Bay, Runaway Bay, Mammee Bay/Old Fort Bay, Dunn’s River and Ocho Rios Bay. The areas suitable for recreation and non-usable areas were determined using 1:50,000 (metric) topographic maps commissioned by the Government of Jamaica (1984). The details of these assessments are presented following, and the findings are summarized in Table 3.2.

Table 3.2 Area Suitable for Recreation

	<i>Total Water Area (m²)</i>	<i>Non-usable area (m²)</i>	<i>Usable Area (m²)</i>
Discovery Bay	1,758,000	703,000	1,054,400
Runaway Bay	1,027,000	460,000	567,000
Mammee Bay/Old Fort Bay	800,000	350,000	450,000
Dunn’s River	630,000	125,000	505,000
Ocho Rios	204,000	145,000	59,000

Discovery Bay

The total water area considered in Discovery Bay is shown in Figure 3.1 following. This was estimated to be 1,758,000 m². The non-usable areas included a swimming zone of approximately 100m from shore (pink/purple area), the shipping channel (purple area) and an area of approximately 50m in front and over the reef. This was estimated at 703,000 m², leaving an area of approximately 1,054,400 m² available for recreational use.

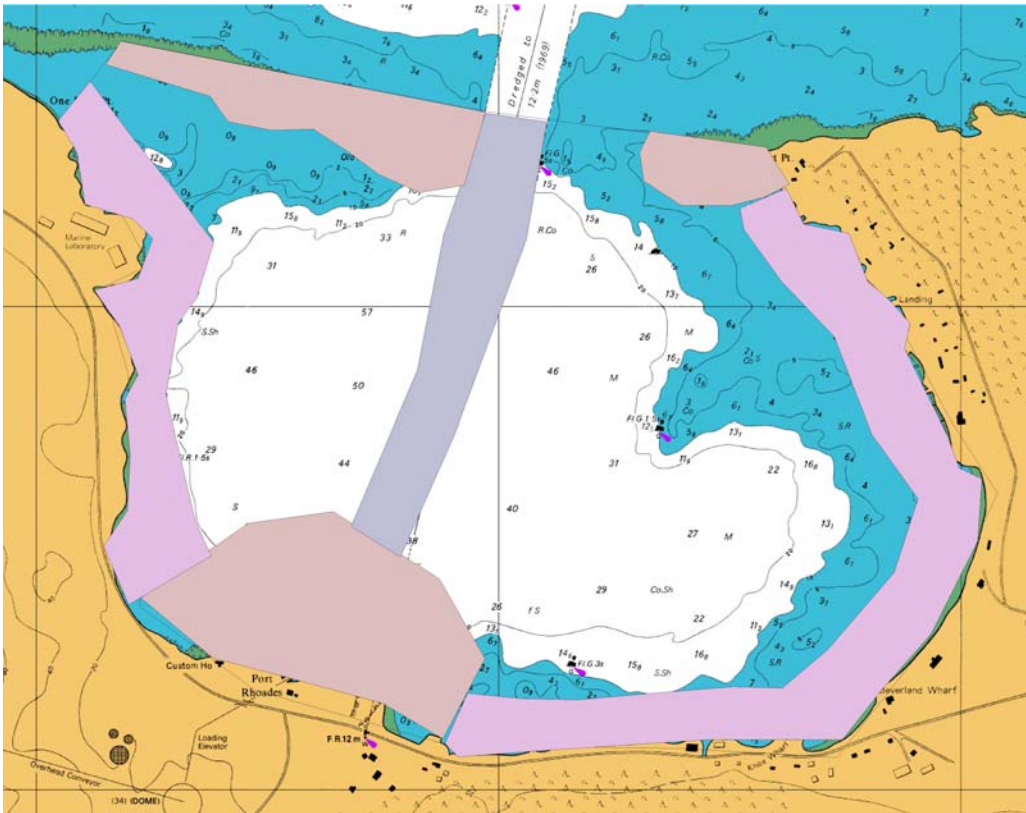


Figure 3.1 Total Water Area Considered for Discovery Bay

Runaway Bay

The total water area considered in Runaway Bay is shown in Figure 3.2 following. This was estimated to be 1,027,000 m². The non-usable areas included a swimming zone of approximately 100m from shore, and an area of approximately 50m in front and over the reef. This was estimated at 460,000 m², leaving an area of approximately 567,000 m² available for recreational use.

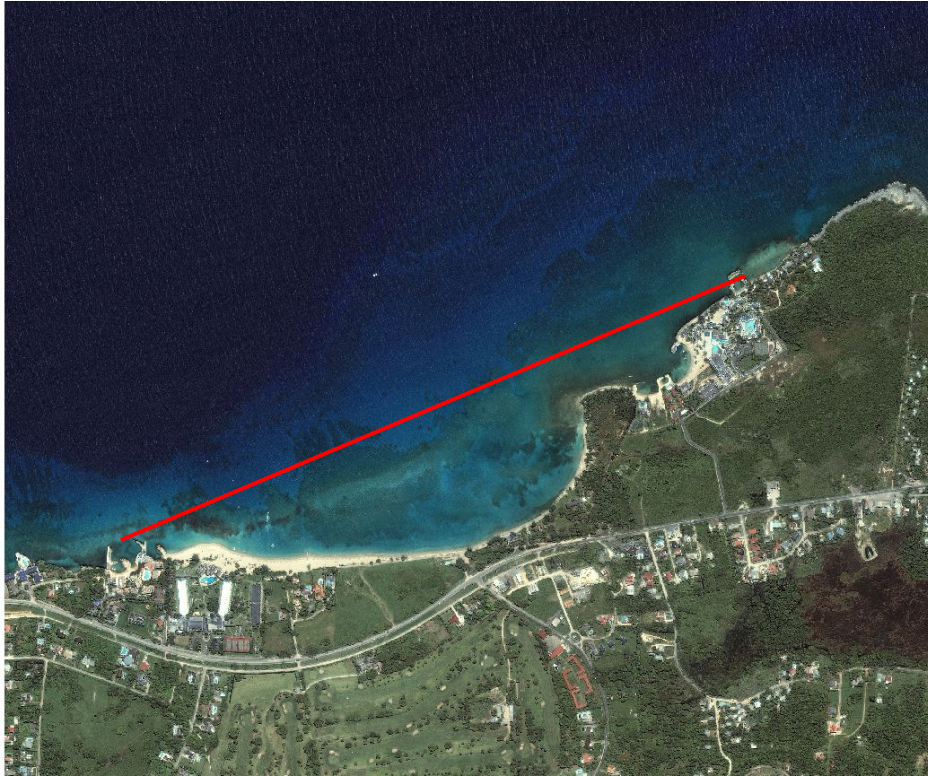


Figure 3.2 Total Water Area Considered for Runaway Bay

Mammee Bay/Old Fort Bay

The total water area considered in Mammee Bay & Old Fort Bay is shown in Figure 3.3 following by the red line, and spanned from the rocky shore in the west by Drax Hall estate to the eastern tip of Old Fort Bay. This was estimated to be 800,000 m². The non-usable areas included a swimming zone of approximately 100m from shore, and an area of approximately 50m in front and over the reef. This was estimated at 350,000 m², leaving an area of approximately 450,000 m² available for recreational use.

Dunn's River

The total water area considered at Dunn's River is shown in Figure 3.4 following by the red line, and spanned from the headlands on either side of the bay. This was estimated to be 630,000 m². The non-usable areas included a swimming zone of approximately 100m from shore, and an area of approximately 50m in front and over the reef. Consideration was also given to the transit channel for vessels accessing the jetty. This non-usable area was therefore estimated at 125,000 m², leaving an area of approximately 505,000 m² available for recreational use.



Figure 3.3 Total Area Considered for Mammee Bay/Old Fort Bay



Figure 3.4 Total Area Considered for Dunn's River

Ocho Rios

The total water area considered at Ocho Rios Bay is shown in Figure 3.5 following by the red line, and spanned from the Reynolds Pier in the west to the tip of the eastern groyne. This was estimated to be 204,000 m². The non-usable areas included a swimming zone of approximately 100m from shore, an area of 30m around the mooring pilons for the cruise ship pier (as required for security reasons under the ISPS Code), and area of approximately 100m for the mooring/berthing of boats in the marina and along the eastern-most pier.. Consideration was also given to a transit channel for vessels accessing the UDC pier. This non-usable area was therefore estimated at 145,000 m², leaving an area of approximately 59,000 m² available for recreational use.

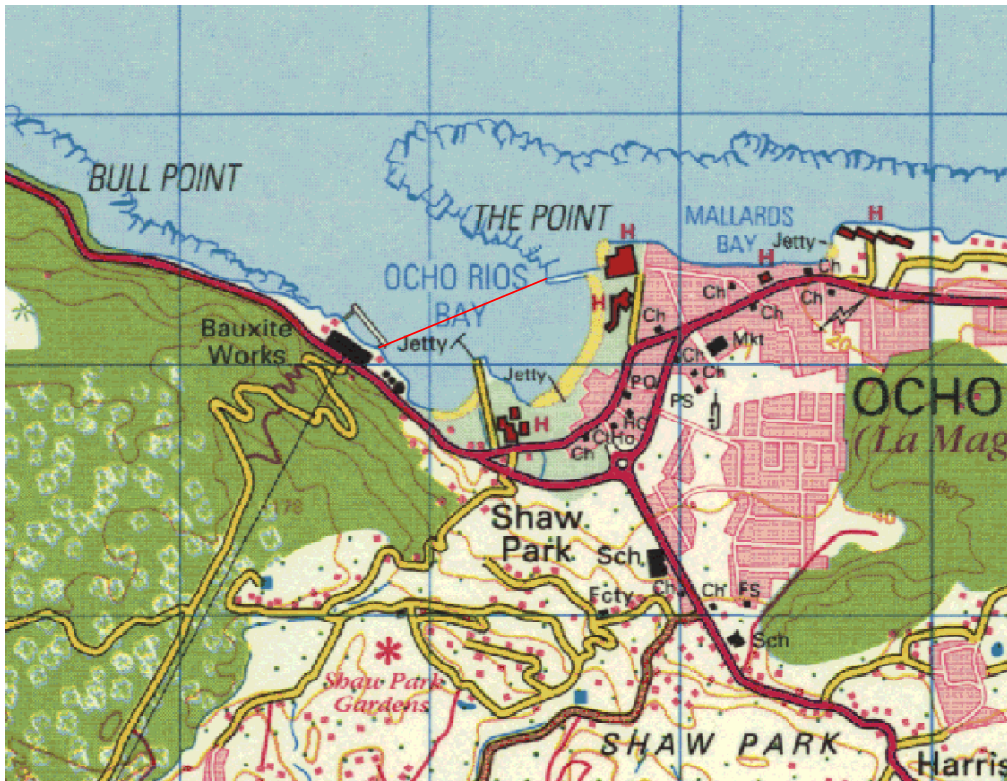


Figure 3.5 Total Water Area Considered for Ocho Rios Bay

East of Ocho Rios

Given the proximity of the reef to the shoreline for most of this area (Figure 3.6) it was difficult to estimate the available of usable water space within the reef. Although sections of this shoreline were apparently heavily used, no calculations were therefore conducted for this section of the study area.

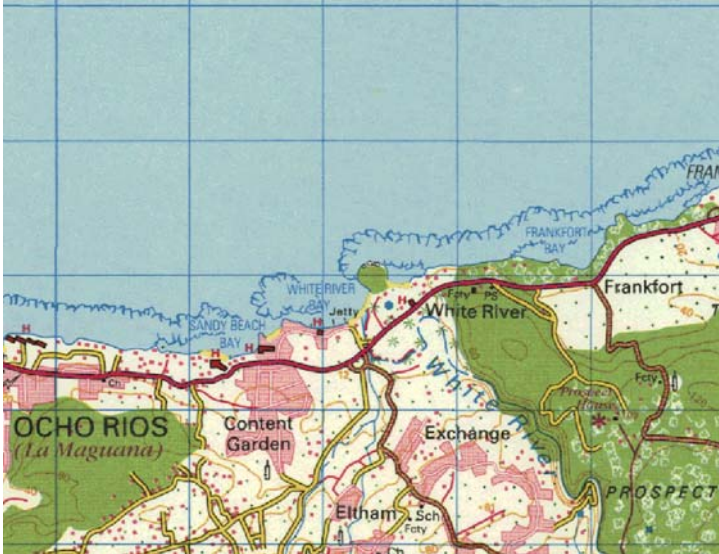


Figure 3.6 Areas East of Ocho Rios

3.3.3. Desired Density & Recreational Boating Capacity

Based on some of the previous studies done (Table 3.1) to determine the optimum densities for lake conditions, a desired density of 10 acres (40,500m²) of water surface per boat/vessel 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 Mammee Bay, Dunn’s River and Ocho Rios have been calculated, and are presented in Table 3.3 following.

Table 3.3 Combined Use Vessel Carrying Capacity for Port Antonio– Study Area

	<i>Usable Water Area</i>	<i>Optimum Boating Density (combined use)</i>	<i>Carrying Capacity (CC) for combined use</i>
Discovery Bay	1,054,400 m ²	40,500 m ² /vessel	26 vessels
Runaway Bay	567,000 m ²	40,500 m ² /vessel	14 vessels
Mammee Bay/Old Fort Bay	450,000 m ²	40,500 m ² /vessel	11 vessels
Dunn’s River	505,000 m ²	40,500 m ² /vessel	12 vessels
Ocho Rios	59,000 m ²	40,500 m ² /vessel	1 vessel

Based on these calculations the selected areas can *together* accommodate a total of approximately 64 motorised and non-motorised vessels combined, without compromising safe, recreational use, aesthetic enjoyment and/or environmental quality.

Observations during the field assessment (presented in Table 2.1) indicated that there are approximately 169 motorised tourism related vessels in the Discovery Bay to Ocho Rios area.

3.3.4. 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 the selected locations in the study area 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 (three 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 the Ocho Rios area. 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 the Ocho Rios area.
- **The limited scale-appropriate mapping.** The assessments of the usable water area and non-usable water area have been estimated using a mixture of topographic maps and bathymetric charts, neither at detailed scale. A more appropriate method of determining the areas would be to use geo-referenced aerial photography, which would better indicate the non-suitable areas for water-based recreational activities.

Given these limitations to the carrying capacity assessment, the findings (vessel numbers) presented in Section 3.3.3 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 St. Ann to St. Mary. 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 St. Ann to St. Mary.
- 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 St. Ann and St. Mary. 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.

Questionnaires were administered in St. Ann over 3 days. 33 of the 100 administered in St. Ann were returned.

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.

The Jamaica Tourist Board’s official list of licensed water sports operators was used to assist in the identification of water sports operators in the defined locations.

4.2.S.W.O.T. Analysis

4.2.1. Discovery Bay

Strengths
<ul style="list-style-type: none"> ▪ Protected marine park (proposed) ▪ Outstanding underwater visibility year round ▪ Coast Guard base located in the area ▪ Of the total water area (1,758,000 m²) Discovery Bay has a large amount of usable area (1,054,400 m²) available for the development of watersports activities ▪ An operational decompression chamber located at Discovery Bay Marine Lab ▪ On going environmental awareness programs with local fishing community. ▪ Low density ▪ Protected bays
Weaknesses
<ul style="list-style-type: none"> ▪ Low standard of accommodations ▪ Relatively low commercial activity that is tourism related. ▪ Industrial nature of the Bauxite loading port.
Opportunities
<ul style="list-style-type: none"> ▪ Imminent large hotel investment ▪ Better access from Sangster’s International Airport due to road improvement on North Coast Highway. ▪ Conditions ideal for the hosting of annual Water sport Regatta. This is fun, competitive, allows for development of community tourism as members of water sporting department at resorts across the island could compete.

Threats
<ul style="list-style-type: none">▪ Relatively untrained labour pool

4.2.2. Runaway Bay & Priory

Strengths
<ul style="list-style-type: none">▪ Snorkeling haven and good dives sites as a result of sunken plane and boat wrecks▪ Natural crescent shape of the bays and the reef conducive for year-round diving.▪ Operators of dive operations are environmentally aware and active and host annual beach and underwater clean up campaigns, through the Project Aware Foundation.▪ Priory's coastline is protected due to shape and geographical location.
Weaknesses
<ul style="list-style-type: none">▪ Inadequate and insufficient support systems (tours, food and beverage outlets and attractions).▪ Overly aggressive vendors/peddlers on the public beach.▪ Poor environmental practices of local residents result in excessive fresh water run-off from surrounding rivers, and as a result the reef is covered in algae
Opportunities
<ul style="list-style-type: none">▪ Location not heavily utilized▪ Potential for growth evident.▪ Geographical location provides conditions conducive to most water sporting activities (sailing, skiing, wake boarding, snorkeling and SCUBA diving).
Threats
<ul style="list-style-type: none">▪ Improper fishing practices by local fishermen resulting in continuous over-fishing.▪ Reef degradation as a result of over fishing and heavy silting from river (especially following heavy rainfall).

4.2.3. Ocho Rios

The once sleepy fishing village Ocho Rios has transformed in the past twenty (20) years to a bustling resort town that has expanded east towards Oracabessa and west towards Runaway Bay and Discovery Bay. Tourism has now overtaken and replaced fishing as the major industry. Access to beaches is limited. Water-skiing is not a popular water sporting activity in this area, as the seas are not as calm as that of Negril. The prevailing winds from the hills/mountains which surround this area allows for parasailing and windsurfing. This area is known for its sport fishing. The reefs of the immediate Ocho Rios environs has been impacted negatively as a result of over-fishing over the years hence the diving experience is limited in comparison to that of Negril. Ocho Rios is the location of the Ocho Rios Marine Park – a protected marine park. Through the efforts of the Friends of the Sea and the Project Aware Foundation, there has been an increased awareness of sound environmentally friendly practices.

In 2003 a total of 1,132, 596 cruise ship passengers arrived in Jamaica. The port of Ocho Rios accounted for seventy-two percent (72%) of this total cruise ship passenger arrivals. (Source: visitjamaica.com/statistics).

Strengths
<ul style="list-style-type: none"> ▪ The Ocho Rios environs enjoy outstanding visibility year round. ▪ Involvement of NGO's (Friends of the Sea and Project Aware Foundation) in protection and clean up of the reef and increased environmental awareness. ▪ Reef and geographical location provides ideal conditions for most water sporting activities. ▪ Ocho Rios is Jamaica's largest cruise ship terminal. ▪ There is a proposed Marine Park in this area.
Weaknesses
<ul style="list-style-type: none"> ▪ Concentrated population (local and visitor) in the immediate environs of Ocho Rios. ▪ High concentration of mechanized and non-mechanized marine traffic observed. ▪ Only 59,000 m² is categorized as usable area and suitable for recreation out of a total water area of 204,000 m². Due to proximity of the reef to the shoreline, it is difficult to determine the usable area in the heavily used area East of Ocho Rios. ▪ Polluted harbor.
Opportunities
<ul style="list-style-type: none"> ▪ Imminent hotel development West of Ocho Rios.

<ul style="list-style-type: none"> ▪ Development of North Coast Highway connecting Negril, Montego Bay and Ocho Rios via improved road network.
Threats
<ul style="list-style-type: none"> ▪ Improper environmental practices on land result in pollution from surrounding rivers. ▪ Continued poor practices by local fishermen. ▪ High concentration of marine traffic (legal and illegal) possible contributing factor to the increased incidences of marine accidents. ▪ Improper operational practices by water sporting operators contribute to the pollution of the harbor. ▪ Occasional harassment by aggressive operators/peddlers.

4.3. Survey Findings

4.3.1. Market Profile

Nationality
<ul style="list-style-type: none"> ▪ 45.5% of respondents were American ▪ 18.2% British ▪ 15.25% Canadian ▪ 3% Jamaican ▪ 3% Puerto Rican ▪ 6.1% Russian ▪ 9.1% did not indicate
Age Group
<p>The age distribution of the respondents was as follows:</p> <ul style="list-style-type: none"> ▪ Ages 26 – 35 years - 24% ▪ Ages 36 – 45 years - 42% ▪ Ages 46 – 55 years - 15% ▪ Over 56 years -19%
Motivation/Attitude

The major factor influencing thirty percent (30%) of respondents (in this region) to visit Jamaica was water sports. A further breakdown revealed:

- 9 % specifically due to water sports
- 6 % due to scenery and water sports
- 15% due to culture, scenery and water sports

The above figures suggest that a combined marketing approach could prove beneficial as the majority chose the island for water sports **in combination** with other factors. In comparison with Negril and Port Antonio, St Ann presents a much wider range of choices of both general activity and water sport activity.

Type of Room Plan

- 90.9% All inclusive
- 3.0 % other
- 6.0% did not indicate

4.3.2. Analysis of Findings

Length of Current Visit

- 51.5% were on 5-7 night stay,
- 39.4% were on a stay for more than 7 nights,
- 9.1% did not respond.

A visitor's length of stay is determined by a number of factors, including time available to them for vacation, and their level of disposable income. This question was included in order to determine if there could be any relationship between the length of stay and how much time a visitor would allocate to taking part in water sports, for instance how far away from their accommodation are they likely to travel to participate in an activity. If zoning of certain water sports activities should become a reality, a visitor's willingness to travel to participate will impact on the viability of that activity.

This data was cross-referenced with that on length of time willing to travel to participate in a water sport. 64% of visitors staying 5-7 nights are willing to travel up to half an hour to participate in activities and 36% are willing to travel an hour or more. 30% of visitor staying 7 nights or more are willing to travel up to a half and hour to participate in activities and 46% are willing to travel and hour or more.

Watersports Preferences

Jet skiing is preferred by 18.8% (16) of male and female visitors but only 3% (1) participated while visiting the St. Ann area. 36% of respondents enjoy wake boarding, but none participated while visiting.

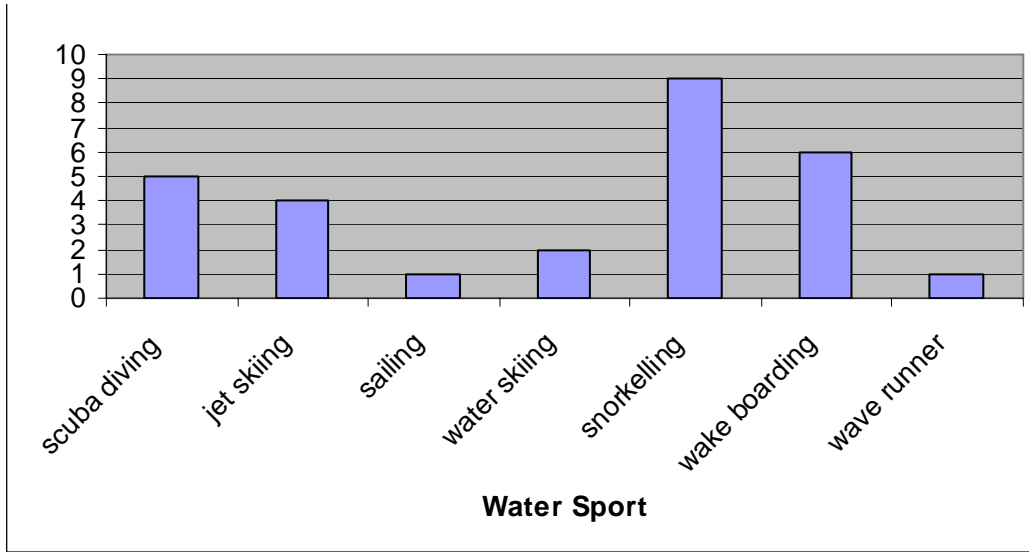


Figure 4.1 Watersports Preferences (Male)

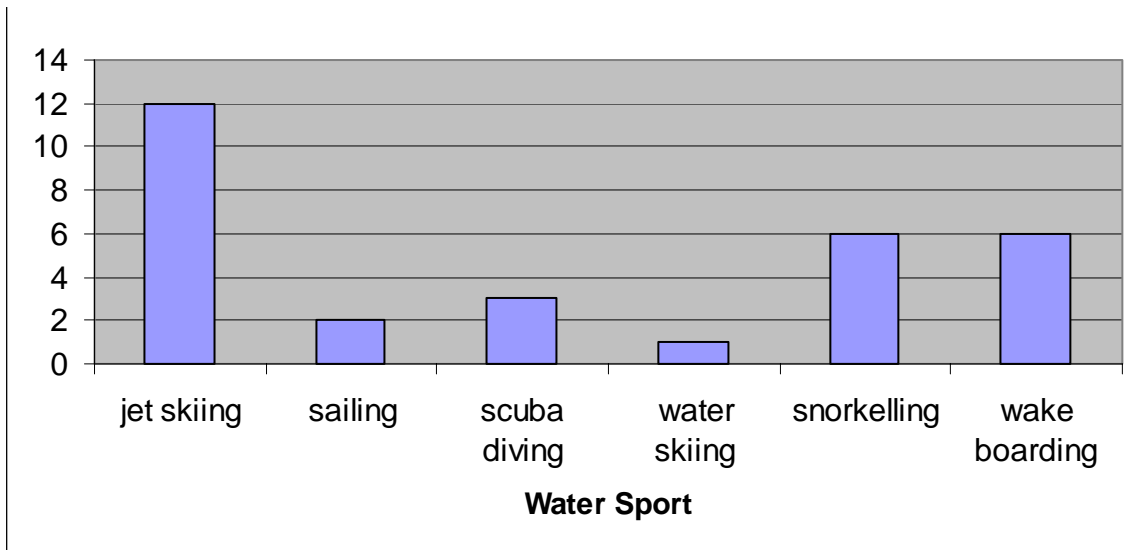


Figure 4.2 Watersports Preferences (Female)

Travel Time to Participate in a Water Sport

- 28% would travel 15 minutes,
- 27% would travel 30 minutes,
- 20% would travel 1 hour,
- 25% would travel more than 1 hour

Environmental Consciousness

- 81.8% indicated that they were environmental consciousness,
- 6.1% indicated that they were not,
- 12.1% did not indicate

Support of Potentially Restrictive Regulations

- 63.2% indicated that they were extremely supportive of environmentally protective regulations which may restrict their water sport activities,
- 26.3% were very supportive
- 5.3% were neutral
- 5.3% did not indicate

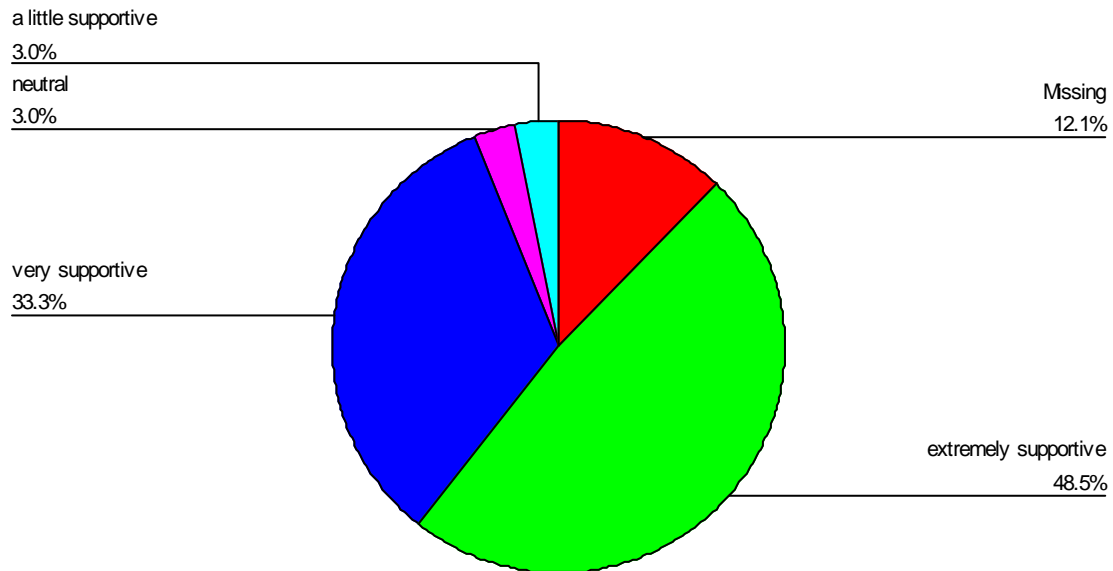


Figure 4.3 Support for Restrictive Watersports Regulations

The fact that the majority of respondents indicated a high level of support for potentially restrictive regulations indicates an opportunity for improving the balance of control similar to the conditions in Negril (currently Negril is highly self-regulating in terms of environmentally protective practices). Zoning regulations aimed at protecting indigenous flora and fauna would see more success in Ocho Rios than in Port Antonio, because areas of activity are typically within 15 to 30 minutes of each other.

When the data was cross-referenced, it was discovered that most respondents regardless of level of support, would travel between 15 and 30 minutes to take part in a water sport.

However, it would be prudent to continue data collection in St. Ann, as it is expected that based on current conditions there (high use of harbor by cruise lines for example), a number of changes would have to take place in order for any realistic environmentally protective practices to be implemented.

4.4. Market Size & Potential for Growth

Number of Hotel Rooms:	3,631 rooms
Number of Visitors (December 2004):	21,145 persons
Potential Revenue from water sports:	USD 253,760 – 2,220,400

Recent JTB statistics indicate that for the period Jan – Dec. 2004, Ocho Rios enjoyed a total of 21.1% of all stop over arrivals to the island.

Accommodation types in the entire Ocho Rios area span a wide cross section with a mix of (larger) all-inclusive resorts and a multitude of smaller properties (hotels and guest house). The water sporting activities vary based on size and resort type with the larger all-inclusive resorts including or making available on site such activities whilst the smaller hotels (European Plan) having clients utilize independent water sport operators off site. Ocho Rios has the second largest concentration of water sports activity along the north coast due to the many hotels and frequent visits from cruise ships.

The Ocho Rios bay consists of one large water sport operator associated with the Jamaica Grande hotel (now Sunset Jamaica Grande) and several smaller operators all along the beachfront. Across the harbor you will find party boat and sail operators who manage cruises to and from Dunn’s River Falls and an occasional sunset cruise. Along the Fisherman’s pier, which is located in the center of the bay, you will find twelve to fourteen sport fishing boats.

Table 4.1 Available Accommodation in the Ocho Rios Area

	Units				Rooms			
	2000	2001	2002	2003	2000	2001	2002	2003
<50 rooms	17	17	16	16	481	488	448	446
51 - 100	9	9	10	10	648	649	709	732
101 - 200	7	7	7	7	7	7	7	7
>200 rooms	8	8	8	8	2402	2402	2417	2417
Total Hotel	41	41	41	41	4495	4503	4538	4564
Guest Houses								
	47	50	52	57	262	301	330	345
Resort Villas								
	470	469	470	446	1326	1323	1327	1276
Apartments								
	387	312	311	311	735	592	592	592
TOTAL	945	872	874	855	6818	6719	6787	6777

- 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.

4.4.1. Discovery Bay

The most immediate and significant factors affecting the potential for growth is the imminent development of a large resort complex outlying the town along with the completion of the North Coast Highway. Over the construction and operation periods in the next five years the expansion of linkage industries in the locale has tremendous potential for commercial activity in the tourism business.

At present there is already activity in the upgrading of existing and development of resort residential subdivisions along coastline area. The demand for housing to accommodate employees estimated in the region of 2500 permanent hotel employees and construction labour of 1000-1200 will stimulate further construction activity and the need for goods and services.

The Green Grotto Cave attraction is also positioned for expansion and in line with the current increased interest in nature based attractions will brand the region in a new direction.

In the context of water sports activities because of the relatively good dive sites in the area and a fair amount of pristine coastline opportunities will present for the development of new offerings for operators. There is limited coastline between Runaway Bay and the area of Puerto Seco but beyond the discovery Bay Marine

Laboratory and the town of Rio Bueno there are still relatively undeveloped parcels of coastline albeit most without considerable reef protection.

4.4.2. Runaway Bay

Runaway Bay has several hotels, three (3) large all-inclusive hotels and two small E.P. Resorts and many villa properties.

Most water sport activities in Runaway Bay are done by:

- FDR, Breezes Runaway Bay,
- Hedonism III and
- Club Caribbean.

Smaller properties provide most non-motorized water sport activities and glass bottom boat rides. Club Caribbean offers water sports to outsiders as well as in house guests and is patronized by most of the villas and small properties in the area.

Several large residential communities are planned for the eastern lands near the coastline of Runaway Bay beginning just east of the community of Salem and stretching toward Llandovery and further toward Priory. These are a mix of villa/resort residential and housing catering to multilevel employee groups. There are high levels of confidence among local entrepreneurs anticipating opportunities following on imminent large scale development. South of the town the National housing Development Corporation is developing a large housing project.

East of Salem because of a number of rivers running into the sea, there are limitations to the type of water sports activity that can be developed as visibility and sand quality would be real concerns despite anticipated development along this section of coastline. In fact developers looking at resort construction in the area are factoring significant cost of river training as a necessary part of any development budget being prepared for coastline development.

Breezes Runaway Bay, part of the SuperClubs group also plans to expand their rooms and are presently in the process of that planning.

Rental property in the Cardiff Hall area is experiencing increases in value after a long period of dormant activity in the area.

The Runaway Bay HEART Academy which focuses on the training and development of human resources in the hospitality business is currently exploring methods by which increased numbers of trained individuals are ready for an expanded market.

Among the territories being studied in St. Ann, Runaway Bay exhibits the most potential for all round growth. Ocho Rios may be best positioned to take advantage of additional cruise ship visitor numbers anticipated, but apart from this one factor overall potential for growth should be strongest in Runaway Bay.

4.4.3. Priory & Mammee Bay

Growth limited largely to spillover from the expansion of Mammee Bay and Runaway Bay hotel rooms but also two large residential projects planned for construction in the short term. Growth possibilities lie in the development of attractions and golf for which there is existing demand both from cruise passengers and stop over visitors. For the development of golf product the destination potential is usually enhanced by the existence of ample villa type accommodations. With the development now in process in the area there is a real opportunity for this direction. With existing accommodations inventories and visitor arrivals the zone between Ocho Rios and Runaway Bay could feasibly accommodate the viable operation of two additional golf courses, according to a study conducted by Economic Research Associates in partnership with the Jamaica Golf Association conducted three years ago.

The fairly large public beach facility which is the venue for frequent local events could have possibilities for water sports offerings as it is in reasonable proximity to the planned residential development, the Seville Heritage Attraction (which has significant short term potential to increase their business activity), and the cruise ship port of Ocho Rios.

Restaurants and retail are two areas that could provide opportunity for Priory to capitalize on neighboring development in both east and westerly directions. The development of portions of the Drax Hall property would significantly increase this potential and there appears to be renewed interest in this location because of the development of an additional 895 rooms in Mammee Bay.

It is reasonable to assume based on the survey data that if the region experiences growth in the above areas, then water sports patronage will grow in line with the trends encountered through the responses in the survey. (ie the premises which guided their participation in the activities largely hinge on a group of preferred activity).

4.4.4. Ocho Rios

Ocho Rios has the second largest concentration of water sports activity along the north coast due to the many hotels and frequent visits from cruise ships. The area is fairly saturates in terms of its resort offering and water sports activities. At present, activities on the main beach are affected by the closure (for refurbishing) of the largest resort property in the area. Tourism growth is anticipated outside the town in general, in a westerly direction and there is evidence of the attractions sub-sector increasing capacity and presence to capitalize on growing cruise visitor numbers.

This region appears to be facing challenges in dealing with anticipated growth. Growth is expected to be stimulated outside its boundaries rather than within them. The areas of Roaring River to Mammee Bay to the west and Prospect and Tower Isle to the east both have terrain attracting investment capital and significant business expansion activity at present. There is also active refurbishing and upgrading of small scale accommodations which have traditionally been very active in their participation in water sports activity.

In the short to medium term tourism growth will be driven mostly by the cruise ship business and neighbouring development.

4.4.5. Overall Potential for Growth

Ocho Rios has fair saturation in terms of its resort offering and water sports activities. At present activities on the main beach are affected by the closure (for refurbishing) of the largest resort property in the area (this resort re-opened on May 16, 2005). Tourism growth is anticipated outside the town, generally in a westerly direction and there is evidence of the attractions sub-sector increasing capacity and presence to capitalize on growing cruise visitor numbers.

This region along with Negril appears to have the most challenges facing it in dealing with anticipated growth and will tend more to stimulate growth outside its boundaries rather than within them. The areas of Roaring River to Mammee Bay to the west and Prospect and Tower Isle to the east both have terrain attracting investment capital and significant business expansion activity at present. There is also active refurbishing and upgrading of small-scale accommodations that have traditionally been very active in their participation in water sports activity.

In the short to medium term tourism growth will be driven mostly by the cruise ship business and neighboring development.

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 & Recommendations

5.1. Compliance with Watersports Licenses

There is a wide range and significant number of watersports on offer in the St. Ann to St. Mary study area, which poses a threat to safety and the environment there. Given the expanse of the study area, the variety of activities on offer, and the duration of the study, it is very difficult to determine the full extent of illegal watersports activities in the Ocho Rios area; illegal activities include licensed operators who are not abiding by the regulations and unlicensed operators. However, the presence of illegally operating waverunners is highly visible, and the use of these vessels on the water as a means of solicitation adds substantially to the water traffic.

5.2. Watersports Capacity, Zoning & Safety

Capacity assessments were conducted only for the more heavily trafficked locations within the large study area. It is important to recognize that the findings of these assessments should be used as guides, and not definitive or finite figures. The capacity assessments are based on existing conditions and management approaches, and may differ should use patterns and management strategies change.

Most notable in the findings is that the recreational carrying capacity assessed for Ocho Rios Bay is only 1 vessel. This suggests recreational activities within the Ocho Rios Bay should be severely restricted, and the Bay should only be considered as a location for swimming, and the entrance and egress of marine vessels.

Generally speaking for the entire study area, there is general respect shown for not conducting activities within the swim zone. However, there are no clear zones for the carrying out of the different particular activities. Both motorized and non-motorised activities take place together and in relative close proximity.

With regard to use patterns, no distinct patterns were observed during the field assessment, although there were some notable trends with regards to the times and locations of activities.

5.2.1. General Zoning Recommendations

The proposed zoning for the ORMP needs to be finalized and implemented. In fact, zoning requirements for the area in general need to be developed, standardized and implemented. This should take into consideration the following:

1. Appropriate swimming areas (depth, current and wave conditions).
2. Suitable areas for non-mechanised recreational activities (access and wave conditions).
3. Suitable areas for mechanized recreational activities (according to type).
4. Locations for the entrance and egress of vessels to shore.

5. The ISPS Code for Port Security.
6. Fishing areas and Fish Nursery Areas.
7. Mooring and berthing needs.

More specifically, the following should be considered for the Ocho Rios Area, and adherence to same could be stated as requirements of watersports licenses:

- Bathing areas should be clearly marked, using a standardized buoy system. This would provide a visual indication to water craft and bathers as to the distinction between appropriate uses. Aesthetics should be considered in the determination of the buoy systems.
- Entrance and egress channels should be clearly marked, using a standardized buoy system.
- Mooring bouys should be installed in typical anchorage areas, to prevent the ad hoc anchorage of vessels. This is particularly important at dive sites.

5.2.2. General Safety & Environmental Recommendations

Given the obvious disregard for shore and marine safety and within the context of the ORMP, the following safety and environmental considerations are recommended:

- Mooring should only be allowed in designated areas. This may be accomplished through requirements in both the Beach Licences and the Tourism Licences.
- Jet driven vessels (no propellers) should be considered for the tow vessels for Banana Boats etc.
- Refueling on the beach should be stopped in favor of refueling some distance toward the back of the beach. Proper equipment such as funnels and containment supplies need to be used. This should be included in the tourism licence given to operators.
- A formal, proper refueling alternative such as particular fuel ‘depots’ be established in each of the major areas.

5.2.3. Licensing

Based on the observed non-compliance and limitations of both watersports and beach licenses, the following are recommended:

- Soliciting by showing the vessel on the sea should not be allowed and rentals should only be effected from designated areas where there are suitable channels (particularly for waverunners). Put a condition on watersports license for no-solicitation using vessels.
- Establish entry/egress channels, and where relevant watersport licences should make reference to the use of these lanes.

- The beach licensing system should be updated for a number of standardized specifications (buoy size, colour, spacing and anchoring). The conditions of the Beach Licences could be amended to enact this recommendation.

It is imperative to note that all the above recommendations require systems for monitoring and enforcement. The legal implications of the recommendations will be further discussed in the final report for the overall *Carrying Capacity & Safety in Marine Recreational Areas Study*.

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