

**PROCEEDINGS  
OF THE  
NINTH SYMPOSIUM  
ON THE  
NATURAL HISTORY OF THE  
BAHAMAS**

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Gerace Research Center  
San Salvador, Bahamas  
2003

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Printed in the USA

ISBN 0-935909-73-7

# MODEL FOR DEVELOPING A NATURAL RESOURCE ZONE FOR SAN SALVADOR ISLAND, BAHAMAS

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## ABSTRACT

We present here an outline for a comprehensive natural resource allocation zone on San Salvador Island, Bahamas. The continuing pressure for the use as well as the preservation of resources in the near shore and on shore areas indicates there is a need and an opportunity to develop a comprehensive plan of allocation and administration of the island ecosystem. Issues of resource utilization have not been included in the planning activities of this island's environment and resources and a model plan suggested here is the initial step in better defining and preserving the natural environment and resources. An all-inclusive plan for zoning of resource allocation would permit the total administration of the Island resources for best utilization and monitoring. The total zoning could then bring all resource interests into a common administration and forum that would best serve the diverse interests in sustaining resources and their utilization.

The proposed zoning plan includes island maps with utilization allocation zones, the definition of each zone, the possible activities in each zone, administrative structure for natural resource allocation and enforcement, suggested funding sources to support the implementation of the proposed plan.

## INTRODUCTION

The impetus for this project stemmed from an island meeting of a few scientists from the Bahamian Field Station (now the Gerace

Research Station) with the concerned citizens of San Salvador Island regarding the state of the environment and the various related problems held during mid January, 1996. During the time between the meeting in early 1996 and early 2001, little progress had been made in environmental cleanup and any responsible utilization of the environment and natural resources. The need for a more comprehensive design or plan for the management of the natural resources for the island became apparent and more urgent. That need and having the opportunity for a citizen of the Bahamas (and an author) to participate in the formulation of a design plan starting the process of placing in the public view through a presentation and publication a possible model. A model design that could become the foundation for the management and maintenance of the island ecosystem.

## DELINEATION OF THE PROJECT

This project and its presentation has as its objective the stimulation of debate, constructive discussion, and implementation of a task force to explore the possibilities and advantages of developing a plan similar to the plan presented here. This is only a model plan, with the recognition that it has received limited review and input. There is a need for wider and more open discussion before implementation of such a plan would be anticipated. The basics of the proposal comes from within the Bahamas, with the assistance and expertise of other interested scientific and public minded persons

who support the idea of the need for a comprehensive environmental planning process and administration of the resulting plan.

San Salvador Island is a small island by most standards. It is generally understood that island ecosystems are limited in scope but probably a more fragile ecosystem interdependent. A plan to include the whole of the island in a natural resource plan would require little more effort than developing a plan for a smaller section. The results of total island inclusion is projected as far more beneficial than just planning and developing a smaller local park or preserve. The model for total inclusion would be similar to the park developed on the island of Saba, also in the Caribbean Region. The park developed and operating on Saba included only the marine aspect of a park in their plan. San Salvador Island is different in its geographic structure, because its landmass is small relative to the total area of the island due to the large and numerous inland lakes. The island could be viewed as integral to the marine environment as the lakes exhibit tidal flux and have various levels of salinity. Damage via pollution or alteration of an inland lake could have a direct effect on the near shore marine environment and conversely the pollution or alteration of the near shore marine environment could effect the islands inland lakes. Therefore, the prudent plan would include both terrestrial and near shore marine environments in a comprehensive management plan for maximum benefit. The model developed is therefore presented for the whole of the island would seemingly be practical and prudent. Figure 1 is an overview map of the island environment.

#### **NEAR SHORE MARINE RESOURCE ZONE DESIGNATIONS**

The marine environment would be classified into four zones, based upon resource preservation, utilization and location. The zones has not been defined or specified. This aspect of the plan would require further, more in-depth study to determine the practicality of a specific distance designation. The designation could be a fixed distance, i. e. two, three, or more kilometers from the shore, or defined by physical features such as barrier reefs, chains of

Cays or location of various Cays. The designation has to be practical from the standpoint of user identification and enforcement. The achievement of the distance criteria has not been accomplished. The suggested areas and their designation are illustrated with the off shore distance from the island left undetermined (Figure 2). The definitions of the four zones are as follows:

#### **Zone Type Class One (1)**

This zone classification would be the least restrictive regarding activities and the removal of natural resources. The objective of the administration of this zone could be monitoring the resources removed, environmental assessment and monitoring population variations in targeted marine species. The imposed controls for this zone would be the least restrictive of the four zones. Examples of this zone are illustrated in Figure 3 and Figure 4. The zone designation, in its various locations would be the largest of the designated-zoned areas in and around the island.

#### **Zone Type Class Two (2)**

This zone would have the fewest restrictions administered for the marine environment around the island. The activities would have minimum restrictions that would direct and control the use of resources in the zone. Selected activities might have a seasonal restriction and use licenses could be required for special recreational use or harvesting marine resources within the zone. The resource administration would support the recreational use and activities as well as maintain a history of resource removal. The administration should actively assess the effects of use and resource removal from the zone. The use permit(s) could be required by and obtained from the administration. This type of zone would be designed to accommodate and support the at shore resorts and businesses. An example of this zone is illustrated in Figure 5, where most of the intense near shore activities are directed and supervised by Club Med.

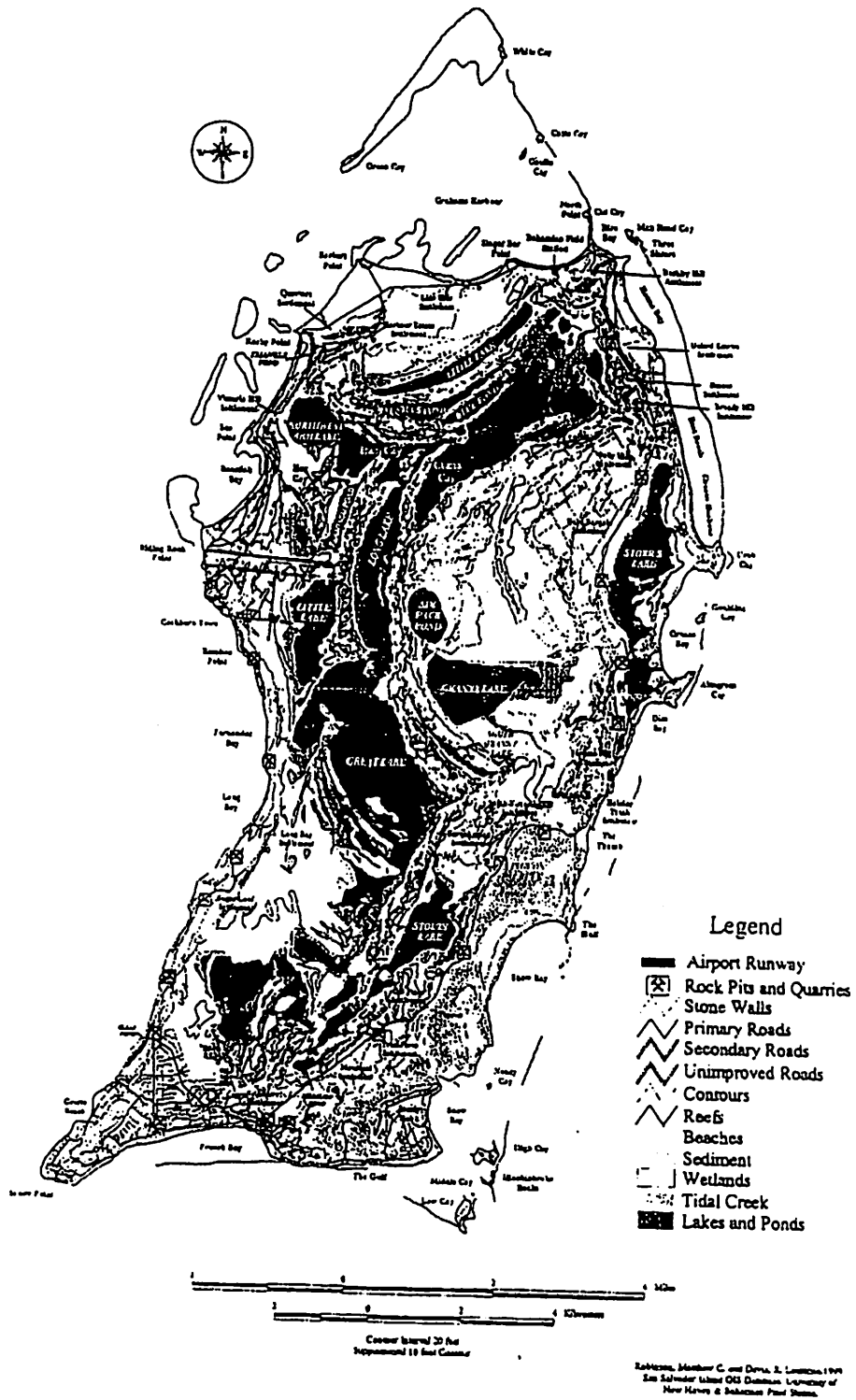


Figure 1. Map of San Salvador, Bahamas.

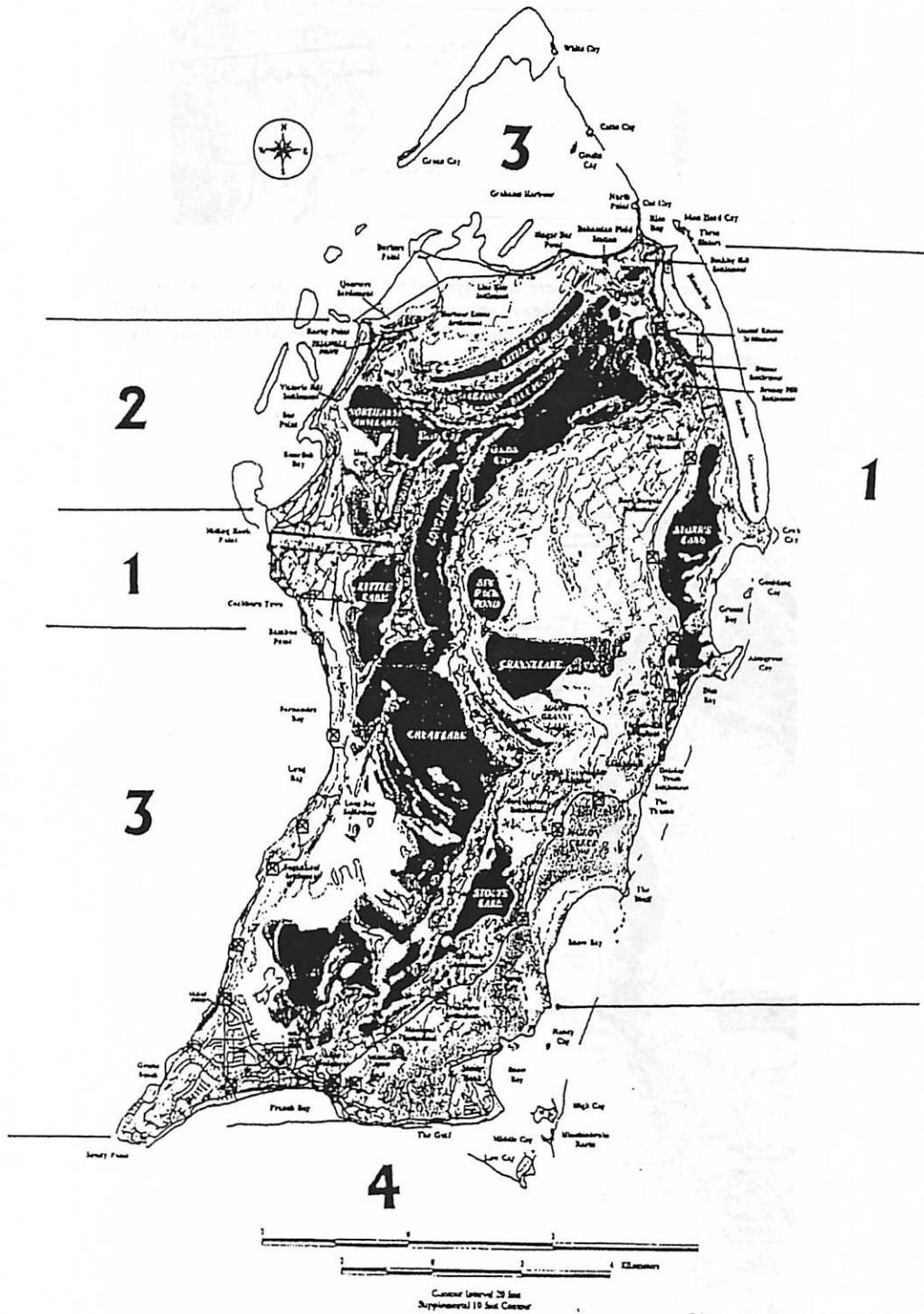


Figure 2. Suggested examples of how the marine areas surrounding the island could be zoned within a Natural Resource Zone Park.

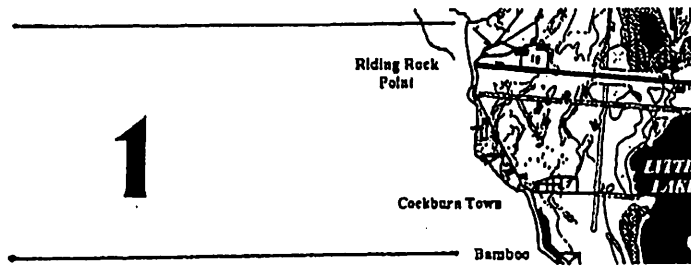


Figure 3 The area marked here is the type of marine area that would be included in Zone 1. This is an area of heavy ship and boat traffic and this would have to be less restrictive for use as the entrances for marinas and docking facilities are in this region.

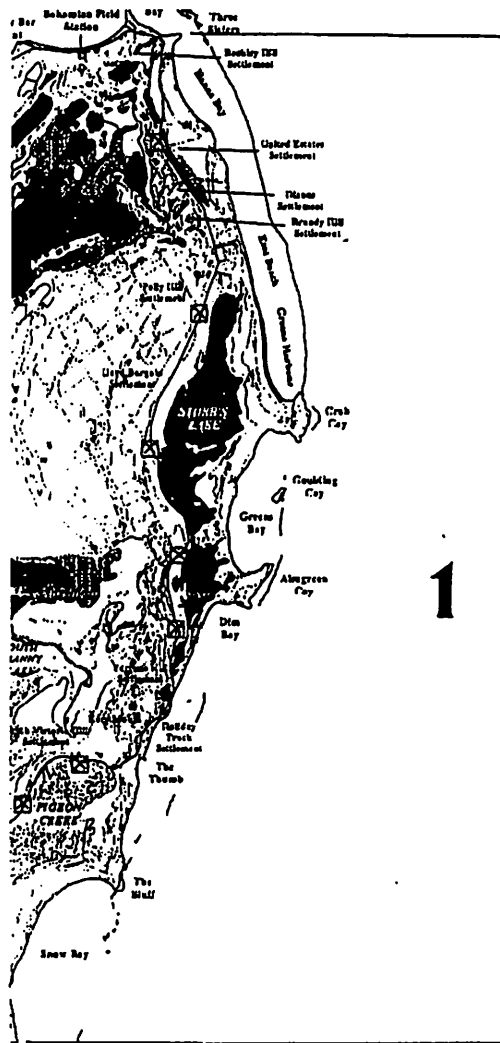


Figure 4 The east side of the island from about the east entrance to Rice Bay south to about Nancy Cay could also be designation in the Zone 1 classification.

### **Zone Type Class Three (3)**

The recreational and fisheries use of this zone would be restricted and controlled with use permits and license required for all activities by those using or taking the natural resources. Various areas could be designated for a specific use or activity and limits/restrictions on resource removal would be in effect for this zone. All activities would be by permit or license with the activity accountable to, monitored by, and reportable to the administration. The resources and environment in this zone type could be sensitive to excessive use and unrestricted resource removal.

A resource administration would assure the safety and accessibility for those using this zone. The administration would promote the responsible use of the class three zone type and not view the area as a strict natural preserve. Enforcement of the zone and its use would be by the park administration or its designated representatives. There would be support and participation in development of suitable uses of resources and activities within this zone.

Examples of the activities that could occur would be selected and controlled SCUBA dive sites that have a number restriction on the divers, so that the full experience of the activity could be enjoyed by the divers. Selected fishing and taking of shellfish could occur to maintain suitable population and supply the sport fisherman or professional with a more certain catch. Guides and activity directors could be available to better aid persons in having a fuller experience when using the zone. Two areas of this type of zone designation are suggested and illustrated in Figures 6 and 7.

### **Zone Type Class Four (4)**

This zone would have the highest level of restriction and this classification would be reserved for the most impact sensitive marine environments. The activities in this zone type would have to be of low impact in relation to all aspects of the zone. Taking of any of the species of animal or plants would not be generally permitted, except in the case where a species was damaging or changing the ecological balance within the zone. The zone should have the highest level of monitoring and control of all aspects of the marine environment. The

administrating authority would keep inventories of all species of both plants and animals where ever practical. The only use that should be encouraged in this high restrictive zone designation would be selected scientific investigations and monitoring of the life forms including the environment in and near the zone. All activity in the zone would be closely monitored with possible onsite supervision of activities. Use permits and/or restrictive license would be required and displayed by the user. The activities and removal of natural resources would be accountable and reportable within strict guidelines.

This zone would be the breeding ground and protected maturation area for reproducing species. This various species in this zone are expected to replenish the renewable resources in other zones around the island. The replenishment effect and effectiveness of the highly protected resources would be accounted for as a function and rational for developing zoning for the whole of the island. Limited activities such as low impact SCUBA diving and snorkeling could occur in this zone id evidence from environmental monitoring indicates that these activities, when done in a none invasive manner, may have negligible effect upon a marine environment. At least one of this type of zone is proposed and shown in Figure 8.

## **TERRESTRIAL AND INLAND LAKES ZONE DESIGNATIONS**

The use of the natural resources on the island and in the inland lakes, would follow a similar pattern of classification as the zone classifications for the off shore/near shore areas. The use designations in some terrestrial areas and inland lake might be as small as an entrance to a cave, a building of significance or a larger land area, Cay or lake that would be of interest for protection or regulation of all or selected activity. The natural resource administration for the island would have the same oversight responsibilities for the activities in these zones in the same manner as those off shore/near shore zones. The zones are designated by letters to distinguish the terrestrial zone from the off shore/near shore zone designation. Figure 9 is



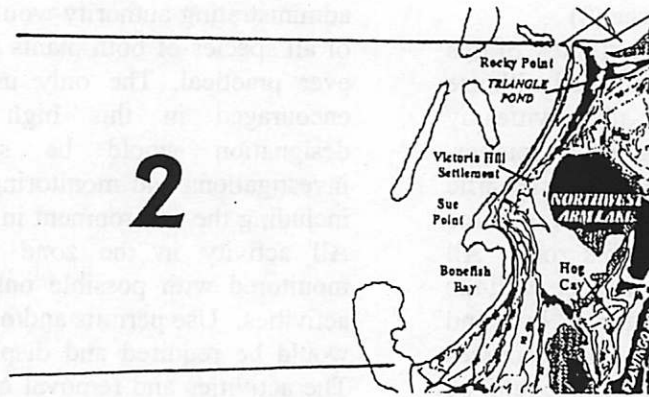


Figure 5. Zone 2 classification would be well suited for the area on the Riding Rock north along the west side of the island to Rocky Point. This would include Bone Fish Bay an area where Club Med has intense activities and uses the area almost exclusively.

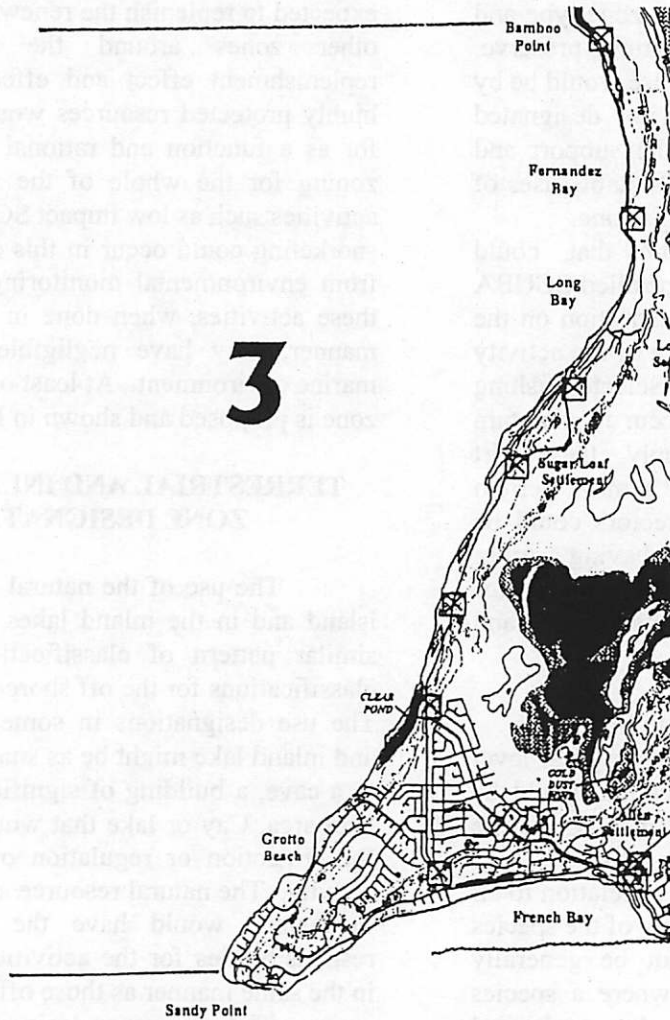


Figure 6. A more restrictive use as a Zone 3 classification would be along the west side of the island from Sandy Point to Bamboo Point. This is an area containing numerous dive and snorkel location and the traditional landing site for Columbus.

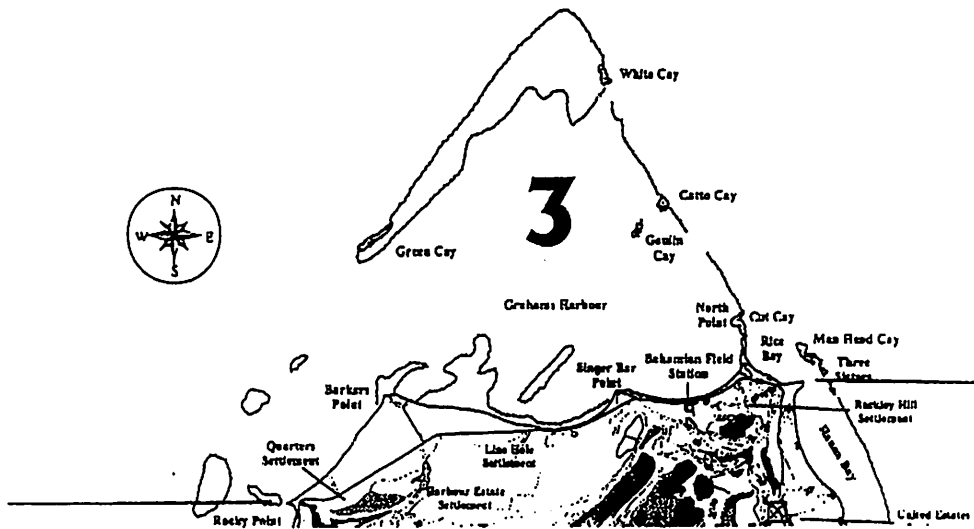


Figure 7. A Zone 3 classification would also be well suited for the area of Grahams Harbour including its various islands and numerous reefs.

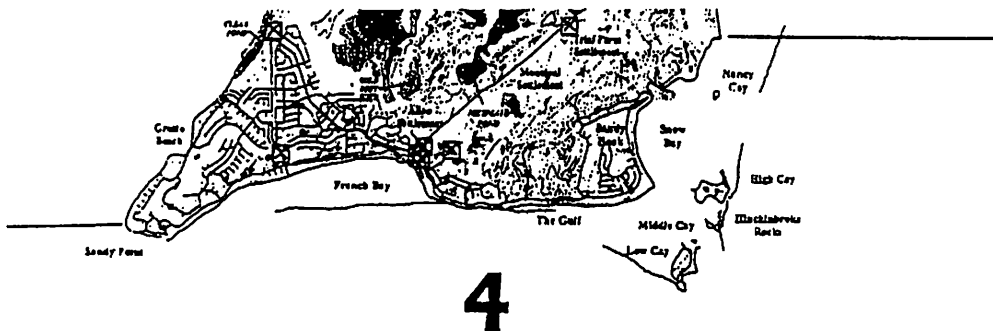


Figure 8. An area that seemingly is a highly sensitive area and includes spawning and juvenile marine life habitat is the southern region of the island from Sandy Point east to Nancy Cay. The entrance to Pigeon Creek and possibly Pigeon Creek needs the type of protection of a Zone 4 classification. Pigeon Creek is the maturation area for the basic marine life found around the island.

not a comprehensive categorization or list of possible sites, only examples of the type of area that would fit criteria established for the classification of the zone.

#### **Zone Type Class A**

The Class A Zone would be the most general class with the minimum or no use restrictions of the natural resources. The regulation of use in this zone would be directed by local codes and regulations as established by the regulating governmental body. The natural resource administration would not have control or regulate use, building or taking of resources in this classification. The land use or natural resource utilization could be noted by the administration and used to assess the affects of the use or removal of the resources on other more restrictive zones. The general Class A Zone would include but not be limited to towns and settlements, businesses, docks and marinas, farming and other various land uses.

#### **Zone Type Class B**

The Class B Zone would be a designation for permitted resource removal or land use requiring a permit at specific locations. The natural resource administration would monitor the activities and assist in the evaluation and use of the resources to assure that the use of the resource was returning the appropriate monetary value for the resource exploited. The administration of the removal of the resource would direct the renewal of the removed resource if possible or assure that the removal of the resource would not adversely affect the ecosystem in and around the area of resource utilization. Examples of the removal or use of natural resources would be the use of limestone products, fresh and brackish water, agricultural use on large scale, timber and mineral extraction from inland waters or the geology of the island. Monitoring by the permit holder would be part of the permit use and reportable to the administration.

#### **Zone Type Class C**

The Class C Zone would be the most restrictive and protective of designated highly sensitive natural, historic and archaeological areas. The area and activities in the area would

be by restricted permit only with possible direct administration of the activities. These designated areas would protect resources that are unique, endangered or threatened by human intrusion, activity or removal. Some examples would be the caves that are roosting habitat for bats, Storr's Lake Stromatolites, blue holes, Fortune Hill Plantation Ruins, Cays that are bird and iguana nesting and habitat areas, archaeological sites and fresh water wet lands and catchments. Placement of an area in this zone would highly restrict or prevent the removal and use of a natural resource.

### **NATURAL RESOURCE ZONE ADMINISTRATIVE STRUCTURE**

#### **Administration**

The sanctioning of the authority and administration of a Natural Resource Zone for San Salvador Island should be the function of the central government for the Bahamas. The government could create a department or assign primary jurisdiction to an independent organization i.e. The National Trust or Nature Conservancy to provide policy and leadership for the Natural Resource Zone. The department or operating organization would administer the various zones for the best use and conservation interests on the island, as a first priority to function in the general best interest of the region and the country.

The governing body would establish a policy making board of directors with a suggested membership of ten members elected by a method to be determined by the sanctioning agency. The board of directors should be diverse, interested persons: the first three of the ten directors would be comprised of three local non- persons with no vested interests, that is local persons with no monetary gain to be made from the natural resources that they would direct. The second group on the ten-person board could be natural resource experts holding three of the seats. The government or designated official(s) could appoint two members to the board who would be the liaison to the government or responsible organization. The remaining two directors could represent businesses that use the natural resources in whole or part as a foundation for their

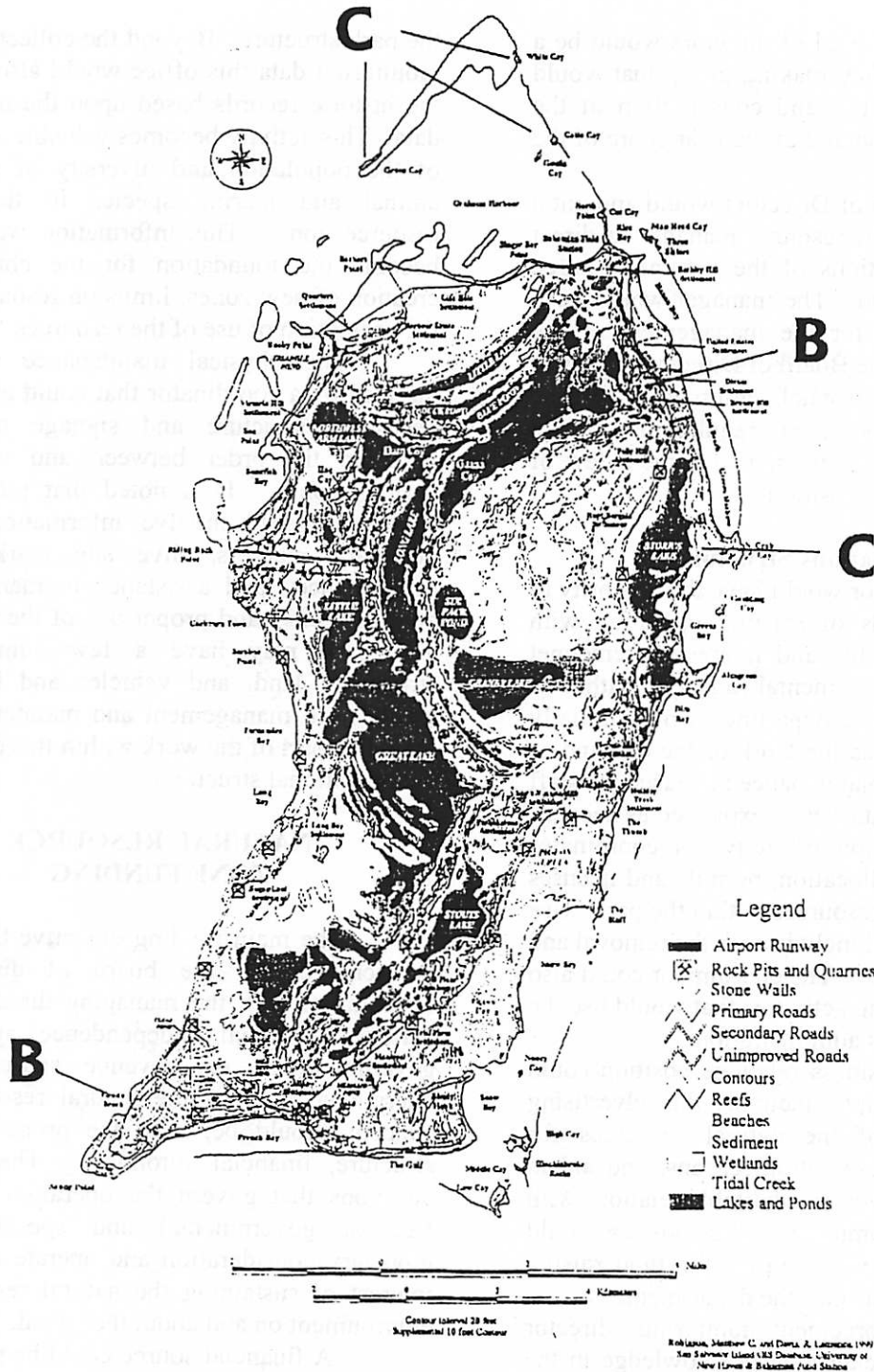


Figure 9. Examples of terrestrial zone classifications are illustrated here. Zone B classification for the caves that have maternity colonies of bats. Alter Cave and the historic site of the light house and Light house cave. Zone C would be the islands that have unique bird nesting and roost habitats or rock iguana colonies. Zone C could include inland lakes that have Stromatolites such as Storr's Lake.

businesses. This board of directors would be a self governing policy making group that would promote the best use and conservation of the natural resources on and at the near shore of the island.

The Board of Directors would appoint a professional natural resource manager to direct the various operations of the natural resource zones on the island. The manager would have the responsibility for the management of the resources within the Board of Directors policy's, the operational personnel, enforcement of the various zones and their regulations, public relations, safety and funding to name a few of the activities of the position.

### **Operations Structure**

The director would have the authority to meet the demands of staffing operation with qualified, responsible and interested personnel for the various departmental functions within its administration. The departments may initially be combined and as the work or the demand of management and maintenance increased the staff and the departments can be expanded as needed.

The position of activities coordinator could direct the allocation, permits and licenses for the use of the resources within the park. Use of resources would include both the removal and activities that occur. The coordinator could also assist in developing activities that would use the resources under its administration.

Public/business relations position could have two important functions, the advertising and promotion of the natural resources for economic and preservation reasons, and aid in developing positive and profitable relations with businesses and commerce. This position could develop cooperative activities for fund raising and conservation as part the department.

The enforcement/monitoring director should have a background or knowledge in the skills needed for law enforcement. The basis developing the zoning and its success would be the maintenance of the proper activities within each zone, and the enforcement of the zone boundaries. The enforcement director could also collect the information for the monitoring of the use and removal of the natural resources. This operation would be compatible with the enforcement duties assigned to this office within

the park structure. Beyond the collection of the monitoring data this office would also maintain the historic records based upon the monitoring data. This activity becomes valuable as a gauge of the population and diversity of the plant, animal and marine species in the natural resource zone. This information would then become the foundation for the changing or creation of new zones, limits on resource use or the promotion of use of the resources.

The physical maintenance would be directed by a coordinator that could provide the necessary structure and signage needed to maintain the order between and within the various zones. It is noted that most of the activities would involve informational signs, boundary markers, dive site markers, trail maintenance and assistance in managing the zones for easy and proper use of the resources. The park may have a few administrative structures, land, and vehicles and boats that would need management and maintenance that would be part of the work within this division of the operational structure.

### **NATURAL RESOURCE ZONE FUNDING**

The main funding objective that should be achieved by the board of directors in cooperation with the managing director of the park is financial independence apart from government or tax revenue sources. The operational goal of the natural resource zone concept should be, with the proper financial structure, financial autonomy. Therefore the decisions that govern the operation would be free of governmental and special interest monetary consideration and operate in the best interest of sustaining the natural resource and environment on and about the island.

A financial source could be private and corporate grants, which would support the general operation or a specific special interest within the operation. The grants could be internal or external to The Bahamas as the resources could be of interest beyond the local island and often impact or are of regional concern and interest. The director should have the ability or staff to search out and work at

obtaining the grants from funding sources that support the mission and purpose of the park.

Those persons and businesses that benefit from the use of the island resources should be part of the support for the operation and maintenance of the natural resource zones. A use fee would be charged for those who use the areas of the natural resource zone and do not remove any of the resources. Use fees, although nominal, for recreation within the park should be levied on divers, snorkelers, and watercraft operators in most of the marine zones of the park even though they do not remove resources. The fees could be set for a use period and activity as deemed appropriate by the director and collected from tour operators or charged to the individual users.

Those interests that remove resources from selected sections of the natural resource zone would purchase a license to remove the resource and the license could have restrictions regarding the zone, type and quantity of resource being removed. The license within the marine zones would apply to the harvest of fish and other marine animals and plants that have commercial value. The license granted in the terrestrial zones could include removal of geological materials, wood, plants, landfill use and water. The license fee could be rated as a portion of the commercial value of the resource and or/scaled to the market value that could fluctuate.

Educational activities would provide an introduction to the resources and as another method of funding the operation. Those activities could provide an introduction to the understanding of some portion of the resources of the island. This type of activity could be directed by personnel from within the administrative staff or by outside resources. Examples of the activities could be boating, diving, or ecology courses. The activities could build skills for use and harvest of resources or for education and boost the responsible use of natural resources.

Cooperative educational activities with nature or ecology organizations, high schools, and colleges could also provide funds for the park. These activities would be using the facilities of the park in cooperation with another group where the programming is generated and

directed by the outside group using the resources for a share of the fees or tuition. Again this type of activity could promote natural resource conservation activities.

## SUMMARY

This project is presented with the intent of stimulating dialogue and activities that could result in the formation of a conservation program on San Salvador Island, Bahamas. It is as a model that could form the basis for further consideration and planning. It was generated independent of and without support of any specific group, but may in some small part capture the vision of what could become the basis for the conservation and protection of the resources and artifacts of importance on the island.

This type of project could be initiated by local, regional or government bodies or conservation organizations and should have the strong input of the people and commercial interests on the island under the guidance and support of knowledgeable individuals. The issues that continue to be raised regarding the natural resource use, overuse, and development could be addressed, through the consideration of organizing a natural resource zone administration for the island. The vision that the zone should include the island and its near shore environments is based on an island that is relatively small and an ecosystem that is difficult to define in sections or segments as independent systems. Administration should and can reflect the various interests, both conservation and commercial included, through the structuring of the board of directors and the general operating policy. The natural resource zone administration should not be a financial liability for the government at any level. This could be a self-supporting operation with proper structure and public relations explaining the resource availability and utilization for commercial, recreational and educational activities.

## ACKNOWLEDGMENTS

This project had its foundations in the concerns expressed by those citizens and community leaders on San Salvador in

conjunction with several community minded scientist from the Gerace Research Center during a community meeting and in other less formal meetings and conversations. The organizations that supported and encouraged this work were Albright College, The Highland Institute and the Gerace Research Center. Individuals that specifically contributed and assisted the authors in this project were Marge and Ken Buchan, who contributed numerous ideas and suggestions based on their experiences in Saba, Craig Stihler from the Department of Natural Resources in West Virginia, George Missonis for his work in digital media, interested scientists from the Gerace Research Center who were willing to listen and make suggestions, and to Dr. Donald and Kathy Gerace for continual encouragement and insight into possibilities for the island and its people.

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