

VIRGIN ISLANDS NATIONAL PARK

DRAFT - SHORELINE MANAGEMENT PLAN

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I. Introduction

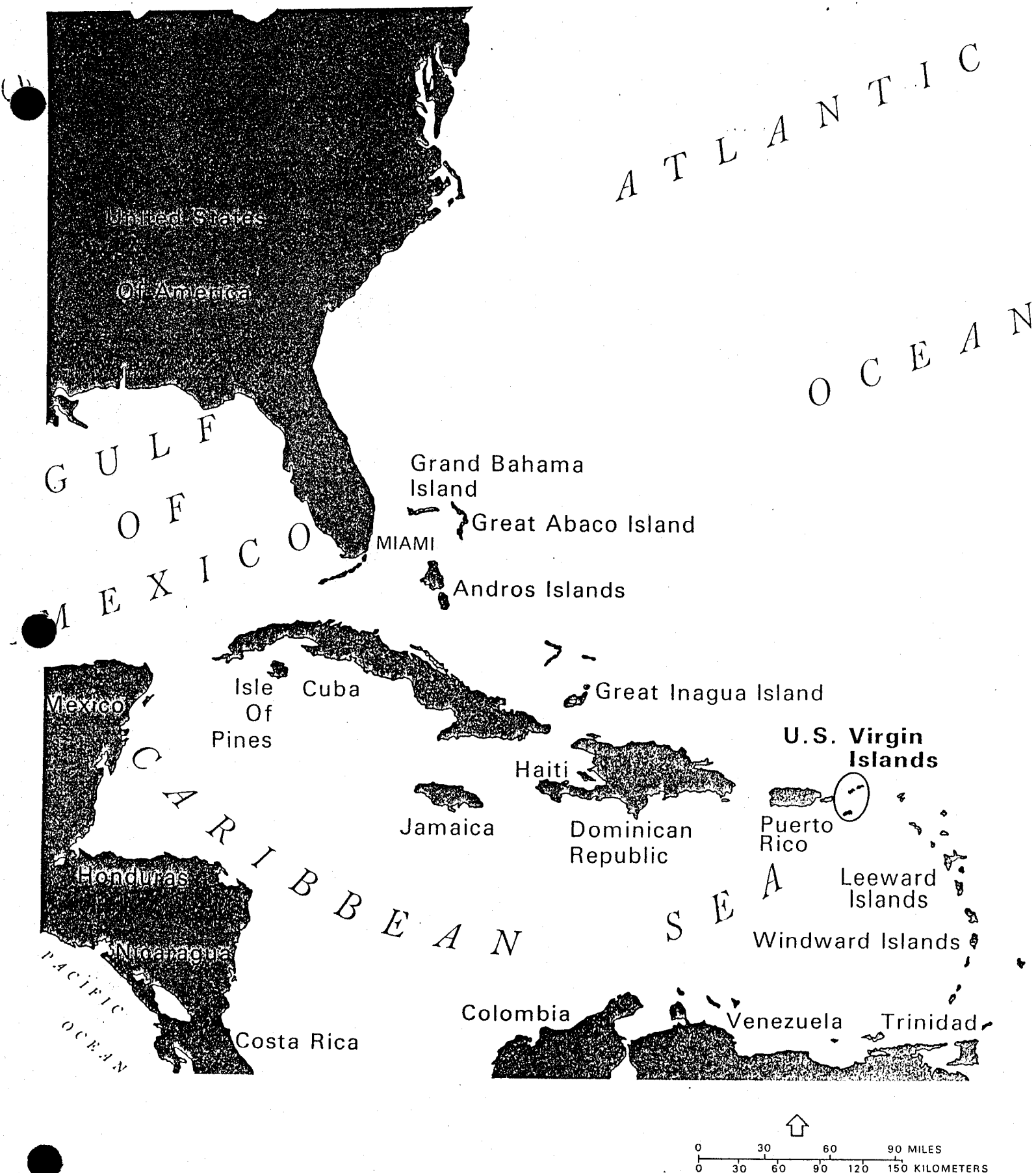
The natural resources of Virgin Islands National Park have been recognized as being internationally significant because of their environmental uniqueness and diversity of rare and endangered flora and fauna species. The park was designated a Biosphere Reserve under the Man and the Biosphere Program of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 1976, and dedicated as such in 1983. The Biosphere Reserve is part of an international network of areas, representative of the world's natural diversity, managed to integrate conservation and development. The Biosphere Reserve provides a framework for relating management directly to people's needs, and for improving cooperation at the local, regional and international levels. Management of the park's natural resources will allow for a model which can then be utilized by other marine areas experiencing similar resources degradation. Virgin Islands National Park was selected as a Biosphere Reserve because it represents the Lesser Antillean biogeographic province.

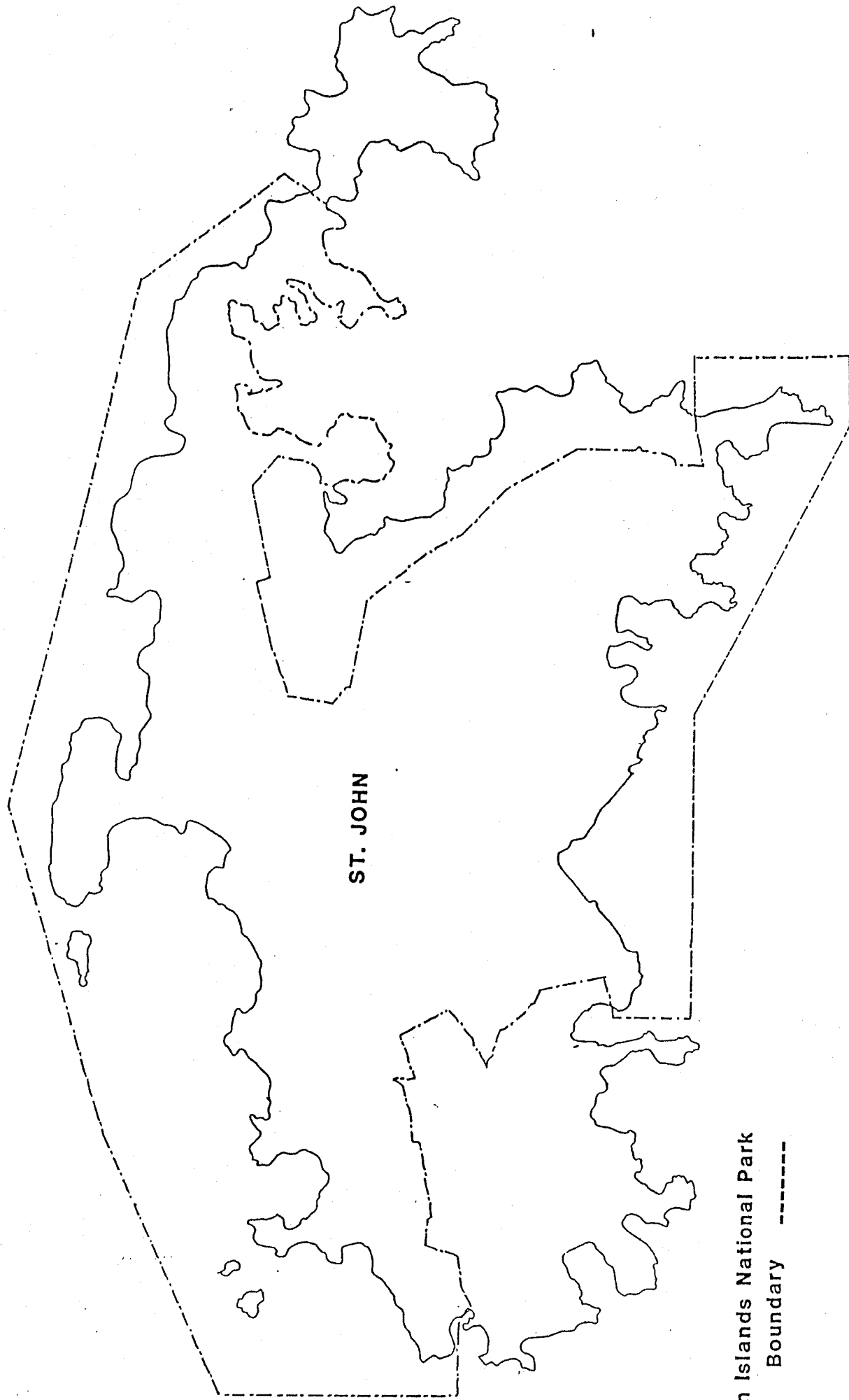
II. Description of Virgin Islands National Park

The U.S. Virgin Islands lie between the Atlantic Ocean and the Caribbean Sea, about 50 miles east of Puerto Rico (Fig. 1). They include three principal islands -- St. Croix, St. Thomas, and St. John -- and a number of surrounding smaller islands. Virgin Islands National Park consists of approximately 14,700 acres of lands and waters, primarily on, and around, the island of St. John.

About 10 square miles (54%) of St. John, the most beautiful and least disturbed of the islands, is included in the park (Fig. 2). St. John constitutes the park's largest land area. Approximately 8.7 square miles of offshore waters are also included within the park boundary. The island is of volcanic origin, and its topography results from the geologic processes of folding, faulting and uplifting. There is a central ridge running the length of the island; steep mountains, deep valleys and gleaming white sand beaches (Fig. 3). The island is ringed by clear blue waters and extensive coral reefs. Smaller islands and reefs dot the offshore waters.

The interior highlands and ravines are dominated by sub-tropical forests of green hardwoods, while several species of cacti are found on the extremely dry east end. Approximately 80% of the original

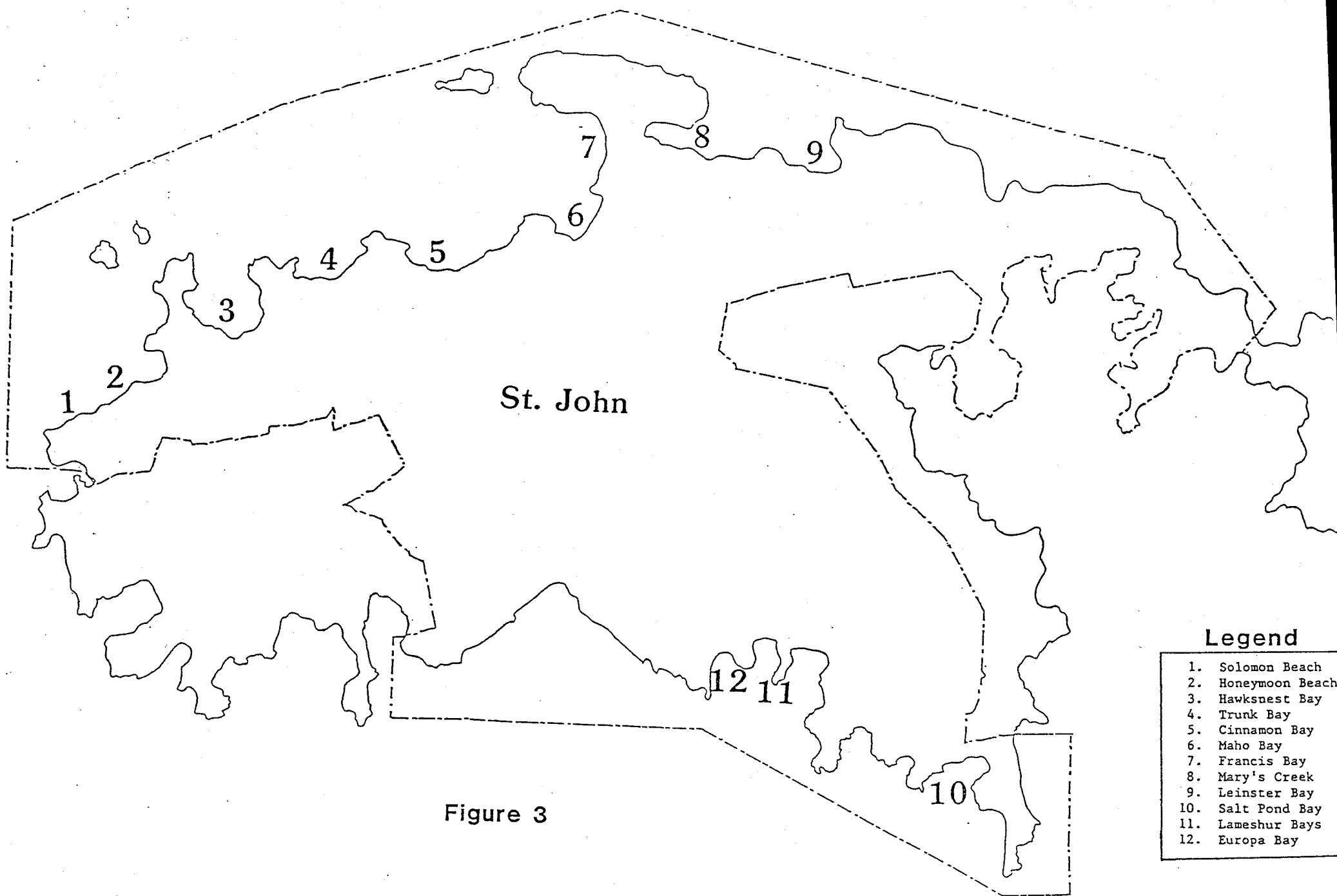




ST. JOHN

Virgin Islands National Park
Boundary -----

Figure 2



forests of St. John were cleared in the 1700-1800's for sugar cane and cotton plantations. These areas are now in various stages of vegetation recovery. Ten (10) vegetation types have been mapped including: mangroves; moist forest; dry evergreen forest; secondary vegetation; and pasture. To date, over 800 species (116 families) of trees, herbs and shrubs have been identified. Eighteen (18) rare and/or endangered flora species have been identified, with six (6) probable new species located.

It is important to note that the vegetation of St. John is unique as it is one of the few protected areas in the Caribbean where climax, sub-tropical forests are being allowed to recover after previously being extensively cleared.

Land birds are abundant, varied, and easy to observe. Hummingbirds, doves, hawks, and warblers are common. Water birds are less common, but include pelicans, herons, egrets and frigates.

Despite extensive disturbance, park lands and waters are a valuable refuge for remnant native species. The park provides critical habitats for 28 federally protected flora and fauna species. It is especially important that the park continue to protect and manage the habitats required by these species to perpetuate their existence. However, several species of native terrestrial fauna have already become severely reduced, or totally eliminated, on St. John apparently from mongoose predation. Predation by mongooses has not only forced several wildlife species into extinction, but is

currently responsible for an annual 21% loss of endangered Hawksbill sea turtle eggs and hatchlings.

The park's marine resources include beautiful sand beaches, coral reefs, salt ponds, extensive seagrass beds, and numerous species of fish and shell fish. In general, water quality within the park boundary is high and the marine resources are in good condition. However, coral reefs and seagrass beds have suffered acute degradation from boat groundings, anchor damage, and breakage or removal of corals by visitors. Research data indicate that carrying capacities, in several areas of the park, have been exceeded and resources management activities must be initiated to minimize these on-going impacts.

Several marine areas of Virgin Islands National Park are environmentally unique, but appear to need additional protection. One such area requiring this protection is Lameshure/Europa Bays on the south side of St. John. Dr. Alan Robinson, Research Biologist, Tektite Program, has stated that "...the marine resources of the Lameshur Bay area have not received adequate protection in the past to insure that the area remains undisturbed and natural as possible. This naturalness is desired not only for the enjoyment of the visiting public, but also to insure that the area retain its full potential for benefit to scientific research efforts." Dr. Robinson also stated that "...it is patently ridiculous to maintain an area in which the fishes, lobsters, molluscs, etc., are under scientific study without closing such an area to public consumptive uses."

III. Purpose

The purpose of this Shoreline Management Plan (SMP) is to direct, regulate and provide for appropriate recreational use. The plan outlines regulations, use zones, carrying capacity and associated aspects of recreational use effecting marine and terrestrial use at Virgin Islands National Park. This plan is founded on NPS policy, legislative direction and previously approved management plans.

IV. Policy Guidelines for Virgin Islands National Park:

The National Park Service was established by Congressional passage of the Organic Act of August 25, 1916. This Act mandates all National Park Service units "...to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations".

Virgin Islands National Park was established by three Acts of Congress in 1956, 1962, and 1978. These Congressional Acts state that the park is mandated to preserve and protect "coral gardens, marine life, and seascapes", in addition to "outstanding scenic features of natural significance". The Acts include:

1. The Act of August 2, 1956

This Act states "...that a portion of the Virgin Islands of the

United States, containing outstanding scenic and other features of natural significance, shall be established...in its natural condition for the public benefit and inspiration...".

2. The Act of October 5, 1962

In essence, this Act was a boundary revision "in order to preserve for the benefit of the public significant coral gardens, marine life, and seascapes...".

3. The NPS Act of 1978

This Act requires that the National Park Service "establish carrying capacities for each area and monitor use levels within those established limits".

V. Natural Resources Management Goals and Objectives

For over a decade, Virgin Islands National Park/Biosphere Reserve has been experiencing a tremendous increase in the numbers of recreational visits to the park (over 1 million persons and 30,000 boats in 1986). Increased visitation has manifested itself into critical impacts to the park's marine and terrestrial resources. Research data indicate that many of the park's natural resources are so severely impacted that only immediate resource protection activities will prevent the resources' demise.

The following list of activities include both compatible (with park policies) and non-compliance uses of the park's marine resources.

Compatible Recreational Uses:

1. Swimming/snorkeling

2. SCUBA diving
3. Day sails
4. Sailboarding
5. Fishing (bait, line, net, pots)

Non-compliance Uses:

1. Illegal harvest of marine resources
2. Coral damage by boat grounding or visitor impacts
3. Spearfishing
4. Pollution (boats)
5. Disturbance of marine life
6. Harassment of endangered species
7. Anchor damage to seagrass beds/coral reefs
8. Prohibited boating operations

Preliminary goals and management objectives for Virgin Islands National Park appear in the park's General Management Plan (1983). These include:

1. Manage the park predominantly as a natural area, with recognized exceptions only in specially zoned areas.
2. Preserve outstanding natural features; ensure the survival of threatened and endangered species.
3. Determine the character of the island's ecological systems...and apply this knowledge to manage stable ecosystems.

4. Establish baselines of resources information and then monitor changes as a basis for visitor use allocations, revolving visitor use of resources and restorative programs.

5. Manage marine life to sustain natural populations and allow fishing within this context.

These generalized goals and objectives have been updated and refined during preparation of this management plan. An additional 5 goals (related to resource protection, visitor and safety management, interpretation, research and resources management activities) provide the basis for developing a long-term strategy for the park's programs, services, and facilities. Detailed management objectives direct specific actions towards achieving the park's goals.

Specific goals and objectives include:

1. Resource Protection:

The overall goal is to protect the environment and resources of the park, the highest priority for park management.

Specific management objectives are:

- a. Develop the means to manage the impacts of park visitors.
- b. Develop contingency and action plans for responding to threats to the park.
- c. Promote voluntary user compliance with regulations through an education program stressing resource sensitivity and wise use.

- d. Review the effectiveness of park regulations and promulgate revised regulations as needed to protect the park.

2. Visitor Management:

The park goal for visitor management is to encourage recreational use that is compatible with park's legislative mandates and resources management purposes.

Specific management objectives are:

- a. Improve public awareness of compatible recreational opportunities within the park.
- b. Increase opportunities for a wider variety of users to enjoy and appreciate the park.
- c. Improve visitor safety within the park.
- d. Direct visitors to varied areas of the park thereby reducing impacts on any one resource management unit.

3. Interpretive Management:

Interpretation should increase public awareness of the resources and significance of the park.

Specific management objectives are:

- a. Direct and orient visitors to the park and its services.
- b. Increase public understanding of marine issues related to and affecting the park.
- c. Develop public appreciation of the need for park management and resource conservation.
- d. Promote public understanding and appreciation of the marine processes and significant features represented in the park.

4. Research Management:

The goal of the park's research program is to direct research activities towards increased understanding of the park and apply that research to resolving resources management issues. Such research programs should identify and recommend projects of very high priority for immediate implementation. The knowledge gained through this research will help implement other programs such as interpretation, visitor management, resource protection, and resources management.

The park research program seeks to achieve this goal by meeting the following management objectives.

- a. Establish a framework for a research program that is primarily directed toward effective management of park resources.
- b. Identify those projects for the park that should be given the highest priority for early implementation.
- c. Make effective use of research results by incorporating them into information and interpretation programs.

5. Resources Management:

The goal of the park's resources management program is to analyze available research data and, in conjunction with applicable NPS guidelines and policies, initiate specific impact mitigation actions.

The park's resources management program seeks to achieve this goal by meeting the following objectives.

- a. Initiate plans and park approved resources management projects that are directed towards minimizing negative recreational impacts to the park's resources.
- b. Promote public understanding of resources management goals and objectives.
- c. Make effective use of resources management results by incorporating them into information and interpretation programs.

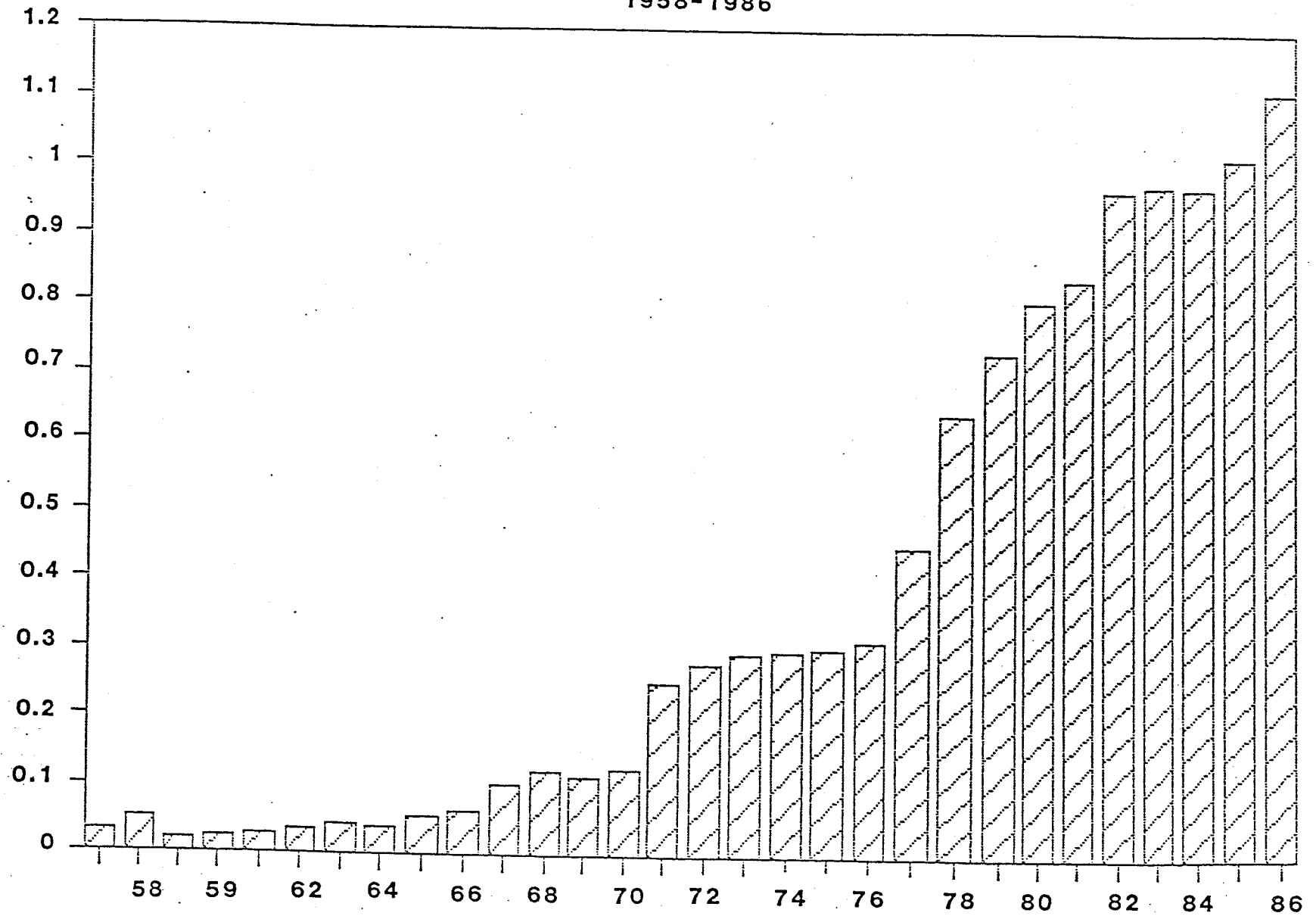
VI. Recreational Use Trends

Throughout the Caribbean tourism and coastal development are exerting severe pressure on the natural resources of many islands and countries. Each year large numbers of tourist are visiting parks and protected areas within the region. Recreational visits to Virgin Islands National Park have increased drastically over the last 10 years. In 1976 approximately 300,000 persons visited the park, whereas, in 1986 park visitation exceeded 1 million visitors (Fig. 4).

Another example of this dramatic increase in recreational use is at Trunk Beach, one of the most outstanding beaches on the north shore. In 1966 only 20,000 persons visited Trunk Beach, whereas, in 1976, the number of visitors had increased to 73,000. In the 10 years from 1976 and 1986, visitation again increased to 170,000 persons (Fig. 5). Substantial deterioration to various marine organisms has been documented as a result of increases in visitation and recreational activities. This incredible increase has not only

TOTAL VISITS

1958-1986

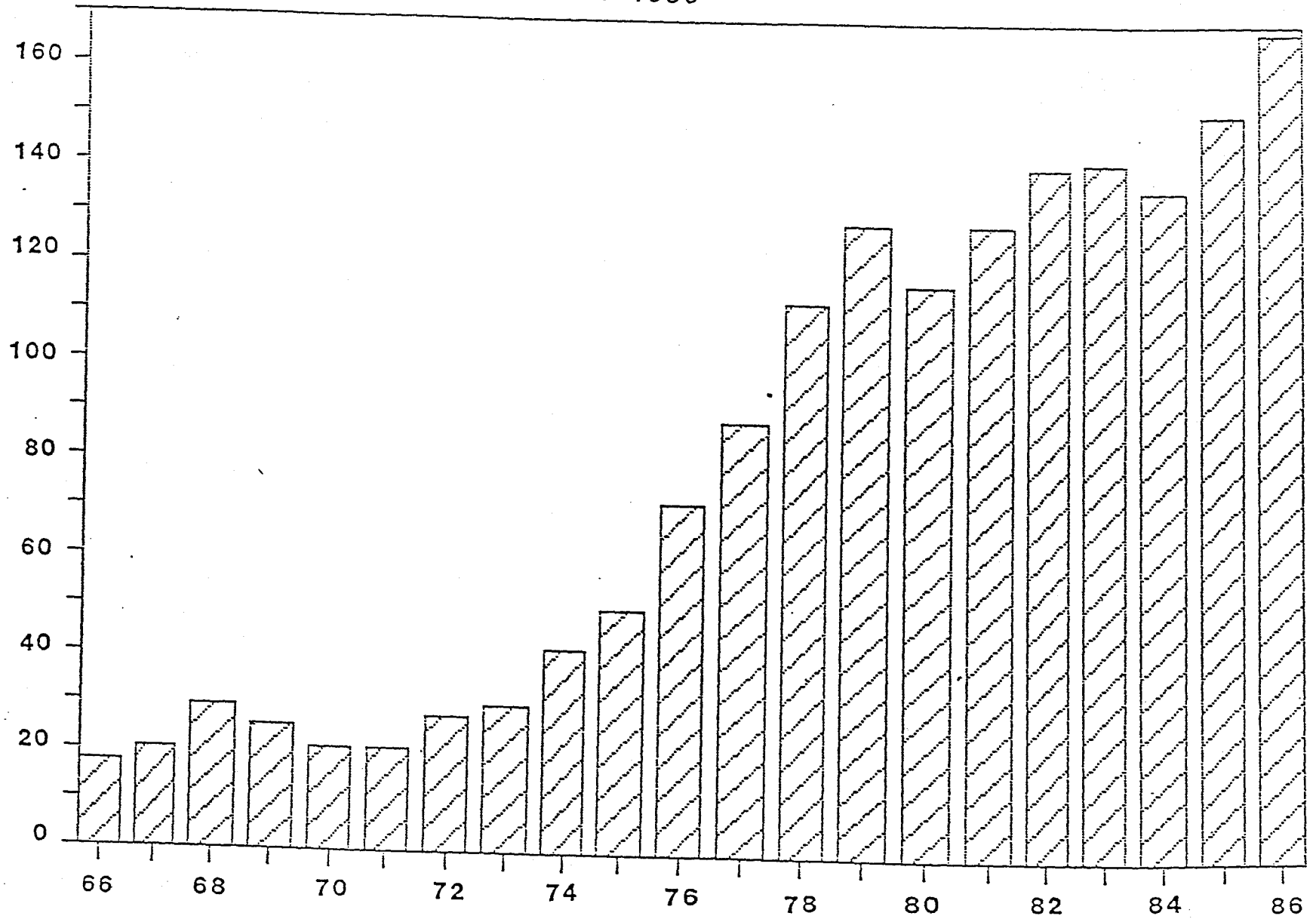


VIRGIN ISLANDS NATIONAL PARK

Figure 4

Trunk Bay Visitation

1966-1986



VIRGIN ISLANDS NATIONAL PARK

Figure 5

affected the aesthetic quality of the "island beach experience" for many visitors but, due to over use, was also responsible for a closure of the park's Trunk Bay sewage facility. Recreational beach impacts include: standing on live corals; accidentally breaking corals while snorkeling; and, removing corals and other marine resources as souvenirs.

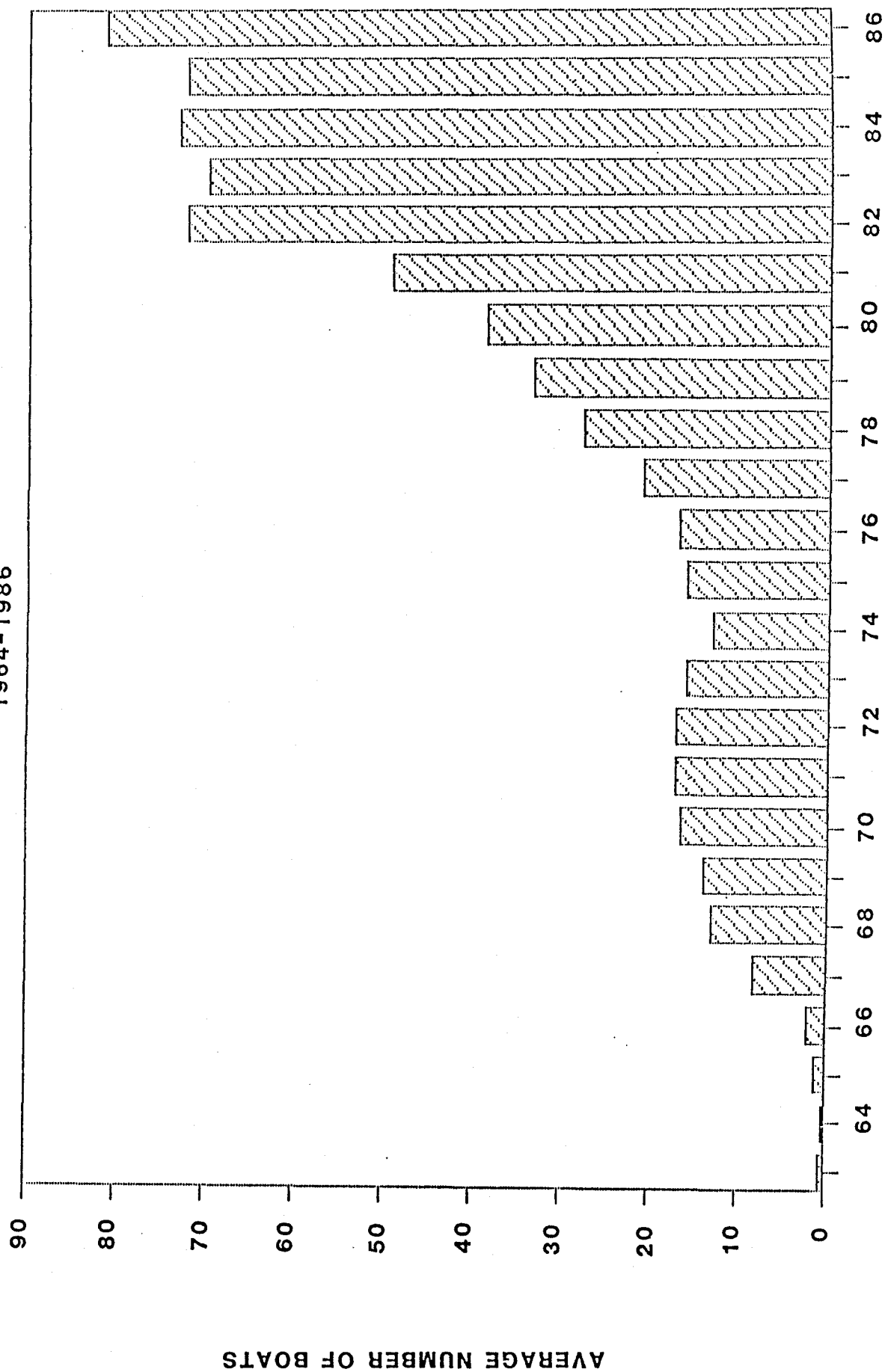
The assessment of trends and associated impacts of recreational boating activities has also increased proportionately to the number of beach users. Research data indicate that increases in boating activity is directly linked to coral reef and seagrass bed degradation. In respect to seagrass beds (a staple food source for sea turtles), comparison of aerial photographs, taken over a 30 year period, indicate a marked decrease of these seagrass beds in several north shore bays. Destruction of the seagrass beds are, in turn, associated with possibly irreversible impacts to the sea turtle population.

The park's Visitation Use Logs indicate that, in 1966, the daily average for the number of boats to visit park waters was less than 10, where as, by comparison, in 1986 the daily average has increased to 80 boats (Fig. 6). Examination of the distribution of boats along the northern and western shores of St. John indicate that Caneel Bay (to include Solomon, Honeymoon and Scott beaches) and Francis Bay are the most heavily utilized anchorages in the park.

Since 1984, mini-cruise ships (+200'long) have begun to anchor in

BOAT COUNT

1964-1986



VIRGIN ISLANDS NATIONAL PARK

Figure 6

park waters. Because these ships draw only 9' of water, they can anchor in close proximity of the shore, which, unfortunately, constitutes the most environmentally sensitive and fragile marine area. As the ship's anchors usually weigh as much as 2,000 pounds each, they can cause an incredible amount of damage to the marine resources. Also, the "ground tackle" (the chain attached from the ship to the anchor) can easily cause as much, if not more, degradation to the marine resources. Research data indicate that, from the number of boats utilizing park waters, there exists the distinct possibility that boat anchors could annually destroy up to 60 hectares of ocean floor within the park.

VII. Marine Resource Management Concerns

Dr. Carl Berg, World Wildlife Fund, Conch Management Project Leader, has stated that "...for years the rate of exploitation of the conch has gone unchecked..(and)..although the concho provides a much-needed source of income to Caribbean peoples, it may be facing extinction in some areas". Cuba's conch fisheries collapsed several years ago, but appears to be stabilizing after a temporary harvesting ban. However, Dr. Berg also stated that "...in Bermuda, Bonaire and the U.S. state of Florida, conch populations have been so drastically reduced that protective regulations have been initiated to include a total ban on conch hunting or collecting".

In February, 1987, a group of local fishery biologists held a conference, at the park's Biosphere Reserve Center, to discuss the

status of the fisheries around St. John. There was general agreement that the conch, lobster and several commercially important fish species have declined to a degree that management action must be initiated. While both overfishing and degradation of the ecosystems, which support the fisheries (coral reefs, seagrass beds and mangroves) have undoubtedly contributed to the population decline.

Under the 1962 Congressional Act, fishing is allowed within park waters, but the effects of fishing are not fully understood. Preliminary research data indicate that fisheries management is necessary to prevent depletion of the marine resources and to sustain natural populations. Conchs, lobsters, and whelks support a small artisanal fishery within the park. However, in spite of protective legislation, a drastic population decline of these species has been documented. In 1985, a research project was initiated by Mr. Ralf Boulon, Jr., Research Biologist, V.I. Division of Fish and Wildlife. The research project was entitled: Map of Fisheries Habitats with the Virgin Islands Biosphere Reserve. Mr. Boulon mapped the marine habitat types for St. John and noted that:

"In addition to demersal fin fish, lobster, conch and whelk are other heavily exploited fishery resources. Lobster populations appear to be quite low and appear to be highest in the deeper, more structurally complex habitats. Conch are less common in shallower habitats, possibly due to overfishing, but are frequently found in the deeper grassbeds seaward of coastal reef systems. With a limited, narrow habitat, which is very accessible to fisherman, whelk populations are extremely low with few large, mature individuals found."

Man's physical impact on coral reefs and seagrass beds is a major

concern for marine park managers. Coral reefs and seagrass beds in Virgin Islands National Park are increasingly popular locations for recreational activities. The number of people visiting these areas poses a management problem, not only in terms of managing crowds and safety, but boating activities as well. Boats of various sizes (4-21m) anchoring on the reefs and seagrass beds inadvertently break and damage corals and rip-up the seagrass beds with their anchors and ground tackle. In some cases, such as Francis Bay, boat anchor impacts on seagrass beds is severe (Williams, 1987).

Severe impacts are caused to coral communities when boaters absentmindedly sail into the reefs, this also results in a number of boats being sunk each year. Reasons are numerous as to why these accidents occur. Many recreational boaters are either novices or unable to read their nautical charts to determine reef locations. Even experienced boaters may simply be "daydreaming" and, at a critical moment, not be paying attention to where their boat is sailing. As an example, at Hawksnest beach, in 1986, a boat struck a shallow water patch reef that was inside the designated "swim only" area. The resulting reef damage was practically impossible to quantify, but park researchers estimated that the structural damage to the reef exceeded 150 square feet.

VIII. Current Research Activities

In 1986, the park's Research Biologist, Dr. Caroline Rogers, and local scientists associated with Virgin Islands Resource Management

Cooperative (VIRMC) initiated a series of research projects to qualify and quantify recreational impacts to the park's marine resources. VIRMC was established in 1982 "...to provide coordinated research, extension, and educational support to programs to achieve full benefits of island forests, wildlife, water resources, the marine environment, and historic areas and their associated resources for their cultural, social, commercial, economic, and recreational utilization and enjoyment".

Virgin Islands Resources Management Cooperative was formed by a Memorandum of Understanding between the following institutions:

1. Virgin Islands National Park
2. University of the Virgin Islands
3. Virgin Islands Planning Office
4. West Indies Laboratory
5. U.S. Geological Survey, Caribbean District
6. Island Resources Foundation
7. Eastern Caribbean Natural Area Management Program
8. U.S. Fish and Wildlife Service
9. Southern Forest Experiment Station
10. Virgin Islands Division of Fish and Wildlife
11. University of Puerto Rico - Sea Grant Program
12. The Caribbean Fisheries Management Council
13. British Virgin Islands National Park Trust
14. Caribbean Institute for Resources Management
15. U.S. Forest Service - Institute for Tropical Forestry
16. V.I. Cooperative Extension Service

One of the VIRMC scientists, Dr. Susan Williams, West Indies Laboratory, St. Croix, was the Principal Investigator for a research project entitled: Assessment of Anchor Damage and Carrying Capacity of Seagrass Beds in Francis and Maho Bays for Green Sea Turtles (Fig. 3, No. 7). Research data indicate that the sea grass beds provide habitat and food for one of the largest populations of green sea turtles in U.S. jurisdiction. The population size was estimated at 50 subadult turtles. Dr. Williams noted that:

"...In addition to grazing pressure, the seagrass beds are seriously disturbed by increasing number of boats that anchor in the seagrass, damaging roots and rhizomes. Up to 10% of the seagrass beds in the bays is presently ripped up by anchors."

The seagrass systems in the Caribbean are among the most highly productive on Earth, producing as much as 500 to 1000 grams of carbon per square meter per year, a figure that is comparable to that for tropical agricultural systems, but which seagrasses achieve without fertilizers or pesticides. Seagrasses serve several important functions in the nearshore marine ecosystem. For instance, seagrass beds provide shelter and feeding grounds for many creatures. Many human food favorites such as shrimp, lobsters, and groupers, to name just a few, spend part or all of their lives in seagrass beds and depend on them directly for shelter and indirectly for food. Seagrass meadows also concentrate food sources for birds such as herons, egrets, and pelicans.

Two other important functions of the beds are related to each other. Seagrass leaves, acting as baffles, slow down the current and reduce

turbulence, allowing sediment to drop and accumulate. Seagrass roots and rhizomes then bind the sediments and thus reduce bottom erosion.

However, Dr. Williams also noted that:

"...The seagrass beds in Francis Bay and Maho Bay are in critical need of preservation. ...Perhaps in response to the poor food resources, which are nevertheless the best available, the turtles exhibit deviations from the feeding behavior observed in less disturbed seagrass beds.", and that "... loss of seagrass could also result in loss of valuable beaches in Francis Bay and Maho Bays." Dr. Williams' research indicates that "...reduction or elimination of anchorage in the existing seagrass beds is recommended. ...Restrictive demarcation of boats in the bays should extend as far beyond the lower depth limit of seagrass growth as feasible..."

In 1986, Dr. Rogers initiated research that entailed an on-site, underwater survey of boat anchors to quantify and qualify associated impacts to the marine resources. Of the 186 boats surveyed, approximately 56% of the boats were anchored in a water depth of 5-or-less meters, 39% anchored in 6-10 meters depth, and 6% anchored in 11 meters or deeper water. Corralating depth of anchorage to resource impact, the research indicate that 32% of the boats were anchored in seagrasses, while 14% were anchored in coral communities. Preliminary results of this project indicate that the park management should establish a "minimum anchoring depth and distance-from-shore" requirement for boaters choosing to anchor in park waters. This requirement would significantly reduce the amount of deterioration that is currently impacting a varity of marine resources.

IX. Boating Impact Mitigation Recommendations

Mr. Rafe Boulon, Research Biologist, V.I. Fish and Wildlife, provided the park with records indicating that a minimum of 23 boats had struck and damaged Windswept reef over an 11 month time period. To minimize these impacts, the park's Research Biologist installed "reef marker" buoys around the seaward edge of the reef. The purpose of these buoys were to warn boaters of the reef's location. Since installation there has been a substantial decrease in the number of boats striking the reef. This data indicates that the park should install additional buoys in other impacted areas.

To minimize similar boat-related impacts, both Looe Key and Key Largo National Marine Sanctuaries', Florida, have installed a mooring buoys system. Installation of the Halas mooring buoys (Fig. 7) has virtually eliminated anchor damage impacts to buoyed areas in both of these marine areas. Because of the Sanctuary's tremendous success in their ability to minimize boat anchor impacts, Virgin Islands National Park will follow their example and install mooring buoys in many of the park bays.

Site selection for the mooring buoy system is determined primarily by bay popularity. Bays that are heavily visited have the greatest need for mooring buoys to help mitigate the anchor damage. Care will be exercised to position buoys in areas where most anchoring occurs, leaving a 50-foot distance between buoys (research data indicate that the "average" boat to utilize park waters is 44' long). Another criterion for site selection will be to install mooring buoys on some of the lesser known, yet

The Halas Mooring Buoy Assembly

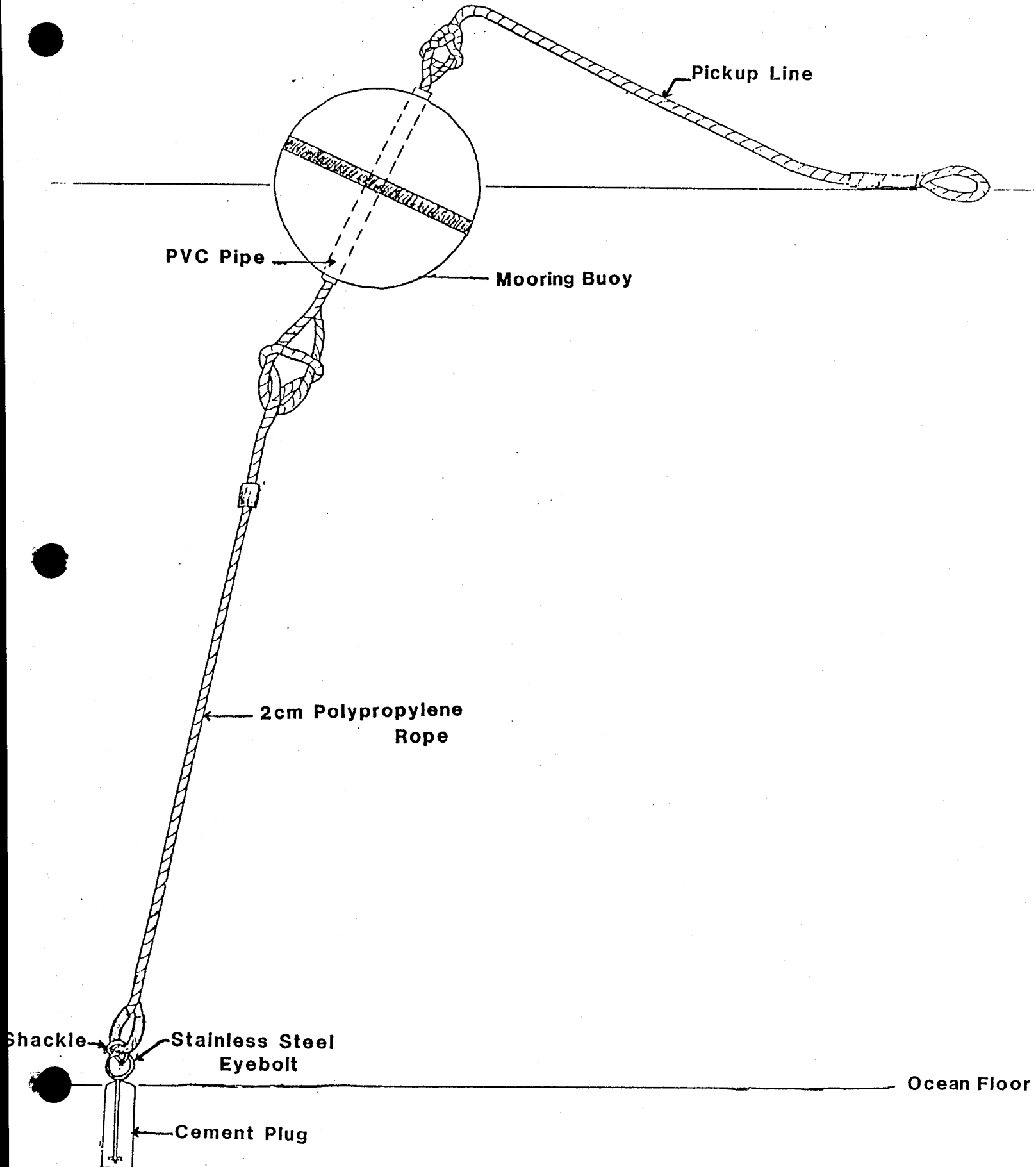


Figure 7

attractive, bays thus reducing the impacts in any one location. Many unmarked reefs receive little, if any, visitation. Hopefully, these areas will remain relatively unaffected by boat related impacts, and will continue to contribute to the vitality of the park's reef system.

Financial requirements necessary to implement a mooring buoy system, in terms of materials and labor, is minimal when considering that the mooring buoys will effectively prevent the majority of anchor damage that is presently occurring. There is a point, however, beyond which additional buoys will be cost prohibitive in terms of yearly buoy maintenance (\$20-40/buoy/year + labor). In some popular bays there is inadequate space to deploy buoys for all the potential boaters all of the time.

IX. Shoreline Management Recommendations

For park management to maintain the integrity of its' natural resources, while concurrently maintaining compatability with recreational use of the resources, issues must be addressed as to carrying capacities and management objectives for both marine and terrestrial areas within the park. These decisions are addressed in this management plan.

Shoreline Management Plan recommendations are designed to mitigate resources management concerns and adverse impacts to the park's natural resources. Impact mitigation will be addressed in a variety of ways to include: public review meetings; management

recommendations on methods to minimize on-going impacts; and, by implementation of approved resources management activities.

The SMP establishes 3 separate and distinct areas within the park. Specific areas have been categorized into "Management Use Zones". These zones were determined by the environmental sensitivity of a specific area, recreational use patterns and the severity of current resources degradation. Management Use Zones would regulate recreational use to specific areas within the park. These Zones would include: Recreational Use Zones and Environmental Protection Zones.

A. Recreational Use Zones:

These zones (Fig. 8) are further separated to include either:

1. High Density Use (HDU) Zone - This zone would include beach areas that would be accessible to large numbers of visitors (eg. 600-800/day). HDU Zones are designed to accommodate large tour groups (eg. cruise ship passengers and/or locally sponsored commercial tour groups). Boat mooring buoys would be installed on a "day use only" basis, while boat owners wishing to utilize their anchors would be compelled, by CFR regulation, to anchor in areas further from the shoreline (seaward of the mooring buoys at a minimal distance-from-shore or minimum water depth). HDU Zones would include Trunk and Cinnamon Bays.
2. Low Density Use (LDU) Zone - This zone would include beach areas that would be accessible to a minimal numbers of visitors

(eg. exact carrying capacity would be dependent on either the size of the beach or current impacts associated with the individual beach). LDU Zones would be buoyed for "swim only" access and mooring buoys would be installed within close proximity to these zones. However, as with HDU Zones, boat owners wishing to utilize anchors would do so in areas seaward of the mooring buoys, in environmentally less-fragile locations (eg. minimum distance and/or depth). LDU Zones would include:

- Solomon Beach
- Honeymoon Beach
- Hawksnest Bay
- Maho Bay
- Mary's Creek
- Leinster Bay
- Salt Pond Bay

B. Environmental Protection (EP) Zone:

Because of the highly sensitive and fragile nature of these zones (attributed to a variety of environmental factors), all current impacts would be addressed by initiating protective legislation and resources management activities. These EP Zones would include Francis Bay and Henley Cay on the north shore and Lameshur and Europa Bays on the south shore. A minimal numbers of mooring buoys would be installed. However, boat anchoring, bait seining, and the taking of lobster, conch, and whelk would be excluded from these areas. Marine resources recovery rate research would be initiated at the Lameshur/Europa Bay EP Zones by Virgin Islands

Ecological Research Station (VIERS). VIERS is a field station for the Caribbean Research Institute and is funded by University of the Virgin Islands and Virgin Islands government. VIERS is a long-term marine resources research facility located, since 1966, at Lameshur Bay. All specimen collecting would be prohibited from EP Zones.

ZONING MANAGEMENT PLAN

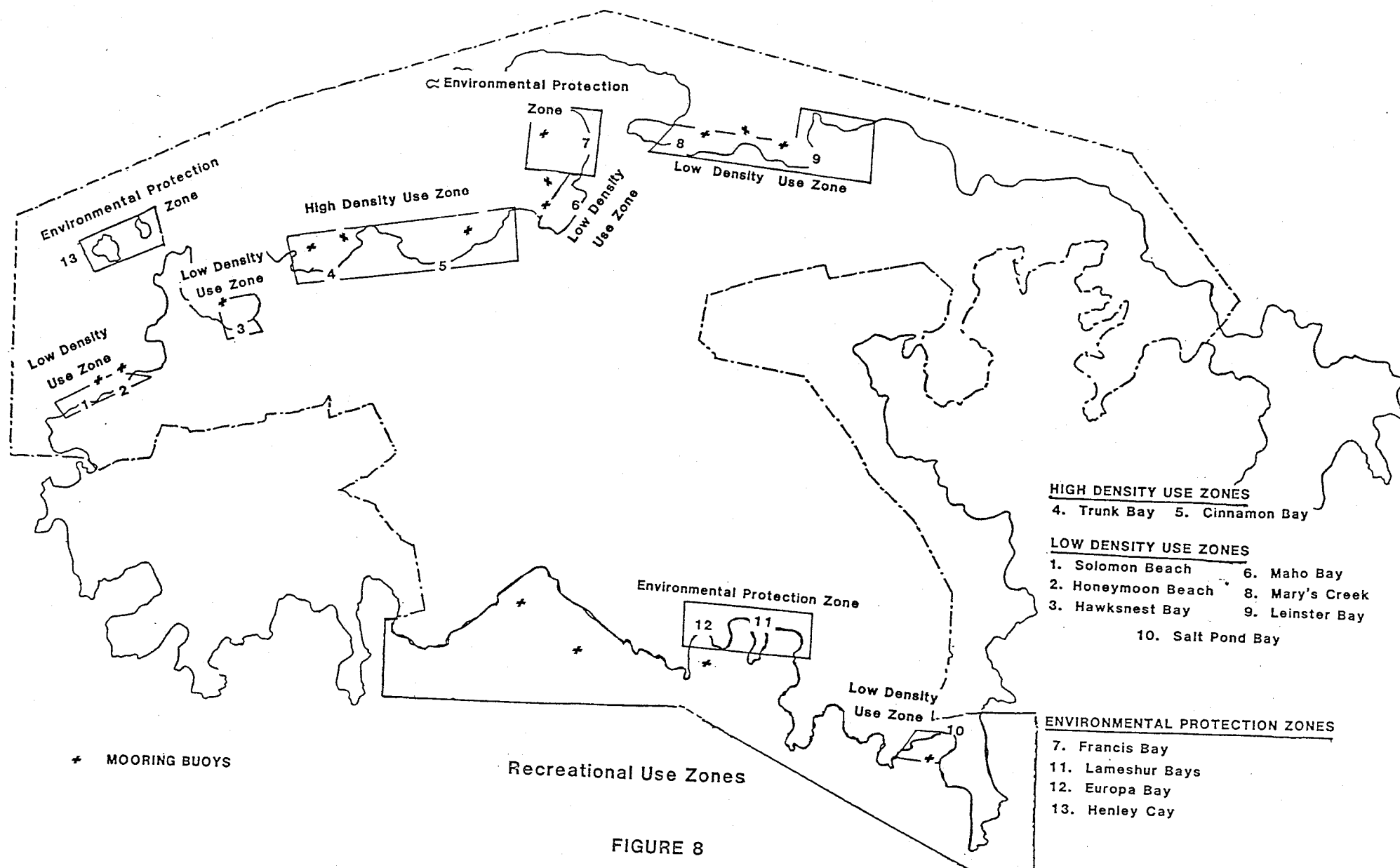
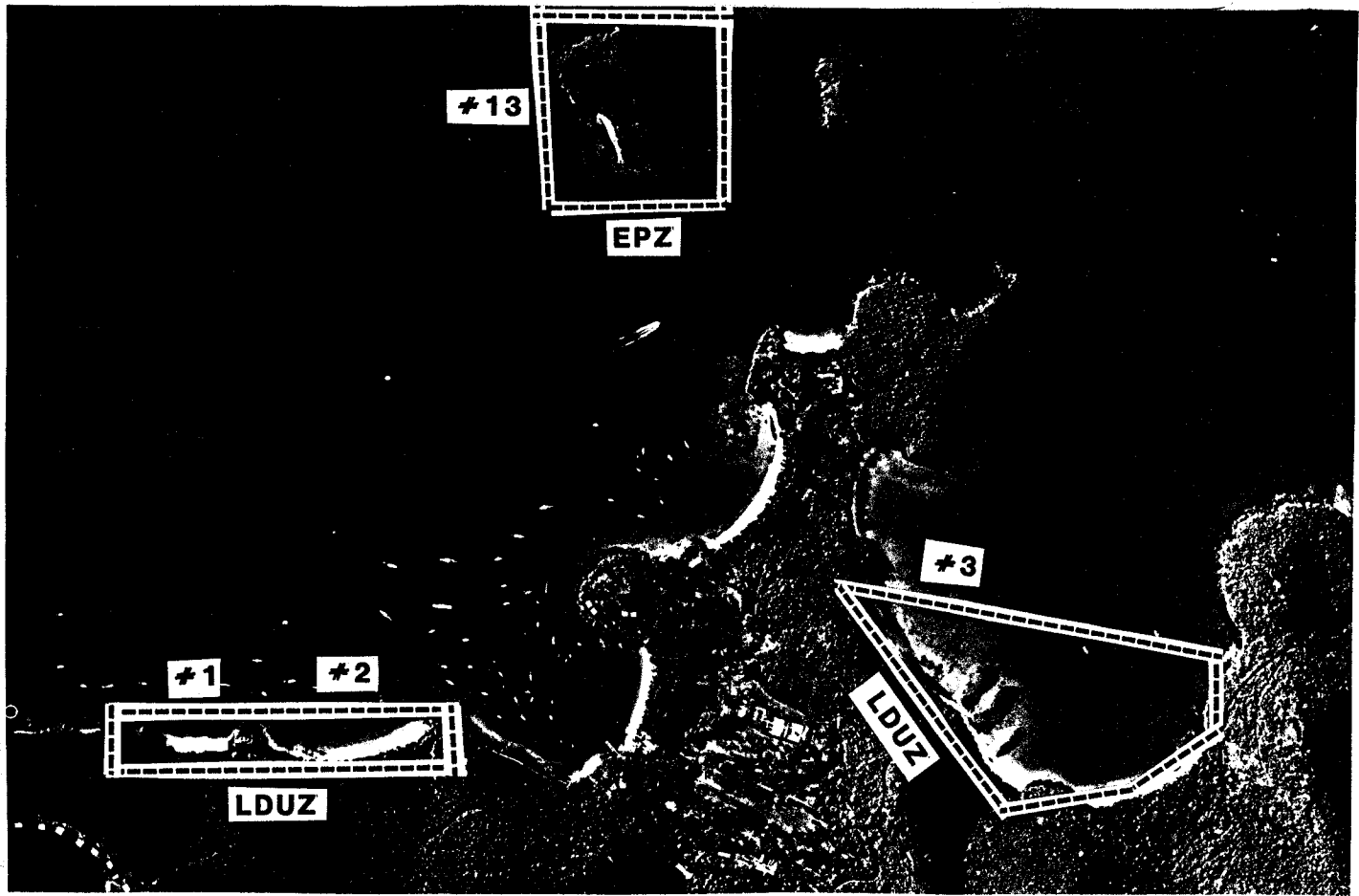


FIGURE 8



Recreational Use Zones

*LDU Zone = Low Density Use

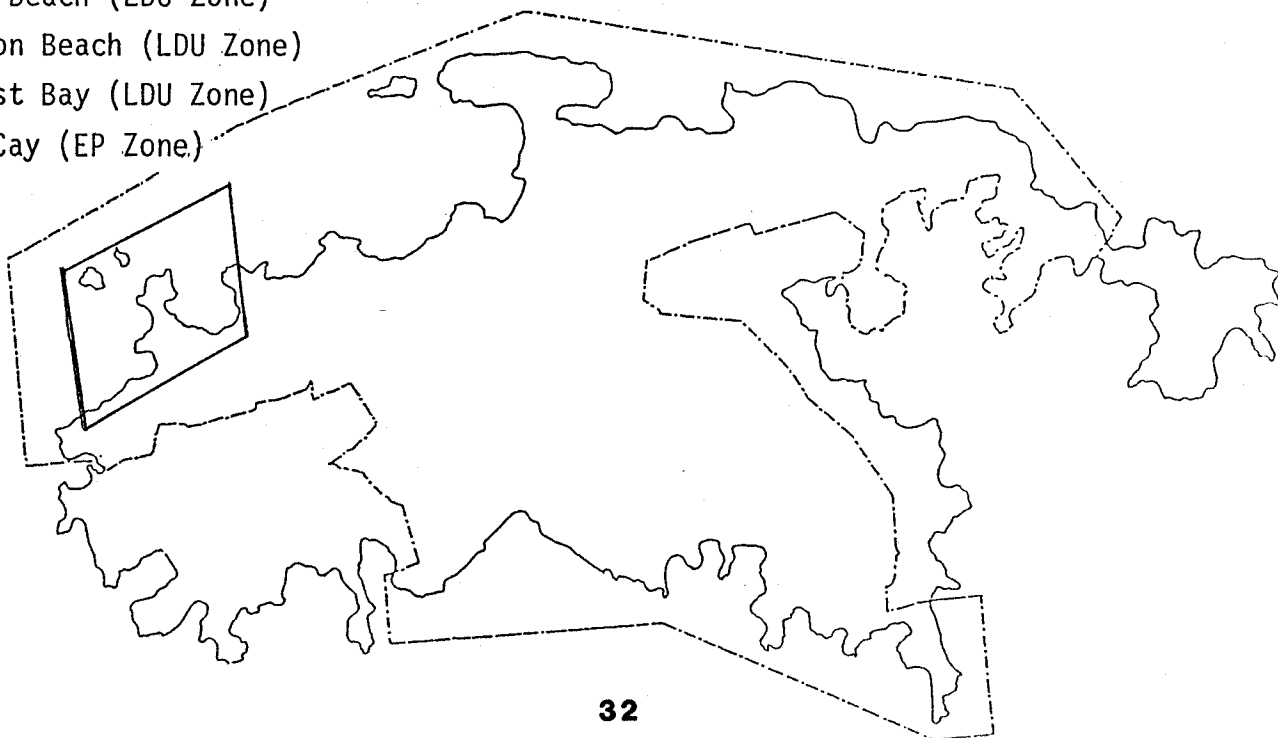
*EP Zone = Environmental Protection

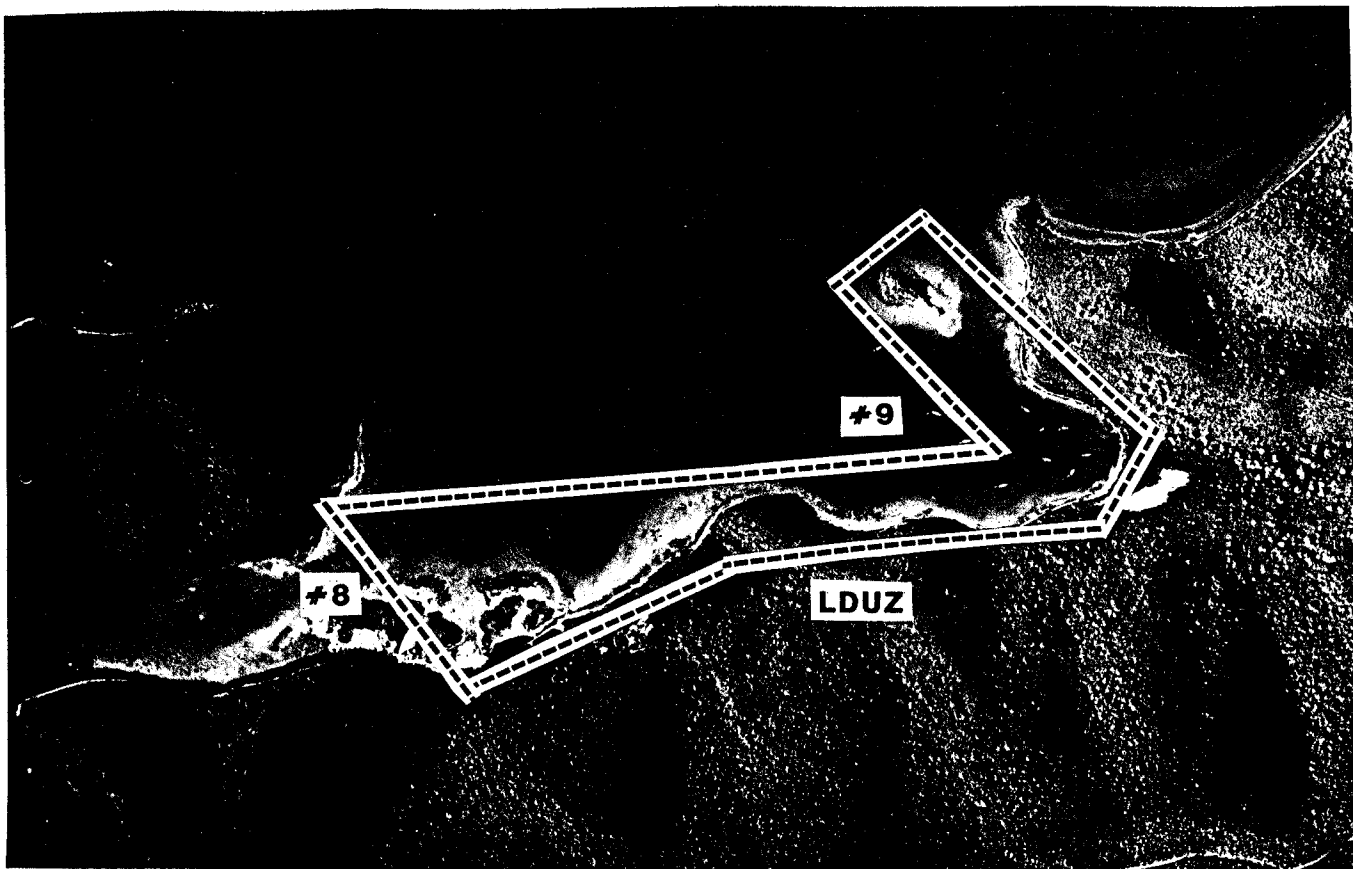
#1 - Solomon Beach (LDU Zone)

#2 - Honeymoon Beach (LDU Zone)

#3 - Hawksnest Bay (LDU Zone)

#13 - Henley Cay (EP Zone)

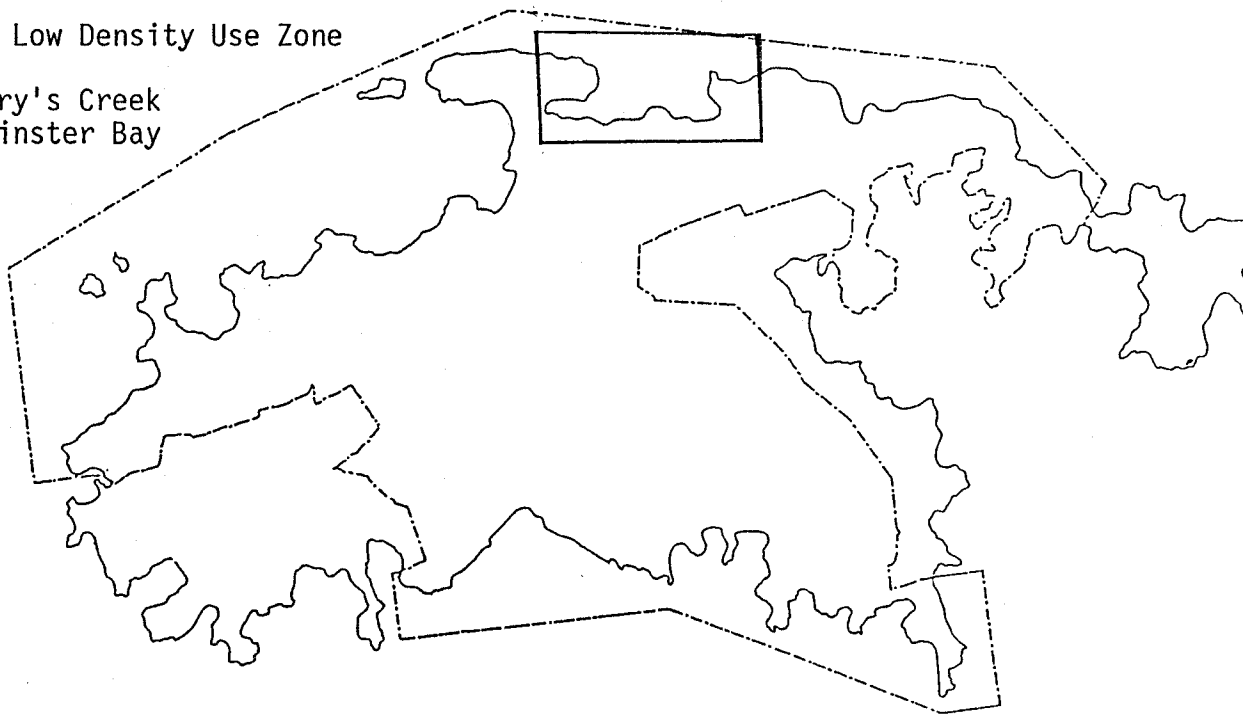


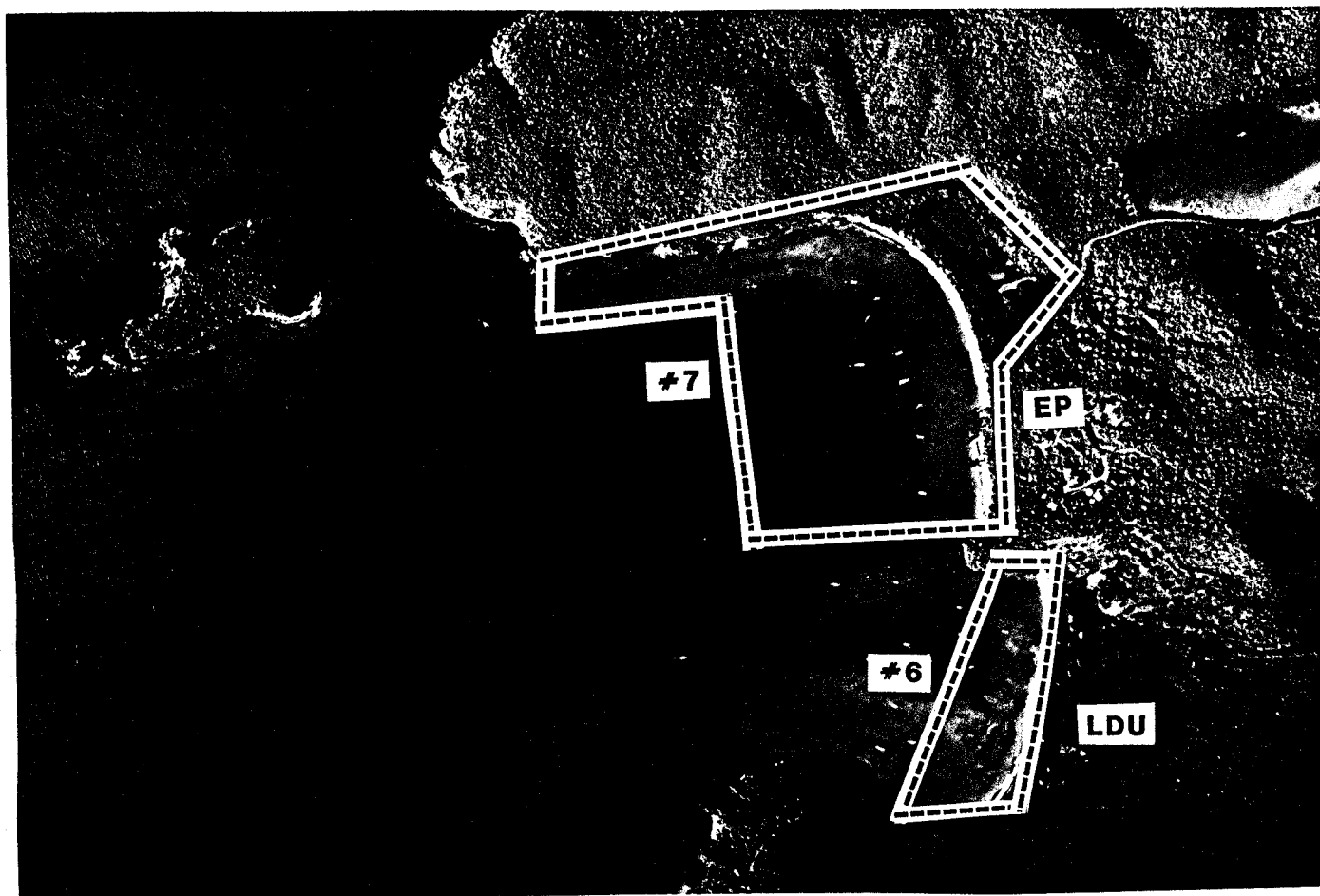


Recreational Use Zones

*LDUZ = Low Density Use Zone

- #8 - Mary's Creek
- #9 - Leinster Bay





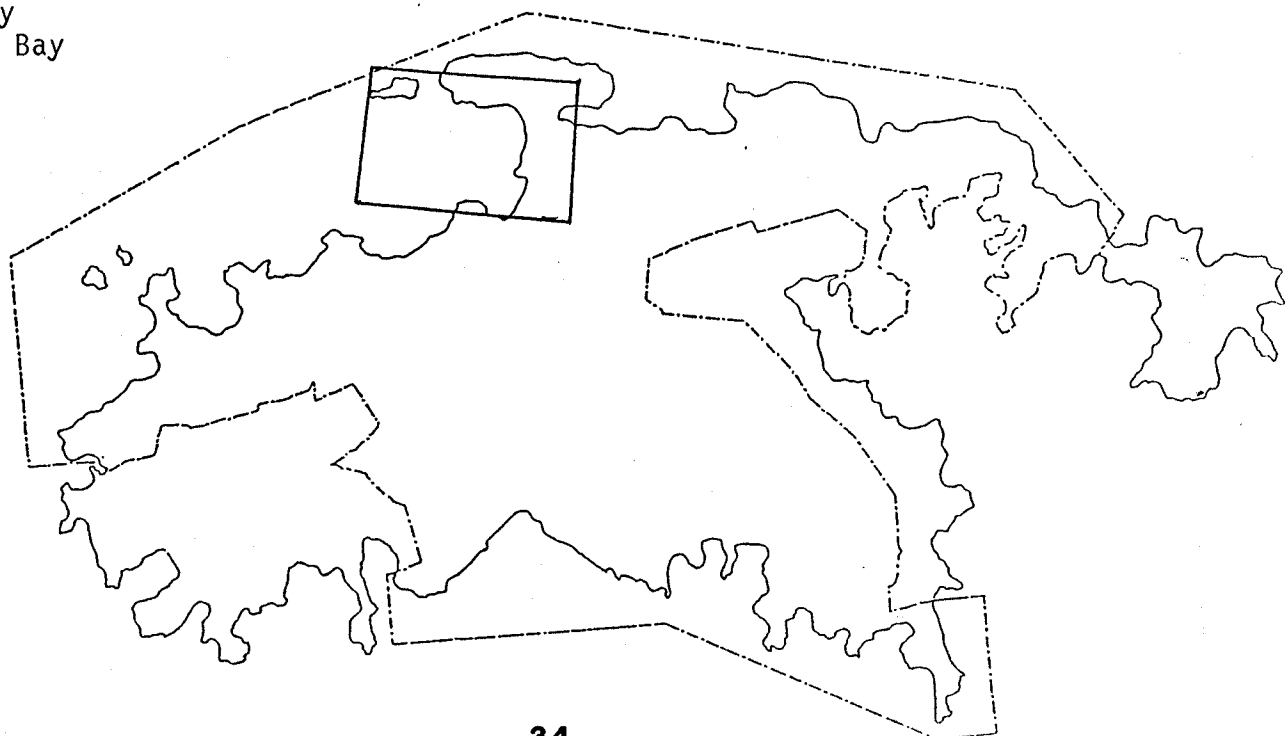
Recreational Use Zones

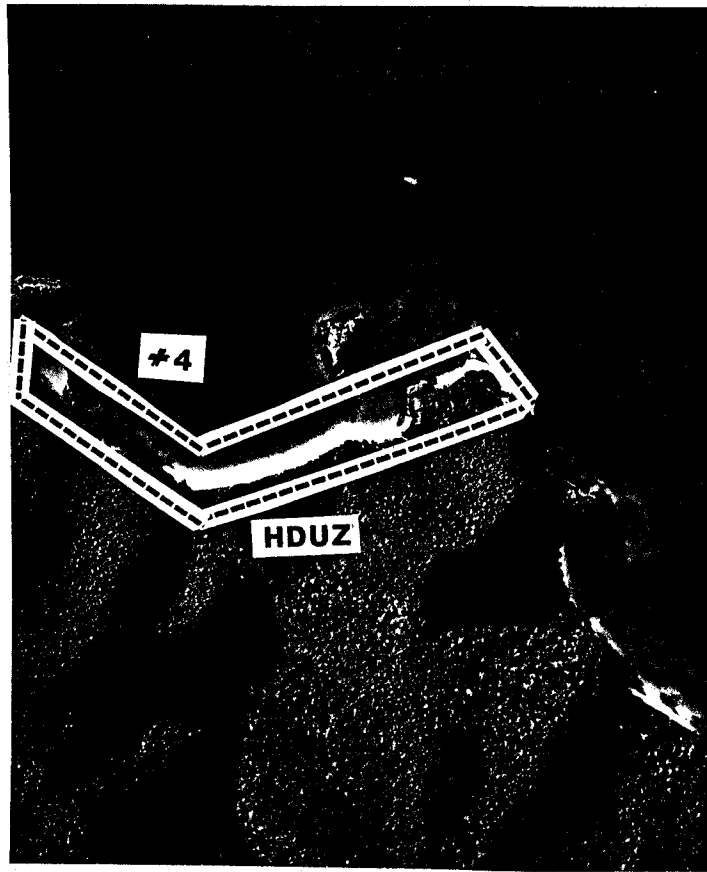
*EP = Environmental Protection Zone

*LDU = Low Density Use Zone

#6 - Maho Bay

#7 - Francis Bay

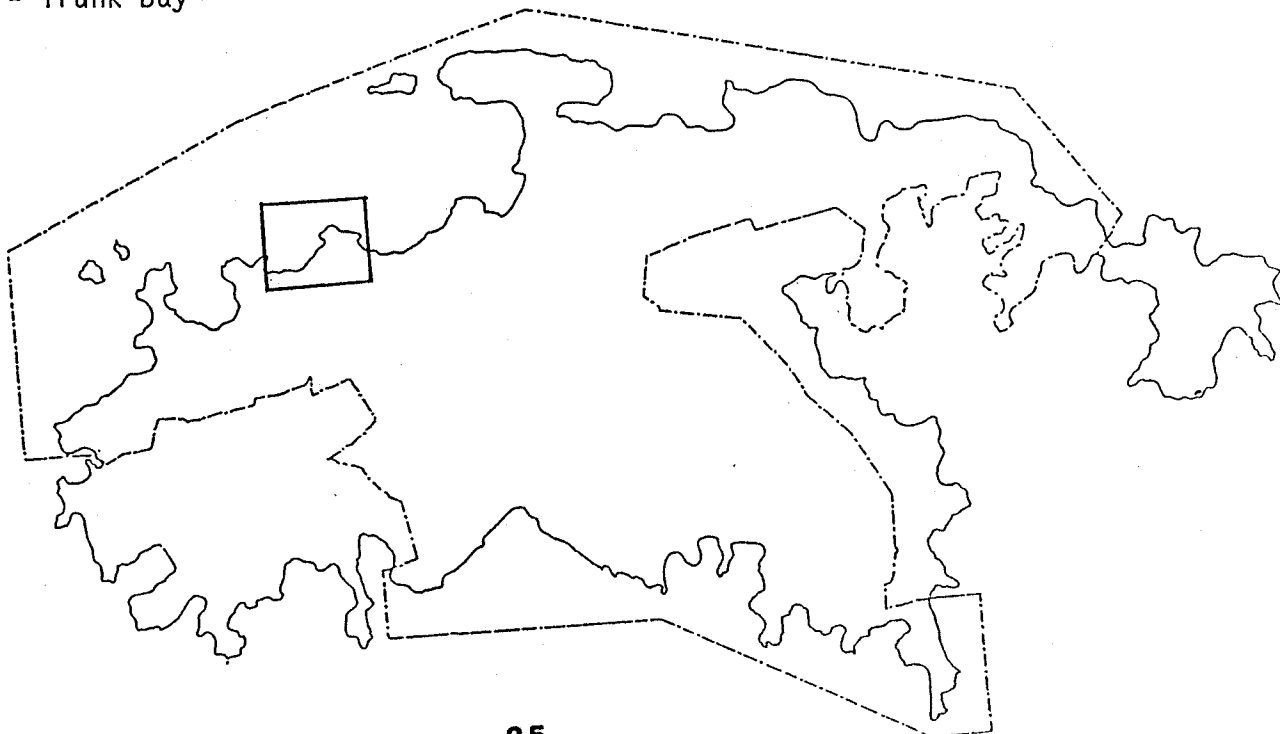


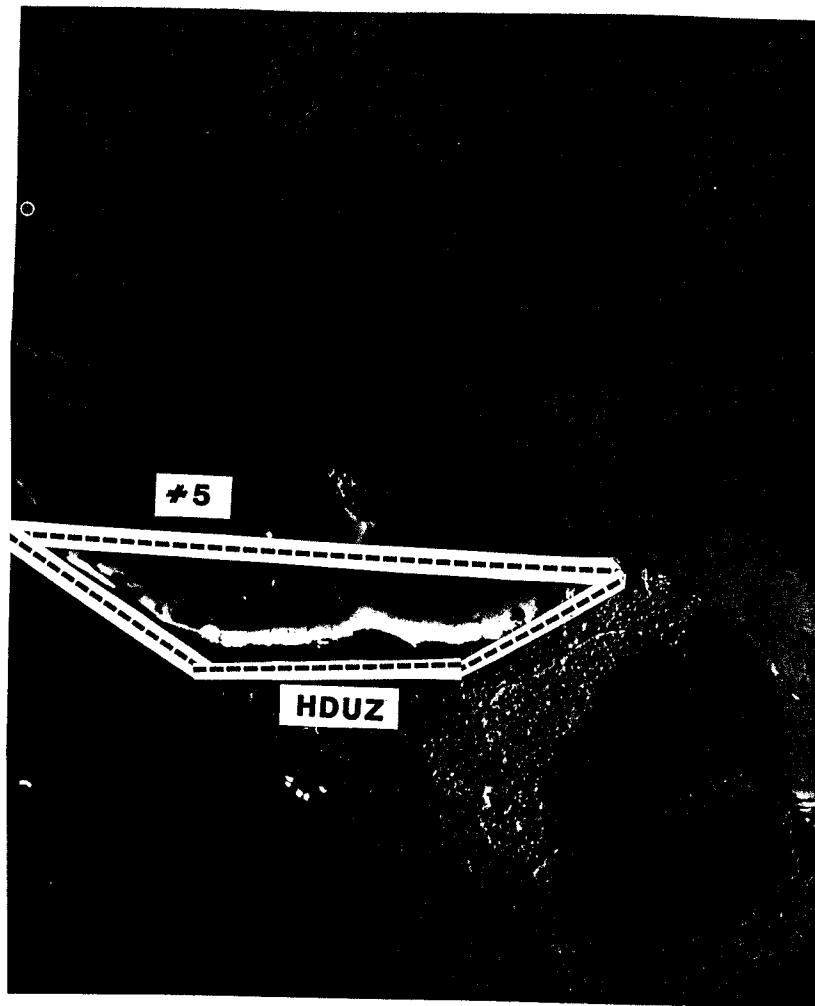


Recreational Use Zones

*HDUZ = High Density Use Zone

#4 - Trunk Bay

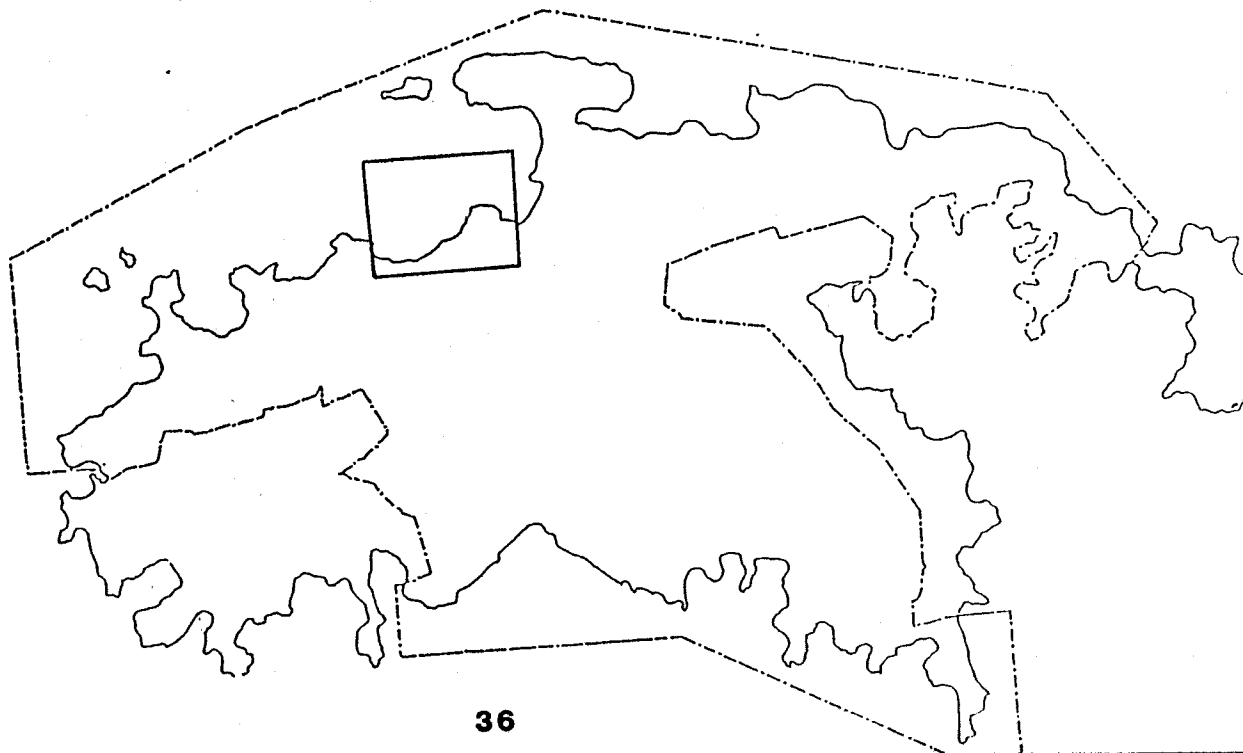


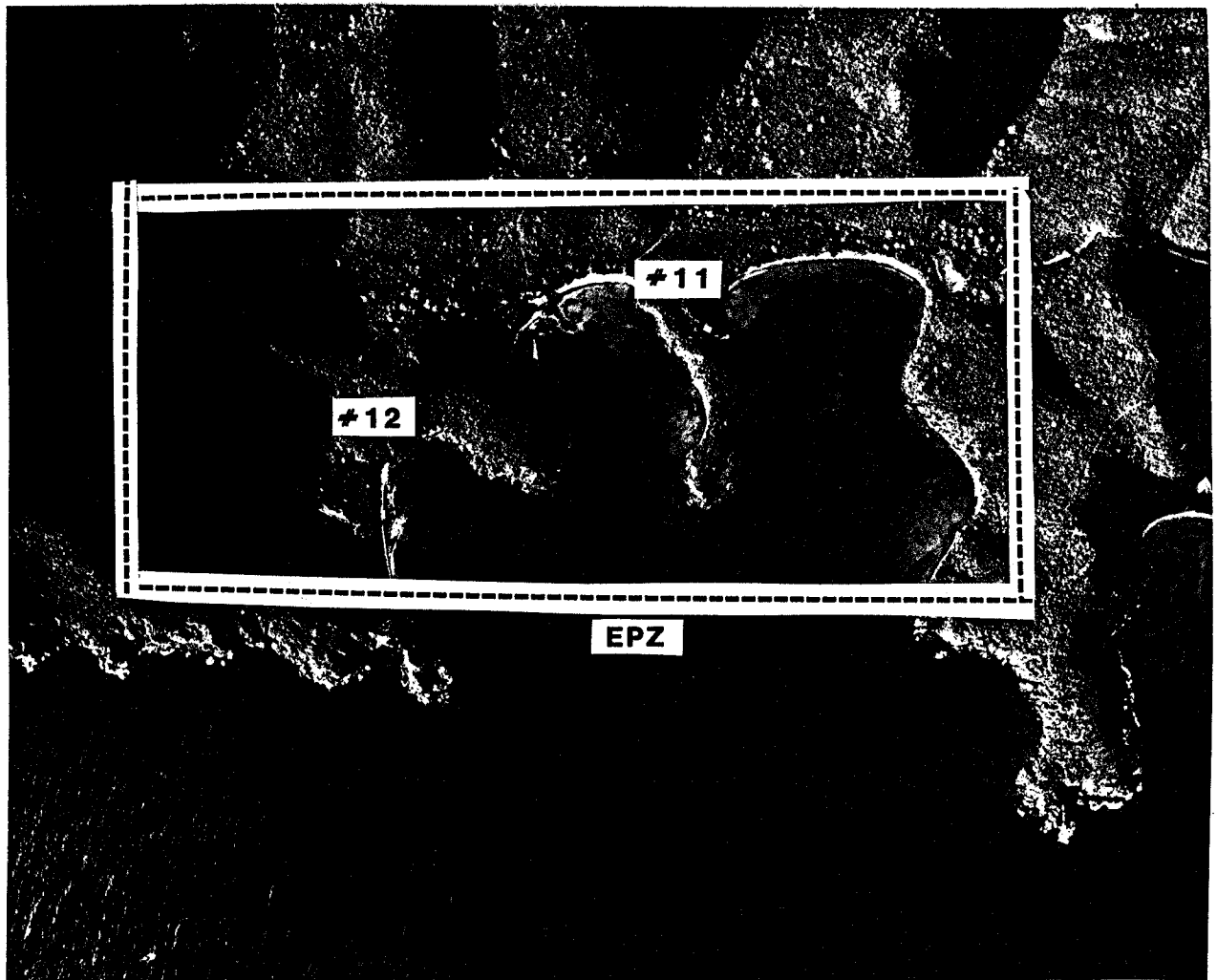


Recreational Use Zones

*H DUZ = High Density Use Zone

#5 - Cinnamon Bay



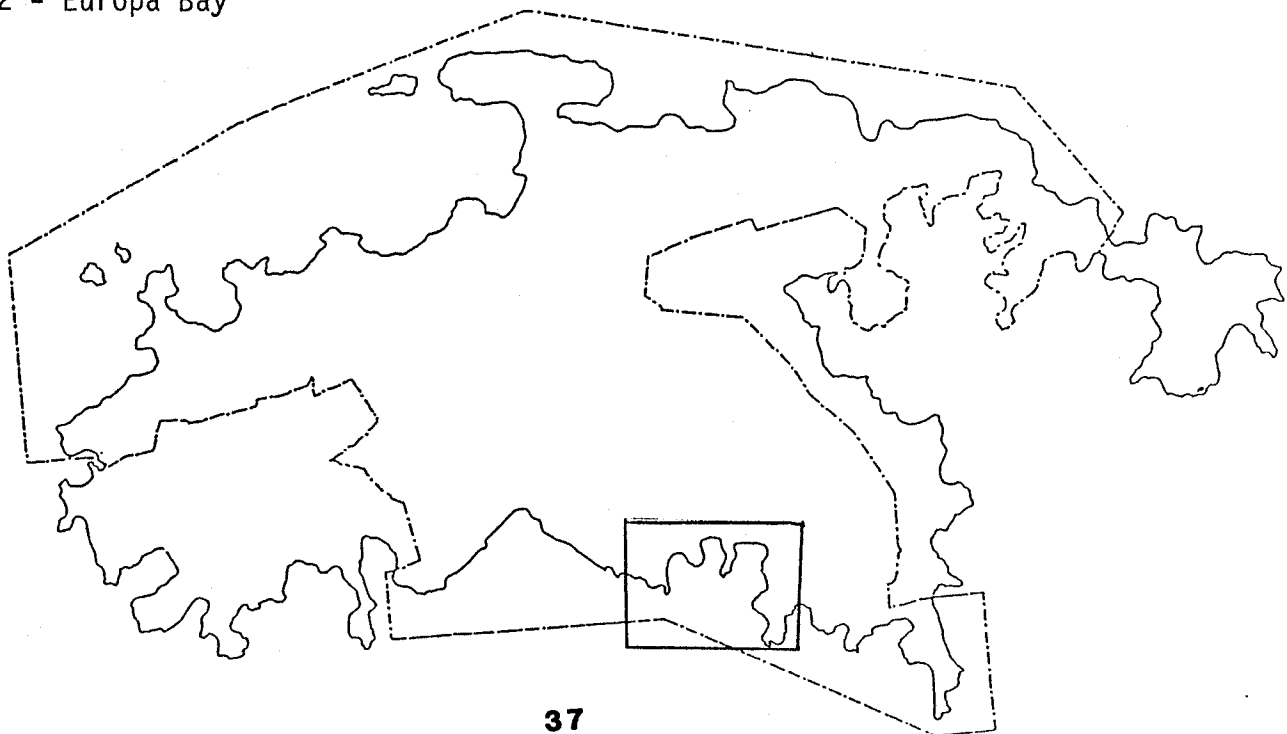


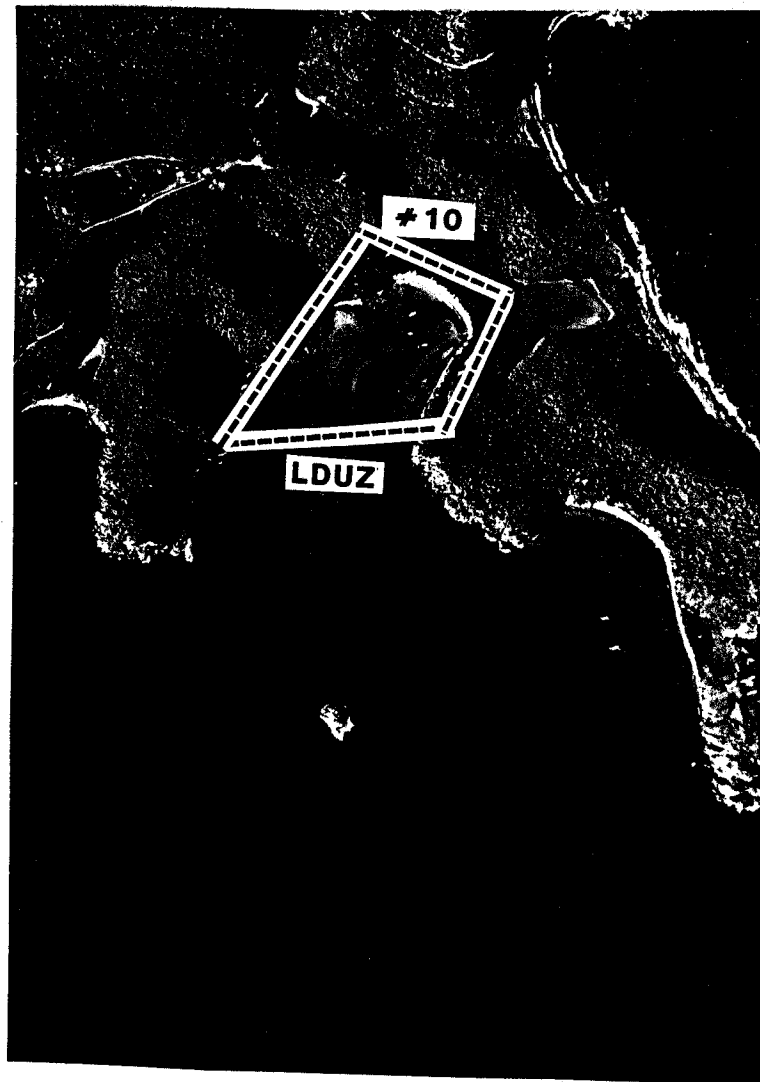
Recreational Use Zones

*EPZ = Environmental Protection Zone

#11 - Lameshur Bays

#12 - Europa Bay

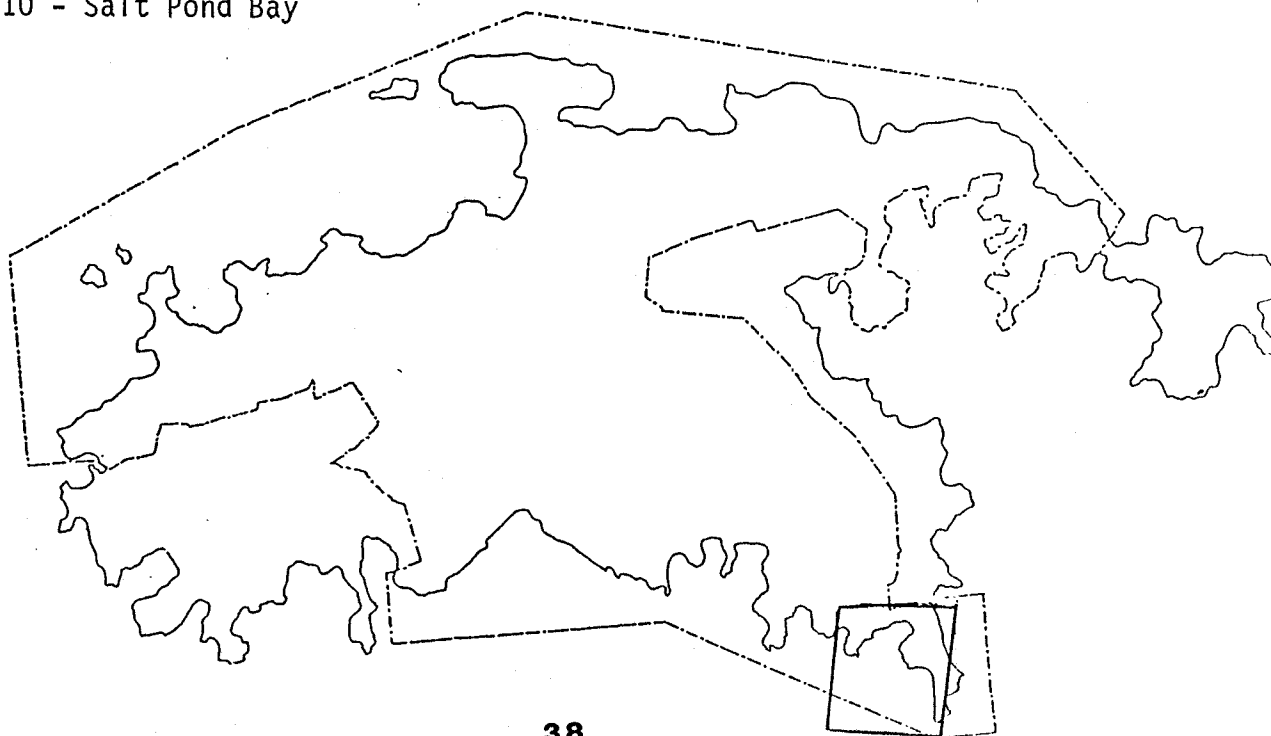




Recreational Use Zones

*LDUZ = Low Density Use Zone

#10 - Salt Pond Bay



IX. Management Recommendations Per Bay

1. Solomon Beach:

- close beach access to boats (via #2)
- delineate "swim area only" area via marker buoys (to obtain minimum distance/depth compliance)
- install 6 mooring buoys

2. Honeymoon Beach:

- close beach access to boats
- delineate "swim area only" via marker buoys
- install 6 mooring buoys

3. Hawksnest Bay:

- add additional area and marker buoys to "swim only" area
- install 8 mooring buoys

4. Trunk Bay:

- install 8 "day use only" mooring buoys

5. Cinnamon Bay:

- install 8 "day use only" mooring buoys

6. Maho Bay:

- close beach access to boats (via #2)
- delineate "swim only" area via marker buoys
- install 10 mooring bouys

7. Francis Bay:

- delineate "no anchors allowed" area via marker buoys
- install 12 mooring bouys

8. Mary's Creek:

- install 10 mooring buoys

9. Leinster Bay:

- delineate "no anchors allowed" area via buoys
- install 6 mooring buoys

10. Salt Pond Bay:

- delineate "no anchors allowed" area via marker buoys
- install 2 mooring buoys

11. Lameshur Bay:

- delineate "no anchors allowed" area via marker buoys
- install 2 mooring buoys

12. Europa Bay:

- delineate "no anchors allowed" area via buoys
- install 3 mooring buoys

A. Additional recommendations for mooring buoy placement:

1. Reef Bay:

- delineate "no anchors allowed" via marker buoys
- install 5 mooring buoys

2. Brown Bay:

- install 3 mooring buoys

X. Code of Federal Regulations Recommendations

1. Prohibit the use of SCUBA equipment for collecting lobsters and conch from south shore NPS waters.
2. Establish minimum depth and distance guidelines for boaters.
3. Prohibit mini-cruise ships from anchoring in park waters or provide the ships with specific areas to anchor within the park (areas would be delineated by the park's Research Biologist).
4. Establish "Recreational Use Zones".
5. Establish mooring buoys as the only anchoring method within approved use zones.
6. Prohibit the unloading of cruise ship passengers to all but "High Density Use Zones".