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Standards for the Approval of New

Hotels in Barbados

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Aloysius Winifred Carrington

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Master in Urban Planning

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STANDARDS FOR THE APPROVAL OF NEW
HOTELS IN BARBADOS

by

Aloysius Winifred Carrington

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

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ABSTRACT

STANDARDS FOR THE APPROVAL OF NEW HOTELS IN BARBADOS

by

Aloysius Winifred Carrington

This thesis focuses on the environmental and land use problems attributed to hotel development in Barbados. There were three specific objectives:

1. To identify problems caused by uncontrolled hotel development.
2. To develop a methodology for analyzing these problems and for identifying possible solutions.
3. To suggest standards and criteria for regulating new hotel development.

The most important finding to come out of this research is the need for comprehensive (rather than fragmented) planning, consistent with national development interests. Poor location of hotels intensifies traffic congestion, accelerates beach erosion and has negative impacts on public beach access, coastal open space and land allocation and conservation. Poor operational practices have deleterious effects on the quality and allocation of domestic water and on the coastal and marine environment. Only with a comprehensive approach to planning can a reasonable compromise whereby adequate provision is made for visitors and locals alike, be reached.

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Chapter 1

INTRODUCTION AND APPROACH TO THE STUDY

INTRODUCTION

The rapid development of hotel industries in many coastal regions of the world is a phenomenon of the last two decades. Hotel development was stimulated by mass travel which was, in turn, made possible by jet travel in the early 1960's.

Many arguments have been advanced for the encouragement of this mass movement of people, now more widely called tourism. Many developing countries throughout the world actively promote tourism in the hope of improving their economies. The reasoning behind such thinking has been well documented (Young, 1965). Some of the more important aspects are:

1) Tourism is a source of foreign exchange. Governments tend to encourage and support industries which earn foreign exchange (export industries) at the expense of those that do not.

2) Tourism is a growth industry and is growing faster than most export industries.

3) Tourism provides employment both for the skilled and unskilled.

In countries with limited mineral resources, tourism also permits the exploitation of geographic location, equable

climate, white sandy beaches and substantial portions of unarable lands.

The literature is also replete with examples of the disadvantages of tourism. In particular, much attention has been paid to the social and environmental costs to local residents. Sociologists seem to be concerned with the impact which large influxes of people can have on the culture of a society and environmentalists with the intensive use or misuse of natural resources. One school of thought, which pervades the literature, suggests that many of the problems caused by hotel development have to do with the attitude of developers and the inadequacy of regulations for controlling development.

In coastal areas, the rule of thumb among resort developers has been to locate highways and accommodations as close to the waterfront as possible. Inevitably, a continuous line of concrete goes up along the beach resulting in a lack of access and views for the resident population (Gunn, 1979). Young (1973) discussed the same problem:

Hundreds of miles of coastline have been ruined irremediably by virtually uncontrolled building of hotels, restaurants, bars and houses. Beaches have been divided into unsightly allotments and noise from juke boxes, fumes from traffic and sheer human overpopulation pay witness to the chaos man has made of the organization of his leisure. These evil consequences are not inherent in the development of tourism; they just happen when tourism is developed in a thoughtless and casual way (op. cit., p. 157).

Purpose

The purpose of this study is to suggest a set of planning criteria and standards which will help to ensure the optimum use of land in the country being studied. Given the extremely limited land resources of the country, coupled with its high population density and the consequent demand for land for residential development, it is important that the government pursue an effective land use policy in order that land is optimally utilized for the benefit of all, and that resources are not eroded.

Problem Statement

This thesis will examine, using Barbados as a case study, some of the problems small countries face when they fail to control hotel development; and will look at possible ways in which these problems can be avoided and hotel development controlled.

The main assumption is, that tourism is desirable in developing countries. The basic question the study addresses is: what are the social and environmental costs of tourism and hotel development? More specifically, two questions are examined: first, how can hotel development exist without causing undue hardship for local residents? Secondly, will this development be beneficial if it also leads to major environmental problems?

Objectives

The objectives of the study are (1) to identify the problems caused by unplanned hotel development; (2) to develop a methodology for analyzing these problems and (3) to suggest standards for the alleviation of the said problems.

Organization of the Study

Chapter 2 describes the methodology used and provides a framework for conducting the research.

Chapter 3 is a case study. It orients the reader to the study area, analyzes growth of the tourist sector in general and the hotel industry in particular, and lists physical constraints to land development. It also discusses specific problems related to hotel development in Barbados and examines possible solutions of these problems based on the guidelines provided in Chapter 2.

Chapter 4 recommends specific standards and criteria for the alleviation of problems discussed in Chapter 3 and suggests a strategy for their implementation.

Chapter 5 consists of summary and conclusions, examines the generalizability of conclusions and points out areas for future research.

SUMMARY

The rapid development of a tourist industry in Barbados and many other coastal areas throughout the world brought a

number of development problems, particularly those related to land use, more sharply into focus. Such problems were particularly visible in Barbados because of the limited land resources available for any type of development. In particular, there was a great deal of concern for the rights of locals. The question was not whether tourism should be encouraged in the first place? but rather, how much tourism can be accommodated without: (1) driving locals away from their favorite beaches; (2) creating water scarcity; (3) polluting the marine environment and causing many of the other problems attributed to the development of a tourist industry. The problem was, how can hotel development exist without creating undue hardships for local people and destroying the natural resources of the area?

Chapter 2

METHODOLOGY

INTRODUCTION

The process of suggesting solutions for the alleviation of hotel development problems requires an understanding of first, the problems and their possible causes; secondly, the existing measures used to deal with these problems and finally, their relative effectiveness. With the data gathered in the process it is then possible to suggest new measures for dealing with these problems. Any such new measures need to be based on existing standards, local trends and current planning principles and practices.

This thesis will use the case study approach. As a methodology, this approach has been used for many years, particularly in the field of political science. It is recognized that there is an inherent problem involved in the use of a case study. While a case study is well suited to an accurate and indepth exposition of the particular case, it is of far less value as a predictive model when it is generalized to other situations. Nevertheless, the method will be utilized here since it remains one of the best tools for understanding the complexities of reality in order that meaningful change may be effected.

CASE STUDY

This research will focus on the problems faced by a small island system, Barbados in particular, as a result of hotel development. This study area is chosen for two main reasons: (1) the country has experienced rapid and intensive growth in tourism and consequently hotel development, over the past two decades and there has been a great deal of discussion at the national level concerning the desirability of the pattern of development that has taken place; and (2) the author's familiarity with the major sources of data for this type of research based on extensive work in both the Tourism Planning and the Urban Planning Departments of the national government.

Using Barbados as the case study, this research will be divided into the following phases:

Phase 1. Problems which have been documented and their relationship to hotel development established are listed according to their sources.

Phase 2. The problems are categorized into two groups, environmental and physical. This serves to facilitate analysis.

Phase 3. Causes of the problems are identified and referenced.

Phase 4. Standards and regulations which currently exist in the study area are reviewed.

Phase 5. The deficiencies of these standards are discussed.

Phase 6. Possible solutions to the problems examined in the previous phases are discussed.

Phase 1

IDENTIFICATION OF PROBLEMS

This phase will identify and describe some of the problems attributed to the physical development of hotels in a small island system. Problems documented either by private, university-based, research or government agencies in the country being used as a case study will be included. This approach is utilized since these sources establish some relationship between hotel development and the problems which they identify.

Only those problems which have to do with the physical use of land will be discussed. The economics of hotel development will only be discussed as far as it affects the demand for land in the first place. These criteria are used in order to give the study an urban planning, rather than an economic focus.

Phase 2

CLASSIFICATION OF PROBLEMS

In order to facilitate the research carried out in phase 3, the problems identified in phase 1 will be divided into two groups, environmental and physical. This classification is useful since it will be necessary to research areas other

than those within the field of Urban Planning in order to better understand the causes of problems.

The causes of problems in the environmental classification, therefore, will be researched not only in planning literature but also in environmental journals and other relevant studies.

This phase is necessary since the causes of the problems identified will influence not only the solutions suggested for their alleviation but also policies in this area. It is therefore important that these problems and their causes are seen in their wider perspective.

Phase 3

CAUSES OF PROBLEMS

This section will identify the causes of each of the problems listed in phase 1. Environmental problems will be discussed first and physical problems second. Causes of the problems will be taken from the same studies that identified the problems in the first place. The causes of the problems given will be checked, through library research, in order to ascertain whether the problems can have different or additional causes to those identified.

Phase 4

REGULATIONS WHICH CURRENTLY EXIST

This section will: (1) explain how development in the country being studied is controlled, and (2) identify specific

legislation which exists. Only legislation which has some relationship to the two groups of problems identified in phase 3 will be reviewed.

Criteria for examining the legislation will be: (1) legislation related to land use planning and/or the environment, and (2) legislation related specifically to the causes of problems identified in phase 3, or the problems themselves as identified in phase 1.

This phase is necessary in order to undertake the next phase which examines the deficiencies of the existing legislation.

Knowing how development is presently controlled in the area being studied will enable us to identify specific control measures which may be used in the future.

The data used in this phase were taken from the Town and Country Development Act 1972.

Phase 5

DEFICIENCIES OF EXISTING LEGISLATION

This phase will examine the legislation described in phase 4 and match it with the causes of problems identified in phase 3. This will indicate what type of control measures are used, if any, for the alleviation of the problems discussed in previous phases. This, in turn, will show whether the problem has to do with inadequate control measures or ineffective implementation of those measures.

Phase 6

IDENTIFICATION OF SOLUTIONS TO PROBLEMS DISCUSSED

This phase will examine current development controls in planning and discuss possible solutions for Barbados, based on the nature of the problems and the type of controls presently in existence as discussed in the previous phases. It will also provide the basis for the recommendations made at the end of the study.

SOURCES OF DATA

Two main sources will be used in this study: primary sources which consist mainly of official publications, unpublished material and studies of the Barbados government; and secondary sources consisting mainly of books and articles in learned journals obtained through library research. The quality of the data then depends almost entirely on the quality of the material obtained from these sources.

SUMMARY

Chapter 2 described the methodology used and developed a framework for conducting the research. The approach used, that of a case study, was described briefly and the following research steps identified: (1) the identification of problems and criteria used for selecting those problems; (2) categorization of problems into groups according to type; (3) identification of causes of problems; (4) a review of

standards and regulations which currently exist in Barbados; (5) identification of the deficiencies of these standards and regulations; and (6) examination of new or modified criteria or standards, found through literature research, which could help to alleviate the problems discussed. Essentially, material in phase 6 will be used as a base for the development of criteria and standards set out in Chapter 4.

Criteria and standards contain a cultural element; thus, ideal standards are not always the most desirable ones. Locals may prefer to frequent a beach which they have traditionally used even though better physical facilities may be provided at one which is closer to their places of residence. Such a decision may be based on the quality of swimming in the area, rather than on distance or the man-made facilities provided.

Chapter 3

RESEARCH CASE STUDY

INTRODUCTION

This chapter provides background material on Barbados, and contains the research findings from the six phases described in Chapter 2.

BACKGROUND

Barbados is the most easterly of the archipelago of islands in the Caribbean Sea (Figure 1). Located 59°37' East longitude and 13°4' North latitude, it is relatively close to the wealthy industrialized countries of North America and Western Europe.

A small island of 430 square kilometers, 42,994 hectares of land, of which only 28,328 hectares are arable, and a population density of 586 persons per square kilometer, it has no significant natural resources.

Colonized by the British, who found it totally uninhabited in 1627, the island's economic history falls into three main phases. The first phase, 1627-1650, was characterized by a peasant economy in which an inexcessive number of settlers pursued a relatively self-sufficient and diversified economy while producing tobacco, cotton and indigo for export.

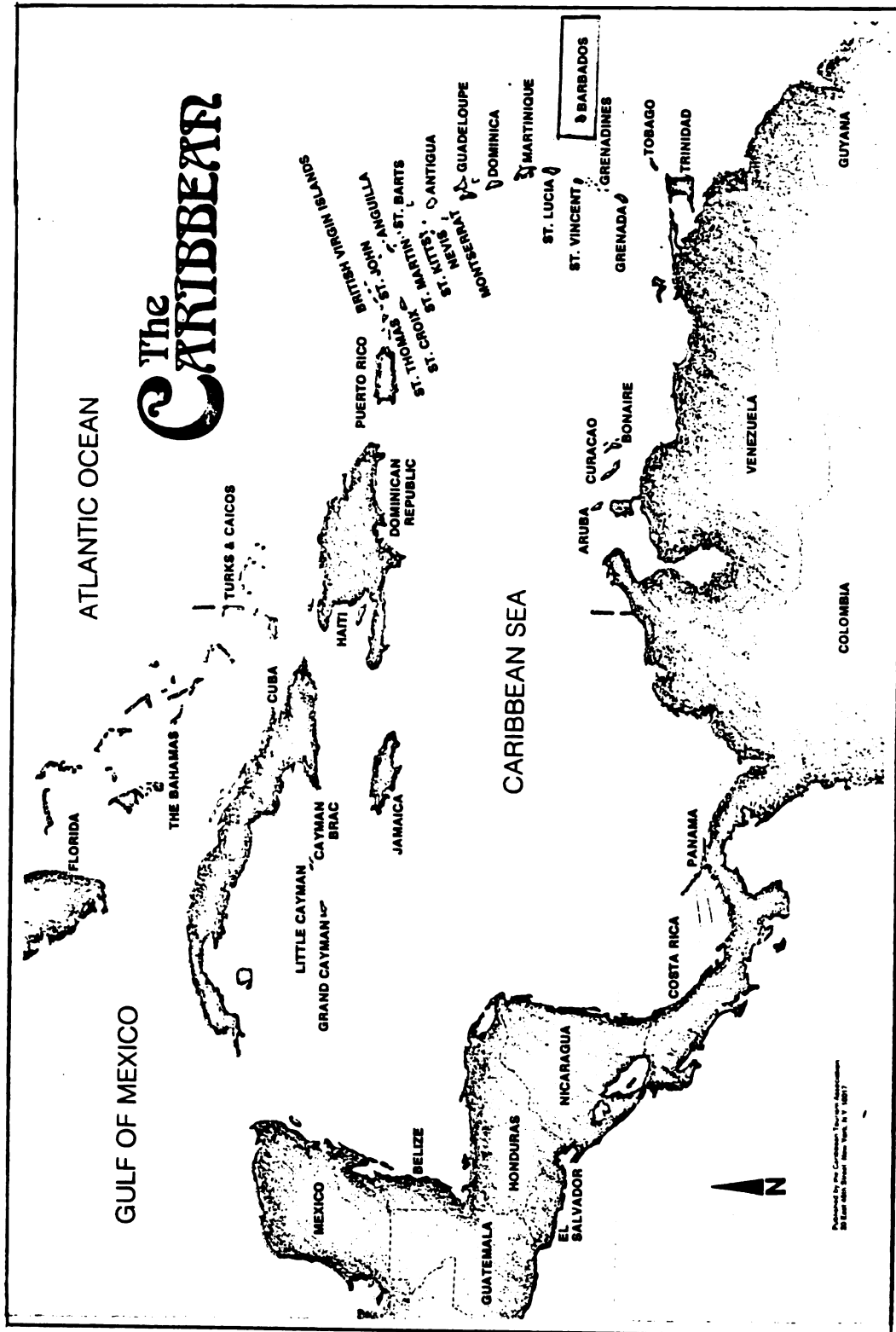


Figure 1. GEOGRAPHICAL LOCATION OF BARBADOS.

During the second phase, 1650-1950, the island was transformed into a rigid and lop-sided sugar export-oriented economy. During this period, little effort was made to exploit what limited opportunities existed for diversification even within the dominant agricultural sector.

The third and present phase, beginning in the 1950's, witnessed the emergence of efforts at diversification; the political decline of the planter class and the rise of more democratic black rulers. Attempts were made to meet the challenge of the country's limited natural resource base and structural dependence by promoting the optimal use of its limited resources while complementing resources, and by diversifying its production structure in the drive towards a more self-sustaining economy. These measures included steps to diversify agriculture by supplementing sugar cane with other cash crops and introducing cane varieties better suited to local conditions, oil exploration, the development and industrialization of fishing activities, the development of a manufacturing sector, environmental protection, intensive and long range programmes in education, human resource development, health and water resources, and the growth of a vibrant tourism sector.

POPULATION GROWTH

The growth of a country's population is one of the major determinants of the rate of social and economic growth of

that country. This relationship between population growth and economic development is widely acknowledged, even if the inter-connecting causes and effects are not fully understood. Tourism, as an economic and social activity requiring the interaction of different peoples in a common setting, can be strongly affected by demographic changes taking place within the host country. The pattern of population growth is of no less significance to land use planning than to economic planning since all development requires some form of spatial expansion.

The population growth of Barbados may be divided into three phases. Phase 1, which lasted until the mid 1930's, was marked by high birth and death rates. Phase 2 was characterized by high birth and low death rates and lasted until the mid 1960's; and Phase 3, the current phase, is characterized by low birth and death rates.

The population of Barbados increased from approximately 172,337 inhabitants in 1911 to 250,000 in 1980. Between 1960 and 1970, there was an annual growth rate of less than .2%. This was largely the result of an extremely high level of immigration and effective control of fertility rates.

Close to one half of Barbados' population is concentrated in the urban region of Greater Bridgetown, an area consisting of approximately 2,428 hectares primarily within the parishes of St. Michael and Christ Church. These two parishes are the most urbanized in the country. Their relative share of the total population increased from 54.7% to 56.5% in 1970.

Growth in Visitor Arrivals

Visitor arrivals to Barbados grew from an estimated 36,000 in 1960 to 370,916 in 1979. Table 1 shows the growth in tourist arrivals over time. Growth was particularly rapid in the 1960's, the factors influencing this growth were technological, economic, social and political. They derived from both external and domestic phenomena. Among them we may identify the following:

1. The arrival of the "jet age". In 1958, the Boeing 707 and the Douglas D.C. 8 aircraft began scheduled flights across the Atlantic from New York to Paris cutting travel time to less than 8 hours. Non-stop flight time from New York to Barbados was cut to 4 hours. Jet travel meant not only a reduction in travel time but also a reduction in the price of long distance travel.
2. The emergence of a highly organized and sophisticated travel industry, including the establishment of travel agencies, and the organization of group and package tours by wholesalers and tour operators. This further reduced the price of travel and for the first time, ensured that not only the very rich could travel.
3. The reconstruction and expansion of the post-war economy of the United States and Western Europe leading to increasing urbanization and rising discretionary incomes.

Table 1. TOURIST ARRIVALS 1960-1980

YEAR	ARRIVALS	% CHANGE
1960	35,500	--
1961	37,100	4.5
1962	44,200	19.1
1963	50,267	13.7
1964	57,625	14.6
1965	68,418	18.7
1966	79,104	15.6
1967	91,565	15.8
1968	115,697	26.4
1969	134,303	16.1
1970	156,417	26.4
1971	189,075	20.9
1972	210,349	11.3
1973	222,080	5.6
1974	230,718	3.9
1975	221,576	-4.0
1976	224,314	1.2
1977	269,314	20.1
1978	316,883	17.7
1979	370,619	17.1
1980	352,089	-5.0

SOURCE: Civil Aviation and Tourism Division, Barbados.

4. The return to a sustained period of peace and relative stability.
5. The institutionalization of minimum holidays with pay ranging from two weeks in the industrialized countries.
6. The popularization of tropical holidays in the winter, strongly influenced not only by the lifestyles of the wealthy but also by aggressive advertising and promotion of destinations and travel interests.

At the local level, these external developments were matched by:

1. Institutional and organizational efforts made by the Barbados Publicity Committee, a voluntary group of business and other interests and later, a better equipped and financed governmental organization, the Barbados Board of Tourism, charged with the overall development of the industry and its marketing and promotion abroad.
2. Financial and other incentives provided under the Hotel Aids Act of 1956, which granted tax and duty free concessions to hotel construction and a Barbados Development Board which provided long-term investment capital.
3. Infrastructural improvements including the construction of a modern air terminal complex.
4. Educational campaigns aimed at facilitating the visitor in Barbados.

Under the impact of these developments, hotel accommodation increased from a total of 1,869 beds in 1958 to 12,727 beds in 1980. This growth is discussed in the next section.

Cruise Ship Passengers. The volume of cruise ship passengers to Barbados increased significantly between 1963 and 1969 but actually declined in 1970, 1971 and 1975 (Table 2). The small numbers arriving in 1975 coincided

Table 2. GROWTH IN CRUISE SHIP PASSENGERS

Year	Number	CRUISE-SHIP PASSENGERS		Cruise-ship Calls	Average No. of Passengers Ship
		Absolute Increase Over Previous Year	% Increase Over Previous Year		
1963	27,184	--	--	74	367
1964	41,671	14,487	53.3%	95	439
1965	52,664	10,993	26.4	118	446
1966	51,593	-1,071	-2.0	158	322
1967	45,451	-6,142	11.9	78	583
1968	78,981	30,530	67.2	130	607
1969	80,565	4,584	6.0	169	477
1970	79,635	- 930	-1.2	154	517
1971	79,159	- 476	-0.6	146	542
1972	100,086	20,927	26.4	181	553
1973	116,469	16,383	16.4	227	513
1974	119,524	3,055	2.6	227	527
1975	98,546	-20,978	-17.6	170	580
1976	N/A	--	--	N/A	N/A
1977	103,077	--	--	N/A	N/A
1978	125,988	22,911	22.0	N/A	N/A
1979	110,073	15,915	-14.0	N/A	N/A

N/A = Not Available

SOURCE: Barbados Statistical Service

with the decline in air arrivals, resulting in a poor year for tourism in Barbados.

Although cruise ship passengers spend less than air visitors, this market is, nevertheless, important for Barbados since a number of duty-free establishments depend on purchases by cruise passengers for a significant portion of their sales.

Growth of Visitor Accommodations

The rapid increase in visitor arrivals brought with it a large number of recognized tourist accommodations. The number of beds available rose from a mere 2,750 in 1964 to 12,727 in 1980 (Table 3).

Undoubtedly the Hotel Aids Act (passed in 1956 and revised in 1967) had considerable impact on this rapid growth. The Act granted duty-free importation of raw materials and equipment for hotel construction or expansion programs and the opportunity to partake of various tax holidays which could delay tax payments to the government for up to ten years on the basis of capital outlays incurred from hotel construction and expansion. Between 1956 and 1970, approximately seventy-seven hotels and other facilities were eligible under the Act. In addition, the government, under the duty-free clauses, allowed the duty-free importation of all hotel operating fixtures, equipment and utensils.

Large blocks of financing have also been provided for big investors and land developers at favorable lending

Table 3. BED CAPACITY IN RECOGNIZED ACCOMMODATION (1964-1980).

YEAR	Luxury		'A' Class		'B' Class		Guest Houses		Apt. Hotels		Total	
		Δ		Δ		Δ		Δ		Δ		Δ
1964	522		945		438		150		695		2,750	
1965	577	55	1,040	95	433	-5	180	30	1,202	325	3,250	500
1966	904	327	1,208	168	471	38	258	76	1,147	127	3,988	738
1967	1,203	299	1,283	75	729	258	363	105	1,217	70	4,795	807
1968	1,503	300	1,483	200	779	50	338	-25	1,277	60	5,358	563
1969	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1970	2,050	547	1,500	17	600	-179	330	18	1,601	324	6,081	723
1971	2,230	180	1,230	-270	474	-126	252	-78	2,587	986	6,773	692
1972	2,252	22	1,304	74	508	34	256	4	3,003	416	7,323	550
1973	2,179	-73	1,545	241	416	-92	399	143	3,430	427	7,969	646
1974	2,179	--	1,545	--	416	--	449	50	3,864	434	8,453	484
1975	2,179	--	1,545	--	416	--	449	--	4,236	372	8,825	372
1976	2,493	314	1,319	-226	940	524	214	-235	4,516	280	9,482	657
1977	2,615	122	1,319	0	1,007	67	263	40	5,048	532	10,243	761
1978	2,497	-118	1,439	120	850	-157	275	0	6,958	1,910	1,277	1,034
1979	2,683	186	1,449	10	940	90	275	0	6,494	-464	11,841	564
1980	3,153	470	1,497	48	940	0	275	0	6,862	368	12,727	886

SOURCE: Central Bank of Barbados and the Civil Aviation and Tourism Division.

rates and over long periods. Some developers were provided with beach and coastal lands through favorable leasehold terms for extensive periods of time (Lewsey, 1978).

Tourist accommodation grew most rapidly between 1965 and 1968. During this period, recognized tourist accommodation grew at an average annual rate of 18.2%. The slackening off in the growth of accommodation was especially noticeable after 1971 and coincided with a decline in tourist arrivals.

Between 1965 and 1970, the number of beds in Class I accommodations increased rapidly while those in Class II and Class III increased at a slower rate. This period was marked by the construction of several new luxury hotels and expansion of existing ones. The second largest increase during the period occurred in the apartment and apartment hotels categories and averaged 25.4%. Although these categories are aggregated for purposes of convenience, it is estimated that apartment hotels accounted for 70% of the total increase in accommodation.

Factors Affecting Development

The major physical factors which affect development of the island are:

- (1) Topography
- (2) Variety and distribution of soil type related to agricultural productivity.

- (3) Special problems of erosion affecting the Scotland district, localized over 1/6 of the island's surface.
- (4) Restrictions on land use necessary to protect ground water resources from contamination.

(1) Topography. The land is generally flat, rising from the West and South in a series of terraces which are parallel to the coast and falls from an elevation of about 274 meters, in an amphitheatre, in the north-east where the more weather resistant coral cap has been removed exposing weaker sedimentary shales and conglomerates. Most of the coral capped, terraced land is under 180 meters and little of the island is over 274 meters. Mount Hillaby, the highest peak, is 339 meters and the general appearance of the land is of flat rolling countryside.

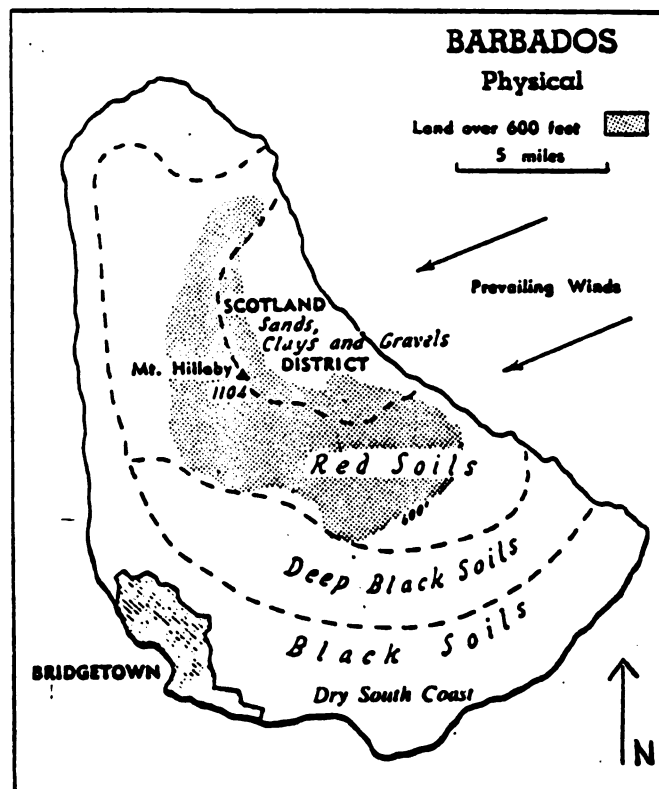
The broad terraces run mainly north and south. The separating cliff edges vary in height between 15 and 18 meters. Where the cliffs are highest, their faces are steep, rocky and barren; the lower cliffs are more gently sloping and well grassed.

(2) Soil Types. There are three major soil types in Barbados (Figure 1). Black soils follow the coast from north and west to the south. In the south, these soils are deep and fertile, along the coast, however, they are too shallow and dry to be suitable for the growing of sugar cane, the island's main export crop. Consequently, they form 16,000 hectares of waste land, grazing and built-up areas.

Red soils of moderate fertility are in the center of the island while in the Scotland District, soils are so poor and eroded that restoration is being carried out.

(3) The Scotland District. Drainage problems in this area affect the stability of the land which is subject to landslip in the wet seasons. Extensive work in reclamation is necessary to restore the land to a normal standard of fertility.

Figure 2. DISTRIBUTION OF SOIL TYPES IN BARBADOS.



(4) Ground Water Protection. The geological formation may be described as Sedimentary Scotland District shales and conglomerates overlaid by the Oceanic Series and fully capped by coral rock 91 meters at its greatest depth.

The ground water which is the island's only source of water supply is stored after filtration through the coral limestone cap and these resources have, therefore, to be protected from the infiltration of deleterious matter.

Consequently, the development of land over probable sources of water is strictly controlled to reduce and eliminate wherever possible, the effects of contamination.

A Water Board Policy statement divides the island into five zones describing the form of sewage disposal, which is permissible in each. In the "Water Reserve Area," there is total prohibition of all new buildings. This, however, covers less than 6% of all land in the island and is coincident for the most part with land which is in agricultural use.

Existing Settlement Structure

The settlement structure of the island can be traced back to the development of the "plantation system" between 1650 and 1950. The plantation was the center of activity, all roads led either from plantations to seaports or to other plantations.

Communication between ports and plantations served two main purposes, (1) all food and supplies used on the

plantation was imported and (2) to export raw sugar for processing. Hence, the heavy emphasis placed on transportation links with Bridgetown (the present capital and site of the seaports) from earliest times to present day.

This pattern of settlement remained virtually unchanged until emancipation in 1834 when the tenantries system came into being. It was not until 1920, however, that a number of free villages, located outside of plantation yards became fully apparent.

With emancipation came the drift away from the rural areas to the urban areas. This draft was largely related to fluctuations in the sugar industry and the cutting up of estate lands for residential and other uses.

The more recent trends in the pattern of settlement coincides with Stage III of the economic development of the island and started in the 1950's. At present, more than half of the total population of Barbados (56.1%) is located along coastal areas in developments on the west, south and south eastern sections of the island. There are also a large number of traditional villages scattered throughout the rural areas, rural tenantries and modern residential subdivisions (Figure 3).

The population settlement structure is based on the concept of an hierarchy of urban centers, each order of which is related, in function and level of amenities and services, to the location and size of the community which it is intended to serve (The Town and Country Planning Office,

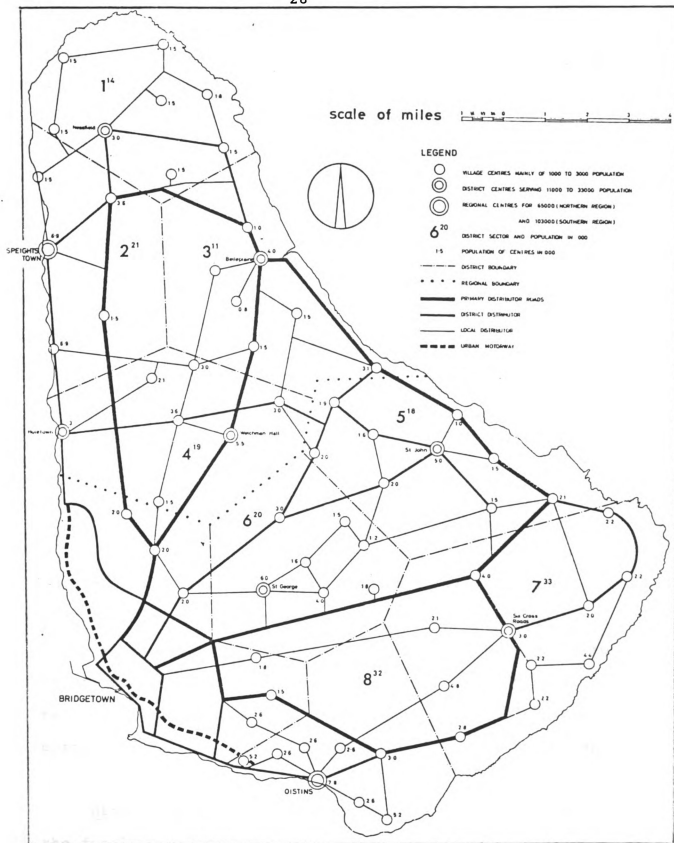


Figure 3. SETTLEMENT PATTERNS

1970). The orders in this hierarchy range from the village center to Metropolitan Bridgetown.

Villages. The village is the smallest unit in the hierarchy of settlements. A village is capable of supporting:

- (a) A one stream primary school of 240 placed comprising six classes of 40 pupils.
- (b) A group of small shops providing for the daily needs of the community.
- (c) Representative chapels of religious denominations.
- (d) A community center.
- (e) A playing field.
- (f) A market place.
- (g) A bus shelter combined with public baths and lavatories.

There are 240 children in primary school for every 1500 inhabitants. A rationalized School Distribution Plans shows that it will rarely be necessary for a child to travel more than 2.3 kilometers or 20 minutes walking distance between his home and the school. This results in a pattern of village centers approximately 2.4 kilometers apart.

Distribution Center. The district center serves as the focal point for a number of villages. The population within the area of influence ranges from 14,000 to 33,000

in a radius of approximately 4 to 5 kilometers. Distance centers supplement facilities in villages with:

- (a) secondary schools
- (b) banks
- (c) supermarkets and department stores
- (d) garages
- (e) post office
- (f) library
- (g) police station
- (h) meat, fish and vegetable market
- (i) parish churches
- (k) social hall with cinema
- (l) playing field and recreation grounds.

Regional Center. Such a center serves a radius of 10-15 meters and a population of 100,000. It provides the following services:

- (a) district maternity hospital and casualty ward
- (b) administrative center
- (c) library
- (d) cinema
- (e) wholesale market
- (f) sports arena or stadium
- (g) park or public garden and band stand
- (h) special tourist attractions
- (i) major commercial center including banks and professional offices.

Bridgetown - Capital City. Bridgetown is the main administrative, commercial, cultural and recreational center of the country. The only major city in the country, its population in 1980 was 99,902 (1980 Census).

The city has over 70% of the total shopping space on the island, both seaports and is the hub of the island's transportation system and home for 40% of the nation's population.

Phase 1

IDENTIFICATION OF PROBLEMS

Problems included here are those documented either by private, university-based research or government agencies in Barbados. This approach is used since these sources establish some relationship between hotel development and the problems which they identify. Problems are divided into two groups.

In Group 1 are problems identified by Lewsey (1978) and these include: (1) inadequate public access to beaches; (2) insufficient open space for recreational activities; (3) beach erosion; (4) water scarcity and pollution; (5) marine pollution and (6) traffic congestion.

In Group 2 are problems compiled from research conducted by the Town and Country Planning Office and the Ministry of Tourism. They include problems related to: (1) Social Carrying Capacity as it relates to beach capacity; (2) land speculation and (3) land conservation. Problems documented

by these two departments but listed in the previous group are not listed a second time.

Group 1

Inadequate Public Access to Beaches. Along the densely populated south and west coast areas there are approximately eleven government maintained public accesses, most of which are located at public recreation areas. Not only are these inadequate in number for the size and distribution of the population which they serve but their state and quality, in respect of the maintenance and support facilities, require improvements.

Insufficient Open Space for Recreational Activities. Intensive coastal development along the west and south coasts has virtually obliterated public bathing beaches. The problem is particularly serious since beaches are the only free recreational facilities available to locals. A survey done by the Town and Country Planning Office revealed that most of the areas currently used by locals for recreation purposes have been approved for development and those not approved are under pressure for hotel development.

Beach Erosion. Building construction closer to the shoreline than desirable has upset the natural equilibrium resulting in erosion of beaches. Visible stop gap measures such as groynes are not necessarily helping the situation since groynes can prevent material, such as sand and pebbles

from moving into the most vulnerable parts of the beach.

Water Scarcity. This was not identified as a current problem, but as a potential problem which could surface as early as 1985 if alternative methods of obtaining water are not explored.

Water Pollution. The limestone substructure of the island requires that all ground water resource areas be protected from contamination. The policy of the Government has been to keep water reserve areas free of development. However, indirect pressures have forced encroachment of new subdivisions in the vicinity of ground water protection areas. Additionally, fierce competition between tourism and domestic land needs has forced the location of sanitary land fill areas in the immediate vicinity of some of the island's primary reserve areas.

High levels of nitrates and nitrites have shown up in test samples of drinking water taken from taps in the vicinity of ground water protection areas. The presence of high levels of nitrates in tap water means that an indeterminate degree of organic leechate is seeping into the underground water channel system. It is also an indicator of a pollution problem.

Marine Pollution. The presence of coliform bacteria and substandard levels of oxygen in marine waters are indicators of marine pollution. The level of dissolved oxygen in marine water varies with temperature. When the level of

oxygen in the water falls below the level expected at that temperature, there is a pollution problem. Lewsey (1978) states that coliform counts in Barbados' marine environment are rising and the water contains substandard amounts of dissolved oxygen. This problem, if left unchecked, could ruin the prospects of the tourist industry.

Traffic Congestion. There are severe traffic congestion problems, at peak hours, in and around the Bridgetown area (capital city). The problem is at it's worst during the tourist season because of increased automotive rentals resulting in a larger number of private vehicles on the road and of increased demand for public transportation services. The resulting confusion and congestion in and around Bridgetown is out of proportion with traffic conditions elsewhere on the Island.

Group 2

Social Carrying Capacity As It Relates to Beach Capacity.

Tourism planners suggest that the major constraint to tourism growth is the ability of the society to absorb large numbers of visitors without this putting a strain on the social tolerance of the indigenous people. The most likely place for such strain to occur is the beach since this is the area most frequented by tourists and local residents alike. How much interaction can locals withstand before their tolerance level is reached? and whether there is a

maximum number of visitors that should be allowed in the country in the first place, are important issues. Tourism planners seem to be in favour of setting a numerical limit on the number of visitors to the country in a single year and the number most often cited is 500,000. This represents a visitor population twice the size of the local population. A breakdown in the visitor/resident relationship would represent a very serious problem for the tourist industry.

Land Speculation. In the Revised Draft of the Physical Development Plan prepared by the National Town and Country Planning Office, it was suggested that developers may be hoarding land approved for hotel development for speculative purposes. This creates two problems: (1) it means that considerable amounts of land are not being utilized and (2) that more land may be tied to hotel development than is necessary. The problems are particularly serious given the extremely limited land resources of the island.

In a single year (1972), it was estimated that 364 hectares of plantation land had been pulled out of agriculture and "banked" for development by private persons. Between 1976 and 1979, a total of 2,965 hotel beds were approved for construction. By May 23, 1980, only 44 percent had been built and there were many approvals issued prior to 1976 still to be taken up.

Land Conservation. The problem here is the preservation, in their natural state, of areas of historical and ecological

significance. These areas need to be saved from hotel or other development since they form part of the local history and heritage of the people and therefore should not be lost to future generations.

Phase 2

CLASSIFICATION OF PROBLEMS

For analytical purposes, the problems listed above may be classified into two categories; environmental and physical. This distinction corresponds to whether the problems are related to land distribution or not.

The environmental problems are not related to the distribution of land. They are largely man-made and include traffic congestion, water scarcity and pollution, marine pollution and erosion.

The physical problems are those relating to land distribution and include inadequate public access to beaches, insufficient coastal open space for recreational activities, social carrying capacity as it relates to beach capacity, land speculation and land conservation.

Phase 3

CAUSES OF PROBLEMS

While all of the problems dealt with here may be traced to tourism growth and, more specifically, to the location and operation of hotels, many of them have causes which rapid

hotel development simply brought more sharply into focus. Lewsey (1978) pointed out that many of the problems cannot be completely attributed to tourism. The haphazard type of development which presently exists in Barbados is the result of decades of unplanned and uncontrolled growth resulting in a pattern of development which did not consider proper spatial relationships. Below are listed the causes of the problems already described. Problems of an environmental nature are discussed first, and physical problems second.

Environmental

Traffic Congestion. The problem of traffic congestion in Bridgetown is a result of (1) the rapid increase in the total vehicular traffic and car ownership in the Island; (2) obsolescence of the city's street pattern to cope with the growth in volume of vehicular traffic; (3) increased employment opportunities in Bridgetown resulting in increased traffic flows into and out of the area; and (4) the city's role as a connecting link between the south and west coastal areas. All tourist traffic, travelling between the airport in the south and the heavily developed west coast, passes through Bridgetown.

Water Scarcity. Lewsey estimated that visitors to Barbados utilized 25% of the estimated island wide reserves of potable water. Cumulatively, tourists and residents

utilized 78% of the island's total known reserves. Projections to 1985 indicate that visitors to the island are expected to use 27% of the island's known reserves and residents 90%. Thus, jointly, demand is expected to exceed supply, leading to depletion of the island's water resources.

Pollution of Potable Water. This problem has been attributed to the improper disposal of waste. The location of sanitary land-fill areas in the immediate vicinity of the island's water reserve areas has resulted in an indeterminate degree of organic leechate seepage (containing high levels of nitrates and nitrites) into the underground water channel system. Fierce competition for land between tourism and local residential development, as well as poor overall planning, has brought about this state of affairs (Lewsey, 1978).

Marine Pollution. The presence of coliform bacteria in the marine environment is an indicator that insufficiently treated sewage is entering the water. This is the result of the predominant use of septic tank systems close to the land-sea interface (Lewsey, 1978). These sewage outfalls and storm drain systems have affected marine life on the southwest coast.

Erosion. The main causes of beach erosion are: (1) siting of structures too close to the sea; (2) the occasional blasting of channels in protective fringe reefs to create white pools for pleasure and craft usage and (3) the removal of coastal vegetative cover.

Physical

Inadequate Public Access to Beaches and Coastal Open Space for Recreational Activities. These two problems have similar causes and are, therefore, discussed together. They are the result of intensive hotel development along the south and west coasts. This development virtually obliterated visual and physical access to beaches and public open spaces in these areas. These problems are attributed not only to unplanned and uncontrolled hotel growth but also to the fact that government had practically no urban reserves of land in the area. If private development is to be effectively controlled, it is important that the government own strategically located lots of land which can be used for public purposes.

Social Carrying Capacity As It Relates to Beach Capacity. As beach use continues to intensify, there are repeated calls from government as well as concerned local residents for the establishment of user limitation levels or "carrying capacities". Social carrying capacity is defined as that aspect of total carrying capacity concerned with the number of other people which users can tolerate and still maintain a quality experience (West, 1981).

The theory behind the concept of social carrying capacity is that persons who feel crowded, visitors or local residents, would cease to use the area. If the theory holds true, then the consequences could be disastrous for any tourist destination area.

The major problem in testing the theory seems to be in measuring "crowding". When does a person feel so crowded that he decides not to return to a particular beach. It has been suggested that on-site surveys of users fail to measure crowding accurately because long-time users who know the area, tend to feel the most crowded and, thus, do not return. Such "displaced" users would not be included in current on-site survey samples. Results from limited tests carried out in Michigan, however, do not support the "displacement thesis".

Land Speculation. Land approved for hotel development fetches a higher price in the open market than land approved for residential or other types of development. The hope of making substantial profits from the buying and selling of land may be the major reason for keeping land approved for hotel development vacant.

Land Conservation. Pressure for hotel development as close to the sea as possible is the major reason for land, which should remain as open space, being engulfed by hotel development. Attempts to protect and conserve areas of natural beauty in the island require identification of the areas worthy of preservation and control of land use against quarrying, building or other forms of commercial exploitation such as tree felling, dumping and littering.

Phase 4

REGULATIONS WHICH CURRENTLY EXIST

In Barbados, land use planning is the responsibility of the government minister under whose portfolio the Town and Country Planning Office falls (The Attorney General), the Town and Country Planning Advisory Committee and the Chief Town Planner.

The Minister must secure consistent, continuous and comprehensive policies for the use and development of all land in the island.

The committee advises the Minister on any matter on which the Minister seeks its advice, on the preparation of development plans and on matters relating to the planning of development in the island.

The Chief Town Planner is responsible for the preparation of the Physical Development Plan. Preparation of such a plan requires that a survey of the whole island be carried out. The final plan should consist of a report of the survey together with a plan showing how he proposes that the land in the island may be used and the stages by which such development may be carried out. The Minister may approve the plan under Section 5 of the Revised Planning Act of 1972.

In Barbados, with certain exceptions, all development requires the prior approval of the local planning authority, the Town and Country Planning Office. The authority has

considerable discretion in this matter. Although it must have regard to the provisions of the physical development plan, it may take any other material considerations into account. Indeed it can approve a proposal which does not accord with the provisions of the development plan. If the proposal does not involve a substantial departure from the plan and does not injuriously affect the amenity of the adjoining land either, the Authority's discretion is unlimited. In other cases, approval requires the discretion of the Minister responsible for planning.

Planning decisions issued can be one of three kinds: unconditional permission; permission subject to such conditions as the Chief Town Planner thinks fit or outright refusal. There is a right to appeal, to the Minister, against conditional permissions and refusals. If the authority exceeds its statutory powers, there is also the right of appeal to the courts. Planning applications which raise issues of major importance to the society can be called in for ministerial decision.

Control is carried out largely through the use of enforcement notices, under this procedure an owner who carries out development without permission or in breach of conditions can be compelled to "undo" the development, even if this involves the demolition of a new building (and this has been known to happen). Before enforcement notices are issued, warning notices are sent to owners/developers, informing

them that the development is an infringement of the Town Planning regulations and that they should, therefore, stop the development.

The authority derives its power from the ordinances contained in the Town and Country Planning Act 1965 and the Revised Act of 1972. The legislation includes: regulations for plot ratios, road reserves, building lines and heights of buildings; the Health Services (Hotels) Regulations 1969 which deals with health conditions in the hotel, size of rooms, access to light, etc.; tree and building preservation orders; control of advertisements; the Land Acquisition Act (1949) and Land Acquisition Amendment Act (1964); the Urban Development Corporation Act 1965 and Protection of Water Resources.

Tree and Building Preservation Orders

These regulations provide for the preservation of trees, woodlands, and buildings of architectural or historical interest in any part of the island. For the orders to be effective, however, the Minister must supply a list defining the position of trees, groups of trees or woodlands and a list of all buildings and sites worthy of preservation. To date, neither of these lists has been written into the legislation.

Land Acquisition Act (1949) and Land Acquisition (Amendment)
Act 1964

The Acts provide for the acquisition of land for public purposes, either by agreement or compulsorily, at prices which reflect the existing use of the land to be acquired. In extension of these powers, the 1965 Planning Act provides for the acquisition of land for planning purposes.

Urban Development Corporation Act (1965)

This act was passed to establish a corporation with powers to hold, acquire, develop, dispose and manage land for urban purposes.

Protection of Water Resources

The protection of water resources is accomplished solely by restrictions on the development of land. These restrictions are imposed and enforced solely by the Town and Country Planning Office. Given the present growing concern with and expertise in water quality management, it may be desirable to allocate some of this responsibility to the Water Board or other water specialists.

Phase 5

DEFICIENCIES OF EXISTING LEGISLATION

Environmental

Beekhuis (1981) observed that in many Caribbean countries, environmental considerations are not incorporated

into development planning. National policies on marine pollution control and coastal and marine protection are either of very recent creation or nonexistent. The problem is aggravated by a lack of integrated marine pollution monitoring and research programs, as well as the lack of standards for water quality, seafood or the disposal of toxic materials.

In Barbados, the only existing regulation aimed at ensuring the quality of potable water is that on the protection of water reserve areas from structural development. Domestic or industrial wastes, however, are not the only causes of water pollution. Nitrogen and carbon, two sources of pollution, are abundant in the environment and phosphorous, the third major source, is present in large quantities in fertilizers and detergents.

The problem of marine pollution has two dimensions: (1) pollution of the Caribbean Sea which affects the region as a whole and (2) localized environmental problems which largely affect the land mass in the immediate area.

Although there is no existing legislation on the protection of the marine environment in Barbados, the need for control measures was summed up by the Barbados Delegation to the Law of the Sea Commonwealth Caribbean Conference in 1978:

The pollution problems of the Caribbean Sea may not have reached the magnitude of those in the Baltic and Mediterranean...but the similarity of land locked configuration

of the Caribbean with the potential for retention of pollutants from a developing region warrants early preventive action. If the countries of this region are to benefit from the exploitation and sharing of the resources of the Caribbean Sea it becomes imperative that immediate action is taken to arrest the trend towards destruction of marine life which is so essential to the maintenance of the marine ecological balance and to the sustenance of our people (Quoted in Rodriquez, 1981).

The second problem relates to such localized environmental problems as high coliform counts and substandard oxygen levels. These problems affect the development of certain economic activities, such as coastal tourism and fisheries which depend on a healthy marine environment. Barring the existing policy against removing sand from the beach there are no regulations in this area.

Beach Erosion. The policy of the Town and Country Planning Office has been to prohibit the building of structures beyond 30 meters or the cliff edge or high water mark, whichever is nearest. However, this regulation is often waived on the south and west coasts where building lines were in existence prior to it's adoption.

There are no regulations governing or preventing the blasting of reefs.

Existing regulations providing for the protection of trees is ineffective because there is no National Register containing a list of trees or groups of trees worthy of preservation.

Physical

Beach Access and Open Space for Recreation Activity.

There is no existing legislation to prevent building development on established or accepted public rights of way to popular beaches and coastal recreation areas in Barbados. Furthermore, once development has taken place, there is no legal method by which private owners can be made to maintain a public beach access.

Social Carrying Capacity As It Relates to Beach Capacity. All beaches in Barbados are public and it is therefore illegal to ban persons, visitors or locals, from any beach. It is therefore difficult, if not impractical, to regulate capacity through legislation.

Land Speculation. The problems here are: (1) no legislation exists to regulate the length of time for which an approval is valid. Land can be approved for a particular type of development, without any obligation on the part of the applicant to develop it, and (2) there is no stated policy on the limiting of new hotel construction based on projected demand for such accommodation.

Land Conservation. Provision is made for the preservation of areas of natural beauty and historical significance through Preservation Orders. For the legislation to be effective, a National List of such areas must be accepted by the Minister. The Barbados Conservation Society has compiled a list of buildings and sites worthy of conservation; however, there is a problem with the definition of

boundaries and the list has not yet been accepted by government.

Phase 6

IDENTIFICATION OF SOLUTIONS TO PROBLEMS DISCUSSED

The solutions suggested in this phase are based on the data examined in the previous phases.

Traffic Congestion.

The problem of traffic congestion is evident only in the Bridgetown area. This is primarily the result of the intensification of land use in the central area of the island's largest city. More people are attracted within a limited time in to an area of restricted size and along a road system which is inadequate to cope with a large volume of traffic.

It has been suggested that the traffic problem of Bridgetown is not so much a reflection of a state of urban congestion throughout the island but due principally to a lack of other urban centers of sufficient size to relieve the area of the load placed upon it. Thus, a policy of decentralization has been suggested since it is not felt that the area can cope with unrestricted expansion of motor vehicle traffic.

Alleviation of the traffic congestion problems in the central area would seem to require two solutions: (1) the development of other commercial centers in the island with the potential to attract large numbers of shoppers and

offering a wide variety of goods and services. This would divert some of the existing traffic (vehicular and pedestrian) away from the Central area; and (2) implementation of regulations for the control of traffic in this area.

Traffic regulations should include: (i) the restricted use of the motor car; (ii) the diversion of traffic travelling between the south and west coasts away from the area.

(i) Restricted use of the motor car would require that persons doing business in the downtown area, leave their cars outside of the area. An adequate number of car parking facilities would have to be provided for such persons; in addition, depending on the distance between these parking facilities and the downtown, a shuttle system for transporting these people may have to be provided.

(ii) At present, most traffic travelling between the south and west coasts, use Bridgetown as a connecting link. The construction of a by-pass road around the central area would divert most of this traffic.

The following non-legislative measures are also suggested: (1) the provision of an adequate public transportation system; (2) improved facilities for the private motorist including the provision of access roads and multi-story car parks and (3) hotels should be required to provide for the sale of essential items on their premises, this would help to reduce the number of trips made to the central area.

Water Scarcity

Barbados obtains all of its potable water from underground wells. The total water resources were estimated at 204 million liters per day of which only 132 million liters per day would be available for public water supply. Presently, about 138 million liters of water are used per day. Assuming an average per capita consumption of 318 liters per day, the island could support an ultimate population of 413,000 persons or, possibly 580,000 persons if control by metering is employed. This capacity is expected to meet the needs of the projected island population up to 1985. However, the rate of water usage attributed to the tourist industry (water used mainly in hotels) was found to have a significant negative impact on the fixed reserves of potable water. Lewsey (1978) estimated that visitors utilized 25 percent of the estimated island wide reserves of potable water. Given the combined demand for potable water by visitors, the local population, industry and commerce, Barbados could be facing serious water shortages as early as 1985. However, there are alternative methods of obtaining potable water and hotel developers should be encouraged to examine and develop some of these possibilities. After 1985, then, all persons seeking permission to develop land for hotel purposes may be required to satisfy the authorities that they can provide a continuous supply of water.

Water Pollution

The maintenance of high quality potable water, in Barbados, essentially requires that water reserve areas be protected. As a result, building construction has been prohibited in water reserve areas in an effort to prevent discharged sewage and other deleterious matter entering the water system. However, residential subdivisions and hotel developments have encroached on these areas. In addition, some sanitary land fill areas have been located in their immediate vicinity.

Pollution of potable water by organic leechate seepage from sanitary land fill areas located close to water reserve areas may be an indicator that these dumping areas need to be relocated. There are three methods of garbage disposal and these are discussed below. The cleanest of these methods is the incinerator type where refuse is delivered to the incinerator plant and burned. This method is also the most expensive. However, given the small size and compactness of the island, along with the fact that there are no large tracts of land available for garbage dumping, the construction of a single incinerator plant may be a very worthwhile investment.

The three types of garbage disposal along with their advantages and disadvantages are:

1. Dumps: In this process, refuse is dumped in a designated area where it is burned periodically and plowed

under. Before burning, garbage and rubbish may or may not be separated. This method is normally utilized by small communities with an ample amount of open land.

It provides land fill for marginal areas, is inexpensive, and is simple to operate and supervise. The major disadvantages are the offensive odors produced and the propagation of insect and rodent populations.

The use of dumps requires approximately 1 hectare of land per 10,000 population served.

2. Sanitary Fill: This process is similar to dumping except that refuse is covered with earth. Refuse is dumped in specified spots and the whole operation is well organized. Sanitary fill areas are usually found in medium or high density areas.

This system is relatively inexpensive, simple to operate and provides land fill for marginal areas. The disadvantages here are the insects and rodents that can result if the system is not constantly supervised.

Sanitary fill areas require four acres of land per 10,000 population (De Chiara, 1975).

3. Incinerator: In this process, refuse is delivered to the incinerator plant where it is burned. This method is usually restricted to large, high density urban areas.

The advantages of this method are: (1) it is an extremely clean operation which does not facilitate the breeding of insects and rodents and (2) the process can be used to make steam.

Among the disadvantages are: (1) the high initial operating costs and (2) its contribution to air pollution.

This technique is used mostly in industrial areas and requires about 4 or 8 hectares of land for operation.

Ensuing quality potable water in Barbados would seem to require the following: (1) standards for maintaining the quality of such water need to be set and adhered to; (2) standards regulating the capacity and location of septic tanks should be rigidly enforced and (3) the method of garbage disposal throughout the country should be improved.

Water quality standards are set out in Appendix B and minimum requirements for septic tanks in Chapter 4. The existing system of dumping garbage in open areas is inappropriate given the small size of the country and existing pressures for land for development purposes. It is estimated that by the open dumping method described above, the island would require a minimum of 20 hectares of land or the existing population of 250,000 persons. This is calculated at the rate of 1 hectare per 10,000 population served.

The use of sanitary-fill areas requires 40 hectares of land in order to serve the existing population of 250,000.

The installation of an incinerator plant on the island would require 4-8 hectares of land and would also eliminate the following problems:

- (1) the large number of rodents and insects caused by the use of dumps or sanitary-fill areas;

- (2) the odor emanating from these dumps;
- (3) the unsightliness of dumping areas especially within the urban area.

The use of an incinerator plant would also free more land for development purposes. Operation of such a plant, however, is particularly costly in the initial phases but the benefits to be derived may far outweigh the costs.

Marine Pollution

Marine pollution is caused largely by the inadequate disposal of waste. The presence of coliform bacteria in marine waters is an indicator that inadequately treated sewage is reaching the sea. The problem has been attributed to poor location, poor maintenance and overloading of septic tanks.

The predominant use of septic tank systems in close proximity to the land/sea interface, and sewage outfalls and storm drain systems emptying directly into the sea have already affected the subaqueous ecosystems of the south west coast of Barbados. Inadequately treated sewage increases coliform counts and lowers oxygen levels in natural waters. This increases the growth of algae and has negative impacts on coral reef formation and marine life.

In order to maintain a quality marine environment, it is important that specific standards for water quality be achieved. The first requirements in alleviating the problem is to define specific quality standards for the surrounding waters and conduct frequent tests to ensure that these standards are being upheld. In addition, minimum capacities of septic tanks and minimum distances for their location away from wells, property lines, foundation walls, water lines, seepage pits and drywells should be specified and dumping of untreated sewage into the sea should be prohibited.

The minimum capacity of septic tanks should be based on the number of bedrooms proposed.

Beach Erosion

During periods of storm attack and changes in the rate of littoral drift, cycles of significant erosion have been apparent in locations along the southwest and west coasts. The occurrence coincides with enclaves of intensive tourism development. Blasting of channels in the protective fringe reefs, to create white pools for pleasure and craft usage, and the removal of protective vegetative cover have increased the rate of erosion in these areas.

Maintaining an adequate beach littoral free of building development and strict monitoring of protective sea walls, groynes and harbour protection works can help to slow down the erosion process.

Placement of structures along the beach can be controlled by stipulating minimum distances, for construction activity, away from the high water mark or cliff edge. A policy of locating structures at least 100 meters away from the high water mark or cliff edge is recommended for all new development. In areas where the building line has already been established, each application should be considered on an individual basis. Insufficient space on the beach to accommodate a particular development, should not be a sufficient condition for the relaxation of this policy. There is also need for regulations to control the creation of white pools within beach areas and the removal of vegetation.

Access to Beaches

The problem here relates mainly to the south and west coasts of the island where intensive hotel development has taken place. The remaining coastal areas are virtually free of man-made barriers. Examination of aerial photographs for 1950, 1964, and 1973 showed the gradual occlusion of the island's south and west coast vistas and public access to beaches. In reality, public beaches became the private property of the individual property owners who built fences around properties thereby limiting access to the beaches behind. The problem of access, however, seems to have more to do with ease of access to beaches than with the number of access points. On the west and south

coasts, at least 58 access points from the road to the beach were identified. Of this number, 38 were footpaths, and 20 were suitable for vehicular movement. Most accesses were disorganized trails, of varying widths, between houses. Twenty-two were located on publicly owned lands and thirty-six on private property.

Eleven of the accesses on government owned land were well organized and maintained by the Parks and Beaches Commission. Four of these, located at Brighton, Brandons, Sandy Lane and Folkstone, are on the west coast and the remainder on the south coast. Some of the major existing accesses to the beach are described in Appendix A.

Several elements can be used to describe access. Managers can control the ease of access by the type of access provided (e.g., roads, trails, footpaths) and by the means of conveyance allowed (e.g., car, horse, bicycle). Both access elements can vary from easy to difficult and therefore design standards are important in defining the range of access systems. Roads and footpaths can be designed as high standard systems, requiring intensive maintenance, or low standard roads and/or paths needing little or no maintenance. In many cases, the topography and type of vegetation will help define the conveyances that can be used. Thus, a combination of natural features, design and maintenance standards and regulations determine access.

In order to facilitate easy access to beaches by the local population, it is necessary to determine the number and location of access points required to satisfy the needs of the local population. Ideally, accesses to be developed should be chosen from those already existing and should be spaced approximately 2 kilometers apart or as close to this standard as possible. The quality of beaches for bathing should also be taken into consideration when selecting accesses for development.

Provision of an adequate number of access points requires: (1) the acquisition by government of the more important access ways in the area and (2) development and maintenance by the Parks and Beaches Commission of those areas acquired.

Coastal Open Space for Recreational Activities

Coastal open space provided by public authorities need not be subject to market forces and requires careful consideration in order to ensure that an adequate supply of such facilities exists. On the supply side, the provision of coastal open space has an opportunity cost represented by the benefits which could be derived from its alternative use as a site for hotel or some other development. On the demand side, under-provision of recreation space results in deprivation, in some way, of the population of the area (Evans, 1974).

Coastal open space, like other goods and services provided by public authorities, assumes no person should be deprived of access to beaches, or the opportunity for physical recreation, by reason of his economic or social status or geographical location.

The provision of open space, however, requires more than the allocation of a calculated area for every 1000 population. Open space allocated in this way may be wrongly located, giving some areas too little and others too much. It is, therefore, necessary to plan for various grades of open space (Onokerhoraye, 1977).

Location and Spacing. The location of open space should depend on the size of the population in the area in which the open space is to be provided. Sometimes, however, the most heavily used open spaces and the most populous areas do not coincide.

The range of influence of an open space depends on the maximum distance persons are willing to travel for the benefits provided by that particular facility (Berry and Garrison, 1958). Generally this distance will vary with the grade of open space, particularly the quality of the beach for swimming and the level of facilities, as well as with the mode of travel available to persons using it (Onokerhoraye, 1976).

Using these concepts as a base, it is possible to suggest a system of open space provision for different levels of use. Other factors which influence the location

of open space are land availability, level of socio-economic development, mode of travel, and the level of existing use for recreational purposes.

Three levels of open space are suggested: local open space, district open space and regional open space.

Local Open Space. Comprises an area of 2 to 4 hectares and caters to a population of one to five thousand persons drawn from a 1 kilometer radius. Children's play areas and sitting facilities for old persons and workers, during lunch hours, are provided in a landscaped environment.

District Open Space. Comprises an area of 4 to 12 hectares and caters to a population of 5 to 10 thousand persons from a 3 kilometer radius. There is a vehicular access, car parking facilities and all the facilities found in the local open space areas.

Regional Open Space. Comprises an area of 12 to 20 hectares with pedestrian and vehicular accesses. In addition to the facilities found in the district Open Space, provision is also made for the parking of public transport vehicles, active recreation, a restaurant and entertainment. Such space is frequented by people from areas of 3/4 to 1 hour driving distance.

Many of the coastal areas on the south and west coasts, traditionally used by locals as picnic areas, have already been developed with hotels. Most of the remaining areas

either have development permissions, which will effectively, nullify their present use or are increasingly coming under pressure for hotel development. Only three areas on the south and west coasts, the Brighton/Brandons, Accra/Rockley and the area adjacent to Good Shepherd Church are not under immediate pressure for hotel development. Two of those three areas are controlled and managed by the Parks and Beaches Commission. Below is a list of picnic areas under pressure for hotel development.

Table 4. EXISTING PUBLIC RECREATION AREAS IN BARBADOS WHICH HAVE BEEN APPROVED FOR ALTERNATIVE TYPES OF DEVELOPMENT.

AREA	TYPE OF DEVELOPMENT
Batts Rock	Erection of a condominium block and erection of a hotel.
Paynes Bay	Erection of a hotel, apartment/hotel and or condominium with ancillary facilities and subdivision of land for residential use.
Heywoods	Construction of an apartment/hotel complex and amusement center (construction presently underway).
Long Beach	Erection of hotel, apartment hotel and use of land for residential purposes; outline subdivision for alternate development (a) hotel; (b) housing; subdivision of land for hotel purposes and development of land for residential and hotel use.
Road View	Use of land for hotel/apartment purposes and erection of an apartment/hotel and beach bar.

SOURCE: Town and Country Development Planning Office, 1980.
Revised Draft of the Physical Development Plan,
 Unpublished.

The amount of open space allocated for use by local residents depends, primarily, on the recreation policy adopted by the government. At present, beaches provide the major, and often the only, recreation areas for the island's population. If this present policy is maintained, it is imperative that a strategy be implemented to save the few remaining open coastal areas from hotel development. With the exception of three areas, the Brighton/Brandon, Pebble and Accra Beach, all of the remaining areas have been approved for hotel development.

As a matter of urgency, Government should acquire land at the following locations for public recreational purposes: Batts Rock, Paynes Bay, Long Beach and Road View. These areas having been acquired, would have to be upgraded. Three types of open space should be provided: (1) local open space; (2) district open space; and (3) regional open space. Criteria for defining these open space types in Barbados, are set out in Chapter 4.

Social Carrying Capacity As It Relates to Beach Capacity.

The problem here seems to be the lack of provision of a sufficient number of adequate beach areas for locals. Most hotels are located along the best swimming areas in the island. This forces locals interested in swimming to use these areas. The existing practice of hoteliers, that of spreading beach chairs from their property line to the

water's edge, virtually barricading the area, has further aggravated the problem thus causing some fear among tourism planners that locals may feel deprived and either openly show their aggression or stop using the beach completely.

Determining the social carrying capacity of the island is a very difficult task. As pointed out earlier, the major problem here has to do with measurement, namely the apparent inability of researchers to measure crowding accurately.

However, there are ways in which the number of persons using the beach at any one time can be regulated. These factors include size of access, availability of parking and type of facilities offered. Unavailability of one or more of these elements can reduce the degree of beach usage.

Opinions expressed as early as 1953 by authorities in the Mid-west of the United States indicate that an ideal beach would be 200 meters long and 33 meters deep. Beaches longer than 1,200 meters are undesirable because of the administrative difficulties they present (West Michigan Shoreline Regional Development Commission, 1979).

Current planning practices in Los Angeles and Westchester County recommend 7 to 14 square meters of beach per person. There should be enough beach space to accommodate 7 percent of the population to be served.

Criteria for determining beach capacity are:

1. Allow beach space for 7 percent of population to be served.

2. Allow a minimum of 7 square meters of space per person.

Beach capacity then may be used as one of the elements for determining the social carrying capacity of the island. Assuming that 7 percent of the local population use the beach at any one time, and each person requires approximately 7 square meters of beach, then the remaining capacity can be allocated to visitor use.

If it is found desirable to separate visitors from locals on the beach, this can be done through the allocation of facilities provided. Large number of persons are more likely to visit beaches where access is easy and the surrounding area well maintained and amenable than beaches which are difficult to access or undeveloped. Minimum beach requirements for visitors and locals are set out in Chapter 4.

Land Speculation

The problem of hoarding vacant land for hotel development in a situation of extremely limited land resources is particularly serious especially when it is suggested that there is already an over-supply of certain types of hotels on the island. When the supply of hotel accommodation was matched with the demand for that accommodation, only Class

I or luxury hotels experienced an under-supply of accommodation (Table 5).

Table 5. THE SUPPLY OF AND DEMAND FOR VARIOUS TYPES OF ACCOMMODATION DURING 1979.

Type of Accommodation	Proportion of Demand	Proportion of Supply
Class I	37.0	22.6
Class II	5.0	12.2
Class III	12.2	7.0
Guest Houses	0.8	2.3
Apartments/Apt. Hotels	45.0	54.8

SOURCE: Town and Country Development Planning Office Barbados, 1980. Revised Draft of the Physical Development Plan. Unpublished.

Should the majority of lagging applications suddenly be taken up this situation could be considerably worsened since the total supply of accommodation is increasing faster than the demand for that accommodation.

The real problem here is the need for control over quantities of land released for tourism purposes. Under the present system, the granting of permission to develop land for hotel purposes does not ensure that construction actually occurs and therefore allows increasing quantities of land to be approved for hotel purposes. In addition, there is no policy to match the supply of accommodation with the demand for the accommodation. One solution might

be to impose a time constraint on all commercial permissions so that they lapse if not taken up within a given time period. However, this is not thought to be, in itself, an effective solution since the owner/developer can reapply for permission to develop that land and, barring some unforeseen circumstance, there is every possibility that the development would be approved.

What seems to be required is some mechanism whereby planners can limit the number of approvals issued in order that the supply of accommodations would more closely match the demand for accommodations. Only then would placing a time limit on the validity of permissions be effective in helping to control the problem.

A two-part solution is suggested: (1) limit the time period for which permits to develop land for hotel development are valid; and (2) hinge the number of permits approved on the estimated number of hotel rooms required to satisfy the projected demand. This method ensures that developments are approved only if the demand exists. On this basis, developments would not be automatically re-approved simply because they were granted permission previously.

Land Conservation

Land conservation requires the identification of districts worthy of conservation and the appropriate legislation to ensure the protection of these areas from

commercial development.

To be of historical and cultural significance, a structure or area should have outstanding historical and cultural significance in the nation, state, region or community in which it exists. Such structures and sites may include:

(1) those structures or sites in which the broad cultural, political, economic or social history of the nation or community is best exemplified, and from which the visitor may grasp in three dimensional form one of the larger patterns of the country's heritage;

(2) structures or areas that are identified with the lives of historic personages or important events in the main currents of national or local history; and

(3) structures or areas that embody the distinguishing characteristics of an architectural type-specimen, inherently valuable for a study of a period, style or method of construction; or a notable work of a master builder. Mere antiquity is not a sufficient basis for selection of a structure for permanent preservation, but can be a factor if other more significant examples have disappeared or if the building forms part of an especially characteristic section of a given community. Small structures, such as the wooden houses of the pioneers, may be of relative importance as mansions of the past.

A list of conservation areas has already been formulated by the Barbados Conservation Association. However,

boundaries of these sites have not been agreed upon.

Resolution of this problem requires (1) a list identifying historic sites and delineating boundaries of sites worthy of conservation in Barbados; (2) acceptance of this list at the Governmental level and (3) a policy for acquiring, developing and maintaining these areas by government authorities.

The following considerations may be used in defining district boundaries:

1. Where a plantation road, farm road, access way or public road exists at the end of the agricultural use within reasonable proximity to the shoreline, it can be used as the boundary between the agricultural and conservation district.

2. Where a vegetation line such as a windbreak or row of trees more clearly marks the edge of the agricultural practice, this can be used.

3. In cases where the shoreline is a steep cliff, the top of the ridge can be used.

4. Where no readily identifiable boundary such as any of the above can be determined, a line 100 meters inland of the line of wave action can be used.

SUMMARY

Chapter 3 provided background data on Barbados, discussed specific problems faced by the country and solutions to those problems.

Background material included: (1) a description of the growth of the tourist industry in Barbados including data on the growth in tourist arrivals, cruise ship passengers and the growth of visitor accommodations, and (2) physical factors affecting development in Barbados. The major factors identified are topography; variety and distribution of soil type; special problems of erosion and restrictions on land use necessary to protect ground water resources from contamination; and a brief description of the existing settlement structure.

The problems discussed relate to traffic congestion, water scarcity, water pollution, marine pollution, beach erosion, the provision of coastal open space for recreational activities, the capacity of beaches, land speculation and land conservation.

Solutions to these problems were discussed within the guidelines specified in Chapter 2. Essentially, they related to measures for regulating hotel development which can help to alleviate the problems discussed. In cases where it was felt that government action is required, the type of action needed was specified.

Chapter 4

RESULTS AND RECOMMENDATIONS

INTRODUCTION

This chapter is divided into two parts. Part I lists standards and criteria suggested for alleviating some of the problems related to hotel development in Barbados. Part II recommends a strategy for implementation of these standards.

Part I

CRITERIA AND STANDARDS

Standards and criteria suggested here relate not only to hotels themselves but to traffic, water, sewage disposal and recreation planning. These standards are included in order to ensure some consistency in the overall planning of the area since it is extremely difficult for a goal or uniform set of objectives to be achieved through a fragmented approach to planning.

Traffic Congestion

Examination of the causes of traffic congestion problems in Barbados indicates that improved traffic regulation methods and road standards are not enough to effectively deal with the problem. At present, too many people are using

the only major shopping and commercial center in the island. What seems to be required is a decentralization policy whereby goods and services can be obtained outside of this area. This would relieve the pressure on the central area. This study, therefore, recommends that:

(1) Small hotels (those of 50 rooms or less) make provision for the sale of small, essential items on their premises; and

(2) larger hotels or groups of hotels provide a wider range of goods, including souvenirs, in addition to such other commercial services as banking.

Water Scarcity

This problem has two aspects: (1) that of satisfying the demands of the local population and (2) that of satisfying the demands of visitors.

Since the government is committed to providing a continuous supply of water for the local population, the limited potential reserves should be preserved for use by locals.

(1) The local population should be guaranteed 273 liters of water per person per day.

(2) Hotel developers should be required to satisfy local planning authorities that they can provide a continuous supply of water. New hotel developments which cannot provide adequate quantities of water, after allocation has been made for locals and existing hotels, should not be

permitted. The water requirements of various types of hotels are given in Table 6.

Table 6. WATER REQUIREMENTS OF SELECTED HOTEL TYPES.

Type of Hotel or Accommodation	Liters of Water Per Day
Cottages with seasonal occupancy (per resident)	227
Clubs	
Country (per resident member)	454
Country (per non-resident member)	114
Guest house (per person)	227
Hotels with private baths (2 persons per room)	273
Hotels with private baths (per person)	227
Apartment hotels with bath, toilet and kitchen space facilities (per bed space)	227
- with bed and toilet (per bed space)	182
Restaurants with toilet facilities (per patron)	32-45
- without toilet facilities (per patron)	11-13.6
- with baths and cocktail lounge (additional quantity per person)	9
Swimming pools (per swimmer)	45

SOURCE: De Chiara, Joseph, et. al., 1975. Urban Planning and Design Criteria. Toronto: Van Nostrand Reinhold Co., p. 525.

Water Pollution

This problem requires: (1) the setting of water quality standards, and (2) strict controls over the disposal of garbage. The justification for making these recommendations is to prevent water pollution. With respect to (1) above, clear standards to ensure the quality of two types of water are recommended for Barbados. The water types are labelled Class SA and Class SB. Class SA water is suitable for drinking. Class SB water is suitable for irrigation of crops, among other uses. Standards, to help ensure a minimum quality of these waters are set out in Appendix B. In the case of (2) it is strongly recommended that Government set up an incinerator plant for the disposal of garbage. Hotels desirous of using public sanitation services for the disposal of garbage should be made to pay user fees. These fees may be used to help ensure the proper maintenance of existing dumping areas and/or the proposed incinerator plant.

Marine Pollution

Similarly in order to prevent marine pollution, criteria for judging the quality of existing water need to be set. These criteria should be set according to the use to which the water will be put. Appendix C identifies four categories of marine waters and lists standards for each. No establishment should be allowed to discharge raw sewage into the sea.

In particular, hotels using septic tanks should ensure that these tanks meet the requirements outlined in Tables 7 and 8.

Table 7. MINIMUM CAPACITIES OF SEPTIC TANKS.

Number of Bedrooms	Minimum Liquid Capacity Below Outlet Invert (liters)
2 or less	3410
3	4091
4	4546
Each additional bedroom add	1137

SOURCE: De Chiara, Joseph, et. al., 1975. Urban Planning and Design Criteria. Toronto: Van Nostrand Reinhold Co., p. 559.

These capacities provide for plumbing fixtures and appliances, including automatic sequence washers, garbage grinders and dishwashers.

The design of the septic tank should provide (1) adequate volume for settling; (2) adequate space for sludge and slum storage; and (3) easy access for cleaning. The structural design and construction materials used should be in keeping with generally accepted good engineering practice. The tank provided should be durable enough to sustain dead and live loads and the liquid and earth pressure involved in each case.

The location of the septic tank must be such that it achieves the following minimum distances as shown in Table 8.

Table 8. MINIMUM DISTANCES FOR SEPTIC TANKS.

DISTANCE (meters) FROM:	DISTANCE TO:			
	Septic Tank	Absorption Field	Seepage Pit	Absorption Bed
Well	17	33	33	33
Property Line	3	2	3	3
Foundation Wall	2	2	7	2
Water Lines	3	3	7	3
Seepage Pit	2	2	--	--
Drywell	2	7	7	7

SOURCE: De Chiara, Joseph, et. al., 1975. Urban Planning and Design Criteria. Toronto: Van Nostrand Reinhold Co., p. 558.

Beach Erosion

Since the use of beaches is essential to tourism, it is important that the quality of these beaches be preserved. Two procedures can help to slow down the erosion process currently taking place along intensively developed coastal areas: (1) strict monitoring of protective sea walls, groynes and harbor protection works and (2) keeping the beach littoral free of structural development.

(1) Unsuitable protective sea walls, groynes and harbor protection works can intensify rather than alleviate the erosion process.

(2) All new hotels or related developments should be located at least 100 meters from the high water mark or

cliff edge. In areas where the building line has already been established, each application for development should be dealt with on an individual basis (this recommendation was proposed in the Revised Draft of the Physical Development Plan for Barbados). Effective use of such legislation would also inhibit the indiscriminate clearing of the natural vegetation, thereby conserving an important natural feature of the coast.

Beach Access

New hotels should have access to 380 linear meters of beach per 100 occupants or 1 linear meter for each user (assuming 50% of all occupants use the beach at any one time). For new hotels, this amount should be available after allocation has been made for local residents and existing hotels.

In order to ensure ease of entry to beach areas, the following standards are recommended for roads and footpaths.

Roads: Ideally access roads should be open at one end only with provision for a turn around at the other. The right-of-way should be at least 16 meters with a 30 meter diameter turn around. The pavement should be between 10 and 12 meters with a 25 meter turn around. The maximum grade should be 5 percent. This type of access should not be longer than 170 meters.

Footpaths: These should be developed as necessary, landscaped and properly signed.

In addition (1) future hotel structures should be sited in such a way that the few remaining views to the sea are not completely obstructed and (2) developers should provide for free pedestrian movement along the water's edge adjacent to their properties.

Coastal Open Space for Recreational Facilities

It is recommended that government pursue a policy of providing recreational facilities along coastal areas, since for many locals, beaches are their only source of recreation. Such a policy would require not mere access to beaches, but also significant amounts of open space adjacent to beaches. Most of these areas would be used for passive recreation such as picnicking. Space requirements for different types of activities are given in Table 9.

Location. A number of areas on the south and west coasts have traditionally been used by locals as picnic areas. With the exception of four of these, which have already been acquired by government for public purposes, all the others have been approved for hotel development. As a matter of urgency, the following four areas should be acquired for public purposes: (1) Batts Rock; (2) Paynes Bay; (3) Long Beach, and (4) Roadview. These four areas are the only remaining undeveloped areas in Barbados with good swimming beaches.

Areas at Long Beach, on the south coast, and Good Shepherd, on the west coast should be developed as regional

Table 9. STANDARDS FOR RECREATIONAL ACTIVITIES.

Type of Recreational Activity	Space Requirements for Activity per 1000 population	Ideal size of Space Required
<u>ACTIVE</u>		
Childrens play area (with equipment)	0.2 hectares/ 1000 pop.	0.4 hectares
Field play areas for young children	0.6 hectares/ 1000 pop.	1.2 hectares
Older children-adult field sports	0.6 hectares/ 1000 pop.	6.0 hectares
Outdoor tennis and other court sports	0.4 hectares/ 5000 pop.	0.8 hectares
Major boating activities	40.5 hectares/ 50,000 pop.	40.0 hectares
Golfing	1-18 hole course per 50,000 pop.	49.0 hectares
<u>PASSIVE</u>		
Picnicking	1.6 hectares/ 1000 pop.	varies
Parking at recreational areas	0.4 hectares/ 1000 pop.	varies

NOTE: 1 acre = 0.40468 hectares.

SOURCE: De Chaira, Joseph, et. al., 1975. Urban Planning and Design Criteria. Toronto: Van Nostrand Reinhold Co., p. 363.

open space areas while those at Batts Rock, Paynes Bay, Tourist Trap and Enterprise should be developed as district open space areas. The remainder of the beach access areas described in Appendix A may be developed as local open space areas. Criteria for defining different types of areas are as follows:

Local Open Space. The area should be landscaped with a well maintained pedestrian access and changing room facilities.

District Open Space. In addition to the facilities found in local open space areas, district open spaces should have a vehicular access, car parking facilities and a life-guard station.

Regional Open Space. In addition to the facilities found in the District Open Space, provision should be made for: (1) parking or public transport vehicles; (2) active recreation; and (3) restaurant and entertainment facilities.

Social Carrying Capacity As It Relates to Beach Capacity

The total social carrying capacity of the island should be related to the carrying capacity of beaches. In order to determine the carrying capacity of beaches, a minimum of 7 square meters of beach area per person should be allowed for 7 percent of the total population; and 7 square miles per person for each visitor using the beach. Only

beaches with some potential for swimming should be included in this survey. There is need for research into the degree of beach usage by local residents and visitors.

Land Speculation

Land speculation should be controlled in order to encourage the immediate use of scarce land resources. Towards this end, a two step solution is recommended: (1) the number of permissions issued to new hotel developers should be limited. This number should be based on existing trends in the demand for certain types of accommodations. If the demand for Class B type hotels is declining, the number of new permits issued should be in keeping with this declining demand for Class B hotel rooms. The second recommendation relates to the length of time for which permits are valid. Permits should be valid for a 4 year period from the date of issue. This would give local persons, desirous of entering the business, adequate time to raise the required capital. Re-approval of permissions would depend on the demand for that particular type of facility at the time of application.

Land Conservation

Although the major concern of this study is for the preservation of sites of national importance along coastal areas, since these are the ones most likely to be lost to hotel development, a comprehensive conservation policy is

suggested. Such a policy would include all lands worthy of conservation in the island.

It is recommended that a Conservation District be set up in Barbados. In determining which areas should be included in such a district, the following types of land should be given high priority:

(1) lands necessary for protecting watersheds, water resources, water supplies and preventing floods or soil erosion;

(2) lands used for national parks;

(3) lands used for the conservation, preservation and enhancement of scenic or historic sites;

(4) lands for preserving wilderness and beach reserves, for conserving endemic plants, fish and wildlife, for forestry, and other related activities to these uses;

(5) coastal areas having an elevation below the high water mark;

(6) lands with steep topography that may not be normally adaptable for urban, rural or agricultural use;

(7) lands with a general slope of 20% or more which provide for open space amenities and/or scenic values.

(8) lands undergoing major erosion damages and requiring corrective action by the national government; and

(9) lands suitable for farming, flower gardening, operation of nurseries or orchards, grazing, growing of commercial timber, hunting and recreational uses including facilities accessory to such uses when the said facilities

are compatible with the natural physical environment
(adopted from Hawaii Land Use Commission, 1969, p. 8-9).

Part II

IMPLEMENTATION

The use of four policies are suggested for implementation of recommendations made in this research. They include: (1) land banking; (2) taxation; (3) the use of conditions attached to decisions issued by the local planning authorities; and (4) private participation.

1. Land Banking

This term has been applied to a wide range of public and private activities in which land is held for future use. There are two major types of land banking activities: project land banking and general land banking.

Project land banking differs from general land banking in that it is concerned with a specific functional area. Activities which have been placed in the project category include (1) holding land for urban renewal, low- and moderate-income housing, open space, industrial development and (2) advanced land acquisition for public purposes. This type of land banking is aimed at immediate implementation of recommendations.

A general land bank would not only be empowered to dispose of land, for all purposes, but would not be required to identify the purpose, for which specific sites would be used, at the time of acquisition.

A policy of project land banking may be the most effective means of ensuring: (1) adequate beach access to locals; (2) coastal open space; and (3) the existence of conservation sites.

Government already has the power to acquire land through the Land Acquisition Act of 1949 and to hold land under the Urban Development Corporation Act of 1965.

2. Taxation

In a planning sense, a taxation policy seeks to achieve inducement rather than control. It attempts to persuade economic man (or corporation) to pursue his self-interest in keeping with the public interest by injecting costs for behavior which is not in the public interest and opportunities for behavior which is in keeping with the public interest.

Tax policy as a planning tool must be tested by three different standards: (1) the translation of legislative intent into accomplished results; (2) the finesse with which the policy can be applied; and (3) the consistency of policy formulations.

Perhaps the two most important questions to ask when suggesting a tax policy are (1) Does the tax system have unplanned effects which aid or hinder the pursuit of planning goals? and (2) How might we use the tax system as an instrument to accomplish the planning purpose, bearing in mind that taxation of any sort represents an intrusion upon

"normal" market forces and inevitably results in a different distribution of income than would be the case without such intrusion?

The tax measures suggested here are: (1) the use of hotel aids and duty free concessions (both already in existence) to control land speculation; institution of fees for the use of public sanitation facilities and increased rates for those developments using water from the public water system.

The gains from land speculation can also be reduced by increasing capital gains taxes on changes in land use and through government acquisition of the land for public purposes.

3. Conditions Attached to Decisions

Subjecting permitted hotel development to certain conditions may be one of the more important tools for implementing the recommendations suggested in this report, given the existing system of development controls in the country. Hotel developments may be approved subject to the following conditions:

1. The building line of the development needs to be in keeping with that specified for the area.

2. The hotel should provide for the sale of consumer goods and services.

3. Each hotel needs to demonstrate that it has access to the minimum linear frontage of beach required for its size.

4. Each hotel should satisfy the authorities that it can provide a constant supply of water.

5. The plans for the disposal of garbage and sewage must meet the minimum requirements set out by the authority.

6. Provided the hotel is located along the coast, owner/operators should keep the area along the water's edge free of any obstruction to pedestrian right-of-way.

Private Participation

Local Service clubs should be encouraged to landscape and otherwise develop open public areas in order to make these areas more appealing to the public. One service club has already landscaped an open area near the harbor. Once these area are developed, however, government should undertake to maintain them.

SUMMARY

This chapter identified standards and criteria for alleviating hotel related problems and strategies for their implementation.

All new hotels should be required to (1) provide for the sale of essential items on their premises; (2) pay a user fee for using public sanitation services; (3) ensure that septic tanks are properly maintained and meet the minimum requirements set out in Tables 6 and 7; (4) ensure that protective sea walls, groynes and other harbour protection works are properly maintained; (5) ensure that all

structural development is within the building line specified for the particular area; (6) preserve, wherever possible, the natural vegetation of the area; (7) provide an adequate access to the beach for occupants; (8) site structures in such a way that the few remaining coastal views to the sea are not completely obstructed and (9) provide for free pedestrian movement along the water's edge adjacent to their properties.

Standards and criteria were also suggested for government agencies. They related to: (1) provision of recreational areas for use by locals along the coast; (2) limiting the number of permits issued to new hotel developers; (3) limiting the length of time for which permits issued to hotel developers are valid and (4) establishing a conservation district.

A four part strategy was suggested for the implementation of the above recommendations. It comprised (1) a policy of project land banking; (2) a taxation policy; (3) the use of conditions attached to decisions and (4) participation by private persons, particularly service clubs, in upgrading open space areas.

Chapter 5

SUMMARY AND CONCLUSIONS

INTRODUCTION

This chapter summarizes the approach to the study, and discusses the generalizability of the methodology developed and the major research findings. It also identifies areas for future research.

SUMMARY AND CONCLUSIONS

This thesis focused on the environmental and land use problems attributed to hotel development. The major issue addressed was how can hotel development exist without causing undue hardships for local people and destroying the natural resources of the area? In order to do this, a methodology was developed for examining the problems and developing solutions for the alleviation of these problems. To this end, criteria and standards were suggested.

It was recognized however, that criteria and standards contain a cultural element. Thus, ideal standards are not always recommended as appropriate for the area under study. Instead, standards adapted were based on the ideals set out in planning policy, but on current planning practice and on the existing situation in the area being studied.

The study concluded that: (1) there are specific problems associated with the physical development of hotels; (2) that there are measures which can be used to control hotel development.

Specific conclusions identified were:

(1) A decentralization policy should be adopted in order to relieve the pressure on the Bridgetown area. In particular, hotels should be made to provide for the sale of goods and services on their premises.

(2) New hotels should be encouraged to develop alternative sources of drinking water.

(3) Water quality standards should be set and there should be strict controls over the disposal of garbage.

(4) The disposal of sewage should be strictly regulated and untreated sewage should not be discharged into the sea.

(5) Since the use of beaches is essential to tourism, a building line, located at least 100 meters from the high water mark or cliff edge should be established.

(6) Minimum standards for roads and footpaths should be enforced in order to ensure ease of access to beaches.

(7) In order to ensure that locals are not deprived of traditional recreational areas, government should acquire some of the more popular open space areas for public use. In particular, areas at Batts Rock, Paynes Bay, Long Beach and Roadview were recommended as requiring high priority

since all of these areas had already been approved for hotel development.

(8) In order to ensure that beaches are not overcrowded, new hotels should be required to have access to a minimum length of beach per anticipated guest.

(9) The number of permissions issued should be limited as well as the time period for which such permissions are valid.

(10) There is need for a conservation district on the island.

GENERALIZABILITY

Many of the problems discussed here can be readily identified in many areas of the world where intensive hotel development is taking place. A search of the literature showed that similar problems have been identified not only in small island systems, such as the Hawaiian Islands, but also in larger countries such as the United Kingdom and the United States. Unfortunately, there is a scarcity of related research from which methods of analyzing these problems and ways of developing solutions can be abstracted. The methodology developed here may, therefore, be useful in helping to analyze and develop solutions in these areas.

It is recognized, however, that each country or area studied may have a certain peculiar combination of characteristics, related to the size of the country, the density and

distribution of population and the political/administrative structure of the island.

FUTURE RESEARCH NEEDS

Based on the findings of this research, the following needs were identified:

(1) the pattern and nature of beach erosion in Barbados and effective measures which can be used to stabilize beaches.

(2) Acceptable standards for the maintenance of quality inland and marine waters.

(3) Effective measures for controlling pollution of the wider Caribbean Sea.

(4) Examination of alternative methods of obtaining potable water and identification of possible funding sources for projects, and

(5) The use of beaches by both locals and residents, and the capacity of beaches.

APPENDIX A

Appendix A
BEACH ACCESSES IN BARBADOS

Listed here are some of the more readily identifiable beach accesses on the west and south coasts of Barbados.

THE WEST COAST

Seventeen accesses are described, starting from those at Brandons in St. Michael and proceeding in a northerly direction to Heywoods in St. Peter.

1. Brandons

This area has two well defined access points, one is an unpaved road originating at the Farm Housing Area; the other is a paved road, leading from Brighton. The beach has been developed and is maintained by the Parks and Beaches Commission as a picnic spot. Adequate changing and parking facilities are provided.

2. Brighton

There are two adequate access points to the beach. The parking area provided can be easily reached from either access.

3. Batts Rock

A well defined but unpaved access, with some space for parking, runs across private property. There are plans to relocate this access route.

4. Swiss Chalet

A narrow, paved, signed footpath provides access to a small beach area.

5. Barbados Beach Village

A small, paved pedestrian footpath leads onto the beach. There is not much scope for improving this access.

6. Paynes Bay

This is an organized area, approximately 500 meters long and 20 meters wide, facing onto the sea with no organized access.

7. Area North of Tamarind Cove

This area, approximately 1 hectare, faces directly onto the sea. It is presently used by locals as a recreation area.

8. Area Opposite West Beach Village

The small, unpaved access runs across private property. It is not heavily used.

9. Sandy Lane

A well maintained footpath at the southern end of Sandy Lane beach leads to an area relatively unsuitable for swimming. The beach, however, is more than 1.6 kilometers long and at the southern end, Sandy Lane Bay, more than 400 meters of wide beach and excellent swimming conditions combine to produce what is probably the finest beach on

the west coast.

10. Good Shepherd

A paved road provides the only access to one of the best and widest beaches along the west coast. The beach along this area is one of the best for swimming and picnicking north of Batts Rock.

11. Folkstone

This area is presently being developed by the Parks and Beaches Commission as a picnic area and marine park.

12. Area South of Check Point Mini-Mart

Access to the beach area is well defined but requires surfacing. There is some parking available, however, the beach has very limited potential.

13. Reads Bay

There are two accesses to the beach area, both are narrow and disorganized. Neither access has much potential for improvement.

14. Carlton

This access runs across private property and is extremely disorganized. The beach, however, is very good for swimming and extremely popular with locals.

15. Mullins Beach

This is in effect an open area with a restaurant facility. Parking facilities should be provided for the use of

persons using the restaurant.

16. Road View

The two small, very inadequate accesses to the beach are both located on private property.

17. Heywoods

This area is presently being developed for hotel purposes. However, it is expected that adequate access to the beach will be provided for locals.

THE SOUTH COAST

Here are described thirteen areas at which access to the beach can be made.

1. Pebble

This area is well organized, has a restaurant and adequate parking facilities. The beach is good for swimming.

2. Graves End

This is a well treed, open area with an organized, paved access to the beach. The road requires proper maintenance; and changing room facilities should be provided.

3. Asta

This access runs across private property. It requires general maintenance and signing. Site conditions render parking in the area difficult.

4. Area near Kentucky Fried Chicken

A small, paved footpath leads to a very poor area for swimming.

5. Accra

The access here runs across private property. The area is, however, well organized and maintained by the Parks and Beaches Commission.

6. Area Opposite Rendezvous Hill

This access also runs across private property. The existing physical conditions of the area do not allow for the provision of amenities.

7. Area near Rydal Waters

This area is presently being developed by the Parks and Beaches Commission.

8. Dover

The area has well organized beach facilities maintained by the Parks and Beaches Commission.

9. Area near Rainbow Reef and Salt Ash

Two narrow, unpaved accesses lead to a beach of very limited capacity.

10. Area near Tourist Trap (Maxwell Coast)

This area requires a great deal of organization; it needs a well defined access, parking and changing room facilities. The only large open space south of Dover, it provides the only means of accessing the Maxwell Coast area.

11. Enterprise

This area requires a defined parking area as well as changing room facilities. It is, in effect, an open "window" to the sea and is very popular with locals for passive recreation purposes.

12. Silver Sands

There is a well defined access which requires signing only. The area is maintained by the Parks and Beaches Commission.

13. Long Beach

Two very inadequate accesses, across private property, provide entrance to the largest beach in Barbados. The beach is over 1.6 kilometers long and 40 meters wide. It is remarkably straight, bounded at both ends by rock out-croppings and protected by coral reefs 500 to 500 meters off shore.

APPENDIX B

Appendix B
STANDARDS OF WATER QUALITY -
INLAND WATERS

Inland waters are divided into two classes, Class SA and Class SB.

Class SA waters are those suitable for drinking and all other water uses. Their character must be uniformly excellent. The characteristics of such water are:

- (1) The level of dissolved oxygen present should be maintained at the level naturally found in such waters;
- (2) there should be no deposits of sludge, solid refuse, floating solids, oils, grease or scum unless these deposits are of natural origin;
- (3) the color and turbidity must be none other than that of natural origin;
- (4) the total number of coliform bacteria should not exceed a monthly arithmetic mean of 100 per 100 mililitres;
- (5) the taste and odor should be that of the natural water;
- (6) the pH (potential of hydrogen) should be that which naturally occurs; and
- (7) there should be no temperature increases other than those which occur naturally (De Chiara and Koppelman,

1975, p. 604).

Class SB waters are those suitable for bathing and other primary contact recreation. These waters are acceptable for public water supply only with appropriate treatment. They are also suitable for agricultural and certain industrial processes, cooling uses and they constitute as well an excellent fish and wildlife habitat. They are of excellent aesthetic value. The characteristics of such waters are:

- (1) the minimum level of oxygen present at any time should be 5 milligrams per litre (There may be seasonal variations due to temperature changes but these should be established.);
- (2) there should be no deposits of sludge, solid refuse, floating solids, oils, grease or scum;
- (3) the color and turbidity should not be concentrated enough to impair the usages assigned to this class of water;
- (4) the total number of coliforms should not exceed a monthly median of 1,000 per millilitre nor more than 2,400 per 100 millilitres in more than 20 percent of the samples collected;
- (5) the taste and odor should not impair any usages assigned to this class nor cause taste and odor in edible fish;
- (6) the pH should lie between 6.5 and 8.0; and

- (7) only increases in temperature that do not impair any usages specifically assigned to this class of water should be allowed (De Chaira and Koppelman, 1975, p. 604) .

APPENDIX C

Appendix C
STANDARDS OF WATER QUALITY -
MARINE WATERS

Marine waters are of four water use classes, Class A, Class B, Class C and Class D.

Class A waters are suitable for all seawater uses including shellfish harvesting for direct human consumption (in approved shellfish areas), bathing and other water contact sports. They are of excellent aesthetic value.

The characteristics of such waters are:

- (1) they should contain not less than 5.0 milligrams of oxygen at any time (except for seasonal and diurnal changes);
- (2) there should be no deposits of sludge, solid refuse, floating solids, oils, grease or scum;
- (3) the color and turbidity should be such that usages specifically assigned to this class are not impaired;
- (4) the number of coliform bacteria present should not ordinarily exceed 230 per 100 millilitres for a 5-tube decimal dilution or 330 per 100 millilitres for a 3-tube decimal dilution.
- (5) the taste and odor should be that of the natural water;

- (6) the pH should lie between 6.8 and 8.5; and
- (7) the allowable temperature increases should be not more than 2.2°C over the monthly means of maximum daily temperatures from October through June nor more than 3.2°C from July through September. All temperatures are those at the surface of coastal waters.

Coastal B waters are those suitable for bathing, other recreational purposes, industrial cooling and shellfish harvesting after purification. They are excellent for fish and wildlife habitats.

Class B waters should contain:

- (1) not less than 5 milligrams of oxygen per litre at any time (except for seasonal or diurnal variations);
- (2) no deposits of sludge, solid refuse, floating solids, oils, grease or scum;
- (3) not more than a median value of 700 per 100 millilitres and not more than 2,300 per 100 millilitres in more than 10% of the samples collected in a 30 day period; and
- (4) no chemical constituents in concentrations that would be harmful to human, animal or aquatic life.

The color, turbidity, taste and odor should be such that they do not affect any usages specifically assigned to this class of water and none that would cause taste and

odor in edible fish and shellfish. The pH of these waters should be 6.8 to 8.5.

Class C waters are suitable for fish, shellfish, wildlife, recreational boating and industrial cooling. They are of good aesthetic value. Such waters should contain:

- (1) not less than 5.0 milligrams per litre of oxygen during daylight hours nor less than 4 milligrams per litre at any time;
- (2) no color, turbidity, taste and odor that would impair usages specifically assigned to this class;
- (3) no coliform bacteria in such concentrations that would impair any usages specifically assigned to this class.

Any deposits of sludge, solid refuse or scum present should be discharged from a waste treatment facility providing appropriate treatment.

Class D waters are suitable for navigation, power, certain industrial processes and cooling uses and migration of fish. These waters are usually of good aesthetic value.

Such waters should contain:

- (1) a minimum of 2 milligrams of oxygen per litre at any time; and
- (2) no deposits of sludge, solid refuse, floating solids, oils, grease or scum except for such small

amounts that may result from the discharge of appropriately treated sewage and/or industrial waste effluents.

The color, turbidity, taste and odor should be such that the usages specifically assigned to this class of water are not impaired.

The pH for this type of water should be between 6.0 and 9.0.

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