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CASE STUDY ON THE VIRGIN ISLANDS BIOSPHERE RESERVE

Contribution to the UNESCO/IUCN Workshop on the Application of the
Biosphere Reserve Concept to Coastal Marine Areas

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Title: MODELS, METAPHORS, NETWORKS, AND INSULAR BIOSPHERE RESERVES:
THE VIRGIN ISLANDS CASE

I. BEGINNINGS

When the initial network of biosphere reserves was established by the United Nations in 1976, the almost new Virgin Islands National Park, situated on the twenty square mile (52 sq. km.) island of St. John, was included in the original group. It was and still remains the only biosphere reserve in the Lesser Antilles. The Park was just twenty years old at the time.

St. John is part of a group known as the Virgin Islands, about half British and half American, consisting of a dozen inhabited islands (six large and six small) plus a generous sprinkling of four dozen additional emergent rocks, islets, and satellite islands. They are spread out over a fifty mile-long easterly extension of the submerged Puerto Rican shelf. St. Croix, the largest of this group, lies some 40 miles to the south across a deep trench on its own elevated platform and is quite separate from the main island cluster. From St. Croix, the rest of the Virgin Islands group, or at least the higher islands, are barely visible smudges on the horizon. This international ensemble of mostly volcanic islands and islets constitutes a transitional bio-geographical link between the Greater and the Lesser Antilles.

Situated in the midst of this island cluster, the sparsely populated, mostly undeveloped island of St. John happens to be both proximal to the international boundary and physically closer to the adjacent British island of Tortola to the northeast than to its sister island, St. Thomas, to the west.

St. John has a seasonally fluctuating population of about three to four thousand residents, but the National Park, which occupies less than sixty percent (2,861 ha) of the land area, plays host to about 900,000 visitors annually. Since even from the early days of the Park on St. John, much of the user activity focused on the beaches, reefs and surrounding marine environment, 2,287 ha of marine waters (and associated submerged land) were added to the park in 1962 "... in order to preserve for the benefit of the public significant coral gardens, marine life, and seascapes..." (16 U.S.C.398). Therefore, almost from the beginning, the Park has been at once a tropical terrestrial woodland park (with a less accessible, natural area de facto "core") as well as a coastal and marine park system (complete with very accessible, arcuate beaches, mangrove fringed salt ponds, sea grass meadows, coral reefs and clear coastal waters ideally suitable for fishing, recreational boating, and scuba diving). Traditional fishing, within certain catch limits, is allowable in otherwise protected National Park coastal waters, but the licensing is handled by the local Virgin Islands Government's Division of Fish and Wildlife.

The Virgin Islands National Park (VINP) has been an extremely popular park. Combined local and tourist/visitor use levels have tripled since 1976, having previously doubled from 1966. Although it is a satellite island of St. Thomas, St. John is highly accessible, and its smallness makes even its core natural area reachable by the day visitor. It has generated or contributed significantly to the establishment of scores of successful commercial activities situated on privately held land on the perimeter of the Park. For the most part, these are tourist-related businesses and support services.

As stated above, the VINP is very accessible. Inexpensive, hourly ferry service between St. John and St. Thomas is available. It is also noteworthy that St. Thomas, with its 55,000 people on only 28 square miles of steep terrain, has no territorial park system and maintains (badly) only three overcrowded public beach/recreation areas -- Brewers, Magens and Lindbergh Bays. In fact, most of the "good" St. Thomas beaches have been co-opted by large resort hotels and have limited access although they legally are open to the public. Therefore, the very attractive, better managed National Park beaches on St. John are preferred by many St. Thomas residents and tourist visitors, despite some inconvenience and cost of a twenty minute ferry ride.

Beaches, of course, are not the only attraction. The island's many other amenities draw scores to hundreds of other non-beach focused visitors and other resource users on a daily basis, many of whom arrive by speed boat, chartered sail boat, private yachts and even small cruise ships -- most of which anchor, sometimes overnight, in Park waters. Many yachts and bareboat charters also stay over-

night. Two campgrounds, Cinnamon Bay, run as a concession inside the Park, and Maho Bay, a private, nature-theme, low key resort just outside the Park are the most popular in the region and full to overflowing most of the year. In effect, visitors come from every direction, including the air (because there is daily seaplane service to and from St. Croix, forty miles to the south). Since Cruz Bay, the administrative center of St. John, is an official Virgin Islands territorial "port of entry", international visitors arrive daily by ferry from the nearby British Virgin Islands. All in all, it is a very busy place.

The 1982 proposed formal dedication of The Virgin Islands National Park as a "biosphere reserve" presented the U.S. National Park Service and interested government and private sector resource managers and planners from the Virgin Islands territory and from the region with two extraordinary challenges -- namely, how to launch the process of turning the VINP into a VIBR and how to develop the Virgin Island biosphere reserve "model" so as to serve both the Virgin Islands and the Eastern Caribbean at the same time.

During the debate over these issues another facet surfaced when the diversity of the extended Antillean archipelago suggested to U. S. National Park Service (USNPS) officials (William Gregg and others) the prospect of the Virgin Islands prototype becoming the nucleus of a new kind of international, multi-island biosphere reserve cluster. It looked like a grand venture at the start although some skeptics saw problems arising out of a mismatch between a "big" NPS and "big" UNESCO vis a vis "smaller" islands with very limited resources. There was also some concern about the effect of this U.S. based biosphere reserve model on other recently developed Eastern Caribbean park and protected area projects.

II. TOWARDS AN APPROACH

Beginning in 1982, the U.S. National Park Service took the lead, first organizing a Virgin Islands Resource Management Cooperative (VIRMC) which aimed at bringing together local and regional expertise to undertake the design of a baseline research effort to assist with resource management problem solving. The Cooperative included some 14 public agencies and private institutions concerned with conservation, research, resource management and economic development in the area (including government institutions in Puerto Rico and the U. S. and British Virgin Islands).

The following year, 1983, saw the formal dedication of the Virgin Islands National Park as a biosphere reserve. This event, by design, was the occasion for a regional, first public vetting of the biosphere reserve "idea" in a three day "Workshop on Biosphere Reserves and Other Protected Areas for Sustainable Development of Small Caribbean Islands". With basic funding by the U.S. National Park Service and co-sponsorship by UNESCO, MAB, and the Caribbean Conservation Association (CCA), the workshop was held at Caneel Bay Plantation, a resort hotel inside the National Park. All the Lesser Antilles island governments were invited and all but two, Dominica and Antigua/Barbuda,

sent a delegate. The proceedings of this workshop, have been published by the National Park Service, and a video tape on delegate responses to the concept was produced by the Island Resources Foundation with US-MAB and USNPS funds and the technical assistance of Allen Putney of CCA/ECNAMP as the scriptwriter/editor. Both the proceedings and the video tape are still available.

There is no question that the delegates from the smaller islands of the Eastern Caribbean were cautious, skeptical and even nervous about the complexity and experimental nature of the biosphere reserve concept. There was some concern about its relevance to very small, less developed, island systems, about the cookie-cutter like concentric circles "zoning" model, and about even the idea of merging terrestrial and marine areas in a single management unit (see A. Putney Case Study, the bottom of page 2). It was decided, for these reasons among others, to defer on any resolutions, and since the Caribbean Conservation Association was conspicuously present, represented in fact by five persons, the workshop formally invited CCA to assume the leadership in undertaking the following organizational and exploratory tasks for the Eastern Caribbean:

A. CCA should facilitate the formation of a Lesser Antilles Biosphere Reserve Consultative Committee which would comprise the Government Members of CCA and representatives of Full Members (i.e., NGOs) in countries that are not Government Members of CCA.

B. CCA should facilitate the formation of working groups to look at critical issues in relation to research, core areas and multiple use zones in relation to Biosphere Reserves.

C. CCA should consider the following five (5) criteria for selecting Biosphere Reserves in the Lesser Antilles:

1. Representativeness
2. Sharing of Human Resources
3. Multiple Zones
4. Multiple Island Design
5. Local Involvement.

[N.B.: these same criteria are elaborated upon in the Putney Case Study, page 2 without reference to CCA to whom they were addressed.]

In a separate recommendation, UNESCO was asked to work with CCA as the regional contact point and to provide "preparatory funds (a proposal was subsequently prepared by CCA/ECNAMP and submitted by CCA to UNESCO but was not funded.)

It is regrettable that although CCA accepted the assignment for building upon the initial information base and alternative planning concept model established by the 1983 NPS/MAB/UNESCO sponsored workshop on St. John, CCA did nothing about tasks A and B above, which

were not contingent on UNESCO financial support. This is not unrelated to the delays and "bureaucratic complications" encountered by CCA and ECNAMP as referred in the penultimate paragraph on page 4 of the Lesser Antilles Case Study. By doing nothing and not relinquishing the assignment, CCA inadvertently blocked others who might have assisted or identified alternatives.

III. TOWARD A PROGRAM: 1984 - 1988

With the Eastern Caribbean biosphere reserve proselytizing "window" metaphorically closed off by CCA's assignment, the U.S. National Park Service (in Washington, Atlanta and the Virgin Islands), in company with VIRMC and its members, turned to the task at hand which was to explore ways to improve the information base of resource management in the National Park and invent a strategy to turn a national park into a biosphere reserve.

A. VIBR "Management Focused" Base Line Research

Using the Virgin Island Resource Management Cooperative as the vehicle, a half million dollar, five year sequence of thirty research projects was financed by USNPS and undertaken through a prime contract with the St. Thomas-based Island Resources Foundation, which arranged subcontracts to a dozen or so local institutional members of the Cooperative for various tasks. The Foundation also handled the peer reviews, technical editing, and all design and publishing details. The resulting research projects and technical report series totaled over 2,300 pages of documentation, which emphasized interdisciplinary techniques and transition zone problems, plugged major gaps in the data base, and identified useful guidelines for resolving resource management problems (which were becoming more serious as use levels escalated rapidly after 1983). Subject matter ranged from reef ecology, to forestry and vegetation, to artisanal fisheries (both regional and local), to salt pond eutrophication, and preliminary subsystem carrying capacity studies. Some efforts were made to separate out and identify "indicators" of anthropogenic as opposed to natural damage to reefs. Extensive resource mapping exercises and preliminary zoning, planning and natural resource data management studies were also undertaken. These are summarized in Annex A, the attached "Reprint" from the August 1989 Marine Connection (Vol. 4, No.1) and are listed on Annex B, the attached list of VIRMC/NPS Biosphere Reserve Publications. All of these documents are currently available as is a volume of "Abstracts" for the Technical Report Series.

B. VIBR "Monitoring-Focused" Base Line Research

Perhaps a dozen of the research projects referred to above were specifically designed to lay the base line for the future, ongoing, intermittent, or projected environmental monitoring of selected terrestrial and marine environmental parameters, both locally and in some cases regionally significant. The aphorism "think globally, act locally" has relevance to biosphere reserve monitoring strategies and

regimes. For example, three quite different and separate, long term forestry plot systems have been established and are being maintained by three institutions -- The New York Botanical Garden, The University of Wisconsin (Center for Biotic Systems, Institute for Environmental Studies) and the (U.S. Department of Agriculture) Institute for Tropical Forestry in Rio Piedras, Puerto Rico. Details on these and other LTM efforts are available on request. One notes in passing that some efforts are being made to develop parallel strategies with other equivalent protected areas or unprotected habitats in the region. Lessons learned in the VIBR, especially regarding low cost techniques, improved resource assessment procedures, sampling schedules, specimen banking, etc., that can only be derived from hands on experience, have already proven helpful.

C. Training and Research Facility

In 1986 the National Park Service completed construction of a new, US\$500,000. Virgin Islands Biosphere Reserve Center at Lind Point on St. John, with the long term objective of addressing some of the training and education needs of both the St. John reserve itself and Caribbean island park and protected area resource managers as well. This complex provides laboratory and office space, storage for scientific collections, housing for visiting scientists and students and conference/teaching facilities.

D. Finding Aids and Research Guides

A published synthesis of prior research on the St. John environment, a keyword indexed master VIBR bibliography, an herbarium collection (also indexed), a data management plan, a map and document reference collection were all completed by the end of 1988.

E. A "Friends of the National Park" citizens group has been organized.

IV. CURRENT PROJECTS LINKING VINP/VIBR WITH THE CARIBBEAN

A. The National Park Service is the sponsor (with Dr. C. Rogers as the project manager) of a US\$450,000. two-phase program focusing on improved methodologies of reef assessment. Several aspects of this initiative focus on the Virgin Islands, and the findings will contribute to the larger task of getting better reef system data at lower costs. Present procedures are not suitable for developing island country resource manager needs and budgets.

B. Caribbean Parks and Protected Area Bibliography. VINP/VIBR has just completed a new computer-based, 43 page, keyword indexed bibliography on Caribbean parks and protected areas. This is scheduled for distribution in November 1989. Funding was provided by the USNPS Office of International Affairs. The contractor was the Island Resources Foundation.

C. Attachment Training Initiatives: Belize and Jamaica. Mr. Earl Young of the Hol Chan Marine Reserve in Belize spent the month of June engaged in direct hands-on, attachment training as a guest-trainee at the Virgin Island Biosphere Reserve Center. His instructional program included (1) reef monitoring techniques, (2) underwater photo documentation, (3) water quality sampling and analysis and (4) basic computer skills. Two Jamaicans have been in residence during much of July, and this program, which is in a testing mode will undoubtedly become more formalized in the future. This will be a slow but methodical process of informing younger parks and protected area leaders about the "biosphere reserve concept" so that they will be in a better position to evaluate its potential for their own country. (However, the region needs more than this, something more systematic, in the way of an educational program focusing on the "biosphere reserve option." Perhaps CCA or UNEP or IUCN or ECNAMP will take up the tasks previously outlined by the 1983 biosphere reserve workshop at Caneel Bay and assigned to CCA.)

V. LESSONS LEARNED

A. Over the years, we have heard frequent advice given about the need to wait and see how the Virgin Islands model works. This has been one of the arguments of those who perceive the concept as being too sophisticated or premature for the region. This is a mistake because the St. John biosphere reserve "model," even in its less complex, early stages of development, is for the most part quite inappropriate as a model for other Eastern Caribbean islands, many of which are on the opposite end of the development spectrum. The Virgin Islands case is too much a hybrid, too specialized a model with a favorable background history of high levels of a special blend of tourism and with three decades of prior USNPS involvement on St. John. It is not irrelevant that the Caneel Bay resort, which is a kind of National Park in-holding, several years ago was the number two hotel in the entire United States for annual earnings per room at US\$130,000. It is very relevant that the local Virgin Islands Government, despite (because of?) the demonstration effect of VINP resource management initiatives on St. John, has no proven interest in or commitment to an equivalent, small scale territorial park system, at least for the two larger, main islands of St. Croix and St. Thomas.

There are, nonetheless, useful things to be learned from the Virgin Islands experience which offers an ideal setting for experimental manipulation under different levels of development and protection, differing kinds of leadership (individual and institutional), employing alternative participatory formats, and attempting to deal with shorter vs. longer term goals (with monitoring for example). The focus, however, should not be on the model but on extracting lessons learned from its various initiatives, procedures, and techniques about monitoring, carrying capacity, resource assessment, mapping and on the management of trash, people, sediments, cruise ships, and mountains of data. Embedded in the model one can find preliminary guidelines, for example, on charter boat anchorage control techniques, on research collecting permits, on damaged dry forest and coral reef ecosystem

recovery and restoration techniques, clues on salt pond eutrophication reversal, on herbarium management, and on visitor impact assessment and mitigation.

B. We observe a tendency, when looking at previous responses to the 1984 Gregg/USNPS idea about a regional, multi-island, international biosphere reserve, to discard the entire idea as impractical in the face of Eastern Caribbean "irreconcilable differences." However, others have noted that St. John is, theoretically speaking, suitably located for pairing with the ecologically and demographically dissimilar, flat, barrier-like coralline island of Anegada in the British Virgin Islands, forming together the nucleus of a possible future international, transboundary, non-contiguous, biosphere reserve (see A. Putney Case Study, Table, page 3 for a listing of Anegada as a potential Eastern Caribbean site). Biosphere reserves may be like shoes -- one puts them on one at a time. We see no reason to defer discussion of this concept until the USVI model is more mature.

C. Conceptual Problems. There is an interesting analogy between "parks" and "islands" -- both are often incorrectly seen as closed systems when in fact they are very open systems and becoming more so every day under the impact of modern technologies. In effect, as a result of human intrusions, with engineering works and pollutants for example, some aspect of systems boundaries are being redefined and rendered more diffuse, selectively diminishing many self-equilibrating, self-regulating natural processes and phenomena. But this raises questions about the appropriateness and utility of traditional conservation methods and park management practices. We raise the question here because terrestrial and marine environments in the Lesser Antilles are virtually all modified landscapes. There are no pristine originals, and the so-called core zone on an island, wet or dry, presents a dilemma to the manager.

In this regard, Alston Chase has drawn our attention to a pertinent statement by G.K. Chesterton who said, "All conservatism is based upon the idea that if you leave things alone, you leave them as they are. But you do not. If you leave a thing alone, you leave it to a torrent of change." ... islands come to mind.

Part of our problem is that resource managers often lack vision and nerve -- both vital to leadership. A second part of the problem lies in the failure of these contemporary environmentalists to define the locus, role and limits of mankind's place in nature, not just as a passive observer but as active resource users and participants. Resource managers, therefore, need to become less guardians and more active, informed, manipulative stewards of various types of protected landscapes. And to do this, management and especially restoration strategies need to be objectively grounded in both historical and ecological research, hence the current emphasis in the VIBR on marshaling accessible information for improved management. It is especially important in island park and protected area management planning to avoid the illusion or assumption that the ecosystem is more or less intact and self-sustaining, and one should let nature take its course.

Our problem is that in the island context, we do not have an intact ecosystem or one immune to modern, external forces and interventions. Nostalgia and wishful thinking are no substitute for science or for a hands-on strategy of constructive intervention.

We are encouraged by the new kinds of visiting investigators appearing these days on St. John's doorstep inquiring as to how they can help. One group even came with a US\$50,000 MAB research grant. What seems most promising in this regard are the emerging disciplines of "restoration ecology" and "conservation biology." Taken together, these offer the promise of providing improved guidelines for the management of landscape areas where culture and nature are not just juxtaposed but inseparably interdependent. The Virgin Islands Biosphere Reserve is by design slanting some of its research initiatives in this direction. It is time we understood that to restore is to develop and that in areas of damaged landscapes truly sustainable development requires ecosystem restoration.

Fortunately, the biosphere reserve framework, which we are experimenting with and learning how to use, forces us to expand our geographical, conceptual and disciplinary boundaries. It forces us to focus more on mechanisms of intervention and constructive management for sustainable use, not just for the National Park but the entire insular system of St. John and its surrounding marine environment -- in other words, the biosphere reserve. It also forces us to perceive St. John as an important part of an Eastern Caribbean archipelagic system of dynamic change -- systemic, institutional, demographic -- already linked in a vaguely defined, Lesser Antillean cluster or network, still lacking a name. That is the network we need to understand. This is the network for which we sorely need a systems gains and losses audit, an accounting, a balance sheet. In fact, the biosphere reserve framework could be seen as analogous to a spread sheet, where we can explore the art of the possible regarding the management of change in the man-landscape, man and the biosphere calculus of human ecology. It is a promising endeavor.

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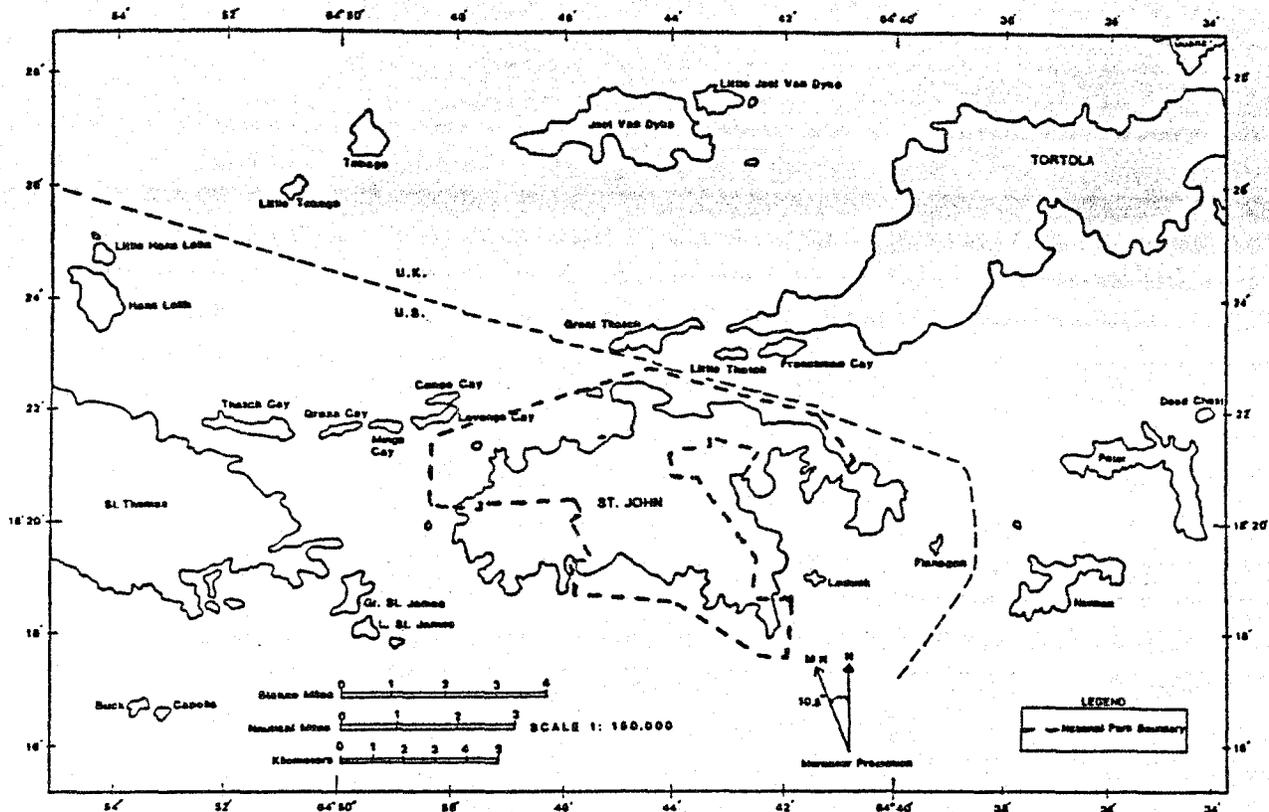
BASELINE STUDIES COMPLETED

After nearly five years of continuous effort involving more than a dozen institutions and over fifty researchers, graduate students, interns, and peer reviewers, the U.S. National Park Service and the Island Resources Foundation have completed an unprecedented research program directed at coastal and marine resources management and centered on the Virgin Islands Biosphere Reserve. The story of this initiative and how it has helped further the biosphere concept in the Lesser Antilles is summarized below.

In 1983, resource planners, managers, and scientists from 13 Caribbean islands met in the U.S. Virgin Islands to discuss the role of biosphere reserves and other protected areas in the sustainable development of the Lesser Antilles. The meeting also served as the forum to dedicate the Virgin Islands National Park as a Biosphere Reserve (Virgin Islands Biosphere Reserve - VIBR). For most participants, the conference was their first encounter with biosphere reserves and their potential benefits for the people of small tropical islands. For most, it was also their first contact with UNESCO's Man and the Biosphere Program (MAB), in which 114 nations are now participating.

The International Network of Biosphere Reserves is a cornerstone of the MAB program. One emphasis of the network is developing and sharing information, locally, regionally, and internationally. The biosphere reserve "model" calls for the establishment of one or more natural areas where a region's characteristic ecosystems may be studied as free as possible from human disturbance -- a baseline against which to assess the effects of human uses occurring in other parts of the biosphere reserve or nearby regions. The biosphere reserve concept also includes experimental research and demonstration areas where scientists, resource managers, and local people work together to manage economic uses and activities which are culturally, ecologically, and institutionally appropriate.

THE VIRGIN ISLANDS NATIONAL PARK AND BIOSPHERE RESERVE



As the Eastern Caribbean region lacked a good working model of a biosphere reserve, the participants in the St. John workshop were interested in seeing whether one could be developed as a basis for evaluating the benefits of such an approach. With this challenge in mind, the Virgin Islands Resource Management Cooperative or VIRMC (see below), with substantial support from the U.S. National Park Service, began a multi-year research program to lay the foundation for a biosphere reserve program in the Virgin Islands. The Virgin Island National Park served as the hub for the research since it encompasses over half of the island of St. John and is the only designated biosphere reserve in the Lesser Antilles.

It was recognized from the start that a working model of a reserve would depend upon the cooperation of the Virgin Islands National Park, its neighbors and resource users, the region's community of scientists and managers, and at least some measure of technical assistance from outside the region. A unique institutional mechanism was created to enable this cooperation -- the "Virgin Islands Resource Management Cooperative" which provided the means to marshall the technical capabilities of more than a dozen agencies and organizations in the U.S. and British Virgin Islands and Puerto Rico concerned with conservation, research, and economic development in the region.

Over a period of five years, 31 separate projects were undertaken on aspects directly related to the coastal and marine ecosystems and sustainable use of the VIBR such as recreational boating and artisanal fisheries. Several organizations provided direct in-kind support to the initiative including the University of the Virgin Islands, University of Puerto Rico, Eastern Caribbean Natural Area Management Program, Virgin Islands Division of Fish and Wildlife, the New York Botanical Gardens, the U.S. Forest Service, the U.S. MAB Project Directorate on Biosphere Reserves, the West Indies Laboratory, Yale University, and Island Resources Foundation. Dr. Caroline Rogers, research biologist of the V.I. National Park, served as the executive officer of VIRMC, and Island Resources Foundation was the program manager.

The final report in the VIRMC technical report series, "Marine and Terrestrial Ecosystems of the Virgin Islands National Park and Biosphere Reserve" (see Rogers and Teytaud, 1988 in RE: Sources) is the 29th volume in the series. This report synthesizes the research results and summarizes the major lessons learned for future management of the coastal and marine ecosystems of the Biosphere Reserve. Major assistance in publishing all VIRMC reports was provided by the Southeast Regional Office of the U.S. National Park Service.

For more information on the availability of these reports, please write to the Island Resources Foundation, Red Hook Box 33, St. Thomas, US Virgin Islands, 00802.

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THE MARINE CONNECTION

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