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Cover Photo:

Establishing long-term monitoring sites on the St. John Reef in the U.S. Virgin Islands National Park is the task of the scuba diver on the cover.

Research and Resource Management Program at Virgin Islands National Park/Biosphere Reserve

By Caroline Rogers and Vonnice S. Zullo

The Research/Resource Management Program in Virgin Island National Park focuses on watershed management and Biosphere Reserve activities. Most of the projects are being carried out under the Virgin Island Resource Management Cooperative (VIRMC), a cooperative venture in research and resource management which began in 1982. The Cooperative consists of the National Park Service and 13 other members, including territorial and federal government agencies, private research and educational institutions based in the U.S. Virgin Islands, British Virgin Islands and Puerto Rico. This Cooperative attempts to bring together local expertise to work towards the solution of resource management problems.

Projects conducted in 1984 emphasized gathering of baseline information on the major benthic communities in the waters off St. John and Buck Island Reef National Monument. Maps were produced, along with qualitative descriptions of the coral reefs, sea grass beds, mangroves and algal plains; collections were made of the common species in these communities. Fish and shellfish populations were studied through visual censuses and analysis of landing statistics from local fishermen. A long-term monitoring program was established to assess the extent of damage attributable to anchoring in seagrass beds.

Several ongoing projects involve an interdisciplinary approach to watershed management in three bays off St. John. In the last five years, runoff into the marine environment during periods of heavy rainfall appears to have increased substantially because of careless development on St. John. In some cases, the development causes significant losses of upland vegetation and the increased runoff can accelerate beach erosion, resulting in degradation of associated reef systems.

This year, biologists, botanists, geologists, resource managers, and historians are working together to develop an overview of the interaction of terrestrial and marine ecosystems, specifically the past and present impact of land clearing on nearshore marine ecosystems in Reef Bay, Fish Bay, and Hawksnest Bay. These bays are subject to different degrees of development. Reef and Fish Bays are both on the south shore of St. John. Reef Bay is within Virgin Islands NP and not subject to any development pressure. Construction of roads and houses in the Fish Bay watershed are threatening coral reefs and other marine ecosystems inside the park boundary. A new clinic was built on the steep slopes above Hawksnest Bay, on the north shore of St. John, creating the possibility of accelerated runoff and possible detrimental consequences for the reefs and seagrass beds in the bay.

Research Biologist Caroline Rogers and Biological Technician **Vonnice Zullo** are gathering quantitative baseline data on the reefs in these three bays and establishing permanent study sites as part of a long-term monitoring program. Using a variety of different methods, they are quantifying the amount of living coral cover on several reef zones. Long-time residents of St. John believe the islands reefs are deteriorating, but the lack of prior quantitative baseline data makes it difficult to be certain.

Rafe Boulon, from the local Division of Fish and Wildlife, is studying the fish, lobsters, and conchs within the three bays. His objective is to develop suitable management strategies after determining the population trends for these fisheries resources.

Dr. Dennis Hubbard, a geologist from the West Indies Laboratory on St. Croix, is studying the past and present effects of terrigenous runoff on the coral reefs. His study includes analysis of coral growth rings to determine if there is evidence of decreased growth rates that correlate with periods of land clearing and increased erosion when the island was cleared for sugar cane and cotton production.

George Tyson, a historian from St. Thomas, is studying the patterns of land use in the three selected watersheds from the 1700s to the present. Most of the vegetation on St. John has been influenced by man. Numerous old plantation ruins and elaborate mountainside terracing attest to this fact. In the 18th century, European planters and African laborers operated a large plantation system geared to the production of sugar and cotton. After 1850, the plantation system died out and there was a period of small scale, diversified agriculture, forestry and fishing.

From 1950 to the present, accelerated economic growth and immigration has occurred, together with intensification of pressure on land and marine resources of the Virgin Islands NP, established in 1956. His study will help to determine the impact of human manipulation (e.g., clearing of land for cultivation, charcoal production, raising of livestock) on the natural vegetation and soils of the island.

John Matuszak from the College of the Virgin Islands Cooperative Extension Service is working with scientists from the New York Botanical Garden to establish permanent plots, measuring from 0.5-1.0 hectare, in the forests of Hawksnest, Reef and Fish Bays of St. John for long-term monitoring study of succession of natural and introduced vegetation. Species identification and standard forestry measurements of dbh and height are recorded for trees greater than 5 cm dbh. It is important to note that the vegetation of St. John within Virgin Island NP is unique in that there are no similar protected areas elsewhere in the Caribbean - no other areas where forests have been allowed to recover after extensive clearing.

The feral donkeys that roam over St. John may have a significant impact on the island's vegetation, altering normal successional patterns. Rebecca Rud-

man, a graduate student at Cornell University, is working with Dr. Dave Nellis from the local Division of Fish and Wildlife to determine the feeding habits of the donkeys and to make recommendations for feral donkey management on the island.

Virgin Islands NP was designated a Biosphere Reserve in 1976, with a formal dedication in 1983. Unlike Biosphere Reserves in the continental United States, the Virgin Island Biosphere Reserve is in a region with mostly developing countries. Biosphere Reserve activities are being formulated with the goal of increasing public awareness of resource management issues. To be effective a Biosphere Reserve should serve as a center of training and education and should integrate local people into all phases of management.

One of this year's projects is the preparation of a report which will outline the major concepts necessary to manage and develop a Biosphere Reserve on St. John. Principal Investigator Allen Putney from the Eastern Caribbean Natural Area Management Program will base his report on information obtained through workshops and informal discussions with St. John residents and Virgin Islands NP employees. Useful information on such issues as the conflicts among the different groups of people who use the natural resources within the park will be valuable in forming Virgin Islands Biosphere Reserve management guidelines.

A videotape on the Virgin Islands Biosphere Reserve prepared by Island Resources Foundation is near completion. The film is based on a Biosphere Reserve workshop in May 1983, when people from many Caribbean islands met to discuss the role of Biosphere Reserves in the conservation of terrestrial and marine resources. The tape will be widely distributed for viewing throughout the Caribbean.

Local residents are involved in current projects within Virgin Islands Biosphere Reserve. Presentation of the goals and results of these projects will take place through the Virgin Islands NP Environmental Studies Program with the local school system and through a series of seminars to be held after completion of the Virgin Islands Biosphere Reserve Resource Management Station conference building later this year.

Rogers is Research Biologist and Zullo is a Biological Technician at Virgin Islands NP.



Virgin Islands National Park is seen here with the British Virgin Islands in the background.