

A STRATEGY FOR MANAGEMENT OF GHUTS IN THE U.S. VIRGIN ISLANDS



Mahogany Gut, St. Croix, January 2007
Photograph courtesy of William Coles

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This report is not meant to dictate to any public agency what should constitute natural resources management programming in the U.S. Virgin Islands. However, as it encapsulates the current state of knowledge about an important resource, it presents a point of departure for development of a ghut management program in the U.S. Virgin Islands.

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TABLE OF CONTENTS

	<i>Page No:</i>
Acknowledgements	1
List of Acronyms	3
1. Introduction	4
2. Purpose and Scope of the Management Strategy	5
3. Current Status of Ghuts in the U.S. Virgin Islands	7
4. Management Strategies	14
References	20
Glossary of Terms	21
Appendix 1: Persons and Institutions Consulted	22
Appendix 2: Ghuts of Interest	23

LIST OF ACRONYMS

CBCC	Coral Bay Community Council
CDC	Conservation Data Center
CES	Cooperative Extension Service
CMES	Center for Marine and Environmental Studies
DFW	Division of Fish and Wildlife
DPNR	Department of Planning and Natural Resources
DPW	Department of Public Works
NPS	National Parks Service
USDA	United States Department of Agriculture
USVI	United States Virgin Islands
UVI	University of the Virgin Islands
VIDA	Virgin Islands Department of Agriculture
VIRC&D	Virgin Islands Resource Conservation and Development Council, Inc
VIWMA	Virgin Islands Waste Management Authority
WRRI	Water Resources Research Institute

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1. INTRODUCTION

Watercourses are some of the most diverse habitats in the U.S. Virgin Islands, containing distinct forest types (Gallery Moist Forest and Gallery Shrubland), as well as one of the two types of freshwater habitats in the Territory. In addition to the ecological functions of these watercourses, or ghuts as they are commonly called, they provide one of the sources of freshwater for agricultural purposes, and they have a demonstrated role in recharge of groundwater. Ghuts also provide a range of goods and services, including recreational and educational opportunities to individuals, community groups, and institutions.

Based on the geology of the islands forming the U.S. Virgin Islands (USVI), the terrain is characterized by ridges and ghuts, and most of the slopes are greater than 30 percent in gradient. St. Croix, with a comparatively large flat area to the south of the island, is the only exception to this characteristic landscape. Ghuts therefore play a critical role in the development process by defining drainage patterns over even small areas. Additionally, sediment and other pollutants emanating from development activities are rapidly transported in surface runoff from the watersheds to the nearshore marine environment.

A recognition of the value of ghuts as a resource, the ease with which ghuts are impacted by human activities, and the ability of ghuts to rapidly transport pollutants to the marine environment resulted in the promulgation of legislation to protect ghuts.

Unfortunately, despite the continuing use of ghuts for water supply and recreation, and despite the fact that ghuts are protected by law, there is no program that focuses directly on the protection or management of this particular resource. In fact, the treatment of ghuts in the development control process is not inherently to protect the resource, and in some cases, activities approved in the development control process may result in degradation of ghuts. The inadequacy of program focus and program integration across the relevant regulatory agencies is exacerbated by inadequate enforcement of the relevant laws, even when communities have expressed concerns regarding the impact of specific development activities on ghuts.

The project from which this report is generated, titled "Revitalization of Guts as Urban Recreational Spaces in the U.S. Virgin Islands", was designed to review the state of knowledge regarding ghuts in the USVI and to design a framework within which a ghut management program can be established by the relevant natural resource management agencies and research institutions in the U.S. Virgin Islands.

It is anticipated that this management strategy will be adopted by the relevant agencies of the Government of the U.S. Virgin Islands, and that concerned institutions and community groups will collaborate in the implementation of the strategy.

2. PURPOSE AND SCOPE OF THE MANAGEMENT STRATEGY

The review of the state of knowledge of ghuts in the U.S. Virgin Islands (Gardner, Henry, & Thomas, 2008) confirms that ghuts are unique ecosystems that provide a range of goods and services, but which face significant threats. While there are a number of programs that have significant impact on ghuts and ghut resources, there is currently no program that specifically addresses conservation of ghut resources.

The primary objective of this Ghut Management Strategy is to integrate ghut conservation considerations into the resource management and development control programs of the relevant agencies of the Government of the U.S. Virgin Islands.

The scope of the Strategy is determined by several factors, including; (i) the range of agencies with legal mandates relevant to ghuts; (ii) the inadequacy of current human and financial resources for undertaking new programs; and (iii) the low probability of obtaining additional resources for a new program focus. Given those considerations, the management strategy advocates the following features:

- (a) **No new separate program** – The lack of focus on ghuts in the current programming, coupled with the afore-mentioned resource scarcity, makes it unlikely that resource managers in the various agencies will embrace an initiative aimed at broadening their programmatic focus, spreading their resources, requiring significant re-alignment of priorities, and requiring the design of new interventions. The Ghut Management Strategy therefore focuses primarily on potential actions within existing programs.
- (b) **Insertion of ghut management initiatives into existing programs** – The mandates of the regulatory agencies include provisions for a range of initiatives that should increase focus on ghuts. For example, a comprehensive non-point source pollution program should include some attention being given to the watercourses that transport pollutants from the watersheds to the coastal environment. A second example is the need to address issues of drainage in the approval of development applications. As stated above, a serious treatment of drainage issues cannot be properly undertaken without adequate attention to watercourses. For some programs, the intervention may require some program design features. One example is the gap in the 2005 wildlife conservation strategy for the U.S. Virgin Islands (Division of Fish and Wildlife, 2005). The report acknowledges the importance of wetlands, in its focus on ecosystem conservation, but makes no provision for action concerning ghuts. Where programs relevant to ghut management currently exist, there is often inconsistency in the assessment process and inadequate enforcement of protection measures. An area of concern in this regard is the handling of the storm-water management permitting component of the development control process.
- (c) **Inclusion of Civil Society Organizations** – A number of civil society organizations (e.g. Virgin Islands Resources Conservation and Development Council) have launched programs specifically in support of ghut restoration and community use. Their continuing efforts in that regard should receive the support of the relevant agencies. Both public and civil society sectors should explore opportunities for greater collaborative

arrangements in the areas of project development and implementation, surveillance, and resource monitoring. Where possible, such groups may be able to assume leadership roles for interventions in specific ghuts (e.g. Virgin Islands Resources Conservation and Development Council for the Estate Adventure Trail in St. Croix). Due to the fact that ghuts traverse both public and privately-owned properties, landowners should be encouraged to participate in the program. While the inclusion of civil society and landowners may add a level of complexity to the current programming efforts of the public agencies, current public policy directions encourage such collaborative efforts, and the relevant agencies have varying levels of experience in designing and coordinating such efforts.

- (d) **Development of new institutional arrangements** – The various agencies with mandates and programs relevant to ghuts rarely share pertinent information, and program integration has never been attempted. However, given the potential conflicts, overlaps, and resource shortage, effective program delivery demands the establishment of collaborative arrangements. Such arrangements should address data collection and management, information sharing, program design and delivery, and reporting. An institutional coordinating mechanism must also be developed to provide support for the afore-mentioned collaborative arrangements.
- (e) **Establishment of management-focused research interventions** – The Division of Fish and Wildlife does not have a program focused on terrestrial or freshwater invertebrates, and indicated that the Division’s work on wildlife populations is “... *constrained by a lack of expertise ...*” and that the Division will rely on the research and advice of external experts (Division of Fish and Wildlife, 2005, page 70). The management institutions and partner institutions should, to the greatest extent possible, design research projects to provide information needed for management decision making.
- (f) **Improved enforcement** – Given the severity, frequency, and widespread nature of the anthropogenic threats to ghuts, enforcement is clearly inadequate. Enforcement by the regulatory agencies could incorporate surveillance systems supported by the communities.

This Ghut Management Strategy has been reviewed by a number of public and civil society organizations, through both a public participatory mechanism and a formal review process. The individuals and institutions that participated in the review process are shown by Appendix 1.

3. CURRENT STATUS OF GHUTS IN THE U.S. VIRGIN ISLANDS

Information concerning the current status of ghuts in the U.S. Virgin Islands (USVI) was compiled over a period of four months (December 2007-March 2008). This limitation resulted in an incomplete picture of ghuts being generated, and is one of the issues to be addressed by establishment of monitoring and reporting systems relevant to ghut management.

Legal Framework¹

Ghuts are afforded legal protection by several sections of the Virgin Islands Code, namely:

- Title 7, Chapter 3 – Soil Conservation (administered by the V.I. Department of Agriculture);
- Title 12, Chapter 1 – Wildlife (administered by the Department of Planning and Natural Resources);
- Title 12, Chapter 3 – Vegetation Adjacent to Watercourses (administered by the V.I. Department of Agriculture);
- Title 12, Chapter 5 – Water Resources Conservation (administered by the Department of Planning and Natural Resources);
- Title 12, Chapter 7 – Water Pollution Control (administered by the Department of Planning and Natural Resources);
- Title 12, Chapter 9A – Commercial Fishing (administered by the Department of Planning and Natural Resources); and
- Title 12, Chapter 13 – Environmental Protection (administered by the Department of Planning and Natural Resources).

Additionally, subsidiary legislation, such as the Water Quality Standards for the U.S. Virgin Islands (2004) and the Territorial Pollutant Discharge Elimination System Rules and Regulations (2007), provide specific rules that have implications for ghut management.

Institutional Framework

A number of government agencies have mandates and programs that are specific to ghuts (e.g. cleaning of ghuts by the Department of Public Works), some initiatives are relevant in the larger context of development planning (e.g. storm water management on sites undergoing development, by Division of Environmental Protection), and some initiatives are included as provision of social services (e.g. waste management, by V.I. Waste Management Authority). A number of civil society organizations have also established programs relevant to ghuts, either for conservation reasons (e.g. University of the Virgin Islands) or for recreational purposes (e.g. Environmental Association of St. Thomas).

The institutions with programs of relevance to ghuts are:

¹ The details of the relevant sections, and their implication for ghut management, are provided in the companion report, “Watercourses as Landscapes in the U.S. Virgin Islands: State of Knowledge”.

- (a) Department of Planning and Natural Resources (DPNR) – The divisions within DPNR have a mixture of development control and resource management programs relevant to ghuts:
- (i) The Divisions of Comprehensive and Coastal Zone Planning, Coastal Zone Management, Building Permits, Environmental Protection, and Fish and Wildlife all review storm-water management plans as part of the development control process. With the passage of the Territorial Pollutant Discharge Elimination System Rules and Regulations (2007), the DPNR divisions are considering delegating assessment of storm-water management plans to the Division of Environmental Protection. Unfortunately, the assessment process does not currently include a detailed protocol that provides differential status to ghuts based on ecological criteria or on the goods and services they provide.
 - (ii) The Division of Archeology and Historic Preservation/Virgin Islands State Historic Preservation Office currently has no program specific to ghuts. However, the Office maintains records of studies done on the historic features of ghuts, such as the Savan Gut.
 - (iii) A focus on ghuts is proposed in the Draft Wetland Conservation Plan for St. Thomas and St. John (Platenberg, 2006), which includes a number of recommended conservation actions. However, the Division of Fish and Wildlife currently conducts periodic monitoring of ghut fauna.
- (b) V.I. Department of Agriculture (VIDA) – The VIDA is responsible for soil conservation practices and (based on the V.I. Code) maintaining buffer zones along ghuts. The V.I. Resource Conservation District, which advises the U.S. Department of Agriculture (USDA) on its USVI conservation plans, is also supported by the V.I. Government through the VIDA.
- (c) Department of Public Works (DPW) – The DPW has a program to clear ghuts, which includes bushing² the sides of the ghuts and removal of solid waste from the ghuts (particularly in the areas where the ghuts are channelized and there is the potential for flooding).
- (d) V.I. Waste Management Authority (VIWMA) – VIWMA has no responsibility for management of ghuts. However, their programs impact on ghuts through the (direct and accidental) disposal of sewage effluent to ghuts and the addition of solid waste as a result of spillage from the collection points (which are often adjacent to ghuts).
- (e) University of the Virgin Islands (UVI) – UVI does not have any management responsibility for ghuts, but several of its departments promote ghuts as environmental resources to be conserved, and staff periodically conduct research on ghuts:
- (i) The Cooperative Extension Service (CES) provides outreach in a number of areas of community endeavor, but the ones relevant to ghuts are agriculture and natural resource management;

² Bushing involves the cutting of “bush” in an area (see Glossary).

- (ii) Faculty attached to the Center for Marine and Environmental Studies (CMES) periodically conduct research on ghat wildlife and water quality. That information is used primarily for teaching purposes;
 - (iii) The Water Resources Research Institute (WRRI) supports research on ghats and streams on a routine basis.
- (f) U.S. Department of Agriculture (USDA) – The USDA has no management responsibility for ghats in the USVI. However, the Conservation Plans developed by the Natural Resources Conservation Service are supposed to address erosion and sedimentation issues, and therefore stream protection. The USDA also provides technical and administrative support to the Virgin Islands Resource Conservation and Development Council.
- (g) Virgin Islands Resource Conservation and Development Council, Inc (VIRC&D) – VIRC&D is a non-profit, non-governmental organization focused on conservation of natural and cultural resources. The organization has undertaken projects for the rehabilitation of ghats.
- (h) St. Croix Hiking Association – This organization does not manage any program that affects ghats. Rather, the organization organizes hikes, some of which traverse ghats.
- (i) Environmental Association of St. Thomas (EAST) – EAST, as its name suggests, is an environmental non-governmental organization. In addition to its advocacy role concerning general environmental issues, EAST organizes periodic hikes of ghats on St. Thomas.
- (j) The National Parks Service (NPS) – The NPS has management responsibility for the lands and waters within the boundaries of the national parks and national monuments in the USVI. Some hiking trails promoted by the various management units (e.g. Reef Bay Trail, St. John) are located within ghats. Other issues relevant to ghats that are of interest to the NPS include the potential damage to resources and infrastructure resulting from development activities close to the upper portions of some ghats.
- (k) Coral Bay Community Council (CBCC) – The CBCC is a community-based, non-governmental organization focused on sustainable land practices and development issues within the Coral Bay area of St. John. The organization is a major advocate of proper watershed management, and therefore has an interest in issues concerned with drainage and ghats. The CBCC received a \$300,000.00 grant from the U.S. Environmental Protection Agency in 2008 to support implementation of the Coral Bay Watershed Management Plan during Fiscal Years 2009 and 2010.

With the exception of the two Departments of Agriculture, there is no structured linkage between the programs of the various institutions.

Goods and Services Provided by Ghuts

Ghuts in the U.S. Virgin Islands (USVI) provide a range of goods and services due to their unique characteristics. Those goods and services supported the development of the USVI in the past, and the contribution from this resource continues. Alternately, misuse of ghuts has generated threats to the development process in the USVI.

Goods and services provided by ghuts in the USVI include:

- (a) **Landscape Value** – The predominantly mountainous nature of the islands in the USVI chain creates a landscape that is defined and dominated by ghuts. This particular terrain influences the design and placement of structures, and the ghuts support specific forest types, both generating an overall characteristic landscape that has great scenic value when viewed either from a distance or from within the ghut itself.
- (b) **Ecological Value** – A number of studies on ghuts on the three main islands confirm that ghuts provide habitats for a range of plants and animals, including some rare and endangered species. Ghuts form the most extensive network of freshwater habitats in the USVI, and are extremely important for several aquatic species that spend part of their life cycle in freshwater and part in the marine environment. In addition to their habitat value, ghuts form corridors that facilitate the movement of wildlife species, an increasingly important benefit given the disturbance in the watersheds and the loss of lower-lying areas to development pressures.
- (c) **Provision of Water** – Streams were the main source of water for domestic purposes in the USVI in the 18th and 19th centuries, and were still used to a limited degree as late as the early 1960s. Ghuts still provide water for agricultural and recreational purposes.
- (d) **Recreation** – Recreational activities in ghuts previously included hunting, bathing, hiking, and catching fish and shrimp. Hiking is the primary recreational activity in recent years. However, residents still visit ghuts to catch fish and shrimp.
- (e) **Education** – Ghuts are increasingly being used as a living laboratory to teach science in the elementary and junior high schools, particularly on St. Croix. Ghuts are also used to support environmental education for youngsters and adults, and programs such as the Natures Environmental Role Model program established by the environmental club of Central High School (St. Croix) indicate an evolution towards more structure for such programs.
- (f) **Research and Teaching** – Faculty and students at the University of the Virgin Islands (UVI), as well as visiting researchers, periodically conduct research on water quality or wildlife in ghuts. Such research is used in teaching at UVI, in supporting professionals in obtaining postgraduate degrees, and adds to the body of knowledge concerning the USVI environment.

- (g) **Cultural and Historical Resources** – Ghuts and streams have shaped the development of the U.S. Virgin Islands (USVI) through their impacts on settlement patterns, provision of water for domestic purposes, provision of water for economic and industrial processes, and as spaces for social discourse. A number of ghuts contain historical resources, and those resources represent links to our pre-Columbian and colonial past.

The value of ghuts to the USVI community is one topic discussed with residents and resource management staff during this project. There seems to be general agreement that, in addition to the current benefits, the contribution of ghuts to the development of the USVI can be increased, primarily in the areas of tourism (eco-tourism and heritage tourism), groundwater recharge, water for agriculture, and community gardens (agriculture).

The challenge is to determine levels of investment that are financially feasible, and to establish a management regime that is sensitive and responsive to both development and conservation goals.

Major Issues of Relevance to Ghuts

The major issue of relevance to ghuts in the USVI is the existence of a range of threats from anthropogenic and natural forces. Threats to ghuts and associated resources include:

- (a) **Development Impacts:**
- (i) **Changed Drainage Patterns** – The construction of residences, commercial buildings, and public buildings (e.g. churches) result in changes in the drainage patterns, starting from high up in the watersheds. Such constantly-changing drainage patterns create problems for storm-water management by public agencies, result in flooding of private property and roadways, and damage to infrastructure. This problem brings into question the validity of the drainage maps currently used to assess storm-water management designs in the development control process.
 - (ii) **Sedimentation of Waterways** – The 1998 Unified Watersheds Assessment Report (Department of Planning and Natural Resources, 1998) states that sediment is the primary non-point source pollutant causing impairment of the waters of the USVI.
 - (iii) **Waste Disposal** – Debris and other wastes (e.g. concrete) from construction sites are occasionally dumped into ghuts. In the case of soil, that results in major sedimentation problems in the ghuts and nearshore marine environment.
 - (iv) **Loss of Rare Plant Species** – Rare plant species are often found in ghuts, and some of those locations have been subjected to development pressures. Neither the frequency of occurrence of such rare species nor the extent of damage from development activities is known, so the significance of the problem has not been determined. However, any loss of rare species is deemed a significant loss from a biodiversity perspective.

- (b) **Pollution:**
- (i) **Solid Waste** – Solid waste deposited into ghuts include household garbage and furniture, tyres, and accidental spillage from the solid waste collection skips. This results in a reduction in amenity value of areas, blocked drains, and health concerns.
 - (ii) **Agricultural Waste** – Runoff from agricultural lands include sediments and organic waste. The pollutants not only pollute the ghuts, but are also transported to the coastal areas.
 - (iii) **Sewage Disposal** – Sewage is deposited directly into ghuts from two municipal sewage treatment plants on St. Thomas, from broken sewer lines, and from commercial and residential properties.
 - (iv) **Bacterial and Nutrient Contamination** – In addition to the agricultural waste and direct sewage inputs, bacterial and nutrient contamination of ghuts result from the large number of septic systems used in residential sewage treatment. The 1998 Unified Watersheds Assessment Report (Department of Planning and Natural Resources, 1998) identifies bacterial contamination as one of the two primary non-point source pollutants causing impairment of the waters of the USVI.
- (c) **Storm-water Management on Project Sites** – The current practice of changing drainage patterns on a site-by-site basis to address storm-water discharge has occasionally generated lawsuits. There is potential for more litigation as there is concern that development activities in a number of watersheds threaten environmental resources and could cause property damage downstream of such developments. The implementation of the 2007 pollution discharge regulations need to include protocols for assessment of storm-water management designs that are sensitive to the resource values of the ghuts of particular interest from environmental and development perspectives (Appendix 2).

Other major issues of relevance include:

- (a) **Inadequate Policy Framework** – The current legislation offers some level of protection of ghut resources, primarily in the area of pollution prevention. However, the policy statements contained in the V.I. Code have not, for the most part, been translated into a cohesive policy framework that includes any specific reference to ghut management. This inadequate policy framework has resulted in gaps in programming and poor enforcement.
- (b) **Inadequate Enforcement** – Inadequate enforcement encourages wrongdoing, and allows small infractions to escalate into major impacts when not corrected. With regards to ghuts, part of the problem with enforcement appears to be lack of clarity of the jurisdiction of the relevant agencies, even within the Department of Planning and Natural Resources.

- (c) **Inadequate Monitoring and Data Management** – As articulated in the companion report³, there are a number of gaps in the current knowledge concerning ghuts in the U.S. Virgin Islands. These gaps relate to information on (i) wildlife species, (ii) recreational use patterns, (iii) location and status of historical and cultural resources, (iv) water quality in ghuts, and (v) relevant programs and initiatives underway or planned by the various USVI and Federal agencies. There is a need for improved data management, not only in the compilation of ghut-related data, but also in terms of information sharing and decision making by the regulatory agencies.

Emerging issues concerning ghuts include:

- (a) **Future Demand for Ghut Resources** – The potential of ghuts to support a wider range of community uses and generate higher levels of benefits has been identified. Considering the current level of degradation of ghut resources, any widespread use of ghuts will require the establishment of a management plan for each site.
- (b) **Community Perception of Value** – During this project, many of the residents that offered comments on the importance of ghuts also displayed some level of nostalgia for the times they spent (during their early years) in recreational pursuits in ghuts⁴. Yet this “importance” has not been “quantified”, qualified, or articulated. The lack of any “agreement” on the importance of ghuts is best demonstrated during the development control process, where community and environmental groups sometimes have widely different positions on those resources. A second demonstration of this absence of consensus is the perceived non-responsiveness of the regulatory agencies when community groups request some form of action from said agencies to address threats to ghut resources from development activities.

³ Gardner, Lloyd, Stevie Henry, and Toni Thomas. 2008. *Watercourses as Landscapes in the U.S. Virgin Islands: State of Knowledge*. Water Resources Research Institute, University of the Virgin Islands. October 2008.

⁴ Persons that shared these fond memories were generally older than 40 years old.

4. MANAGEMENT STRATEGIES

A conceptual framework for designing a management strategy is usually a desirable construct, and several are applicable to this ghut management strategy. “Island Peak to Coral Reef”, the title of a 2005 publication by Thomas and Devine, typifies the approach to management of island ecosystems, particularly those that are small and mountainous in nature. Within the Wider Caribbean Region, the “Ridge to Reef” concept forms the basis for design of mitigation measures for environmental problems in watersheds, as well as linking coastal zone environmental quality to land-use practices and management interventions in watersheds. Typically, those interventions include a mixture of policies, technologies, and design of collaborative institutional arrangements for project/program implementation.

A similar conceptual framework is offered by the White Water to Blue Water initiative, an international initiative that was created at the 2002 World Summit on Sustainable Development, and launched in the U.S.A. in 2004. The initiative includes a range of public, private, and civil society institutions working to “... *address land-based sources of marine pollution; promotes sustainable tourism, fisheries, agricultural and forestry practices; and prevents the degradation of coastal areas*”.

However, the focus on pollution prevention by such frameworks makes them somewhat restrictive for ghut management purposes, given the range of benefits provided by ghuts and associated resources. As stated above, the primary objective of this Ghut Management Strategy is to integrate ghut conservation considerations into the resource management and development control programs of the relevant agencies of the Government of the U.S. Virgin Islands. Specific objectives include the following:

- (d) Prevention of threats to ghuts, and restoration of degraded habitats where necessary.
- (e) Development of appropriate policies, programs, and legal and fiscal instruments to manage ghuts and associated resources as a critical resource base for the USVI.
- (f) Development of collaborative arrangements between public sector agencies, civil society organizations, and landowners as appropriate to ensure sustainable use of ghuts and associated resources.
- (g) Improvement in public knowledge and awareness of the historical, cultural, ecological, and economic importance of ghuts and associated resources.

Strategy 1: Consolidation of the Policy Framework for Ghuts

Background:

The ghuts in the USVI form an important resource that is afforded protection in law. The current legal framework requires several agencies to conduct a range of initiatives to protect ghuts, even enhancing such resources as necessary. However, there are serious gaps in the management framework, as some of the relevant agencies have no program dealing with ghuts, while

programs relevant to ghuts are actually focused on other resources or issues (e.g. reducing pollution of coastal waters or storm-water management on development sites).

Given the community uses of ghuts, the ecological value of ghuts, and the potential economic value, it is appropriate to develop a unified policy and management framework focused directly on ghuts.

Proposed Actions:

- (a) Adoption of the Ghut Management Strategy by the relevant agencies.
- (b) Development of a unified policy framework for ghuts.
- (c) Integration of strategies and proposed actions identified in the ghut management strategy into the programs of the relevant agencies.
- (d) Establishment of consensus on ghuts of special interest.

Strategy 2: Development of Appropriate Institutional Arrangements

Background:

The legislative framework relevant to ghuts provide mandates for a number of agencies, producing overlapping responsibilities. Yet, even with those overlaps, there are areas and instances where there is no clear jurisdictional responsibility. Given that ghuts are resource corridors that run from ridge to shoreline, interventions require collaboration among several institutions, including civil society, the private sector, and landowners.

Proposed Actions:

- (a) Establishment of an inter-agency working group to facilitate program planning, information sharing, and collaborative action in program and project design and implementation.
- (b) Development of participatory processes and associated supporting mechanisms.
- (c) Clarification of institutional roles and establishment of mechanisms for threat prevention or abatement.

Strategy 3: Ensure Sustainability of Ghut Resources

Background:

Though ghuts provide a range of goods and services to the community, the associated resources are consistently being degraded, primarily by human activities. Actions are required to prevent threats to the resource, and enhance the resources as appropriate to meet future demand for goods and services. Additionally, a structured program is required to ensure that the USVI meets territorial, national, and international conservation obligations.

Proposed Actions:

- (a) Refinement of the development control process to ensure more rigorous assessment of activities affecting ghuts.
- (b) Inclusion of ghut protection plans within sector plans as appropriate.
- (c) Development of a sustainability tool kit (to address issues of land management, appropriate technologies, site assessment protocols, best management practices, etc.).
- (d) Establishment of a comprehensive monitoring program for ghuts.
- (e) Development of enhancement projects as required.
- (f) Establishment of buffer zones for ghuts, using appropriate legal instruments to facilitate agreements with landowners.

Strategy 4: Improve Data Collection and Research to Support Improved Decision Making⁵

Background:

There is currently limited data on ghut resources to support decision making, including program design. There are concerns that the physical alterations to ghuts may have impacted negatively on the ability of some aquatic faunal species to complete their lifecycles, thus leading to the loss of some species from the USVI. There is very limited information on the water quality within ghuts, and the impact of that water quality on aquatic fauna. Similarly, though there is evidence that rare and endangered species of wildlife are occasionally found in ghuts, there is no data to confirm distribution and frequency/population status.

Proposed Actions:

- (a) Development of a data management policy and data sharing agreement.

⁵ Data management would be linked to the monitoring program in Strategy 3, Action (d).

- (b) Establishment of an environmental repository and/or database for ghut information.
- (c) Identification and prioritization of management information needs to guide research.
- (d) Design and implementation of research projects as required.

Strategy 5: Build Support for Environmental Management

Background:

The current uses and threats occasionally create conflicts between uses, users, and stakeholders. Land owners are not generally supportive of conservation actions, and the general public may not be as informed as to the benefits of ghuts. This is particularly true of the younger generation, since they do not share their parents' experiences of recreational activities in the ghuts. However, conservation of ghut resources require the support of many persons in the various sectors of the community.

Proposed Actions:

- (a) Establishment of a ghut adoption program for institutions and community groups.
- (b) Development of community livelihood projects as practicable.
- (c) Promotion of recreational and educational uses of ghuts.
- (d) Promotion of the historical and cultural value of ghuts.
- (e) Promotion of the benefits of ghuts.
- (f) Undertake periodic reporting exercises to stakeholders.
- (g) Development of interpretative materials and stations (e.g. kiosks at ghut access points, plant identification guides, and information about the history and value of ghuts).

Table 1: Institutional Role in Implementation

Strategy	Action	Lead Agency
Strategy 1: Consolidation of the Policy Framework for Ghuts	Adoption of the Ghut Management Strategy by the relevant agencies.	All agencies
	Development of a unified policy framework for ghuts.	DPNR
	Integration of strategies and proposed actions identified in the ghut management strategy into the programs of the relevant agencies.	All agencies
	Establishment of consensus on ghuts of special interest.	UVI
Strategy 2: Development of Appropriate Institutional Arrangements	Establishment of an inter-agency working group to facilitate program planning, information sharing, and collaborative action in program and project design and implementation.	DPNR and UVI-CES
	Development of participatory processes and associated supporting mechanisms.	Working Group
	Clarification of institutional roles and establishment of mechanisms for threat prevention or abatement.	Working Group
Strategy 3: Ensure Sustainability of Ghut Resources	Refinement of the development control process to ensure more rigorous assessment of activities affecting ghuts.	DPNR
	Inclusion of ghut protection plans within sector plans as appropriate.	All agencies
	Development of a sustainability tool kit.	UVI-CES
	Establishment of a comprehensive monitoring program for ghuts.	DPNR
	Development of enhancement projects as required.	All agencies
	Establishment of buffer zones for ghuts.	DPNR and VIDA
Strategy 4: Improve Data Collection and Research to Support Improved Decision Making	Development of a data management policy and data sharing agreement.	UVI-CDC
	Establishment of an environmental repository and/or database for ghut information.	UVI-CDC

Strategy	Action	Lead Agency
	Identification and prioritization of management information needs to guide research.	Working Group
	Design and implementation of research projects as required.	All agencies
Strategy 5: Build Support for Environmental Management	Establishment of a ghut adoption program for institutions and community groups.	DPNR/UVI
	Development of community livelihood projects as practicable.	Relevant agencies
	Promotion of recreational and educational uses of ghuts.	All agencies
	Promotion of the historical and cultural value of ghuts.	All agencies
	Promotion of the benefits of ghuts.	Working Group
	Undertake periodic reporting exercises to stakeholders.	All agencies
	Development of interpretative materials and stations.	DPNR-DFW

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Glossary of Terms

Bush	A common term used in the USVI (and the Caribbean) to mean (a) shrub or clump of shrubs, (b) mixture of tall grass and saplings, or (c) any combination of grasses, shrubs, and young trees that is not maintained in a manicured fashion.
Ghut	Common term for watercourse. The USVI variation of the word ghut is usually “gut”.
Riparian	Adjective used in reference to rivers and streams. Example, riparian rights (right of owner of property that is adjacent to a stream to use water from that stream).
Watercourse	<p><i>“... , a natural watercourse means any stream with a reasonable well-defined channel, and includes streams which have a permanent flow, as well as those which result from the accumulation of water after rainfall and which regularly flow through channels formed by the force of the waters.”</i></p> <p><u>Source:</u> Title 12, Chapter 3, Section 123(b) of the Virgin Islands Code (Annotated, 2006 Edition).</p>

Appendix 1: Persons and Institutions Consulted

The draft of this Ghut Management Strategy was circulated by email on Wednesday March 26, 2008 to forty eight (48) persons in the U.S. Virgin Islands that are known to have an interest in ghuts. Along with the three project team members, eleven (11) of those persons participated in the review meeting on Thursday March 27, 2008 (see Table below). The meeting focused on the scope of the program, the objectives, and the proposed management strategies.

Name of Person	Institutional Affiliation
Allegra Kean Moorehead	Department of Tourism
Jack Bremer	Environmental Association of St. Thomas
Marjorie Hendrickson-Emanuel	Division of Comprehensive & Coastal Zone Planning
Diane Prime	Division of Comprehensive & Coastal Zone Planning
Jennifer Valiulis	Division of Fish & Wildlife
Leia LaPlace	Division of Comprehensive & Coastal Zone Planning
Marcia Taylor	University of the Virgin Islands
Wayne Allick	Department of Public Works
Renata Platenberg	Division of Fish & Wildlife
Anita Nibbs	Division of Environmental Protection
Alexis Doward	Division of Building Permits
Project Team: Toni Thomas – University of the Virgin Islands Stevie Henry – University of the Virgin Islands Lloyd Gardner – Environmental Support Services, LLC	

Written comments on the draft report were submitted by:

- Jennifer Valiulis,
- Renata Platenberg, and
- Jack Bremer.

Appendix 2: Ghuts of Interest

Ghuts of Interest are those that meet any one of the following criteria:

- Ghuts with permanent pools
- Ghuts currently used for recreational purposes
- Ghuts supporting other community uses
- Ghuts containing critical habitats
- Ghuts supporting endangered species of plants or animals
- Ghuts containing significant historic, archeological, or cultural resources
- Ghuts facing significant threats – e.g. dumping from construction activities or used for sewage disposal.

St. Croix	St. John	St. Thomas
Adventure Stream	Battery Gut	Bonne Resolution (Dorothea) Gut
Bethlehem Gut	Fish Bay Gut	Caret Bay/Sorgenfri ghut
Butler Bay ghut	Guinea Gut	Contant Gut
Caledonia Gut	Johnny Horn ghut	deJongh Gut
Canaan ghut	Living (Reef Bay) Gut	Magens Bay Gut
Cane Bay ghut		Nadir Gut
Creque Gut		Neltjeberg Gut
Fountain ghut		Santa Maria Gut
Harden Gut		Savan Gut
Jolly Hill Gut		Turpentine Run
La Grange Gut		
Mahogany Gut		
River Gut		

Source: Gardner, Lloyd, Stevie Henry, and Toni Thomas. 2008. *Watercourses as Landscapes in the U.S. Virgin Islands: State of Knowledge*. Water Resources Research Institute, University of the Virgin Islands. October 2008.